REPORT OF THE FINAL PANEL

BOARD OF REGENTS SUPPORT FUND R&D PROGRAM

RESEARCH COMPETITIVENESS SUBPROGRAM

FISCAL YEAR 2018-19

March 4, 2019

Dr. Richard Vulliet
Professor, Laboratory of Veterinary Cyotherapeutics
Department of Veterinary Molecular Biosciences
University of California at Davis

William A. Hyman
Professor Emeritus of Biomedical Engineering
Department of Biomedical Engineering
Texas A & M University

Dr. Kirk Peterson
Professor, Chair
Department of Chemistry
Washington State University
BACKGROUND INFORMATION

One hundred fifty-three research proposals requesting a total of $7,778,113 in first-year funds were submitted for funding consideration in fiscal year (FY) 2018-19 to the Research Competitiveness Subprogram (RCS) of the Board of Regents Support Fund (BoRSF) R & D Program. Nine disciplines were eligible, including agricultural sciences, biological sciences I, biological sciences II, computer and information sciences, earth and environmental sciences, engineering "A" (i.e., chemical, civil, and electrical and electronics), mathematics, physics and astronomy, and social sciences.

THE REVIEW PROCESS

To conduct as thorough, objective, and expert a review as possible on such a large number of applications within the Board's monetary constraints and time frame, a two-phase review process was adopted.

Phase I: In-Depth Review by Subject-Area Panel

In Phase I of the review process the one hundred fifty-three proposals were assigned to nine subject-area panels, for funding consideration in FY 2018-19. Two biological sciences panels were used because a large number of proposals were submitted in this subject area. The biological sciences I subject-area panel reviewed proposals related (but not limited) to human biology, cell/molecular biology, virology, and immunology; biological sciences II proposals were related (but not limited) to ecology, pharmacognosy, microbiology, genetics and natural biology. Each panel was composed of two to four out-of-state professionals with broad expertise in the disciplines represented by the proposals, as well as familiarity with the goals and tenets of an EPSCoR-type program.¹ Using the criteria set forth in the FY 2018-19 R & D Request for Proposals (RFP), panel members worked individually and then collaboratively by telephone and email to decide which proposals in their subject area met all four eligibility requirements (i.e., the applicant and the proposal fit the EPSCoR mold; the proposal contained a significant research component; the proposal had the potential to make fundamental [basic] research contributions; and the research topic fit one of the nine eligible disciplines as defined in the RFP). In this phase of the review process, each subject-area panel member acted as “primary discussant” for an assigned portion of the proposals and completed an in-depth consensus critique form for each of his/her assigned proposals after discussing its relative merits and shortcomings with the other panel members. Through a telephone conference, the subject-area panel members jointly ranked the proposals in the order in which they believed that the proposals should be funded. The panel carefully scrutinized the budgets of those proposals ranked high enough to merit serious consideration for funding and recommended modifications where appropriate.

¹RCS is modeled after the National Science Foundation's Established Program to Stimulate Competitive Research (EPSCoR). NSF EPSCoR programs currently exist in 29 states, the Virgin Islands, Puerto Rico, and Guam.
Phase II: Final Panel Review and Interdigitation of Recommended Proposals

In Phase II of the review process a final panel (hereafter referred to as the “Panel”), composed of three senior out-of-state professionals whose expertise spans the eligible disciplines and who possess comprehensive experience with EPSCoR-type programs, convened on March 4, 2019, to discuss and compare the various groups of top-ranked proposals and, ultimately, to interdigitate the rankings of the various proposals across the subject areas. Prior to the group meeting each panelist reviewed proposals, reviews, and rankings from the Subject-Area Panels.

The three principal criteria used by the Panel in making its funding recommendations were as follows: (1) the appropriateness of the applicant to this program; (2) the scientific and technical merit of the proposed research, utilizing national standards of excellence; and (3) the proposal’s identification of barriers to the principal investigator’s national competitiveness and presentation of a convincing plan for overcoming such barriers. Additional factors considered by the Panel included the current national pool of funds available for the type of research being proposed, the appropriateness of the budget request, and the relevance of the proposed research to the State of Louisiana. Forty-nine proposals were discussed at length during this meeting.

The Panel was informed that approximately $1.25M had been budgeted to fund the first year of work of the RCS projects, though reductions were likely due to low revenues in the Support Fund. Utilizing the criteria described previously, the Panel recommended thirty-four proposals, totaling $1,502,442 in first-year funds, which it strongly believed were worthy of support and placed them in the “Priority One” category in Appendix A. The first fourteen proposals in Appendix A are ranked “1” (i.e., first). In the Panel’s opinion, these proposals are of nearly equal merit, and the order in which these proposals are listed is arbitrary. Proposals ranked fifteen through thirty-four are listed in descending order of merit for funding. It should be noted that although the Panel was informed that $1.25M was available for funding, the Panel recommended additional proposals in the event a recommended applicant became nationally competitive or received stimulus funding comparable to the RCS, resulting in a vacated award.

Note: Funds anticipated to be available will currently support Priority One proposals ranked 1-28. However, should additional funds become available the panel recommends that the Board of Regents fund in rank order as many additional Priority One proposals as possible.

The budgets for each of the thirty-four proposals rated as Priority One were scrutinized closely and, in most cases, adjusted downward to reflect the minimum amount of funds necessary to accomplish the proposed research. The Panel emphasizes, however, that in no case was a budget reduced to the point where the scientist or engineer could not accomplish the research proposed in the application.

Several other highly meritorious proposals ranked Priority One by the subject-area panels and considered at the final panel meeting but, for a variety of reasons, not recommended for Priority One funding, are listed in Appendix B. The fact that a proposal considered by the Panel was not recommended for funding should not, in itself, be interpreted to mean that the application fell just below the cutoff for funding. Each applicant whose proposal is listed in Appendix B should closely review the reviewers’ comments (see Appendix F) before making a decision to resubmit a proposal to this program.
Appendix C lists those proposals that were ranked Priority Two by the subject-area panels but not recommended for funding by the final panel. In general, the proposals listed in Appendix C were considered scientifically sound, but possessed one or more problems that precluded a recommendation for funding, such as poor or unconvincing identification of barriers to national competitiveness; a scope of work either too broad or poorly defined; and/or research proposed in an area in which federal dollars are not currently expended.

The Panel observed that several other proposals, although not recommended for funding by the Panel, deserve notice. Appendix D lists proposals that were considered meritorious (Priority Three) by the subject-area panels, but which were not rated highly enough to be included in the Priority Two list. Applicants whose projects are listed in Appendices C and D are encouraged to pay particular attention to the reviewers’ comments and, if appropriate, revise their applications and resubmit them when their research topics are again eligible.

Appendix E gives comments and funding stipulations for each of the thirty-four proposals highly recommended for funding.

Appendix F provides specific comments made by the consultants applicable to those proposals listed in Appendix B, as mentioned above.

Appendix G lists the out-of-state experts who served as full members of the final and subject-area panels.

Appendix H summarizes all proposals submitted for funding consideration to the RCS and provides the following information for each proposal: proposal number, title, discipline, institution, principal investigator, and BoRSF funds requested.

**FINAL PANEL COMMENTS AND RECOMMENDATIONS**

The Research Competitiveness Subprogram of the Board of Regents Support Fund is designed to help those researchers in Louisiana who have strong potential to become nationally competitive for research funding from federal granting agencies. The Panel compliments the Board of Regents and the State of Louisiana on the establishment of such a quality program. It is the consensus of the Panel that this program has helped to establish a number of principal investigators who, in turn, have been able to conduct meaningful research and support graduate students in their scientific and engineering studies through outside funding. It should be noted that through beneficial comments provided in each level of review, the process itself enhances the possibilities of success for proposals originating from researchers within the State of Louisiana who submit applications to a wide variety of funding sources. Moreover, the out-of-state scientists who reviewed and provided constructive criticism of this year’s proposals are made aware of the scientific and engineering endeavors taking place in Louisiana and are impressed with the State’s attempts to improve the research climate for its scientists and engineers through this program.
To the Applicants:

1. **Barriers to Competitiveness.** Despite the repeated emphasis placed on this criterion in the RFP, some applicants continue to ignore or inadequately respond to this program requirement. This year, as in past years, a number of applicants failed to present an argument indicating how a Board of Regents Support Fund award would help to address the applicant’s barriers to national competitiveness. In several proposals it appeared that the principal investigator was already nationally competitive and had significant external competitive funding. For other proposals, the barriers to national competitiveness were so great that funding the proposal would not overcome these barriers within the time limits of the program (i.e., three years). The ratings of those proposals not in compliance with program guidelines were lowered accordingly.

**RCS One-Year Component.** Although the objective of the RCS one-year component is to stimulate and support faculty on a limited basis leading to near-term federal support, a number of applicants did not adequately demonstrate innovation or novel techniques, which resulted in lower scoring.

2. **Profile of Applicant.** The Panel scrutinized each applicant's past funding levels and took into consideration the principal investigator's research productivity, particularly in the past three to five years. In some instances, proposals were submitted by nationally competitive faculty who had recently lost funding, but who gave no indication that they faced barriers to competitiveness that needed addressing. As stipulated in the RFP, junior researchers at the threshold of becoming competitive were given priority over senior researchers who are changing fields. One-year applicants were evaluated based on their ability to develop cutting-edge techniques and/or innovative/novel concepts leading to near-term federal support.

In some cases, proposals ranked highly by reviewers during Phase I contained little or no information about the applicant or lacked a history of funding. In such cases, reviewers cannot sufficiently evaluate the applicant’s profile for eligibility. Therefore, the Panel could not recommend these proposals for funding.

3. **Format, Syntax, and Appearance of Application.** In several cases, research ideas suffered greatly because the proposals were not well written. From the finished products presented to the Panel (i.e., the proposals), it also appears that some investigators did not sufficiently appreciate the competitive nature of the RCS. Applicants should be made aware that typically no more than twenty-five percent of the proposals submitted to this program will be funded with the money available, and that every year the number of excellent proposals far exceeds the funds available. Applications containing numerous spelling and typographical errors were viewed more critically than other applications, because an evident lack of care went into their preparation.

4. **Requests for Equipment.** As stated in the RFP, the R & D program is not an equipment grants program. Equipment may be requested only in the context of the particular research initiative proposed. It is the applicant's responsibility to justify the uniqueness of the equipment and/or software requested under the aegis of this program. With respect to computing equipment and software, it is the firm belief of the Panel that items such as personal computers, laptops, and standard word processing and data crunching software packages should be provided to faculty by their institutions. Board of Regents Support Fund money should be used only to support the acquisition of special peripherals and software that are specific to and justified by the proposed research.
5. **Proposal Submission History.** In several cases the Panel found it very helpful to have a detailed record tracking the submission of the proposal to other funding agencies. Also, as indicated in the RFP, if the project had been reviewed previously by another granting agency, it greatly enhanced the current proposal's chances of obtaining RCS funding if copies of these reviews were included, along with an explanation of any revisions that were made in the current application and a further explanation of how RCS support would help to overcome the problems identified by federal and/or other reviewers.

6. **Funds Requested for Travel and Release Time.** The Panel noted that requests for travel support and faculty release time frequently were poorly justified and itemized. Such requests should be carefully justified and detailed in future proposals.

7. **Requests for Post-Doctoral Researchers and Graduate Research Assistants.** The subject-area panels noted that some proposals requested funds for post-doctoral researchers instead of graduate assistants, but did not provide an adequate explanation or justification of the need for the more expensive post-doctoral researchers. Because BoRSF funds are quite limited, the Panel recommends that principal investigators request funding for less costly graduate assistants unless a compelling need for assistance from one or more post-doctoral researchers can be demonstrated.

8. **Use of Consultants.** In some proposals, funding was requested for “consultants” with inadequate identification of who the consultants were or why their services were needed. The needed for consultants must be clearly articulated.

9. **General Comments.**

   a) The Panel agreed that, at a minimum, a successful proposal must contain the following:

   (1) A precisely identified research problem or statement of a research hypothesis;

   (2) A section describing the importance of solving the research problem;

   (3) Evidence that the identified research problem is new and unresolved;

   (4) A section describing the precise research methodology to be used;

   (5) A section detailing expected results and future contributions;

   (6) A discussion of the state and/or national implications of this research and identification of prospective future funding sources; and

   (7) An assessment of the barriers that prevent the principal investigator from competing successfully for federal funding. This assessment should incorporate items 1-6 in a manner that will convince the reviewers that BoRSF support for up to three years will enable the PI to secure federal R & D dollars for the PI's research endeavors.

   b) Applicants whose proposals have been declined two or more times are encouraged to seek assistance in proposal/grant writing from a mentor or an established, nationally competitive investigator in the same field, perhaps at a nearby institution.
c) Applicants whose proposals were submitted and declined for the first time this year should look to the reviewer comments for guidance in strengthening future proposals.

d) Inexperienced principal investigators are helped by workshops on the preparation of research proposals. It would be beneficial if the institutions developed mentor programs, in which competitive scientists assisted these investigators in the preparation of good proposals. Mentors could also review the proposals prepared by junior investigators and suggest ways to strengthen these proposals. The Panel continues to be impressed by a marked improvement in the quality of proposals submitted by faculty from undergraduate teaching-oriented public and private institutions, though notes the difficulty in challenging budgetary circumstances for these campuses to rank sufficiently high to receive funds.

e) A number of top-ranked proposals were submitted by scientists who are clearly already nationally competitive. The Panel believes that it is inappropriate to use limited RCS resources to support such scientists, even if these PIs are changing research directions. It should also be noted that some highly ranked proposals were submitted by scientists who had already received three years of BoRSF R & D support. In those cases where three years of previous BoRSF R & D support did not enable the PI to become nationally competitive, the Panel found it difficult to recommend or justify additional support when so many other equally worthy applicants had yet to receive BoRSF R & D funds. In the Panel’s view, three years of BoRSF R & D support should enable a scientist to become nationally competitive, if the research area is capable of attracting support from national funding agencies. All proposals recommended for funding by the Panel are believed to have strong potential for overcoming the barriers that have prevented the submitting scientists from achieving national competitiveness.

To the Board of Regents:

1. **Limitations on Salary Requests as Applicable and Requests for Post-Doctoral Researchers.** The Panel strongly believes that the investigators funded through the RCS should be involved actively (i.e., play a “hands-on” role) in their research. For this reason, some requests for post-doctoral researchers were declined when budgets were reviewed. In most cases the Panel recommended Board funding for only one month’s summer salary for principal investigators. The Panel believes that the institutions should be strongly encouraged to provide release time to their investigators. The institutional provision of release time provides tangible evidence to reviewers and the Board that the institution is committed to the research endeavors of its investigators and frees up Board funds that would otherwise be committed to salary support, thereby helping to ensure that the maximum number of excellent projects will be funded.

2. **Limitations on Overall Funding Requests.** In no year of the RCS’s operation have the funds available sufficed to fund all proposals worthy of support. The Panel must cut proposal budgets significantly each year to ensure that the maximum possible number of worthy projects is funded. Therefore, the Panel strongly recommends that the Board maintain the existing overall cap on the amount of funds that may be requested ($200,000 over a three-year period or $20,000 for a one-year award).
## APPENDIX A

### RCS PROPOSALS HIGHLY RECOMMENDED FOR FUNDING (PRIORITY ONE)

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APPENDIX A (continued)

RCS PROPOSALS HIGHLY RECOMMENDED FOR FUNDING (PRIORITY ONE)

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**TOTALS**  
$1,502,442  
$1,356,058  
$1,270,412

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

APPENDIX B

MERITORIOUS PROPOSALS RANKED PRIORITY ONE BY THE SUBJECT-AREA PANELS AND CONSIDERED BY THE FINAL PANEL BUT NOT RECOMMENDED FOR FUNDING (15)

006A 007A 011A 027A 042A 059A 067A 093A 101A 103A 108A 111A 114A 125A 138A

*Note: These proposals are not listed in rank order of merit. The Panel’s comments on these proposals are provided in Appendix F. Subject-area panel reviews for each proposal will also be provided to the applicant in July 2019.*
APPENDIX C

MERITORIOUS PROPOSALS RANKED PRIORITY TWO
BY THE SUBJECT-AREA PANELS AND CONSIDERED BY THE FINAL PANEL
BUT NOT RECOMMENDED FOR FUNDING (51)

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**Note:** These proposals are not listed in rank order of merit. The subject-area panel reviews for each proposal will be provided to the applicant in July 2019.
### APPENDIX D

**PROPOSALS RANKED PRIORITY THREE OR DECLARED INELIGIBLE/WITHDRAWN BY THE SUBJECT-AREA PANELS AND NOT RECOMMENDED FOR FUNDING (53)**

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**Note:** These proposals are not listed in rank order of merit. The subject-area panel reviews for each proposal will be provided to the applicant in July 2019.
General Comments and Stipulations

This section provides comments and stipulations set forth as conditions of funding for the thirty-four proposals highly recommended for awards by the Panel. The Panel would again like to emphasize that it considered the first fourteen proposals to be of relatively equal merit and, therefore, the order in which they have been listed is arbitrary. Proposals ranked fifteen through thirty-four are listed in descending order of merit for funding.

In some instances the Panel deleted funds for research associates and post-doctoral researchers. The Panel believes that the principal investigators themselves should conduct a significant portion of the proposed research and that BoRSF funds should first support graduate students who will benefit from scientific and/or engineering training.

The Panel strongly recommends that prior to funding each proposal recommended for an award, the Board of Regents ascertain whether the principal investigator has obtained significant research support from another external funding source, such as a major foundation or federal granting agency. Several scientists have proposals pending before such agencies or foundations. The Panel believes that some of these scientists are so close to achieving national competitiveness for research funding that they are likely to receive these requested funds. In cases where a principal investigator obtains a commitment of significant external funding prior to receipt of an RCS award, the RCS award should be vacated and the funds thereby released should be used to support other deserving projects in the RCS or other R & D subprogram(s) of the Board of Regents Support Fund. Any principal investigator who receives notice of external funding after an award is contracted will be expected immediately to report the notice of external funds in accordance with Section X of the RCS grant contract.

Although the Panel reduced the budgets of most projects recommended for funding, the Panel did not reduce any budget to such an extent that achievement of a project’s goals or execution of its work plan would be impaired. Therefore, no reductions in the scope of work plans of projects recommended for funding should be allowed. If the work plan submitted for a project does not correspond in scope to that of the original proposal, the award should be vacated and funds thereby made available should be used to fund other worthy projects in the RCS or other R & D subprogram(s) of the Board of Regents Support Fund.

The types and amounts of institutional match pledged in a proposal played a significant role in determining whether that proposal was recommended for funding. Therefore, unless specifically stated in the funding stipulations of a project recommended for funding, no reductions in the types or amount of institutional match pledged in the original proposal should be permitted. If the types or amounts of institutional match for a project recommended for funding are reduced, unless such reductions are specifically authorized by the funding stipulations for that grant, the award should be vacated and funds thereby made available should be used to fund other worthy projects in the RCS or other R & D subprogram(s) of the Board of Regents Support Fund.
Appendix E (continued):

PROPOSAL: 039A-19

RANK: 1

TITLE: Enhancing Mycelium-Based Biocomposite for Novel Applications in Building Support and Design

INSTITUTION: Louisiana State University and A&M College

PRINCIPAL INVESTIGATOR: Hai Lin, Ph.D.

COMMENTS: Traditional building materials (brick and cement) are produced by consuming a large amount of fossil fuel energy and emitting CO₂. Public attention has been drawn to the search for “green” building materials. Inspired by microorganisms’ biological processes, researchers have been exploring sustainable biomimetic materials to improve or replace brick and cement, such as bio-brick and self-healing bio-concrete. The proposed research seeks to explore the use of mycelium biocomposite as a “green” building material to replace brick and/or cement for building support. Mycelium biocomposite is grown from agricultural waste (e.g., woodchips, sugarcane residue) by nonpathogenic fungal mycelium (root structure fungi) at room temperature for a short time (~14 days) and then dried to kill the mycelium. Its unique growing process offers advantages such as low energy consumption and low-cost production. However, mycelium biocomposites are not as strong and durable as brick and concrete, which has significantly limited mycelium biocomposites to packaging-related applications.

The goal of this project focuses on the use of fungal-induced CaCO₃ precipitation (FICP) to improve mechanical properties (strength and stiffness) and durability (water absorption and resistance under freezing-and-thawing cycles) of the mycelium biocomposites. Using FICP to precipitate CaCO₃ in the mycelium biocomposites will seal pore space and cement mycelium network and agricultural wastes together, thus improving mechanical properties and durability of the mycelium biocomposites. The mechanical properties and durability of the FICP-treated mycelium biocomposites will be characterized at micro- and macro-scales.

It is recommended that the project be funded at the level requested, i.e., $59,251 for year one, $54,251 for year two, and $51,251 for year three.

Year 1: $59,251 Year 2: $54,251 Year 3: $51,251

The Institutional match pledged in the proposal should be maintained in full.
Appendix E (continued):

PROPOSAL: 043A-19  
RANK: 1

TITLE: Impacts of Underwater Anthropogenic Noise on the Brain and Behavior of a Soniferous Social Fish

INSTITUTION: Louisiana State University and A&M College

PRINCIPAL INVESTIGATOR: Karen Maruska, Ph.D.

COMMENTS: Underwater anthropogenic noise has risen rapidly in the past century due to increases in pile driving, sonar use, and shipping traffic. High-intensity sounds cause fish mortality and lower catch rates even at distances far from the source, resulting in negative impacts on the economy and environment. While previous research shows that noise has detrimental effects on behavior and physiology in some fishes, nothing is known about the neural and molecular underpinnings of these outcomes. In species that exhibit an intimate relationship between parent and offspring during development, environmental perturbations during critical parental care phases can have amplified detrimental effects on species persistence. Preliminary data in a mouthbrooding cichlid reveal that excess noise impairs a mother’s ability to carry her brood to term and has deleterious effects on offspring behaviors and survival. An important gap in the current literature is establishing mechanistic links between these behaviors and brain function. The goal of the research is to develop transcriptomic approaches to identify differentially expressed genes in the brain of a mouthbrooding female and her offspring exposed to anthropogenic noise versus silent controls. The data will complement the PI’s behavioral and physiological analyses to provide an integrative picture from molecules to behavior of how parental fishes might be impacted by and cope with noise.

It is recommended that the proposed budget be reduced to provide limited travel support of $1,500 and printing charges deleted for a year one budget of $16,250.

Year 1: $16,250

The Institutional match pledged in the proposal should be maintained in full.
Appendix E (continued):

PROPOSAL: 106A-19  
RANK: 1

TITLE: Smart Optimization Framework to Accelerate Distributed Deep Learning

INSTITUTION: University of Louisiana at Lafayette

PRINCIPAL INVESTIGATOR: Li Chen, Ph.D.

COMMENTS: Machine learning and deep learning have become increasingly important for image classification, speech recognition, etc. Training deep neural networks can take days or weeks on a single machine, which drives the demand of scaling out to a cluster of machines for distributed learning. Although faster hardware (GPUs) and more machines provide promising computational power for scaling up, the performance of training time is bottlenecked by the network communication when parameters at each machine need to be synchronized over the cluster. The proposed research seeks to alleviate the communication bottleneck and accelerate distributed deep learning by investigation of a diverse range of strategies, including neural network pruning, disciplined scheduling and intelligent resource allocation. Research tasks will include (1) neural network pruning to reduce communication overhead and dynamic resource allocation after pruning to rebalance the computation and communication load across the cluster; (2) disciplined task and job scheduling in a multi-job cluster to improve the overall training performance; (3) learning-based techniques for smart resource allocation to achieve speedup; and (4) design and implementation of a smart framework that integrates these optimization strategies to accelerate distributed deep learning.

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. It is recommended that the proposed budget be reduced to provide limited travel support of $1,500 and supplies charges deleted for a year one budget of $52,735. A similar budget of $52,735 is recommended for year two that limits other expenses charges to $2,000. A budget of $51,635 is recommended for year three.

Year 1: $52,735  
Year 2: $52,735  
Year 3: $51,635

The Institutional match pledged in the proposal should be maintained in full.
Appendix E (continued):

PROPOSAL: 020A-19

RANK: 1

TITLE: Catalytic Reduction of Hexavalent Chromium to Reclaim Contaminated Water Sources

INSTITUTION: Louisiana State University and A&M College

PRINCIPAL INVESTIGATOR: Noémie Elgrishi, Ph.D.

COMMENTS: Freshwater is a strategic resource in short supply in a growing number of areas. Decontamination of polluted water sources is a critical challenge, and in particular, it is of great value to have in hand on-site decontamination methods at the pollution source before release into the environment. In response to global water contamination challenges, the proposed research will focus on energy-efficient remediation of highly carcinogenic hexavalent chromium (Cr(VI)) from contaminated water and industrial waste streams. Cr(VI) is generated in the waste of a large number of industries from steel to textile. The proposed research is anchored in the PI’s larger efforts to design molecular platforms capable of mediating the selective reduction of toxic oxyanions. The proposed research will use spectroscopic and electroanalytical methods to uncover the influence of catalysts on water decontamination methods that target efficient electro-catalytic reduction of toxic Cr(VI) to Cr(III). The new method is amenable to large-scale implementation via flow systems that will reduce the economic cost characteristic of current technologies. The methodology developed will provide a roadmap that will allow its expansion to removal of other toxic oxyanions contaminants. The proposed work will advance the fundamental understanding of the influences of hydrogen bonding networks in catalyzing proton-coupled electron transfer processes, thereby contributing to global solutions to the increased pressure on our freshwater supplies.

It is recommended that the project be funded at the level requested, i.e., $61,291 for year one, $46,313 for year two, and $40,476 for year three.

Year 1: $61,291  
Year 2: $46,313  
Year 3: $40,476

The Institutional match pledged in the proposal should be maintained in full.
Appendix E (continued):

**PROPOSAL:  146A-19**

**RANK:  1**

**TITLE: Effects of Early Antipyretic Exposure on Social-Emotional Behavior in a Mouse Model**

**INSTITUTION: University of New Orleans**

**PRINCIPAL INVESTIGATOR: Christopher Harshaw, Ph.D.**

**COMMENTS:** Autism Spectrum Disorders (ASDs) are heterogeneous and costly neurodevelopmental disorders, with elusive etiologies. The proposed study will develop a mouse model for autism-relevant outcomes following early-life exposure to a common yet poorly understood xenobiotic, acetaminophen (APAP). A number of recent studies have linked early-life APAP to attention-deficit and social disorders in humans—an alarming fact given that APAP is the single most frequently used drug for human infants and children. Several rodent studies have confirmed that early-life APAP exposure can have enduring effects on the brain and behavior. Few studies to date have, however, examined behavior specifically relevant to ASDs and none have used appropriately (e.g. allometrically) scaled doses, rendering translation of findings to humans difficult. The PI will examine autism-relevant social, communicative, and repetitive phenotypes in C57BL/6 mice exposed during early development to fever alone, APAP alone, or fever plus APAP, comparing these to vehicle-only controls. Mice will be administered appropriately scaled doses of APAP three times during early development, mimicking the repeated fever and APAP exposure typical of childhood. The PI will subsequently assay autism-relevant behavior on a battery of tests over the course of development, from infancy through adulthood. The PI is experienced in performing pharmacological manipulations and behavioral testing of mice, using a variety of tests of social and emotional functioning.

It is recommended that the proposed budget be revised to eliminate salary support for the PI, including fringe benefits, for a year one budget of $6,609. The PI should note that requests for PI salary support are not permitted for RCS one-year proposal submissions.

**Year 1: $6,609**

The Institutional match pledged in the proposal should be maintained in full.
Appendix E (continued):

PROPOSAL: 143A-19

TITLE: New Measures of Quantum Nonlocality for Multiple Parties

INSTITUTION: University of New Orleans

PRINCIPAL INVESTIGATOR: Peter Bierhorst, Ph.D.

COMMENTS: Quantum entanglement is an inherently fascinating phenomenon. It is also a resource that can be exploited to solve problems in cryptography and computing. The PI participated as a consulting theorist in multiple experiments in 2015 that first unambiguously demonstrated quantum nonlocality – a phenomenon enabled by quantum entanglement – in a so-called “loophole-free” demonstration. In 2018, the PI led a Boulder, CO-based team that exploited entanglement to demonstrate a highly secure method for random number generation. The experiments involved “two-party” quantum entanglement in which a pair of entangled particles are distributed to two separate stations—“parties”—where they are detected and measured. However, entanglement can also be shared between three or more parties. The structure of three-party entanglement is more complicated and less well understood than that of two-party entanglement, and experimental demonstrations of three-party entanglement are at an earlier stage of development. Nonetheless, three-party entanglement is already known to enable unique quantum information protocols such as quantum secret sharing and third-party-controlled quantum cryptography. There remain important open questions about the security of three-party protocols.

The PI proposes to develop new, more precise theoretical models of three-party entanglement to better understand this phenomenon, and to leverage these models to develop novel quantum information protocols enabled by the three-party setting. This proposal will also foster the formation of new collaborations with US-based experimental groups that specialize in multi-party entanglement with the goal of performing experiments to demonstrate three-party quantum information protocols.

It is recommended that the proposed budget be reduced to provide one-month summer salary including fringe benefits for the PI, rather than the one course release requested, for a year one budget of $48,480. Similar budgets of $48,480 are recommended for year two and year three that provide limited travel support of $1,500. The PI should note that proposed budgets should not increase in each subsequent year.

Year 1: $48,480  
Year 2: $48,480  
Year 3: $48,480

The Institutional match pledged in the proposal should be maintained in full.
Appendix E (continued):

PROPOSAL: 002A-19  RANK: 1

TITLE: Mechanisms Controlling Cardiac Fibroblast Activation and Differentiation After Myocardial Infarction

INSTITUTION: Louisiana State University – Agricultural Center

PRINCIPAL INVESTIGATOR: Xing Fu, Ph.D.

COMMENTS: The PI recently demonstrated that in response to myocardial infarction (MI) resident cardiac fibroblasts (CFs) undergo a series of activation and differentiation processes. Mobilized CFs first migrate into the infarct area, followed by massive proliferation. Proliferating CFs differentiate into myofibroblasts secreting large amounts of extracellular matrix (ECM) proteins and express a high level of smooth muscle α-actin (αSMA) assembled into stress fibers. Myofibroblasts then differentiate into matrifibrocytes which lose the expression of myofibroblast signature genes including the gene encoding αSMA, and produce a distinct set of ECM proteins. Surprisingly, as the most widely used marker for myofibroblast differentiation, the function of αSMA stress fibers in the post-MI tissue repair is still not clear. The PI hypothesizes that αSMA stress fibers protect the heart from rupture and preserve the heart function after MI. In addition, through transcriptome analysis of CFs isolated at different post-MI time points, the PI has identified transcription factor 21 (Tcf21) and runt-related transcription factor 1 (Runx1) as two potential regulators of the sequential differentials of CFs post-MI. In the proposed study, mouse lines with CF-specific genetic deletions or overexpression of these genes will be employed to facilitate achieving three specific aims:

- **Aim #1:** determine the functional role of αSMA stress fibers in the post-MI tissue repair
- **Aim #2:** examine the role of Tcf21 in the myofibroblast differentiation of CFs
- **Aim #3:** examine the role of Runx1 in the matrifibrocyte differentiation of myofibroblasts

The PI’s goal is to reveal novel CF-related therapeutic targets for improving the post-MI heart function.

The PI has (3) pending proposals:

- NIH – entitled “Tcf21 and Visceral Adipose Tissue Development and Growth” in the amount of $409,391 for the period 7/2019 – 6/30/2022
- USDA – entitled “Fibro/Adipogenic Progenitors and Beef Quality” in the amount of $499,800 for the period 3/1/2019 – 2/28/2023
- American Heart Association (AHA) – entitled “The Functional Role of Myofibroblast-Expressed αSMA in Post-Myocardial Infarction Tissue Healing” in the amount of $231,000 for the period 4/1/2019 – 3/31/2022

Should the PI receive funding for any of these pending proposals, he/she should be considered nationally competitive and the requested funds from the BoRSF program should not be awarded.

It is recommended that the proposed budget be reduced to provide limited travel support of $1,500, supplies charges of $15,000, and other expenses costs of $17,374, not to include publication charges of $1,500, for a year one budget of $48,449. Similar budgets of $48,449 are recommended for year two and year three.

- **Year 1:** $48,449
- **Year 2:** $48,449
- **Year 3:** $48,449

The Institutional match pledged in the proposal should be maintained in full.
Appendix E (continued):

PROPOSAL: 122A-19

TITLE: Multimethod Approaches to Understanding the Complexity of Psychological, Social and Community Influences on Academic Outcomes

INSTITUTION: University of Louisiana at Lafayette

PRINCIPAL INVESTIGATOR: Man Li, Ph.D.

COMMENTS: The goal of the proposed research is to introduce computational methods to the study of social and community psychology. Specifically, this project employs Egocentric Social Network Analysis and Random Forest Machine Learning Algorithm to establish a three-step, evidence-based methodology, namely, Person-Network-System Aggregation Model (PNSAM), to study the complex influences of psycho-sociocultural factors on human behaviors. In the past, theories and research in community and social psychology have emphasized the importance of considering the interaction of individual, sociocultural and systemic factors when studying human behaviors (e.g., social capital theories, interactionism). Although attempts were made to analyze the joint effects of multiple facets, the majority of studies tended to focus on one or a few specific areas of interest. The recent development and rising popularity of statistical programming and software provide psychological researchers with opportunities to develop effective methodologies to study such combined effects on human behavior. For example, social network analysis software has been developed to help researchers collect and analyze large-scale social network data. Similarly, machine learning can be applied through statistical programming to improve model estimation. Through applying these advanced computational statistics, the proposed research will investigate the combined and interactive effects of person, network (family, peer, and community) and sociocultural/systemic factors on students’ academic success. It is expected that the research program will result in a set of tested research methodologies and easy-to-follow analytical approaches that can be applied to other areas of research to study the joint influences of psycho-sociocultural factors on human behavior.

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. It is recommended that the proposed budget be reduced to provide undergraduate student support of $2,000, and limited travel support of $1,500, for a year one budget of $46,788. Budgets of $45,788 are recommended for year two and year three.

Year 1: $46,788  
Year 2: $45,788  
Year 3: $45,788

The Institutional match pledged in the proposal should be maintained in full.
Appendix E (continued):

PROPOSAL: 120A-19
RANK: 1

TITLE: Algebraic Structures and Geometric Phenomena in Spaces of Embeddings

INSTITUTION: University of Louisiana at Lafayette

PRINCIPAL INVESTIGATOR: Robin Koytcheff, Ph.D.

COMMENTS: The proposed research lies in topology and more specifically spaces of embeddings. Embeddings include the quintessential example of knots in three-dimensional space, as well as higher-dimensional phenomena, and their study is often physically motivated. Spaces of embeddeddings capture not just knots but also n-parameter families of knots. Recent years have seen the development of intricate algebraic structures on these spaces, yet interesting open questions remain, such as Vassiliev’s conjecture on finite-type knot invariants. The PI will further study these spaces by both algebraic and geometric methods. The PI will use methods such as operad actions, graph complexes, and Goodwillie-Weiss functor calculus, while also making explicit calculations.

The PI has (1) pending proposal:


Should the PI receive funding for the pending proposal, he/she should be considered nationally competitive and the requested funds from the BoRSF program should not be awarded.

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. It is recommended that the proposed budget be reduced to provide one-month summer salary including fringe benefits for the PI, rather than two-months requested, and limited travel support of $1,500, for a year one budget of $46,048. Budgets of $46,048 and $45,548 are recommended for year two and year three, respectively.

Year 1: $46,048  Year 2: $46,048  Year 3: $45,548

The Institutional match pledged in the proposal should be maintained in full.
Appendix E (continued):

**PROPOSAL: 048A-19**

**RANK: 1**

**TITLE: Computational Investigation of Transition Metal Sulfides for Overcoming the Challenges of Electrocatalytic CO₂ Reduction**

**INSTITUTION: Louisiana State University and A&M College**

**PRINCIPAL INVESTIGATOR: Craig Plaisance, Ph.D.**

**COMMENTS:** The overall objective of the proposed research is to use atomistic simulations to determine the mechanistic details of how imidazolium and pyridinium derivatives synergistically co-catalyze electrochemical CO₂ reduction on the MoS₂ surface and to identify whether structural modifications to the co-catalyst can enhance the activity and selectivity to desired products such as methanol and molecules containing C—C bonds. This objective will be accomplished by pursuing three specific aims. The first two aims will be to determine the mechanisms for pyridinium and imidazolium co-catalyzed CO₂ reduction on MoS₂ and which elementary steps are responsible for the low experimentally observed activities of these systems for C—H and C—C bond formation. The third aim is to use the mechanistic insight gained from the first two aims to explore whether structural modifications to the co-catalysts can increase these activities to a sufficient level to yield high activity and selectivity to the desired products. The molecular-level insights obtained by achieving the objective are expected to guide the computational and experimental design of transitional metal chalcogenide-based electrocatalytic systems for CO₂ reduction with high selectivity to these desired products. Such an electrocatalyst is a critical component of any technology that directly uses excess renewable electricity to convert CO₂ to liquid fuels for temporary storage or for use in transportation.

It is recommended that the proposed budget be reduced to provide limited travel support of $1,500, and supplies charges deleted, for a year one budget of $52,475. Similar budgets of $52,475 are recommended for year two and year three.

**Year 1: $52,475**  **Year 2: $52,475**  **Year 3: $52,475**

The Institutional match pledged in the proposal should be maintained in full.
Appendix E (continued):

**PROPOSAL: 044A-19**

**RANK: 1**

**TITLE:** Macroscale Patterns of CO₂ in US Flowing Waters

**INSTITUTION:** Louisiana State University and A&M College

**PRINCIPAL INVESTIGATOR:** Steve Midway, Ph.D.

**COMMENTS:** The overall objective of the proposed research is to develop a state-of-the-art ecological framework designed to substantially advance our understanding of spatial and temporal variability of CO₂ in flowing freshwaters. The first objective is to build a database of CO₂ in flowing freshwaters in the continental US. The PI recognizes that this will be calculated CO₂ and not directly measured, because directly measured data do not exist for this purpose. Additionally, the PI will be using data from sources like EPA and USGS, in which the data have already undergone extensive QA/QC. Once the database is built, the second objective will be to use the CO₂ data, coupled with several sources of covariate data, in a hierarchical modeling framework to quantify spatial trends in mean and variability of CO₂. The third objective is to identify sites with longer temporal scales, use dynamic linear models to examine for temporal increases (or decreases) in CO₂, and attribute those changes to plausible macroscale drivers.

It is recommended that the proposed budget be reduced to provide limited travel support of $1,500, for a year one budget of $47,799. Budgets of $45,799 and $44,799 are recommended for year two and year three, respectively.

**Year 1:** $47,799  
**Year 2:** $45,799  
**Year 3:** $44,799

The Institutional match pledged in the proposal should be maintained in full.
Appendix E (continued):

**PROPOSAL: 071A-19**

**TITLE:** Stabilizing High-Energy Batteries Through Experiment and Modeling

**INSTITUTION:** Louisiana Tech University

**PRINCIPAL INVESTIGATOR:** Kristopher Harris, Ph.D.

**COMMENTS:** There is a general consensus among commercial and governmental forecasting groups that the complex energy marketplace of future societies will require greatly improved secondary batteries for transporting energy efficiently. The category of materials most likely to be the base of the next generation of rechargeable batteries are the over-lithiated (OL) versions of the Nickel-Manganese-Cobalt (NMC) batteries already popular in electric vehicles. These OL-NMCs can be made in almost infinite variations by altering the ratio and type of transition metals, vacancies, and Li content. Most importantly, OL-NMCs with ~40% higher capacities are already known, but unsuitable for commercialization due to poor structural and chemical stability during cycling. The objective of the proposed research is to determine which member of this large set of possible mixtures (or which stabilization surfaces or pretreatments) will finally form the next generation of batteries. Understanding the chemistry of such cathodes is complicated by the fact that they are solids comprised of definite crystalline positions that are populated by metals in a manner that is mostly disordered, yet retains partial ordering on an atomic scale. The PI proposes to develop and use new methods to connect device performance to the initial structure and structural dynamics at an atomic level – data that has not been available – to develop the better battery technology needed by society in the near future.

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. Furthermore, the PI has a pending LA BoR Enhancement proposal entitled “Acquisition of a 400 MHz NMR Spectrometer for Enhancing Education and Undergraduate Research at Louisiana Tech University” in the amount of $200,000 for the period 6/1/2019 – June 30, 2020. It is recommended that the proposed budget be reduced to provide limited travel support of $1,500 for a year one budget of $54,871. *If the pending LA BoR Enhancement proposal is funded, and NMR data can be collected at LA-Tech, rather than by travel to the National High Magnetic Field Laboratory in Florida, budgets of $44,871 are recommended (other expenses charges deleted, i.e. travel, accommodations, etc.) for year two and year three, rather than budgets of $49,871 for year two and year three.

Year 1: $54,871  
Year 2: $49,871/*44,871  
Year 3: $49,871/*44,871

The Institutional match pledged in the proposal should be maintained in full.
Appendix E (continued):

PROPOSAL: 005A-19

RANK: 1

TITLE: DNA Methylation on N6-Adenine During Bovine Preimplantation Embryo Development

INSTITUTION: Louisiana State University – Agricultural Center

PRINCIPAL INVESTIGATOR: Zongliang Jiang, Ph.D.

COMMENTS: Dynamic changes in DNA methylation are crucial in the epigenetic regulation of mammalian embryonic development. Abnormalities in these changes are likely to result in embryonic arrest at preimplantation stages. Early embryonic mortality is a major cause of infertility in cattle and humans, but little is known about the basic epigenetic regulation mechanism governing early embryonic loss. DNA cytosine methylation (5mC) is a major form of epigenetic modification that has been extensively characterized. A novel DNA methylation, N6-adenine methylation (6mA), recently reported in the mammalian genome has challenged the prevailing paradigm that 5mC is the only form of DNA methylation in mammalian species. This raises fundamental and largely unexplored questions about its function in epigenetic regulation. The PI hypothesizes that 6mA occurs independent of CpG Islands and represents an additional mechanism for gene regulation for normal embryonic development, and 6mA interplays and cooperates with 5mC to modulate precise epigenetic regulation during early embryo development. These findings will advance our knowledge of epigenetic mechanisms responsible for embryonic development and differentiation as well as infertility, which can then be leveraged into new tools to treat infertility disorders in animals and humans.

The PI has (1) pending proposal:

- USDA-NIFA – entitled “The Role of N6-Adenine DNA Methylation in Epigenetic Regulation of Bovine Preimplantation Embryo Development” in the amount of $100,000/year for the period 1/1/2019 – 12/31/2022

Should the PI receive funding for the pending proposal, he/she should be considered nationally competitive and the requested funds from the BoRSF program should not be awarded.

It is recommended that the proposed budget be reduced to provide limited travel support of $1,500, supplies charges of $20,000, and other expenses charges of $5,000, for a year one budget of $41,075. Similar budgets of $41,075 are recommended for year two and year three.

Year 1: $41,075  Year 2: $41,075  Year 3: $41,075

The Institutional match pledged in the proposal should be maintained in full.
Appendix E (continued):

PROPOSAL: 069A-19 RANK: 1

TITLE: Enabling Smart Communities to Mitigate the Effects of Natural Disasters Using IoT-Based Sensor Networks

INSTITUTION: Louisiana Tech University

PRINCIPAL INVESTIGATOR: Benjamin Drozdenko, Ph.D.

COMMENTS: In the past decade, many natural disasters have befallen the southern United States, bringing damages to property as a result of hurricanes and flooding. These natural disasters have caused devastating damage to the environment, including storm-related damage and release of hazardous pollutants. The impact of events like these on the human population living in the disaster zones cannot be ignored. Measures must be taken to minimize human exposure to poisonous chemicals in the air and water, especially those of the combustible variety, and ensure cleanliness of the potable water supply. In the presence of fires, ensuring that the local populace is not exposed to harmful gases is also a priority. Fortunately, the advent of the Internet of Things (IoT) has led to new technologies that make it possible for researchers to develop solutions that mitigate the effects of these natural disasters, thereby improving the quality of life. The primary goal of the proposed research is to establish and make public a smart cities framework on the Louisiana Tech campus for the purpose of reacting to natural disasters. The research includes three major tasks: (1) developing the smart cities framework and publishing a procedure that the research community can use for repeatability; (2) designing algorithms for determining events based on data stores in the cloud; and (3) performing a study in the computing, networking, and security concerns to make the framework safe and efficient.

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. Furthermore, the PI should note that proposed budgets should not increase in each subsequent year. It is recommended that the project be funded at the level requested, i.e., $49,985 for year one. Budgets of $49,485 and $48,485 are recommended for year two and year three, respectively.

Year 1: $49,985 Year 2: $49,485 Year 3: $48,485

The Institutional match pledged in the proposal should be maintained in full.
Appendix E (continued):

PROPOSAL: 130A-19  
RANK: 15

TITLE: An Integrated Approach to Investigating Genetic Variation in the Highly Invasive Fern Salvinia Molesta

INSTITUTION: University of Louisiana at Lafayette

PRINCIPAL INVESTIGATOR: Erin Sigel, Ph.D.

COMMENTS: Many of the world’s most ecologically devastating and economically burdensome invasive plants are hybrids and polyploid species. It is widely hypothesized that novel combinations of parental genes and redundant genetic material allow these species to exploit new ecological niches and outcompete native vegetation. This may be the case in the northern Gulf of Mexico region where the invasive aquatic fern Salvinia molesta has spread rampantly in many slow-flowing swamps and marshes. Salvinia molesta is pentaploid, postulated to be of hybrid origin, and forms dense mats that can clog water bodies and create anoxic conditions. Very little is known about the evolutionary history, population-level genetic diversity, and phenotypic plasticity of S. molesta. The primary objective of the proposed research is to integrate phylogenetic, population genetic, and transcriptomic approaches to characterize the genetic variation imparted by hybridization and polyploidization that may have enabled S. molesta to expand its distribution. Specific research aims include: (1) characterizing the genomic composition of S. molesta; (2) quantifying and identifying the origin of the genetic diversity within and among S. molesta populations in the northern Gulf of Mexico region; and (3) assessing the potential for phenotypic variation among genetically differentiated individuals of S. molesta in response to varying environmental conditions.

The PI has (1) pending proposal:


Should the PI receive funding for the pending proposal, he/she should be considered nationally competitive and the requested funds from the BoRSF program should not be awarded.

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. It is recommended that the proposed budget be reduced to provide one-month summer salary including fringe benefits for the PI, rather than two-months requested, and other expenses charges of $3,478 not to include publication, documentation dissemination cost, for a year one budget of $34,721. A similar budget of $34,721 is recommended for year two that provides limited travel support of $4,819, and other expenses charges of $6,534. A budget of $31,514 is recommended for year three that provides limited travel support of $1,500 and other expenses charges of $13,105.

Year 1: $34,721  
Year 2: $34,721  
Year 3: $31,514

The Institutional match pledged in the proposal should be maintained in full.
Appendix E (continued):

PROPOSAL: 017A-19

TITLE: Spatial Regulation of Myosin Dynamics During Tubular Organ Formation

INSTITUTION: Louisiana State University and A&M College

PRINCIPAL INVESTIGATOR: SeYeon Chung, Ph.D.

COMMENTS: Many organs in the human body, including the lungs and kidney, are organized as three-dimensional tubular structures. Defective tubular structures are the underlying cause of many common diseases, such as spina bifida. Therefore, determining the mechanism underlying tube formation is essential to understanding many developmental processes and diseases.

Tubular structures arise by invagination from a flat epithelial sheet. A crucial cell shape change during invagination is apical constriction, wherein cells shrink their apical surface so that they form the curved wall of the tube. Contractile cytoskeletal networks generate the mechanical forces that drive these changes. Therefore, understanding how the cytoskeletal networks are regulated is key to understanding proper tube formation.

Using the Drosophila (fruit fly) embryonic salivary gland, the PI previously discovered the key pathway driving apical constriction: the secreted protein Folded gastrulation (Fog) is required for accumulation of Rho kinase to activate myosin cytoskeleton in the center of the apical end of cells that coordinates apical constriction. However, the regulatory mechanisms of this signaling pathway are largely unknown. The proposed research will address the following questions: (1) what receptor transduces a Fog signal; (2) how is the Fog signaling activity controlled; and (3) how is the invagination site determined?

The PI will use Drosophila genetics, imaging, computational image analysis, and mathematical modeling approaches to answer the questions. These studies should provide insights into understanding how a normal tubular organ forms. Given the similarities in tube-forming mechanisms across phyla, these studies will likely reveal key mechanisms of tissue invagination that are broadly applicable.

It is recommended that the project be funded at the level requested for year one, i.e., $64,527. A budget of $54,528 that provides one-month summer salary including fringe benefits for the PI, rather than 1.5-months requested, is recommended for year two. A budget of $51,028 is recommended for year three that deletes printing charges of $3,000.

Year 1: $64,527  Year 2: $54,528  Year 3: $51,028

The Institutional match pledged in the proposal should be maintained in full.
Appendix E (continued):

**PROPOSAL: 123A-19**

**TITLE: Structure and Cohomology in Fusion Systems**

**INSTITUTION: University of Louisiana at Lafayette**

**PRINCIPAL INVESTIGATOR: Justin Lynd, Ph.D.**

**COMMENTS:** Fusion systems are categories which abstract the local structure of a finite group around a prime $p$. The theory of fusion systems brings together three distinct areas of mathematics: the structure theory of finite groups, the local homotopy theory of classifying spaces, and the modular representation theory of finite groups. The proposed research will explore connections within the first two areas, between which a link is provided by the cohomology of the center functor. First, a characterization of those fusion systems whose center functor has nonvanishing first cohomology will be given using methods from a program for the classification of simple fusion systems (CSFS) at the prime. Second, component problems within the CSFS that are required to carry out the characterization will be solved. Certain technical difficulties in the CSFS related to such component problems are caused by lack of a suitable construction of the centralizer of a subsystem of a fusion system, a construction which is known only in restrictive cases. A cohomological obstruction theory for rigid actions by a $p$-group on the linking system of a subsystem will be developed. Theorems giving necessary and sufficient conditions for the existence and uniqueness of a centralizer based on the vanishing of those cohomological obstructions will be proved. In addition to the resolution of technical issues with the CSFS, applications to the problem of giving a combinatorial description of mapping spaces between $p$-completed classifying spaces will be researched.

The PI has (1) pending proposal:


Should the PI receive funding for the pending proposal, he/she should be considered nationally competitive and the requested funds from the BoRSF program should not be awarded.

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. It is recommended that the proposed budget be reduced to provide one-month summer salary including fringe benefits for the PI, rather than two-months requested, and limited travel support of $1,500 for a year one budget of $45,111. Similar budgets of $45,111 are recommended for year two and year three.

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The Institutional match pledged in the proposal should be maintained in full.
Appendix E (continued):

PROPOSAL: 034A-19

TITLE: Articulatory Modifications Across Speaking Modes: Segment-Based Approach

INSTITUTION: Louisiana State University and A&M College

PRINCIPAL INVESTIGATOR: Yun Jung Kim, Ph.D.

COMMENTS: The speech disorder secondary to Parkinson’s Disease (PD) is called hypokinetic dysarthria because hypokinesia (reduction in body movement) is a significant manifestation of the disorder which affects primarily phonation, articulation and prosody. Given the (1) high incidence/prevalence of PD; (2) more or less equivalent life expectancy between normally aging people and people with PD; and (3) the growing evidence that individuals with PD can benefit from behavioral rehabilitation activities, there is an increasing need to understand the disorder-specific profile of speech deficits and to develop behavioral treatment techniques optimized for PD.

The purpose of the current application is three-fold: (1) articulatory kinematics will be examined at the fine-grain level of segments (individual speech sounds such as /b/ and /a/) across 3 speaking modes (conversational, clear, and loud); (2) the PI will expand the scope of research to include speech kinematics in addition to her current specialty, speech acoustics; and (3) the PI will establish a solid rationale and feasibility data for a preclinical grant proposal (NIH-NIDCD K01) applying the segment-specific approach to speakers with Parkinson’s Disease. The proposal was submitted and received favorable feedback from the reviewers in general. However, it was recommended to strengthen the evidence of the interaction between segments and speaking modes. Previous perceptual and acoustic literature has identified a set of segment-based contributors to enhance speech intelligibility (i.e., target of clear/loud speech). However, corresponding kinematic data are lacking partly due to the relatively new, affordable use of articulography technology in the field. The proposed research will fill the lacuna with the ultimate goal of constructing an articulation-based model of speech intelligibility.

It is recommended that the proposed budget be revised to eliminate printing charges of $1,595, for a year one budget of $18,388.

Year 1: $18,388

The Institutional match pledged in the proposal should be maintained in full.
Appendix E (continued):

PROPOSAL: 015A-19  
RANK: 19  

TITLE: Developing Molecular Photoelectrodes for Renewable Energy Storage and Catalysis  

INSTITUTION: Louisiana State University and A&M College  

PRINCIPAL INVESTIGATOR: Matthew Chambers, Ph.D.  

COMMENTS: Photoelectrodes are multicomponent materials capable of converting light into electrical and chemical energy. Traditional photoelectrodes are solid state materials typically comprising four components: an electrode, a semiconductor to absorb light, a passivation layer for semiconductor protection, and a catalyst material. The efficiencies of photoelectrodes are limited by the performance of each individual component and the interfacial junctions. Typical research approaches involve optimizing components through nano-structuring as well as evaluating methods to improve charge transfer across interfaces. Despite these efforts, experimental efficiencies using expensive high-performance materials remain modest (10-20%). Opportunities for breakthrough improvements are limited as theoretical efficiencies have been estimated at 40% or less.

A new approach to photoelectrode design is proposed in which molecular complexes are employed as both the light absorber and catalyst, while immobilized on electrodes. A molecular photoelectrode needs only two parts, an electrode and a photocatalyst, resulting in fewer efficiency-limiting interfaces. The efficiency of molecular photoelectrodes is dominated by the quantum yields of the photocatalysts, which can approach 100% efficient once optimized. The PI proposes to develop the first molecular photoanode by using a photoreactive system developed by the Chambers Group, Mo(O)2(Cl)2(bpy). Various immobilization techniques will be explored by measuring quantum efficiencies and catalytic benchmarks, such as turnover frequency. Fundamental investigations of photocatalyst properties in the presence of an applied electric field will be conducted using known photosensitizers immobilized on electrodes.

It is recommended that the project be funded at the level requested, i.e., $59,785 for year one, $54,285 for year two, and $45,785 for year three.

Year 1: $59,785  
Year 2: $54,285  
Year 3: $45,785  

The Institutional match pledged in the proposal should be maintained in full.
Appendix E (continued):

PROPOSAL: 022A-19

RANK: 20

TITLE: Ecosystem Impacts of Invasive Lionfish in Shallow and Mesophotic Reefs in the Gulf of Mexico

INSTITUTION: Louisiana State University and A&M College

PRINCIPAL INVESTIGATOR: Cassandra Glaspie, Ph.D.

COMMENTS: Invasive lionfish (Pterois volitans) are recognized as a major threat to marine biodiversity in shallow reef habitats throughout the US South Atlantic and Gulf of Mexico. However, lionfish migrate into deeper mesophotic reef environments as they age, resulting in a large population of old, large individuals in waters 30-150m deep. These fish share habitat with many of Louisiana’s key commercial and recreational fish species, such as red snapper, blue crab, and shrimp. The ecosystem impact of the mesophotic lionfish population, relative to the shallow-dwelling lionfish population, is unknown. Using lionfish collected in Florida, Louisiana, Texas, and the Mexican Caribbean, the PI will conduct a series of field and laboratory experiments to measure several key parameters describing lionfish metabolism and predator-prey interactions. These parameters will be used to develop combined foraging-bioenergetics models for shallow-dwelling lionfish and mesophotic lionfish. Models combined with estimates of lionfish density, lionfish size, and environmental variables will be used to compare the ecological impacts of lionfish populations in shallow and mesophotic reef systems throughout the Gulf of Mexico. As lionfish become ubiquitous in coastal habitats throughout the Gulf of Mexico, the proposed research will help ecosystems managers focus removal efforts on the populations that have the largest impact on native biodiversity and fisheries production.

It is recommended that the proposed budget be reduced to provide one-month summer salary including fringe benefits for the PI, rather than two-months requested, limited travel support of $1,500 and supplies reduced to $2,280, for a year one budget of $48,980. A budget of $46,700 is recommended for year two. A similar budget of $46,700 that eliminates $1,600 in printing charges is recommended for year three. The PI should note that proposed budgets should not increase in each subsequent year.

Year 1: $48,980  
Year 2: $46,700  
Year 3: $46,700

The Institutional match pledged in the proposal should be maintained in full.
Appendix E (continued):

PROPOSAL: 136A-19                      RANK:  21

TITLE: Activation of the Unfolded Protein Response Protects Against LPS-Induced Lung Endothelial Barrier Dysfunction

INSTITUTION: University of Louisiana at Monroe

PRINCIPAL INVESTIGATOR: Nektarios Barabutis, Ph.D.

COMMENTS: Endothelial barrier dysfunction is the hallmark of major cardiovascular pathologies, including diabetes, atherosclerosis, hypertension, acute lung injury (ALI) and acute respiratory distress syndrome (ARDS). The development of novel anti-inflammatory agents with limited side effects is of great significance in the prevention and management of cardiovascular disease. Glucocorticosteroids demonstrate severe side effects, and single-target anti-inflammatory agents are void of broad spectrum applications. Hsp90 inhibitors represent an exciting new possibility as clinically used anti-inflammatory agents, since they have already completed Phase I and Phase II trials for cancer treatment. An emerging body of evidence suggests that the protective role of Hsp90 inhibitors in the LPS-induced vascular barrier dysfunction is mediated, at least in part, by the “guardian of the genome” and tumor suppressor P53. The PI’s group recently reported that P53 enhances endothelial barrier function by disrupting the inflammatory RhoA/MLC2 pathway, and via the suppression of the actin-severing activity of cofilin. Both Hsp90 inhibition and P53 induction are associated with the induction of the unfolded protein response (UPR) element. The proposed research will provide preliminary data which introduce the protective action of UPR against the LPS-induced endothelial vascular barrier dysfunction. A series of experiments will be conducted in established in vivo and in vitro experimental models of ALI/ARDS. The outcomes of the research will elucidate the signaling cascades that mediate the regulation of pulmonary endothelial vascular function, and explore new therapeutic avenues towards the treatment of ALI/ARDS.

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. It is recommended that the proposed budget be reduced to provide limited travel support of $1,500, supplies charges of $15,000, and other expenses (publication cost) deleted, for a year one budget of $46,762. Similar budgets of $46,762 are recommended for year two and year three. The PI should note that proposed budgets should not increase each subsequent year.

Year 1: $46,762             Year 2: $46,762             Year 3: $46,762

The Institutional match pledged in the proposal should be maintained in full.
Appendix E (continued):

**PROPOSAL: 079A-19**

**RANK: 22**

**TITLE: Assessing the Physiological Effects of Feed pH on Postprandial Processing and Growth in Marine Finfish**

**INSTITUTION: Louisiana Universities Marine Consortium**

**PRINCIPAL INVESTIGATOR: Abigail Bockus, Ph.D.**

**COMMENTS:** Aquaculture is the fastest growing food sector and supports 50% of the seafood consumed worldwide. However, feeds account for >60% of operating costs and farm success depends on appropriate diet formulation and digestive efficiency. In many fish species, digestive strategy is characterized by a post-consumption drop in stomach pH. This acidification, facilitated by parietal cells in the stomach epithelium, induces an influx of hydrochloric acid and a concomitant secretion of bicarbonate into the blood stream, causing an increase in blood pH referred to as the alkaline tide. The return to ionic- and osmoregulatory homeostasis is energetically expensive and can take up to 48 hours. Inclusion of dietary acidifiers can increase growth and feed efficiency, although these benefits are not consistent across species or functional groups. The PI will examine the physiological mechanisms driving the relationship between dietary pH and digestive efficiency. Using red drum (*Sciaenops ocellatus*), a commercial marine finfish, the PI will test the hypothesis that decreasing feed pH provides protons to assist with stomach acidification – suppressing the alkaline tide, decreasing the metabolic costs associated with digestive acid-base regulation, and enhancing growth in a dose-dependent manner. This hypothesis will also be tested in cobia (*Rachycentron canadum*), an aquaculture species that maintains a continuously low stomach pH.

The PI has (1) pending proposal:

- NOAA, Saltonstall Kenned – entitled “Mapping Short- and Long-Term Climate-Related Shifts in Gulf Brown Shrimp Distribution Using the Metabolic Index” in the amount of $283,415 for the period 9/1/2019 – 8/31/2021

Should the PI receive funding for the pending proposal, he/she should be considered nationally competitive and the requested funds from the BoRSF program should not be awarded.

It is recommended that the proposed budget be reduced to provide limited travel support of $1,500, for a year one budget of $57,431. Budgets of $57,431 and $16,085 are recommended for year two and year three, respectively. The PI should note that proposed budgets should not increase in each subsequent year.

Year 1: $57,431  
Year 2: $57,431  
Year 3: $16,085

The Institutional match pledged in the proposal should be maintained in full.
Appendix E (continued):

PROPOSAL: 100A-19

TITLE: Breaking Correlations in Reaction Energetics for Design of Highly Efficient Catalysts

INSTITUTION: Tulane University

PRINCIPAL INVESTIGATOR: Matthew Montemore, Ph.D.

COMMENTS: The design possibilities of metal catalysts are constrained by correlations between the energetics of various reaction steps along the pathway known as scaling relations and Brønsted-Evans-Polanyi (BEP) relations. These correlations lead to simplifications in design, but also lead to tradeoffs, as increasing the rate of one elementary step often slows another elementary step, which leads to an upper limit on the overall catalytic performance. In this project, the PI will investigate strategies to break these correlations, and use these strategies to design more efficient catalysts than can be achieved by more traditional design strategies. The research will involve creating alloy surfaces that use surface inhomogeneity, entropy, and adsorbate-adsorbate interactions to break correlations in reaction energetics, thereby allowing greater control over the energetics along the pathway. The surfaces will consist of localized ensembles of a more reactive metal alloyed into the surfaces of a more inert metal. The PI will study them using density functional theory and kinetic modeling. The PI will focus on alkane conversion and ammonia synthesis, which are important and well-studied reactions. For alkane conversion, small ensembles of 1-3 reactive metal atoms will facilitate initial C-H bond scission which is often the rate-determining step, but will prevent coking. For ammonia synthesis, ensembles of 1-10 reactive atoms will allow fast N₂ dissociation, but repulsive interactions between NHₓ species, along with entropy, will drive these species onto the more inert metal to allow faster NH₃ desorption. This work could lead to new strategies for designing catalysts with higher efficiency.

It is recommended that the proposed budget be reduced to provide limited travel support of $1,500, and supplies of $250, not to include the purchase of a computer, for a year one budget of $45,723. Similar budgets of $45,723 are recommended for year two and year three.

Year 1: $45,723  Year 2: $45,723  Year 3: $45,723

The Institutional match pledged in the proposal should be maintained in full.
Appendix E (continued):

PROPOSAL: 024A-19

TITLE: Building a Climatology of Mesoscale Convective Processes Using Image-Classification and Machine-Learning Techniques on Sequences of Radar Data

INSTITUTION: Louisiana State University and A&M College

PRINCIPAL INVESTIGATOR: Alex Haberlie, Ph.D.

COMMENTS: The near-real-time availability of weather radar data represented a paradigm shift in the capabilities of short-term forecasting. In the subsequent decades, the body of research associated with these data has matured and improved our ability to anticipate high-impact weather events. Specifically, visual interpretation of temporal sequences of these data can uncover critical mesoscale-convective processes that serve as proxies for surface conditions. Some well-known examples include the occurrence of tornadoes and damaging wind swaths. However, the identification of these processes using radar data requires careful, time-consuming interpretation by skilled meteorologist. Additionally, our understanding of where and when these processes occur on climatological (i.e., $> 10^1$ yrs) time scales relies on damage reports and case studies with limited temporal periods. The proposed research will first generate a sample of sequences of radar data associated with subjectively identified mesoscale-convective processes over a 20-year period. Next, these data will be used to test and train a machine algorithm for the purpose of performing sequence classifications with relatively high accuracy. The dataset can then be processed orders of magnitude faster with the trained algorithm than is possible with manual identification. The data can be used to generate a climatology of particular processes and improve our basic understanding of where and when these events occur. Additionally, the process can be used to aid decision-making for operational meteorologists who are generating short-term forecasts.

It is recommended that the proposed budget be reduced to provide one-month summer salary including fringe benefits for the PI, rather than two-months requested, limited travel support of $1,500, and printing charges deleted for a year one budget of $37,399. Budgets of $35,899 are recommended for year two and year three.

Year 1: $37,399  
Year 2: $35,899  
Year 3: $35,899

The Institutional match pledged in the proposal should be maintained in full.
Appendix E (continued):

**PROPOSAL: 045A-19**

**RANK: 25**

**TITLE:** Lung Physiological, Cellular and Molecular Toxicity Induced by Electronic Cigarette in Mouse Models of In Utero and Adult Exposure

**INSTITUTION:** Louisiana State University and A&M College

**PRINCIPAL INVESTIGATOR:** Alexandra Noel, Ph.D.

**COMMENTS:** Little is known regarding the pulmonary effects of inhaling electronic cigarette (e-cig) heated and aerosolized nicotine and flavors. Heating of e-liquids during e-cig use produces an aerosol that includes fine and ultrafine particles, as well as nicotine and aldehydes, which can damage epithelial cells and induce lung inflammatory reactions. The PI hypothesizes that the toxicity of inhaled e-cig aerosol will decrease lung function, in addition to inducing inflammation and oxidative stress responses in mice. As nicotine is a key element involved in impaired development, the PI also hypothesizes that *in utero* exposures to e-cig will significantly affect pregnancy outcomes and delay lung development in the offspring. The overall goals of the research are (1) to identify biomarkers of pulmonary toxicity in young adult mice exposed sub-acute to e-cig aerosols, and (2) to evaluate pregnancy outcomes as well as pulmonary toxicity induced by *in utero* e-cig exposure in neonate mice.

It is recommended that the project be funded at the level requested, i.e., $49,983 for year one and $48,866 for year two, for the first two years. A budget of $40,903 is recommended for year three that eliminates printing charges of $1,000.

**Year 1: $49,983**  
**Year 2: $48,866**  
**Year 3: $40,903**

The Institutional match pledged in the proposal should be maintained in full.
Appendix E (continued):

PROPOSAL: 087A-19
RANK: 26

TITLE: Classification of EEG Signals Utilizing 2D Temporal Patterns with Deep Learning

INSTITUTION: Southeastern Louisiana University

PRINCIPAL INVESTIGATOR: Kazim Sekeroglu, Ph.D.

COMMENTS: The proposed research will explore the recognition of brain activities using EEG signals for Brain Computer Interfaces (BCI) by utilizing spatiotemporal patterns in hierarchical deep learning. EEG data are a record of electrical activity of the brain over a period of time. EEG signals have been used in diagnosis of neurological disorders as well as in BCIs. BCI enables a user to control the interactive application by only imagining the actions. Therefore, BCI is very crucial particularly for motor-impaired users to be able to control assistive technologies such as text input systems, wheelchairs, and rehabilitation devices for stroke patients. Brain activity of the BCI user is typically collected via EEG. Analysis of EEG signals have been done for decades. The common approach in the analysis and the classification of EEG signals is based on one-dimensional (1D) time series input. The PI will explore (1) the transformation of 1D temporal EEG signals into 2D spatiotemporal EEG image sequences for feature extraction and recognition; (2) the use of multi-view hierarchical deep learning methods for the classification of 2D spatiotemporal EEG image sequences; and (3) development of a novel wavelet-based pooling method for use in multi-view hierarchical deep learning.

It is recommended that the project be funded at the level requested, i.e., $18,109 for year one.

Year 1: $18,109

The Institutional match pledged in the proposal should be maintained in full.
Appendix E (continued):

PROPOSAL: 065A-19

TITLE: Measurements of Fundamental Features of Nuclear Structure Relevant for Nuclear Physics and Astrophysics Using Parity Violating Electron Scattering

INSTITUTION: Louisiana Tech University

PRINCIPAL INVESTIGATOR: Rakitha Beminiwattha, Ph.D.

COMMENTS: Parity Violating Electron Scattering (PVES) is an extremely important precision tool for testing the Standard Model (SM) of particle physics, detecting physics beyond the SM, and understanding nucleon and nuclear structure. The proposed research will further develop the PI’s research potential in PVES experiments aimed at testing the fundamental symmetries and understanding nucleon and nuclear structure using extended collaborative visits to Jefferson Laboratory. The proposed research goals are to: (1) extract a model independent measurement of the neutron skin thickness of lead ($^{208}$Pb) and calcium ($^{48}$Ca) nuclei; (2) design real-time high-precision electron beam polarimetry for PVES experiments using electron-electron scattering; and (3) explore and evaluate currently available software frameworks to propose a suitable software framework for next-generation PVES experiments. The proposed activities will provide a necessary experimental input for understanding bulk structure and three-nucleon forces, improve the astrophysics models for neutron stars, improve two-photon exchange model calculations for electron-nucleon scattering, and constrain new physics beyond the SM. The research activities will make progress in electron beam polarimetry, computational reproducibility, open data initiatives and re-usability of simulation, data acquisition, and data analysis software, improving the quality and productivity of nuclear physics research in the United States.

The PI has (1) pending proposal:


Should the PI receive funding for the pending proposal, he/she should be considered nationally competitive and the requested funds from the BoRSF program should not be awarded.

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. It is recommended that the project be funded in the first year at the level requested, i.e., $50,178 for year one. Budgets of $40,428 are recommended for year two and year three.

Year 1: $50,178
Year 2: $40,428
Year 3: $40,428

The Institutional match pledged in the proposal should be maintained in full.
Appendix E (continued):

PROPOSAL: 035A-19  RANK: 28

TITLE: The Neurobiology of Resilience to Environmental Challenges

INSTITUTION: Louisiana State University and A&M College

PRINCIPAL INVESTIGATOR: Christine Lattin, Ph.D.

COMMENTS: The overall goal of the proposed research is to determine the neuroendocrine basis for stress resilience in a free-living songbird species, the house sparrow. Understanding the neural mechanisms for stress resilience is essential given that potential chronic stressors such as urbanization, habitat destruction, climate change, and species invasions now affect most, if not all, animal species. It is also crucial for understanding stress resilience in humans exposed to trauma. Using an interdisciplinary approach, the research will test the hypothesis that variation within species in different brain systems that shut down, degrade, or counteract the effects of hormones and neurotransmitters released due to stress exposure predicts variation in resilience to environmental challenges. The PI will investigate this hypothesis using an ecologically relevant chronic stress protocol (long-term exposure to predator calls), and a fitness-based stress resilience framework examining whether animals can maintain normal reproductive behavior even in the face of prolonged and repeated stressors.

It is recommended that the proposed budget be reduced to provide limited supplies charges of $15,000, rather than $78,484 requested, for a year one budget of $41,109. Budgets of $38,105 are recommended for year two and year three. It is the Panel’s position that the scope of the study can be scaled back since there is not an actual experimental design and statistical basis that justify the number of subjects. A smaller study, within available funds, can provide an indicator of whether or not the study will be effective and therefore guide future work.

Year 1: $41,109  Year 2: $38,105  Year 3: $38,105

The Institutional match pledged in the proposal should be maintained in full.
Appendix E (continued):

PROPOSAL: 025A-19  
RANK: 29

TITLE: Word Knowledge in Young Children with Autism Spectrum Disorders: The Developing Lexicon

INSTITUTION: Louisiana State University and A&M College

PRINCIPAL INVESTIGATOR: Eileen Haebig, Ph.D.

COMMENTS: Children with autism spectrum disorders (ASD) have core impairments in social communication and have restricted interest and repetitive behaviors. In addition, the majority of young children with ASD have significant work-learning difficulties. The severity of delays in work knowledge are predictive of child outcomes. As such, it is necessary to understand how young children with ASD construct their lexicon. The proposed research will examine early word knowledge in young children with ASD using a multi-level approach.

The first aim is to examine the organization of early word knowledge (semantic networks) between young children with ASD and typically developing toddlers. Parent-reported child vocabulary will be analyzed using network modeling techniques to characterize the structure of each child’s work knowledge and to test theories of vocabulary learning. These models will provide unique insight into the learning strategies that children with ASD employ during word learning. The second aim is to experimentally test whether semantic-level word characteristics predict word processing difference in young children with ASD and their typically developing peers. Children will participate in a lexical decision task and a word association task that include words with different semantic (word meaning) characteristics. The third aim is to compare the neural correlates of word processing using a word processing task while online electroencephalogram (EEG) data are collected. Findings from the proposed study will inform understanding of how young children with ASD organize their developing lexicon (i.e., semantic structure), enhance insight into learning processes, and provide important implications for clinical practice.

It is recommended that the proposed budget be reduced to provide one-month summer salary including fringe benefits for the PI (not to include support for the other investigator), rather than two-months requested, limited travel support of $1,500, and consultant’s charges deleted, for a year one budget of $42,008. Budgets of $41,508 and $39,508 are recommended for year two and year three, respectively.

Year 1: $42,008  
Year 2: $41,508  
Year 3: $39,508

The Institutional match pledged in the proposal should be maintained in full.
Appendix E (continued):

PROPOSAL: 132A-19
RANK: 30

TITLE: Understanding Species Persistence Under Reoccurring and Interacting Disturbances

INSTITUTION: University of Louisiana at Lafayette

PRINCIPAL INVESTIGATOR: Amy Veprauskas, Ph.D.

COMMENTS: An important focus for management and conservation is determining whether a species, a collection of interacting species, or an entire ecosystem can sustain itself. This question becomes increasingly important as populations are exposed to various disturbances, both natural and anthropogenic, such as hurricanes, habitat fragmentation, and toxicants. The PI proposes to use mathematical modeling, specifically structured matrix models with stochastic environments (such as Markov chain models), to study how reoccurring and interacting disturbances impact species persistence. Though general theory has been developed to establish when persistence in a stochastic environment is possible, the lack of analytical formulas for key terms, such as the stochastic growth rate, makes these results difficult to apply. In addition, some of the established conditions for persistence are only sufficient and weaker conditions may suffice. Furthermore, mathematical models that describe how a population is affected by the interaction of multiple disturbances need to be developed. Specific goals of the proposed research include (1) to develop methods for examining and quantifying species persistence under reoccurring disturbances—these methods may include both new techniques for examining population growth and persistence and new mathematical models that address how stressors may impact particular ecosystem types; and (2) to develop and analyze a mathematical framework for modeling the effects of multiple interacting disturbances that considers how the impact of one type of disturbance may be altered by the presence of another.

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. It is recommended that the proposed budget be reduced to provide limited travel support of $1,500 and consultant charges deleted, for a year one budget of $46,756. Budgets of $44,131 and $41,506 are recommended for year two and year three, respectively.

Year 1: $46,756  Year 2: $44,131  Year 3: $41,506

The Institutional match pledged in the proposal should be maintained in full.
Appendix E (continued):

PROPOSAL: 070A-19  
RANK: 31

TITLE: Modulation of Thalamocortical Circuitry in Epilepsy

INSTITUTION: Louisiana Tech University

PRINCIPAL INVESTIGATOR: Levi Good, Ph.D.

COMMENTS: Understanding the human brain and how neural circuits interact for development of diseases such as epilepsy, autism, depression, and traumatic brain injury among other neurological disorders are still major challenges. Neuromodulation has recently shown significant value for effective intervention and treatment of diseases of the nervous system. The importance of pursuing research in both neural circuits and neuromodulation avenues has recently been emphasized by the BRAIN Initiative sponsored by NIH, NSF, and DARPA federal agencies. The BRAIN Initiative goals are to accelerate the development and application of innovative technologies that could lead to understanding of how complex neural circuits interact in both space and time. The primary goal of this research is to develop an effective recording and stimulation microscopic system to study the treatment of seizure activity in thalamocortical circuitry associated with epilepsy. The specific aims are to (1) utilize a new MEMS-based multi-electrode array recently designed by the PI for recording from and stimulation of the thalamocortical neuronal network; and (2) experiment with recording from, and applying in-house developed electrical stimulation schemes to, thalamocortical slice preparations from the brains of epileptic mice toward an effective control of their seizures.

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. It is recommended that the proposed budget be reduced to provide limited travel support of $1,500, for a year one budget of $50,456. Budgets of $50,456 and $46,956 are recommended for year two and year three, respectively, that eliminate annual printing charges of $1,500. The PI should note that proposed budgets should not increase in each subsequent year.

Year 1: $50,456  
Year 2: $50,456  
Year 3: $46,956

The Institutional match pledged in the proposal should be maintained in full.
Appendix E (continued):

PROPOSAL: 066A-19

TITLE: Advancing Shape Memory Alloy Design and Capabilities: A Multiscale Insight

INSTITUTION: Louisiana Tech University

PRINCIPAL INVESTIGATOR: Xiang Chen, Ph.D.

COMMENTS: Shape memory alloys (SMAs), among the most well-known smart materials, exhibit unique superelastic and shape memory effects, and have been identified as next-generation functional materials. Although SMAs have attracted the attention of research for decades due to the multiscale multiphysics complexity in their deformation mechanisms, fundamental understanding is still lacking, which continues to restrain their future application. The unique properties of SMAs stem from a solid-state phase transformation which is closely related to temperature in concert with other mesoscale factors, such as dislocations and grain boundaries. A computational tool that can predict these combined effects is a promising and open research avenue. Recent work by the PI has lead to a concurrently coupled atomistic and continuum multiscale simulation tool which is the only available tool in the field for the simulation of the coexistence of materials microstructure and phonon heat transport at the mesoscale. The proposed research aims to (1) further develop the theory and the computational implementation of the multiscale methodology, so as to establish a unique simulation tool for predictive study of SMAs and smart materials in general; and (2) provide a fundamental understanding of the deformation mechanisms in SMAs, including the isolated and combined effects of different mesoscale factors.

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. It is recommended that the proposed budget be reduced to provide limited travel support of $1,500, and equipment charges deleted, for a year one budget of $45,531. Budgets of $42,956 are recommended for year two and year three that eliminate annual other expenses charges of $1,500.

Year 1: $45,531 Year 2: $42,956 Year 3: $42,956

The Institutional match pledged in the proposal should be maintained in full.
PROPOSAL: 023A-19

TITLE: Novel Molecular Mechanism of Inhibition of the Antiviral Response to Respiratory Syncytial Virus

INSTITUTION: Louisiana State University and A&M College

PRINCIPAL INVESTIGATOR: M. Guerrero-Plata, Ph.D.

COMMENTS: Respiratory syncytial virus (RSV) is the major etiologic agent of bronchiolitis and pneumonia in infants and young children. Reinfection by the virus is a frequent event throughout life, indicating that protective immunity is incomplete. Moreover, the lack of a vaccine for RSV warrants further research toward understanding the host immune response induced by this pneumovirus. The PI has recently shown that RSV induces a distinctive profile of small non-coding microRNAs (miRNAs) in RSV-infected cells. The discovery of functional miRNAs has introduced new mechanisms that contribute to the regulation of protein translation and cellular response to stimuli by inhibiting and degrading its target mRNA. The immune response to respiratory viruses is associated with an altered expression of distinct miRNAs, and the changes in miRNA expression could contribute to the pathogenesis of both acute and chronic airway disease. However, there is limited information regarding the role of specific miRNAs in the antiviral immune response to RSV. Therefore, using a well-established in vitro model of infection, the PI will analyze a novel role of miR-4634 in the regulation of the RSV-induced innate antiviral response. The unveiling of mechanism(s) evolved by RSV to negatively modulate the immune response in the host is critical for a better understanding of the pathogenesis caused by this virus.

The PI has (1) pending proposal:

- NIH – entitled “R01/Exacerbation of Respiratory Syncytial Virus-Induced Disease” in the amount of $1,829,700 for the period 2019 – 2024

Should the PI receive funding for the pending proposal, he/she should be considered as having received funding for the same and/or similar project and the requested funds from the BoRSF program should not be awarded.

It is recommended that the proposed budget be revised to eliminate printing charges of $2,300, for a year one budget of $17,700.

Year 1: $17,700

The Institutional match pledged in the proposal should be maintained in full.
Appendix E (continued):

PROPOSAL: 126A-19
RANK: 34

TITLE: Energy-Efficient Machine Learning Systems with Deterministic Bit-Stream Processing

INSTITUTION: University of Louisiana at Lafayette

PRINCIPAL INVESTIGATOR: M. Hassan Najafi, Ph.D.

COMMENTS: Bitstream-based computing using stochastic logic has been used in recent years for low-cost and low-power implementation of machine learning (ML) systems. Inherent inaccuracy and long latency of processing random bit-streams have made prior bit-stream-based implementations of ML systems inefficient compared to conventional fixed-point binary implementations. Random or pseudorandom bit-streams often need to be processed for a very long time to produce acceptable results. This long latency leads to significantly higher energy consumption in the bit-stream-based systems compared to their conventional binary counterparts. Recently, deterministic approaches to bit-stream-based computing have been proposed. The approaches can produce completely accurate results, the same as results from conventional binary designs. However, these deterministic methods lack the property of progressive precision enjoyed by conventional random bit-streams. They also do not scale well. As a result, these approaches are not competitive for applications where some degree of inaccuracy can be tolerated, such as ML applications. The overall goal of this project is to develop novel low-cost, high-performance, noise-tolerant, and energy-efficient architectures for hardware implementation of ML systems. The project exploits the recent evolution in the idea of stochastic computing (SC), deterministic and completely accurate computation with stochastic bit-streams.

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. It is recommended that the proposed budget be reduced to provide limited travel support of $1,500, supplies charges of $2,000, and other expenses/printing cost deleted, for a year one budget of $49,679. Budgets of $47,679 and $47,111 are recommended for year two and year three, respectively.

Year 1: $49,679           Year 2: $47,679           Year 3: $47,111

The Institutional match pledged in the proposal should be maintained in full.
APPENDIX F

COMMENTS ON PROPOSALS RANKED PRIORITY ONE BY THE SUBJECT-AREA PANELS AND CONSIDERED BY THE FINAL PANEL BUT NOT RECOMMENDED FOR FUNDING

PROPOSAL: 006A-19

TITLE: Prebiotics and Probiotics to Control Antibiotic Resistance in Food

INSTITUTION: Louisiana State University – Agricultural Center

PRINCIPAL INVESTIGATOR: Joan King, Ph.D.

COMMENTS: Antibiotics resistance has become a significant issue over the past few years. Similar antimicrobials used in humans have been used in food animals for treatment of disease and to promote growth. Continuous exposure to the same antimicrobials has resulted in antimicrobial resistance of some pathogenic bacteria, for example Salmonella and Campylobacter. These resistant pathogenic bacteria are the types that are likely to be found in human foods through the food chain. This in turn can lead to problems in treating human diseases. A viable alternative for dealing with the issue of treating humans and animals due to antimicrobial-resistant bacteria may be the use of probiotics in combination with prebiotics. Probiotics are health-beneficial bacteria in the gut that outcompete harmful bacteria. Prebiotics, such as resistant starch, have been shown to enhance the levels of intestinal probiotic bacteria, which in turn resulted in improved health. The PI’s hypothesis is that the combined use of resistant starch and a probiotic that outcompetes a particular pathogen will decrease the antimicrobial resistance of the pathogen.

Although the proposal is of good quality, it did not rank high enough in comparison with other Agricultural Sciences proposals to warrant funding. It was not placed in the “Priority I” category by the Final Panel because there is not enough money, even if additional funds become available, to fund more than the thirty-four (34) proposals listed in Appendix A.
Appendix F (continued):

**PROPOSAL: 007A-19**

**TITLE: In Vitro Reprogramming of Monolignol Biosynthesis**

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

**PRINCIPAL INVESTIGATOR: Yongchan Kwon, Ph.D.**

**COMMENTS:** Lignin is one of the abundant heterogeneous copolymers produced by all growing plants and plays an important role in the nature of trees and forests. Lignin typically consists of 10 to 40 wt% of plant dry matter. Although the potential of lignin-based chemicals to replace petrochemical feedstocks as a precursor for chemical and advanced materials is widely recognized, the use of lignin is currently limited by complex post-processing to depolymerization of the lignin structure. To build up the tunable lignin copolymer biosynthesis platform, selective biosynthesis of the building blocks of lignin (monolignols) is highly encouraged. Lignin is polymerized from three primary monomers: p-coumaryl alcohol (H), coniferyl alcohol (G), and sinapyl alcohol (S) converted from phenylalanine via multi-enzyme reactions (5 to 11 steps). This multi-step enzymatic reaction typically delivers lower selectivity as well as difficulty in reconstitution of the biosynthetic pathway in a heterologous system. The cell-free protein synthesis system designed for the alternative protein synthesis and metabolic engineering platform has advantages over a traditional in vivo system which often requires a laborious, time-consuming design-build-test sequence of engineering biological systems. By escaping the cellular growth constraint, the cell-free system provides a controllable environment to direct manipulation of the system. The goal of this project is to establish a controllable in vitro monolignol biosynthetic pathway for the selective production of three building blocks of lignin using a cell-free metabolic engineering platform. The results could provide not only understanding of monolignol biosynthesis but further opportunity to develop a tunable lignin polymerization platform for the production of lignin-based chemicals.

Although the proposal is of good quality, it did not rank high enough in comparison with other Engineering A proposals to warrant funding. It was not placed in the ’Priority I’ category by the Final Panel because there is not enough money, even if additional funds become available, to fund more than the thirty-four (34) proposals listed in Appendix A.
Appendix F (continued):

**PROPOSAL: 011A-19**

**TITLE: Determining the Role of Mississippi River Diversions in Fluxing Microplastics into Coastal Waters**

**INSTITUTION: Louisiana State University and A&M College**

**PRINCIPAL INVESTIGATOR: Mark Benfield, Ph.D.**

**COMMENTS:** Microplastic pollution has emerged as a pressing environmental problem that can impact marine ecosystems, coastal economics, human food security, and human health. Most microplastics (<5mm) are derived from terrestrial sources. These enter freshwater systems and ultimately are fluxed into the oceans. Recent research conducted by the PI indicates that microplastic concentrations in the northern Gulf of Mexico are among the highest reported anywhere globally. Given the low population density of the central Gulf of Mexico coast, the logical source of these plastics is the Mississippi River catchment, which contains over 100 million people. In an attempt to rebuild our vanishing coast, Louisiana has embarked on an ambitious plan to divert Mississippi River water into coastal estuaries where entrained sediments can build new land. Preliminary samples from one diversion indicate that diverted river water contains vast quantities of microplastics. Once in coastal estuaries, these microplastics have the potential to enter food webs and impact recreationally, ecologically, and economically important fishes and shellfish.

Research objectives are to (1) increase the PI’s laboratory productivity on microplastics in the Mississippi and at freshwater diversions; and (2) maintain a monitoring program in the Mississippi River to allow a comprehensive picture of microplastic concentrations over seasons and years. This will allow the PI to estimate fluxes to the Gulf of Mexico, evaluate the efficacy of initiatives to reduce usage of single-use plastics, and expand monitoring to encompass the Davis Pond diversion. The latter could allow the PI to quantify how sediment diversions may also serve as vectors for microplastics, enabling him to establish international partnerships of coastal estuaries. A third objective is to allow comparisons of microplastic transport via rivers to semi-enclosed seas and secure international funding for comparative research.

Although the PI “proposes to strengthen his laboratory capacity to study microplastics by increasing productivity via a graduate student, continuing a Mississippi River microplastics time series, and monitoring Davis Pond diversions”, which represents a new research direction for his laboratory, the PI should note that in accordance with the RFP “Junior researchers at the threshold of becoming nationally competitive will be given priority over senior researchers who are changing fields.” For this reason the PI was not recommended for RCS funding.
Appendix F (continued):

PROPOSAL: 027A-19

TITLE: The LSU Social Media Panel

INSTITUTION: Louisiana State University and A&M College

PRINCIPAL INVESTIGATOR: Michael Henderson, Ph.D.

COMMENTS: Social media provides people unprecedented opportunities to express their views. Researchers in multiple disciplines are working to harness the power of the sentiments people express via social media to measure public opinion along with other large-scale social phenomena, including aspects of mass political and economic behavior. Through the proposed research, the PI identifies an opportunity for scholars at Louisiana State University to establish leadership in the analysis of social media. The addition, with this project the University will claim a leadership role in bridging this analysis with conventional understandings of public opinion, historically informed by people’s responses to survey questions.

The PI will develop a three-year study aimed at producing and enhancing knowledge of a broad array of social processes as well as expanding an infrastructure for continued leadership in social media analysis and public opinion research. The PI plans to recruit a panel of at least 2,000 U.S. adults to be studied in two ways. First the PI will interview these participants using well-developed survey research techniques, eliciting demographic, attitudinal, social and behavioral data from them in the form of response to survey questions. Second, the PI will solicit information from each consenting member of the panel who will allow the PI to monitor his or her behavior on social media. The participants of the panel will be demographically representative of the US adult population, sufficiently large to enable extensive sub-group comparison by partisanship, ethnicity, class, gender, and level of civic engagement, among other characteristics.

Although the proposal is of good quality, it did not rank high enough in comparison with other Social Sciences proposals to warrant funding. It was not placed in the “Priority I” category by the Final Panel because there is not enough money, even if additional funds become available, to fund more than the thirty-four (34) proposals listed in Appendix A.
Appendix F (continued):

**PROPOSAL: 042A-19**

**TITLE: Machine Learning for Quantum Enhanced Metrology**

**INSTITUTION: Louisiana State University and A&M College**

**PRINCIPAL INVESTIGATOR: Omar Magana-Loaiza, Ph.D.**

**COMMENTS:** Recent progress in machine learning has triggered quantum protocols that rely on the implementation of artificial neural networks to efficiently perform quantum state discrimination and tomography. However, research on the potential of machine learning for quantum photonic technologies, such as quantum metrology, is in its initial stage. Despite the surprising features that characterize quantum technologies like quantum metrology, modern society suffers the absence of smart quantum technologies. Unfortunately, quantum technologies are not capable of learning or making decisions. For this reason, the PI proposes a research program that utilizes quantum fluctuations of light to train neural networks to perform smart quantum metrology. The quantum theory of electromagnetic radiation predicts characteristic statistical fluctuation for sunlight, laser radiation and molecule fluorescence. The underlying statistical fluctuations of each of these kinds of light define correlation properties that the PI will use to force optimization algorithms for machine learning to unambiguously converge to unique solutions, with small uncertainties, in rapid fashion. The PI’s research on quantum metrology will exploit quantum statistical fluctuations of photons and their correlation to train neural networks to estimate small physical parameters of interest in the estimation of small separation among multiple incoherent sources and longitudinal phase shifts. The PI will explore the limits that nature imposes on optimized neural networks for quantum metrology. This will allow the PI to demonstrate the first family of protocols for smart quantum metrology. The PI anticipates that these results will have implications for other fields such as microscopy of biological materials, remote sensing and the identification of exoplanets.

Although the proposal is of good quality, it did not rank high enough in comparison with other Physics and Astronomy proposals to warrant funding. It was not placed in the “Priority I” category by the Final Panel because there is not enough money, even if additional funds become available, to fund more than the thirty-four (34) proposals listed in Appendix A.
Appendix F (continued):

PROPOSAL: 059A-19

TITLE: Development of an Accurate and Robust Multi-Sensor Data Fusion Method to Detect Adulteration and Floral Origin of Honey

INSTITUTION: Louisiana State University of Alexandria

PRINCIPAL INVESTIGATOR: Gerard Dumancas, Ph.D.

COMMENTS: In recent years, it has become standard practice to add adulterants to honey. By adding corn, cane, beet, and/or rice syrup to the floral nectar that makes up pure honey, companies are able to reduce their costs and sell their product at a much lower price. Honey has become the third-most-adulterated product in the world, and it is hard to detect the additives. Honey adulteration is a serious global issue that has significant economic and organoleptic consequences. Current methods for detecting such adulterants are typically complex, expensive, and time consuming. The overall goal of this study is to develop an accurate, robust, and facile analytical method for the simultaneous quantification of honey adulterants consisting of corn, cane, beet, and rice syrup in honey using chemometrics and a multi-sensor data fusion technique.

Although the proposal is of good quality, it did not rank high enough in comparison with other Agricultural Sciences proposals to warrant funding. It was not placed in the “Priority I” category by the Final Panel because there is not enough money, even if additional funds become available, to fund more than the thirty-four (34) proposals listed in Appendix A.
Appendix F (continued):

PROPOSAL: 067A-19

TITLE: A Situationally Aware Tailored Health Communications System for Mobile Health Interventions

INSTITUTION: Louisiana Tech University

PRINCIPAL INVESTIGATOR: Pradeep Chowriappa, Ph.D.

COMMENTS: Computer-tailored health communication (CTHC) is a tool that is frequently adopted to support behavior change in patients. CTHC provides personalized messages as timely interventions to boost the morale of patients who are subject to long-term treatments. These tools have been used to gain insights into personal preference, cultural similarity, and patient behavior. Fueled by the onset of web and mobile technologies, there is a need for patients and researchers to work together to embrace newer forms of mobile health interventions to support self-management of long-term conditions. Existing CTHC systems require domain experts to monitor selected variables of a patient's baseline profile. Using machine learning, if-then rules are extracted to send tailored messages to patients over time. The success of CTHC systems require “the human-in-the-loop” to map selected variables and develop rules that dictate how content should be tailor-made. Newer approaches adopt collective intelligence that uses previous successes of patients to overcome limitations inherent in traditional rule-based systems. The goal of this research is to provide a scalable, situationally aware CTHC system. Situational awareness of the proposed system will be determined by taking in three modalities of data: (a) health parameters provided by the patients (EHR and Fitbit data), (b) users’ choice of data (video) stream, and (c) user feedback.

Although the proposal is of good quality, it did not rank high enough in comparison with other Computer and Information Sciences proposals to warrant funding. It was not placed in the “Priority I” category by the Final Panel because there is not enough money, even if additional funds become available, to fund more than the thirty-four (34) proposals listed in Appendix A.
PROPOSAL: 093A-19

TITLE: Anti-Inflammatory Role of Enriched Muscadine Berry Extracts in Human Alveolar Epithelial Cells Exposed to Electronic-Cigarette Vapors

INSTITUTION: Southern University and A&M College

PRINCIPAL INVESTIGATOR: Devaiah Kambiranda, Ph.D.

COMMENTS: The use of electronic cigarettes (e-cigarettes; e-cigs) as a safer alternative to conventional tobacco cigarettes is increasing rapidly in the United States. E-cigs are battery-operated heating devices which convert e-cig liquid (e-liquid) into an inhalable vapor. The evaluation of e-cigs by the FDA and independent researchers has shown that their emissions induce free radicals and inflammatory responses in the lung tissue. Furthermore, flavored e-liquids (particularly cinnamon) have been shown to induce more stress and toxicity on the lung tissue. Preliminary studies by the PI revealed that flavored e-liquid vapor condensate [F-ELQVC (tobacco)] regulated: (1) the production of cytokines/chemokines including IL-17A and IL-17F; (2) NF-κB expression; (3) autophagy genes; and (4) microRNAs associated with immune/inflammatory genes in lung epithelial cells. The PI observed a possibility of cross-talk between autophagy and IL-17 mediated responses. Nutrivention with grape berry extract or ellagic acid metabolites significantly rescued F-ELQVC or cigarette smoke extract medicated transcriptional induction of IL-17A, CCL2 and autophagy genes. The PI hypothesizes that F-ELQVCs induced inflammation resulting from the cross-talk between epigenetically regulated autophagy and IL-17 mediated response can be rescued by grape fruit extracts or ellagic acid metabolites.

Although the proposal is of good quality, it did not rank high enough in comparison with other Agricultural Sciences proposals to warrant funding. It was not placed in the “Priority I” category by the Final Panel because there is not enough money, even if additional funds become available, to fund more than the thirty-four (34) proposals listed in Appendix A.
PROPOSAL: 101A-19

TITLE: Construction of Bacterial Chassis for Advanced Biofuel Production

INSTITUTION: Tulane University

PRINCIPAL INVESTIGATOR: Nicholas Sandoval, Ph.D.

COMMENTS: Solventogenic Clostridium are key to the production of sustainable biofuels and chemicals. They have unique capabilities to consume various carbon sources as feedstocks, including waste biomass, and naturally produce a number of industrially relevant metabolites, including butanol. Additionally, their ability to manage internal electron and energy balances while maintaining high carbon fluxes to metabolites make them a prime candidate to serve as chassis organisms for further development and engineering. However, they are underutilized due to the difficulty of engineering on the genetic level, the lack of robust functional knowledge of their genomes, and the co-regulation of solventogenesis with undesirable sporulation processes. Resolving these limitations and filling these knowledge gaps will enable the broader use of Clostridium organisms for advanced biofuel production. The PI proposes to address critical knowledge gaps in the understanding and engineering of solventogenic Clostridium for biofuel and biochemical production.

Although the proposal is of good quality, it did not rank high enough in comparison with other Engineering A proposals to warrant funding. It was not placed in the “Priority I” category by the Final Panel because there is not enough money, even if additional funds become available, to fund more than the thirty-four (34) proposals listed in Appendix A.
PROPOSAL: 103A-19

TITLE: Determining Obesity-Influenced Changes in Chemical Sensitivity via Mutational Biomarkers in Kidney Cells

INSTITUTION: Tulane University Health Sciences Center

PRINCIPAL INVESTIGATOR: Mark Wilson, Ph.D.

COMMENTS: Obesity is a critical global public health issue and has been identified as a major risk factor for chronic diseases such as cancer, including kidney cancer. Obesity alters the metabolic profile of the liver and possibly other organs in toxicologically relevant ways. These alterations may confer increased sensitivity to chemicals that are bioactivated via altered pathways. The proposed research seeks to determine impacts of obesity on renal cell mutagenesis using in vitro and ex vivo approaches. This will be accomplished by the adaptation of the blood-based Pig-a gene mutation assay in TERT immortalized and primary renal proximal tubule cells. The primary cells will be isolated from obese and non-obese rodents. Existing in vitro systems are not sufficient to determine these types of effects because whole-body phenotypes, like obesity, are difficult or impossible to recapitulate in cell culture. In addition to answering basic questions related to how obesity impacts mutagenesis and development of a new in vitro genetic toxicology assay method, successful completion of this work will provide critical preliminary data for the development of a competitive national grant submission.

Although the proposal is of good quality, it did not rank high enough in comparison with other Biological Sciences II proposals to warrant funding. It was not placed in the “Priority I” category by the Final Panel because there is not enough money, even if additional funds become available, to fund more than the thirty-four (34) proposals listed in Appendix A.
Appendix F (continued):

**PROPOSAL: 108A-19**

**TITLE: Determining the Pathogenesis of Dystonia via Directly Reprogramming Human Neurons**

**INSTITUTION: University of Louisiana at Lafayette**

**PRINCIPAL INVESTIGATOR: Baojin Ding, Ph.D.**

**COMMENTS:** The overall goal of the proposed research is to determine the pathogenesis of dystonia via directly reprogramming human neurons from patient fibroblasts. Dystonia is the third-most-common movement disorder and the pathological mechanism remains largely unknown. DYT1 dystonia is caused by a mutation in the protein torsin A, which plays important roles in the maintenance of nuclear envelope (NE) morphology and mRNA nuclear exporting. DYT1 dystonia is a neurodevelopmental disorder and represents the most frequent and severe form of dystonia, providing an excellent source to understand the pathogenesis of this disease. However, the limited access to patient neurons and the lack of *in vitro* human neuron systems greatly impede the progress of dystonia research. Using lentiviral delivery of transcription factors, the PI has successfully generated human neurons from fibroblasts of DYT1 patients and healthy controls, making it possible to biochemically decipher the pathological mechanism. Using these disease-relevant human neurons, the long-term goals of this research are to determine the pathogenesis of dystonia and to identify molecular targets for therapeutic interventions.

Although the proposal is of good quality, it did not rank high enough in comparison with other Biological Sciences II proposals to warrant funding. It was not placed in the “Priority I” category by the Final Panel because there is not enough money, even if additional funds become available, to fund more than the thirty-four (34) proposals listed in Appendix A.
PROPOSAL: 111A-19

TITLE: Multi-Scale Structured Models of Infectious Disease Dynamics

INSTITUTION: University of Louisiana at Lafayette

PRINCIPAL INVESTIGATOR: Hayriye Gulbudak, Ph.D.

COMMENTS: The ecology and evolution of infectious disease operate on several interdependent scales. This is particularly true for vector-borne diseases, where coupled within-vector, within-host, and between vector-host population dynamics together determine the diversity and distribution of the pathogen. However, immunology and epidemiology are traditionally treated separately in disease modeling. The goal of this proposal is to develop multi-scale disease models, with an emphasis on vector-borne pathogens, connecting dynamics at nested levels: from cellular infection kinetics to population-level epidemics. The PI will incorporate complexities of viruses like Dengue and West Nile Virus, which have challenged both researchers and public health experts, and suggest the need for a unified immune-epidemiological framework. These problems are addressed in the proposed work by formulating ODE-PDE hybrid vector-host models structured by dynamic host immunity and vector infection kinetics. The structure of the proposed models is motivated not only by biology, but also to advance analytical and computational methods for an important class of dynamical systems in mathematical biology.

Although the proposal is of good quality, it did not rank high enough in comparison with other Mathematics proposals to warrant funding. It was not placed in the “Priority I” category by the Final Panel because there is not enough money, even if additional funds become available, to fund more than the thirty-four (34) proposals listed in Appendix A.
Appendix F (continued):

**PROPOSAL: 114A-19**

**TITLE:** Developing Methodologies for Detecting Misinformation on the Internet to Provide Truthful Information and Protect Impressionable Masses

**INSTITUTION:** University of Louisiana at Lafayette

**PRINCIPAL INVESTIGATOR:** Aminul Islam, Ph.D.

**COMMENTS:** Sustained funding in research and development from the United States government agencies over the past three decades has resulted in the high-speed Internet with information readily available to nearly the entire population. Almost all spectrums of the population now heavily depend on the Internet for many of their daily needs. However, the new and previously unimagined issue of disinformation is beginning to emerge as one of the most insidious problems on the Internet, and has huge implications for education, health, the economy, and even sustenance of truthful values in society. The research community is only now waking up to recognize this new problem which needs to be systematically researched and proper remedies developed to make the Internet truly usable and safe as originally envisioned. The PI proposes a systematic framework and methodology to target the problem of identifying disinformation, and algorithms and tools that can assist the users of the Internet. Formulations of mathematical modeling and theories from social sciences, natural language processing, and machine learning will be used in this research.

Although the proposal is of good quality, it did not rank high enough in comparison with other Computer and Information Sciences proposals to warrant funding. It was not placed in the “Priority I” category by the Final Panel because there is not enough money, even if additional funds become available, to fund more than the thirty-four (34) proposals listed in Appendix A.
Appendix F (continued):

**PROPOSAL: 125A-19**

**TITLE:** Modeling the Effects of Regional Flood Mitigation on Water Quality Dynamics in Tidal Watersheds

**INSTITUTION:** University of Louisiana at Lafayette

**PRINCIPAL INVESTIGATOR:** Robert Miller, Ph.D.

**COMMENTS:** Catastrophic flood events have recently sparked national interest in comprehensive flood mitigation strategies in coastal regions. While the immediate public safety benefits of large flood mitigation projects are undeniable, the unintended environmental consequences can be permanent. Public decision-makers run the risk of inadvertently amplifying storm water pollution problems and flood risks in downstream communities. The aim of the proposed research is to develop a monitoring program and baseline numerical models to explore the interaction between regional flood mitigation and water quality dynamics in low-gradient watersheds. The Teche-Vermilion Watershed (4,277 sq. mi.) located in South Louisiana was selected as the testbed for this initiative. Largely unstudied except for regulatory compliance purposes, this region experienced catastrophic floods in March 2012 and August 2016 and suffers from chronic water quality challenges (e.g., hypoxia, fecal contamination, turbidity, pesticides, saltwater intrusion). Moreover, the region was disconnected from the Atchafalaya Basin by a vast levee system following the Flood Control Act of 1928 authorizing the Mississippi River and Tributaries (MR&T) project until the introduction of a baseflow augmentation project in 1983. These factors, in addition to the flat topography, rapid urbanization, and artificial flow regulation, provide an ideal testing environment aimed at developing a firmer understanding of the role of hydromodification on water quality in hydraulically complex regions. As such, the PI will employ a continuous monitoring and modeling-based framework to explore how regional implementation of several of the most popular flood mitigation themes may impact the long-term dynamics of biologically significant stormwater quality variables.

Although the proposal is of good quality, it did not rank high enough in comparison with other Earth and Environmental Sciences proposals to warrant funding. It was not placed in the “Priority I” category by the Final Panel because there is not enough money, even if additional funds become available, to fund more than the thirty-four (34) proposals listed in Appendix A.
PROPOSAL: 138A-19

TITLE: Novel miRNA Function in Reprogramming Tumor-Associated Macrophages

INSTITUTION: University of Louisiana at Monroe

PRINCIPAL INVESTIGATOR: Georgios Matthaiolampakis, Ph.D.

COMMENTS: Hurdles in treatment of most cancers stem from the complex tumor microenvironment, consisting of a fibroblast-rich stromal shell, endothelial cells, tumor cells and infiltrated tumor associated macrophages (TAMs). Generally, TAMs can be polarized to two distinct phenotypes: the classically-activated (M1, inflammatory), and alternatively-activated (M2, anti-inflammatory). During cancer progression, TAMs switch to a M2-like phenotype, increasing fibroblastic morphology and promoting tumor cell proliferation, migration and chemoresistance. In contrast, M1 polarized TAMs inhibit angiogenesis and tumor growth, and improve survival and prognosis.

miRNA dysregulation in cancers is ubiquitously present. In lung and pancreatic cancers, miR-30a downregulation correlates with tumor onset and its metastatic potential. The PI’s preliminary work demonstrates that miR-30a has multifaceted, previously unknown, activities, affecting not only the tumor cells, but also macrophages. It targets key gene expressions associated with macrophage polarization, potentially promoting the more desirable M1 status. The PI will expand preliminary work to gain full understanding of the miR-30a activity against macrophages in a panel of cell lines. The PI will evaluate miR-30a in vivo using syngeneic subcutaneous mouse models of lung and pancreatic cancer. To overcome the inherent limitations of nucleic acid delivery, the PI has developed a drug delivery carrier using FDA-approved materials. This study is highly significant and innovative in illustrating the multifaceted activity of miR-30a for the treatment of cancers, and improving basic scientific knowledge of macrophage polarization and of a very promising miR.

Although the proposal is of good quality, it did not rank high enough in comparison with other Biological Sciences I proposals to warrant funding. It was not placed in the “Priority I” category by the Final Panel because there is not enough money, even if additional funds become available, to fund more than the thirty-four (34) proposals listed in Appendix A.
APPENDIX G

OUT-OF-STATE EXPERTS WHO SERVED AS FINAL AND FULL SUBJECT-AREA PANELISTS

FINAL PANEL

Richard Vulliet, Ph.D., D.V.M., Chair
Professor, Laboratory of Veterinary Cytotherapeutics
Department of Veterinary Molecular Biosciences
University of California at Davis

William A. Hyman, Sc.D.
Professor Emeritus of Biomedical Engineering
Department of Biomedical Engineering
Texas A&M University

Kirk Peterson, Ph.D.
Professor, Chair
Department of Chemistry
Washington State University
Appendix G (continued):

SUBJECT-AREA PANELS

BIOLOGICAL SCIENCES I (Human Biology, Immunology, Virology and Microbiology)

Eric Prossnitz, Ph.D., Chair
Professor of Cell Biology and Physiology
University of New Mexico Health Sciences Center

Clinton D. Allred, Ph.D.
Associate Professor
Department of Nutrition and Food Science
Texas A&M University

Helen J. Hathaway, Ph.D.
Professor of Cell Biology & Physiology
University of New Mexico Health Sciences Center

BIOLOGICAL SCIENCES II (Natural Sciences, Ecology, Microbiology, Genetics)

Steven N. Francoeur, Ph.D., Chair
Professor
Department of Biology
Eastern Michigan University

Heather E. Watts, Ph.D.
Associate Professor
School of Biological Sciences
Washington State University

Shahid S. Siddiqui, Ph.D.
Associate Professor
Department of Medicine
University of Chicago

AGRICULTURAL SCIENCES

Richard C. Pratt, Ph.D., Chairman
Director/Professor
Department of Plant and Environmental Sciences
New Mexico State University

Kevin E. Kenworthy, Ph.D.
Agronomy Department
University of Florida
Appendix G (continued):

**COMPUTER & INFORMATION SCIENCES**

**Sartaj Sahni, Ph.D., Chair**  
Distinguished Professor  
Department of Computer & Information Sciences and Engineering  
University of Florida

**Oscar H. Ibarra, Ph.D.**  
Professor  
Department of Computer Science  
University of California at Santa Barbara

**EARTH & ENVIRONMENTAL SCIENCES**

**Charles J. Wurrey, Ph.D., Chair**  
Curators’ Distinguished Teaching Professor Emeritus  
James C. Olson Professor Emeritus of Chemistry  
University of Missouri at Kansas City

**Patricia Solis, Ph.D.**  
Research Associate Professor  
Department of Geoscience  
Texas Tech University
Appendix G (continued):

ENGINEERING A

William A. Hyman, Sc.D., Chair
Professor Emeritus of Biomedical Engineering
Department of Biomedical Engineering
Texas A&M University

Samir Ahmed, Ph.D.
Professor
School of Civil & Environmental Engineering
Oklahoma State University

D. Mitchell Wilkes, Ph.D.
Associate Professor
Department of Electrical Engineering & Computer Science
Vanderbilt University

Daniel A. Gulino, Ph.D.
Associate Professor Emeritus
Department of Chemical & Biomedical Engineering
Ohio University

MATHEMATICS

Giles Auchmuty, Ph.D., Chairman
Professor
Department of Mathematics
University of Houston

M. Zuhair Nashed, Ph.D.
Professor
Department of Mathematics
University of Central Florida

PHYSICS & ASTRONOMY

J. Michael Shull, Ph.D., Chairman
Professor
Department of Astrophysical & Planetary Sciences
Center for Astrophysics and Space Astronomy (CASA)
University of Colorado, Boulder

Gary Scott Collins, Ph.D.
Professor
Department of Physics & Astronomy
Washington State University
Appendix G (continued):

SOCIAL SCIENCES

Kara S. Finnigan, Ph.D., Chairman
Professor
Warner School of Education and Human Development
University of Rochester

John Hartigan, Jr., Ph.D.
Professor
Department of Anthropology
University of Texas, Austin
APPENDIX H

RESEARCH COMPETITIVENESS SUBPROGRAM
FY 2018-19
SUMMARY OF PROPOSALS

153 TOTAL PROPOSALS

<p>| | | |</p>
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<td>Social Sciences</td>
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TOTAL FIRST-YEAR FUNDS REQUESTED: $7,778,113
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<th>Duration</th>
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<tr>
<td>001A-19</td>
<td>Dr. Jeb Fields</td>
<td>Agricultural Sciences</td>
<td>Louisiana State University Agricultural Center</td>
<td>3 Years</td>
<td>Engineering Resource Efficient Substrates through Modeling Water Dynamics in the Container System</td>
<td>$45,916 $30,000 $21,475 $97,391</td>
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<td>002A-19</td>
<td>Dr. Xing Fu</td>
<td>Biological Sciences I</td>
<td>Louisiana State University Agricultural Center</td>
<td>3 Years</td>
<td>Mechanisms controlling cardiac fibroblast activation and differentiation after myocardial infarction</td>
<td>$60,249 $60,249 $53,249 $173,747</td>
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<td>003A-19</td>
<td>Prof. Kevin Hoffstein</td>
<td>Biological Sciences II</td>
<td>Louisiana State University Agricultural Center</td>
<td>3 Years</td>
<td>Simulating Functional Effects of Injury, Disease, Healing, and Remodeling on Cortical Bone Structure</td>
<td>$48,220 $46,980 $46,980 $142,180</td>
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<td>004A-19</td>
<td>Dr. Changyoun Jeong</td>
<td>Agricultural Sciences</td>
<td>Louisiana State University Agricultural Center</td>
<td>3 Years</td>
<td>Evaluation of biological nitriication inhibitors from brassica crops to mitigate soil nitrous oxide emission, reduce nitrate leaching, and increase crop yields</td>
<td>$49,923 $50,013 $50,013 $149,949</td>
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<td>005A-19</td>
<td>Dr. Zongliang (Carl) Jiang</td>
<td>Agricultural Sciences</td>
<td>Louisiana State University Agricultural Center</td>
<td>3 Years</td>
<td>DNA Methylation on N6-Adenine during Bovine Preimplantation Embryo Development</td>
<td>$68,575 $66,575 $63,575 $198,725</td>
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<td>006A-19</td>
<td>Dr. Joan King</td>
<td>Agricultural Sciences</td>
<td>Louisiana State University Agricultural Center</td>
<td>1 Year</td>
<td>Prebiotics and Probiotics to Control Antibiotic Resistance in Food</td>
<td>$20,000 $0 $0 $20,000</td>
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<td>007A-19</td>
<td>Prof. Yongchan Kwon</td>
<td>Engineering A (Chemical, Civil, Electrical, etc.)</td>
<td>Louisiana State University Agricultural Center</td>
<td>3 Years</td>
<td>In vitro reprogramming of monodgnal biosynthesis</td>
<td>$56,773 $55,273 $53,773 $165,819</td>
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<td>008A-19</td>
<td>Dr. Qian Sun</td>
<td>Biological Sciences II</td>
<td>Louisiana State University Agricultural Center</td>
<td>3 Years</td>
<td>Omic and neuroanatomic investigation of chemosenesation in the Formosan subteraneeous termite</td>
<td>$67,300 $60,500 $55,000 $182,800</td>
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<td>009A-19</td>
<td>Dr. Blake Wilson</td>
<td>Agricultural Sciences</td>
<td>Louisiana State University Agricultural Center</td>
<td>2 Years</td>
<td>Economic Impact of Invasive Apple Snail to Louisiana Rice and Crawfish Production Systems</td>
<td>$31,000 $29,000 $0 $60,000</td>
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<tr>
<td>010A-19</td>
<td>Dr. Wenqing Xu</td>
<td>Agricultural Sciences</td>
<td>Louisiana State University Agricultural Center</td>
<td>3 Years</td>
<td>Microbiological risk assessment of Louisiana raw milk and raw-milk cheese</td>
<td>$48,390 $64,190 $52,550 $165,130</td>
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<td>011A-19</td>
<td>Dr. Mark Benfield</td>
<td>Earth/Environmental Sciences</td>
<td>Louisiana State University and A &amp; M College</td>
<td>3 Years</td>
<td>Determining the role of Mississippi River diversions in flaxing microplastics into coastal waters</td>
<td>$74,816 $49,133 $27,000 $150,949</td>
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<td>012A-19</td>
<td>Prof. Edgar Berdahl</td>
<td>Computer and Information Sciences</td>
<td>Louisiana State University and A &amp; M College</td>
<td>3 Years</td>
<td>Spatially Distributed Vibratoile Actuator Arrays (DVAA's) for Music-To-Vibratoile Sensory Augmentation</td>
<td>$46,000 $39,000 $36,000 $121,000</td>
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<td>013A-19</td>
<td>Prof. Bhuvnes Bharti</td>
<td>Engineering A (Chemical, Civil, Electrical, etc.)</td>
<td>Louisiana State University and A &amp; M College</td>
<td>3 Years</td>
<td>Directed binding of lignin nanoparticles to liquid-liquid interfaces: Understanding the effect of nanoparticle adsorption on interfacial properties</td>
<td>$64,000 $61,000 $60,000 $185,000</td>
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<td>014A-19</td>
<td>Dr. Adam Bohnet</td>
<td>Biological Sciences I</td>
<td>Louisiana State University and A &amp; M College</td>
<td>3 Years</td>
<td>Regulation of protein homestasis in the immortal germline</td>
<td>$65,825 $60,825 $55,825 $182,475</td>
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<td>015A-19</td>
<td>Prof. Matthew Chambers</td>
<td>Engineering A (Chemical, Civil, Electrical, etc.)</td>
<td>Louisiana State University and A &amp; M College</td>
<td>3 Years</td>
<td>Developing Molecular Photoelectrodes for Renewable Energy Storage and Catalysis</td>
<td>$59,785 $54,285 $45,785 $159,855</td>
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<td>016A-19</td>
<td>Dr. Shengli Chen</td>
<td>Engineering A (Chemical, Civil, Electrical, etc.)</td>
<td>Louisiana State University and A &amp; M College</td>
<td>1 Year</td>
<td>Theoretical Modelling of Cavity Expansion in Anisotropic Elastoplastic Soils with Applications to In Situ Test Interpretation</td>
<td>$20,000 $0 $0 $20,000</td>
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<td>017A-19</td>
<td>Dr. SeYeon Chung</td>
<td>Biological Sciences I</td>
<td>Louisiana State University and A &amp; M College</td>
<td>3 Years</td>
<td>Spatial regulation of myosin dynamics during tubular organ formation</td>
<td>$64,527 $62,640 $62,140 $189,307</td>
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<td>018A-19</td>
<td>Dr. Michael Dance</td>
<td>Biological Sciences II</td>
<td>Louisiana State University and A &amp; M College</td>
<td>3 Years</td>
<td>Stock structure and population connectivity of coastal pelagic fishes in the Gulf of Mexico</td>
<td>$87,175 $55,450 $34,800 $177,425</td>
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<td>019A-19</td>
<td>Dr. Thompson Davis</td>
<td>Social Sciences</td>
<td>Louisiana State University and A &amp; M College</td>
<td>1 Year</td>
<td>Examining the Effects of Preschool Curricula on Youth Behavioral, Psychological, and Executive Functioning</td>
<td>$19,981 $0 $0 $19,981</td>
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<td>020A-19</td>
<td>Dr. Noémie Elgrishi</td>
<td>Engineering A (Chemical, Civil, Electrical, etc.)</td>
<td>Louisiana State University and A &amp; M College</td>
<td>3 Years</td>
<td>Catalytic reduction of hexavalent chromium to reclaim contaminated water sources</td>
<td>$61,291 $46,313 $40,476 $148,080</td>
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<td>021A-19</td>
<td>Dr. Niloufar Emami</td>
<td>Engineering A (Chemical, Civil, Electrical, etc.)</td>
<td>Louisiana State University and A &amp; M College</td>
<td>3 Years</td>
<td>Flex-form: design and fabrication of additive flexible framework for the design of concrete interlocking modules</td>
<td>$59,249 $47,920 $46,351 $153,520</td>
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<td>022A-19</td>
<td>Dr. Cassandra Glaspie</td>
<td>Earth/Environmental Sciences</td>
<td>Louisiana State University and A &amp; M College</td>
<td>3 Years</td>
<td>Ecosystem impacts of invasive lionfish in shallow and mesophotic reefs in the Gulf of Mexico</td>
<td>$67,709 $63,649 $65,249 $196,607</td>
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<td>023A-19</td>
<td>Dr. M Guerrero-Plata</td>
<td>Biological Sciences I</td>
<td>Louisiana State University and A &amp; M College</td>
<td>1 Year</td>
<td>Novel molecular mechanism of inhibition of the antiviral response to respiratory syncytial virus</td>
<td>$20,000 $0 $0 $20,000</td>
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<td>024A-19</td>
<td>Dr. Alex Habefie</td>
<td>Earth/Environmental Sciences</td>
<td>Louisiana State University and A &amp; M College</td>
<td>3 Years</td>
<td>Building a Climatology of Mesoscale Convective Processes Using Image-classification and Machine-learning Techniques on Sequences of Radar Data</td>
<td>$55,299 $51,299 $49,299 $155,897</td>
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<td>025A-19</td>
<td>Dr. Eileen Haebig</td>
<td>Social Sciences</td>
<td>Louisiana State University and A &amp; M College</td>
<td>3 Years</td>
<td>Word Knowledge in Young Children with Autism Spectrum Disorders: The Developing Lexicon</td>
<td>$60,289 $59,289 $57,289 $176,867</td>
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<td>026A-19</td>
<td>Dr. Daphne Hartzeim</td>
<td>Social Sciences</td>
<td>Louisiana State University and A &amp; M College</td>
<td>3 Years</td>
<td>Behavioral and environmental predictors of language outcomes in nonverbal or minimally verbal children with autism spectrum disorders</td>
<td>$64,859 $60,159 $59,859 $184,877</td>
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<td>027A-19</td>
<td>Dr. Michael Henderson</td>
<td>Social Sciences</td>
<td>Louisiana State University and A &amp; M College</td>
<td>3 Years</td>
<td>The LSU Social Media Panel</td>
<td>$20,000 $0 $0 $20,000</td>
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<td>028A-19</td>
<td>Dr. Matthew Hiatt</td>
<td>Earth/Environmental Sciences</td>
<td>Louisiana State University and A &amp; M College</td>
<td>3 Years</td>
<td>The effects of depth on coral reproduction and implications for deep refuges</td>
<td>$79,926 $63,201 $53,646 $188,773</td>
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<tr>
<td>029A-19</td>
<td>Prof. Navid Jafari</td>
<td>Engineering A [Chemical, Civil, Electrical, etc.]</td>
<td>Louisiana State University and A &amp; M College</td>
<td>3 Years</td>
<td>Integration of agent-based occupant behavior modeling with building lighting energy simulation</td>
<td>$71,926 $63,201 $53,646 $188,773</td>
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<td>030A-19</td>
<td>Dr. Yong-ha Kim</td>
<td>Earth/Environmental Sciences</td>
<td>Louisiana State University and A &amp; M College</td>
<td>3 Years</td>
<td>Fate of Radioactive Particles in Aquatic Environments</td>
<td>$75,000 $65,000 $60,000 $176,000</td>
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<td>031A-19</td>
<td>Prof. Yunjung Kim</td>
<td>Social Sciences</td>
<td>Louisiana State University and A &amp; M College</td>
<td>1 Year</td>
<td>Articulatory modifications across speaking modes: Segment-based approach</td>
<td>$19,983 $0 $0 $19,983</td>
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<td>032A-19</td>
<td>Dr. Christine Lattin</td>
<td>Biological Sciences II</td>
<td>Louisiana State University and A &amp; M College</td>
<td>3 Years</td>
<td>The neurobiology of resilience to environmental challenges</td>
<td>$104,593 $51,539 $43,746 $199,878</td>
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<td>033A-19</td>
<td>Prof. Jimmy Lawrence</td>
<td>Engineering A [Chemical, Civil, Electrical, etc.]</td>
<td>Louisiana State University and A &amp; M College</td>
<td>3 Years</td>
<td>Multi-component, High-Performance Precision Polymers for Metal-free Magnetic Resonance Imaging Applications</td>
<td>$72,000 $64,000 $47,227 $183,227</td>
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<tr>
<td>034A-19</td>
<td>Dr. Hai Lin</td>
<td>Earth/Environmental Sciences</td>
<td>Louisiana State University and A &amp; M College</td>
<td>1 Year</td>
<td>Effect of Particle Inertia on the Distribution of Buoyant Contaminants in the Upper Ocean</td>
<td>$20,000 $0 $0 $20,000</td>
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<td>035A-19</td>
<td>Dr. Fengyan Lu</td>
<td>Physics/Astronomy</td>
<td>Louisiana State University and A &amp; M College</td>
<td>3 Years</td>
<td>Phase and Microstructural Analysis of High Entropy Ceramics for Extreme Environments</td>
<td>$59,251 $54,251 $51,251 $164,753</td>
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<td>036A-19</td>
<td>Dr. Heather Lucas</td>
<td>Social Sciences</td>
<td>Louisiana State University and A &amp; M College</td>
<td>3 Years</td>
<td>Neural dynamics of the interplay between memory and information sampling across the adult lifespan</td>
<td>$65,309 $61,194 $57,993 $184,496</td>
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<td>037A-19</td>
<td>Dr. Yong-Cheol Lee</td>
<td>Engineering A [Chemical, Civil, Electrical, etc.]</td>
<td>Louisiana State University and A &amp; M College</td>
<td>3 Years</td>
<td>Beyond the Building: Neutral Data Exchange Modules for Ensuring Data Interoperability of City Infrastructure Information Modeling (CIIM)</td>
<td>$59,251 $54,251 $51,251 $164,753</td>
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<td>038A-19</td>
<td>Dr. Karen Maruska</td>
<td>Biological Sciences II</td>
<td>Louisiana State University and A &amp; M College</td>
<td>1 Year</td>
<td>Machine Learning for Quantum Enhanced Metrology</td>
<td>$72,000 $64,000 $47,227 $183,227</td>
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<td>039A-19</td>
<td>Prof. Omar Magana-Louisa</td>
<td>Physics/Astronomy</td>
<td>Louisiana State University and A &amp; M College</td>
<td>3 Years</td>
<td>Machine Learning for Quantum Enhanced Metrology</td>
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<td>040A-19</td>
<td>Dr. Edward Ochse</td>
<td>Earth/Environmental Sciences</td>
<td>Louisiana State University and A &amp; M College</td>
<td>3 Years</td>
<td>Enhancing Mycelium-Based BioComposite for Novel Applications in Building Support and Design</td>
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<td>Dr. Richard Parker</td>
<td>Social Sciences</td>
<td>Louisiana State University and A &amp; M College</td>
<td>3 Years</td>
<td>Neural dynamics of the interplay between memory and information sampling across the adult lifespan</td>
<td>$65,309 $61,194 $57,993 $184,496</td>
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<td>042A-19</td>
<td>Prof. Omar Magana-Louisa</td>
<td>Physics/Astronomy</td>
<td>Louisiana State University and A &amp; M College</td>
<td>3 Years</td>
<td>Machine Learning for Quantum Enhanced Metrology</td>
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<tr>
<td>043A-19</td>
<td>Dr. Karen Maruska</td>
<td>Biological Sciences II</td>
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<td>Impacts of underwater anthropogenic noise on the brain and behavior of a sensitive social fish</td>
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<tr>
<td>044A-19</td>
<td>Prof. Steve Midway</td>
<td>Earth/Environmental Sciences</td>
<td>Louisiana State University and A &amp; M College</td>
<td>3 Years</td>
<td>Macroscale Patterns of CO2 in US Flowing Waters</td>
<td>$144,397</td>
</tr>
<tr>
<td>045A-19</td>
<td>Dr. Alexandra Noel</td>
<td>Biological Sciences II</td>
<td>Louisiana State University and A &amp; M College</td>
<td>3 Years</td>
<td>Lung physiological, cellular and molecular toxicity induced by electronic cigarette in mouse models of in utero and adult exposure.</td>
<td>$140,752</td>
</tr>
<tr>
<td>046A-19</td>
<td>Dr. Olalekan Ogunade</td>
<td>Biological Sciences II</td>
<td>Louisiana State University and A &amp; M College</td>
<td>3 Years</td>
<td>KCa2.2 regulation of synaptic pCaMKII [T286] translocation and its dysregulation in neuropsychiatric disorders.</td>
<td>$160,000</td>
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<tr>
<td>047A-19</td>
<td>Dr. Olufemi Olorode</td>
<td>Earth/Environmental Sciences</td>
<td>Louisiana State University and A &amp; M College</td>
<td>3 Years</td>
<td>A Study of the Multiscale Coupled Physical Mechanisms of Induced Seismicity Associated with the Development of Resource Shales</td>
<td>$135,000</td>
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<tr>
<td>048A-19</td>
<td>Prof. Craig Plaisance</td>
<td>Engineering</td>
<td>Louisiana State University and A &amp; M College</td>
<td>3 Years</td>
<td>Computational Investigation of Transition Metal Sulfides for Overcoming the Challenges of Electrocatalytic CO2 Reduction</td>
<td>$161,525</td>
</tr>
<tr>
<td>049A-19</td>
<td>Dr. Rachel Smith</td>
<td>Social Sciences</td>
<td>Louisiana State University and A &amp; M College</td>
<td>3 Years</td>
<td>The work-family experiences of low-wage workers: Improving well-being and performance</td>
<td>$127,253</td>
</tr>
<tr>
<td>050A-19</td>
<td>Dr. Brian Snyder</td>
<td>Earth/Environmental Sciences</td>
<td>Louisiana State University and A &amp; M College</td>
<td>2 Years</td>
<td>Machine Learning-based Autonomous Damage Diagnosis and Its Application to Civil Infrastructures</td>
<td>$109,098</td>
</tr>
<tr>
<td>051A-19</td>
<td>Dr. Chao Sun</td>
<td>Engineering</td>
<td>Louisiana State University and A &amp; M College</td>
<td>3 Years</td>
<td>Machine Learning-based Autonomous Damage Diagnosis and Its Application to Civil Infrastructures</td>
<td>$95,695</td>
</tr>
<tr>
<td>052A-19</td>
<td>Dr. Fang-Ting Tu</td>
<td>Mathematics</td>
<td>Louisiana State University and A &amp; M College</td>
<td>3 Years</td>
<td>Arithmetic Properties of Modular Forms and Hypergeometric Systems</td>
<td>$178,355</td>
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<tr>
<td>053A-19</td>
<td>Prof. Martin Tzanov</td>
<td>Physics/Astronomy</td>
<td>Louisiana State University and A &amp; M College</td>
<td>2 Years</td>
<td>Detecting Enriched Nuclear Material</td>
<td>$96,456</td>
</tr>
<tr>
<td>054A-19</td>
<td>Prof. Tuo Wang</td>
<td>Biological Sciences I</td>
<td>Louisiana State University and A &amp; M College</td>
<td>2 Years</td>
<td>Assessing the Molecular Effect of Antifungal Drugs on the Cell Wall Architecture of Pathogenic Fungi</td>
<td>$96,456</td>
</tr>
<tr>
<td>055A-19</td>
<td>Dr. Yejun Wu</td>
<td>Social Sciences</td>
<td>Louisiana State University and A &amp; M College</td>
<td>2 Years</td>
<td>Creating a General Verbal Phrase Classification Scheme and Domain-based Verb Phrase Classification Schemes</td>
<td>$176,375</td>
</tr>
<tr>
<td>056A-19</td>
<td>Dr. Masami Yoshimura</td>
<td>Biological Sciences I</td>
<td>Louisiana State University and A &amp; M College</td>
<td>3 Years</td>
<td>The Role of Type 7 Adenyl Cyclase in Ethanols Effects on Innate Immune Responses</td>
<td>$20,000</td>
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<tr>
<td>057A-19</td>
<td>Dr. Yimin Zhu</td>
<td>Engineering</td>
<td>Louisiana State University and A &amp; M College</td>
<td>1 Year</td>
<td>Design and engineering for human wellbeing: understanding the potential of immersive virtual environments for biophilic design</td>
<td>$20,000</td>
</tr>
<tr>
<td>058A-19</td>
<td>Dr. Guangsheng Zhuang</td>
<td>Earth/Environmental Sciences</td>
<td>Louisiana State University and A &amp; M College</td>
<td>3 Years</td>
<td>The Qaidam Basin—World’s highest desert: Wetter and Greener during the last glacial period?</td>
<td>$200,000</td>
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<tr>
<td>059A-19</td>
<td>Dr. Gerard Dumanacu</td>
<td>Agricultural Sciences</td>
<td>Louisiana State University at Alexandria</td>
<td>1 Year</td>
<td>Development of an accurate and robust multi-sensor data fusion method to detect adulteration and floral origin of honey</td>
<td>$200,000</td>
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<tr>
<td>060A-19</td>
<td>Prof. Guoyi Ke</td>
<td>Mathematics</td>
<td>Louisiana State University at Alexandria</td>
<td>3 Years</td>
<td>Developing New Preconditioning Techniques for the Magneto-hydrodynamic Thermal Interaction Problems</td>
<td>$200,000</td>
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<tr>
<td>061A-19</td>
<td>Prof. James Maxin</td>
<td>Physics/Astronomy</td>
<td>Louisiana State University in Shreveport</td>
<td>2 Years</td>
<td>Calculation of Vector-like Particle Masses in Supersymmetric Grand Unification Theories</td>
<td>$95,768</td>
</tr>
<tr>
<td>062A-19</td>
<td>Dr. Kaushalya Adhikari</td>
<td>Engineering</td>
<td>Louisiana Tech University</td>
<td>3 Years</td>
<td>Semi-Coprine Sparse Arrays</td>
<td>$134,153</td>
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<tr>
<td>063A-19</td>
<td>Dr. Shaurav Alam</td>
<td>Engineering</td>
<td>Louisiana Tech University</td>
<td>3 Years</td>
<td>Frontal polymerization for curing of fly ash based geopolymer materials</td>
<td>$142,171</td>
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<tr>
<td>064A-19</td>
<td>Dr. Hamzeh Bandaweel</td>
<td>Engineering</td>
<td>Louisiana Tech University</td>
<td>3 Years</td>
<td>Understanding and harnessing the role of nonlinearities in complex dynamics of vibration energy harvesting systems for enhanced performance metrics</td>
<td>$149,908</td>
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<tr>
<td>065A-19</td>
<td>Dr. Rakitha Beminwartha</td>
<td>Physics/Astronomy</td>
<td>Louisiana Tech University</td>
<td>3 Years</td>
<td>Measurements of Fundamental Features of Nuclear Structure Relevant for Nuclear Physics and Astrophysics Using Parity Violating Electron Scattering</td>
<td>$32,908</td>
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<tr>
<td>Proposal</td>
<td>PI Name</td>
<td>Category</td>
<td>Institution</td>
<td>Duration</td>
<td>Project Title</td>
<td>Amount Requested</td>
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<tr>
<td>066A-19</td>
<td>Dr. Xiang Chen</td>
<td>Engineering A [Chemical, Civil,</td>
<td>Louisiana Tech University</td>
<td>3 Years</td>
<td>Advancing Shape Memory Alloy Design and Capabilities: A Multiscale Insight</td>
<td>$47,733 $45,616 $46,301 $139,650</td>
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<tr>
<td>067A-19</td>
<td>Dr. Pradeep Chowriappa</td>
<td>Computer and Information Sciences</td>
<td>Louisiana Tech University</td>
<td>3 Years</td>
<td>A Situationally Aware Tailored Health Communications System for Mobile Health Interventions</td>
<td>$49,885 $49,984 $42,211 $142,080</td>
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<tr>
<td>068A-19</td>
<td>Prof. John Doyle</td>
<td>Mathematics</td>
<td>Louisiana Tech University</td>
<td>3 Years</td>
<td>Moduli spaces and Galois theory in arithmetic dynamics</td>
<td>$40,725 $41,194 $41,680 $123,599</td>
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<tr>
<td>069A-19</td>
<td>Prof. Benjamin Drostenko</td>
<td>Computer and Information Sciences</td>
<td>Louisiana Tech University</td>
<td>3 Years</td>
<td>Enabling Smart Communities to Mitigate the Effects of Natural Disasters Using IoT-Based Sensor Networks</td>
<td>$49,985 $50,184 $49,911 $150,080</td>
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<tr>
<td>070A-19</td>
<td>Dr. Levi Good</td>
<td>Biological Sciences II</td>
<td>Louisiana Tech University</td>
<td>3 Years</td>
<td>Modulation of Thalamocortical Circuitry in Epilepsy</td>
<td>$50,956 $53,116 $50,301 $154,373</td>
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<tr>
<td>071A-19</td>
<td>Prof. Kristopher Harris</td>
<td>Engineering A [Chemical, Civil,</td>
<td>Louisiana Tech University</td>
<td>3 Years</td>
<td>Stabilizing High-Energy Batteries Through Experiment and Modeling</td>
<td>$55,371 $50,906 $51,461 $157,738</td>
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<tr>
<td>072A-19</td>
<td>Dr. Jason Holderearth</td>
<td>Agricultural Sciences</td>
<td>Louisiana Tech University</td>
<td>3 Years</td>
<td>Spatially Explicit Agent-Based Climate Change Adaptation Model</td>
<td>$56,366 $62,436 $62,548 $181,350</td>
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<td>073A-19</td>
<td>Dr. Chen Liang</td>
<td>Social Sciences</td>
<td>Louisiana Tech University</td>
<td>1 Year</td>
<td>Peer-to-peer interactions during suicidal ideation development in LGBT youth online communities</td>
<td>$19,390 $0 $0 $19,390</td>
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<tr>
<td>074A-19</td>
<td>Dr. Elizabeth Matthews</td>
<td>Engineering A [Chemical, Civil,</td>
<td>Louisiana Tech University</td>
<td>3 Years</td>
<td>Flood Damage Reduction through Advanced Infrastructure Modeling</td>
<td>$62,759 $63,879 $64,959 $191,577</td>
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<tr>
<td>075A-19</td>
<td>Prof. Kasra Momeni</td>
<td>Engineering A [Chemical, Civil,</td>
<td>Louisiana Tech University</td>
<td>3 Years</td>
<td>A Multiscale Framework for Simulation Guided Synthesis of 2D Materials</td>
<td>$48,300 $45,549 $46,225 $140,074</td>
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<tr>
<td>076A-19</td>
<td>Prof. Andrew Peters</td>
<td>Engineering A [Chemical, Civil,</td>
<td>Louisiana Tech University</td>
<td>3 Years</td>
<td>Nanoscale Ordered Materials via Diblock Copolymer Blending</td>
<td>$53,956 $52,616 $51,301 $157,873</td>
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<tr>
<td>077A-19</td>
<td>Dr. Joshua Vandenbrink</td>
<td>Biological Sciences II</td>
<td>Louisiana Tech University</td>
<td>3 Years</td>
<td>Utilizing Genome-Wide Association to Identify Gravity Response Genes in Arabidopsis thaliana</td>
<td>$48,979 $49,438 $49,915 $148,332</td>
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<tr>
<td>078A-19</td>
<td>Prof. Shengnian Wang</td>
<td>Engineering A [Chemical, Civil,</td>
<td>Louisiana Tech University</td>
<td>1 Year</td>
<td>Sustainable nitrogen fixation into valuable chemicals using lithium cycle</td>
<td>$20,000 $0 $0 $20,000</td>
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<tr>
<td>079A-19</td>
<td>Dr. Abigail Bockus</td>
<td>Agricultural Sciences</td>
<td>Louisiana Universities Marine Consortium</td>
<td>3 Years</td>
<td>Assessing the physiological effects of feed pH on postprandial processing and growth in marine fish</td>
<td>$57,841 $58,539 $16,495 $32,875</td>
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<tr>
<td>080A-19</td>
<td>Dr. Marshall Bowles</td>
<td>Earth/Environmental Sciences</td>
<td>Louisiana Universities Marine Consortium</td>
<td>3 Years</td>
<td>A highly resolved spatial analysis of the biogeochemistry of salt marsh grass tissues</td>
<td>$64,614 $63,430 $60,036 $188,080</td>
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<tr>
<td>081A-19</td>
<td>Dr. Steven Rainey</td>
<td>Social Sciences</td>
<td>McNeese State University</td>
<td>3 Years</td>
<td>Preliminary Research into Potential Impacts of Dams and Commercial Waterways on Riverine Environments and Communities in Brazil</td>
<td>$55,393 $79,465 $22,268 $157,126</td>
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<tr>
<td>082A-19</td>
<td>Prof. Raj Boopathi</td>
<td>Earth/Environmental Sciences</td>
<td>Nicholls State University</td>
<td>1 Year</td>
<td>Microbial Mining of Termite Hindguts for Novel Microorganisms that Degrade Hazardous Chemicals</td>
<td>$20,000 $0 $0 $20,000</td>
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<tr>
<td>083A-19</td>
<td>Dr. Jonathan Willis</td>
<td>Biological Sciences II</td>
<td>Nicholls State University</td>
<td>3 Years</td>
<td>Determining microplastic abundance in Louisiana wetlands and their interaction with dominant macrophytes</td>
<td>$48,738 $45,938 $50,003 $144,679</td>
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<tr>
<td>084A-19</td>
<td>Dr. Emmin Zou</td>
<td>Biological Sciences II</td>
<td>Nicholls State University</td>
<td>1 Year</td>
<td>Does epidermal carbonic anhydrase mediate exoskeletal calcification in the post-ecdysial blue crab, Callinectes sapidus?</td>
<td>$20,000 $0 $0 $20,000</td>
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<tr>
<td>085A-19</td>
<td>Dr. Mehmet Bahadir</td>
<td>Earth/Environmental Sciences</td>
<td>Southeastern Louisiana University</td>
<td>1 Year</td>
<td>Sustainability Analysis of Atomic Diffusion Additive Manufacturing (ADAM) Technology for 3D Printing of Metal Parts</td>
<td>$20,000 $0 $0 $20,000</td>
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<tr>
<td>086A-19</td>
<td>Dr. Lisa Kuhn</td>
<td>Mathematics</td>
<td>Southeastern Louisiana University</td>
<td>3 Years</td>
<td>Simulation and Modeling of Smart Material Multiple Component Structures</td>
<td>$28,956 $34,440 $32,858 $96,254</td>
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<tr>
<td>087A-19</td>
<td>Dr. Kazim Sekeroglu</td>
<td>Computer and Information Sciences</td>
<td>Southeastern Louisiana University</td>
<td>1 Year</td>
<td>Classification of EEG Signals Utilizing 2D Temporal Patterns with Deep Learning</td>
<td>$18,109 $0 $0 $18,109</td>
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<tr>
<td>088A-19</td>
<td>Dr. Omer Soysal</td>
<td>Computer and Information Sciences</td>
<td>Southeastern Louisiana University</td>
<td>3 Years</td>
<td>A CAR framework for recognition of lung tumors utilizing ARM-based hierarchical deep learning</td>
<td>$52,916 $53,684 $54,870 $161,470</td>
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<tr>
<td>Proposal</td>
<td>PI Name</td>
<td>Category</td>
<td>Institution</td>
<td>Duration</td>
<td>Project Title</td>
<td>Amount Requested</td>
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<tr>
<td>089A-19</td>
<td>Dr. April Wright</td>
<td>Biological Sciences II</td>
<td>Southeastern Louisiana University</td>
<td>3 Years</td>
<td>Integrating Paleontological and Neontological Data for Phylogenetic Estimation in Ants (Formicidae)</td>
<td>$63,478 $63,613 $63,255 $190,346</td>
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<tr>
<td>090A-19</td>
<td>Dr. Yaser Banadaki</td>
<td>Computer and Information Sciences</td>
<td>Southern University and A&amp;M College - Baton Rouge</td>
<td>1 Year</td>
<td>Smart Additive Manufacturing Empowered by a Closed-loop Machine Learning Algorithm</td>
<td>$19,675 $0 $0 $19,675</td>
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<tr>
<td>091A-19</td>
<td>Dr. Fareed Dawan</td>
<td>Engineering A [Chemical, Civil, Electrical, etc.]</td>
<td>Southern University and A&amp;M College - Baton Rouge</td>
<td>2 Years</td>
<td>Additive Manufacturing and Electrical Characterization of a Solar-Harvesting Wind Turbine</td>
<td>$98,376 $98,376 $0 $196,752</td>
</tr>
<tr>
<td>092A-19</td>
<td>Dr. Yasser Ismail</td>
<td>Engineering A [Chemical, Civil, Electrical, etc.]</td>
<td>Southern University and A&amp;M College - Baton Rouge</td>
<td>2 Years</td>
<td>Low-Cost and High-Speed Homeland Security Video Surveillance system Over the Internet of Things [IoT]</td>
<td>$54,785 $54,785 $0 $109,570</td>
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<tr>
<td>093A-19</td>
<td>Prof. Devaiah Kambiranda</td>
<td>Agricultural Sciences</td>
<td>Southern University and A&amp;M College - Baton Rouge</td>
<td>3 Years</td>
<td>Anti-inflammatory role of enriched muscadine berry extracts in human alveolar epithelial cells exposed to electronic-cigarette vapors</td>
<td>$58,709 $59,709 $60,709 $179,127</td>
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<tr>
<td>094A-19</td>
<td>Dr. John-Clifford Obih</td>
<td>Biological Sciences I</td>
<td>Southern University at New Orleans</td>
<td>1 Year</td>
<td>Acquisition of Research Techniques in Bacterial Mechanisms of Action of Garcinia kola, and Collection of Preliminary Data that are Competitive for Federal Funding</td>
<td>$20,000 $0 $0 $20,000</td>
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<tr>
<td>095A-19</td>
<td>Dr. Ilya Tietzel</td>
<td>Biological Sciences I</td>
<td>Southern University at New Orleans</td>
<td>3 Years</td>
<td>Microplastic, Microbiome, Host Interactions</td>
<td>$41,997 $34,927 $34,927 $111,851</td>
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<tr>
<td>096A-19</td>
<td>Prof. Kathleen Ferris</td>
<td>Biological Sciences II</td>
<td>Tulane University</td>
<td>3 Years</td>
<td>The genetic basis of phenotypic plasticity and population differentiation in the cut-leaf Monkey flower</td>
<td>$58,385 $92,059 $48,276 $198,920</td>
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<tr>
<td>097A-19</td>
<td>Prof. Ryan Glusser</td>
<td>Physics/Astronomy</td>
<td>Tulane University</td>
<td>3 Years</td>
<td>Machine learning for quantum information science</td>
<td>$55,115 $55,086 $53,449 $163,650</td>
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<tr>
<td>098A-19</td>
<td>Dr. Alex Gunderson</td>
<td>Biological Sciences II</td>
<td>Tulane University</td>
<td>3 Years</td>
<td>Does the evolution of phenotypic plasticity promote adaptive radiation?</td>
<td>$72,338 $63,855 $51,859 $188,452</td>
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<tr>
<td>099A-19</td>
<td>Dr. Julie Markant</td>
<td>Social Sciences</td>
<td>Tulane University</td>
<td>3 Years</td>
<td>Mechanisms of reward-based modulation of selective attention during infancy</td>
<td>$50,157 $51,112 $50,028 $151,297</td>
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<tr>
<td>100A-19</td>
<td>Prof. Matthew Montemore</td>
<td>Engineering A [Chemical, Civil, Electrical, etc.]</td>
<td>Tulane University</td>
<td>3 Years</td>
<td>Breaking Correlations in Reaction Energies for Design of Highly Efficient Catalysts</td>
<td>$48,698 $47,151 $45,886 $141,735</td>
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<tr>
<td>101A-19</td>
<td>Prof. Nicholas Sandoval</td>
<td>Engineering A [Chemical, Civil, Electrical, etc.]</td>
<td>Tulane University</td>
<td>3 Years</td>
<td>Construction of bacterial chassis for advanced biofuel production</td>
<td>$50,313 $49,028 $48,276 $147,597</td>
</tr>
<tr>
<td>102A-19</td>
<td>Dr. Louis Krane</td>
<td>Biological Sciences I</td>
<td>Tulane University Health Sciences Center</td>
<td>3 Years</td>
<td>Exosomal microRNA as a Novel Biomarker for Aggressive Renal Cancer</td>
<td>$65,337 $69,892 $60,876 $195,095</td>
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<tr>
<td>103A-19</td>
<td>Dr. Mark Wilson</td>
<td>Biological Sciences II</td>
<td>Tulane University Health Sciences Center</td>
<td>3 Years</td>
<td>Determining obesity-influenced changes in chemical sensitivity via mutational biomarkers in kidney cells</td>
<td>$56,344 $62,296 $62,460 $180,100</td>
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<tr>
<td>104A-19</td>
<td>Prof. Michalis Charilou</td>
<td>Physics/Astronomy</td>
<td>University of Louisiana at Lafayette</td>
<td>3 Years</td>
<td>Multi-scale computational and experimental analysis of magnetic fields in nanomaterials</td>
<td>$74,659 $63,438 $60,106 $198,203</td>
</tr>
<tr>
<td>105A-19</td>
<td>Dr. Beenish Chaudhry</td>
<td>Computer and Information Sciences</td>
<td>University of Louisiana at Lafayette</td>
<td>3 Years</td>
<td>Designing Technologies to Enhance Art Museum-Based Interventions for People with Dementia and their Caregivers</td>
<td>$53,611 $53,118 $52,049 $158,778</td>
</tr>
<tr>
<td>106A-19</td>
<td>Dr. Li Chen</td>
<td>Computer and Information Sciences</td>
<td>University of Louisiana at Lafayette</td>
<td>3 Years</td>
<td>Smart Optimization Framework to Accelerate Distributed Deep Learning</td>
<td>$63,235 $56,650 $55,619 $175,504</td>
</tr>
<tr>
<td>107A-19</td>
<td>Dr. DILIP DEPAN</td>
<td>Engineering A [Chemical, Civil, Electrical, etc.]</td>
<td>University of Louisiana at Lafayette</td>
<td>3 Years</td>
<td>Modulation of Osteoblast Response on Nano-Crystalline Architecture for Bone Tissue Engineering</td>
<td>$58,854 $57,635 $56,196 $172,685</td>
</tr>
<tr>
<td>108A-19</td>
<td>Dr. Boqin DIN</td>
<td>Biological Sciences II</td>
<td>University of Louisiana at Lafayette</td>
<td>3 Years</td>
<td>Determining the pathogenesis of dystonia via directly reprogramming human neurons</td>
<td>$61,778 $59,710 $57,660 $178,148</td>
</tr>
<tr>
<td>109A-19</td>
<td>Dr. Farzad Ferdowsi</td>
<td>Engineering A [Chemical, Civil, Electrical, etc.]</td>
<td>University of Louisiana at Lafayette</td>
<td>3 Years</td>
<td>Real-Time Dynamic Behavioral Recognition in Microgrids</td>
<td>$47,086 $43,642 $39,210 $129,940</td>
</tr>
<tr>
<td>110A-19</td>
<td>Dr. Seyed Mahdi Ghamkhari</td>
<td>Engineering A [Chemical, Civil, Electrical, etc.]</td>
<td>University of Louisiana at Lafayette</td>
<td>3 Years</td>
<td>Enhancing Reliability of Power Grid under High Penetration of Distributed Energy Resources</td>
<td>$50,686 $49,669 $48,319 $148,670</td>
</tr>
<tr>
<td>Proposal #</td>
<td>PI Name</td>
<td>Category</td>
<td>Institution</td>
<td>Duration</td>
<td>Project Title</td>
<td>Amount Requested</td>
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<tr>
<td>111A-19</td>
<td>Dr. Hayriye Gulbudak</td>
<td>Mathematics</td>
<td>University of Louisiana at Lafayette</td>
<td>3 Years</td>
<td>Multi-Scale Structured Models of Infectious Disease Dynamics</td>
<td>$148,867</td>
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<tr>
<td>112A-19</td>
<td>Dr. Philip Hackney</td>
<td>Mathematics</td>
<td>University of Louisiana at Lafayette</td>
<td>3 Years</td>
<td>Operadic structures and homotopy coherence</td>
<td>$199,250</td>
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<tr>
<td>113A-19</td>
<td>Dr. Diana HERNANDEZ BAEZ</td>
<td>Earth/Environmental Sciences</td>
<td>University of Louisiana at Lafayette</td>
<td>3 Years</td>
<td>Development of a geothermal reservoir characterization methodology for improving thermal potential estimations and reservoir performance assessment in Louisiana Geothermal Reservoirs, integrating machine learning, well log analysis and numerical reservoir simulation</td>
<td>$198,835</td>
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<tr>
<td>114A-19</td>
<td>Dr. Animul Islam</td>
<td>Computer and Information Sciences</td>
<td>University of Louisiana at Lafayette</td>
<td>3 Years</td>
<td>Developing Methodologies for Detecting Misinformation on the Internet to Provide Truthful Information and Protect Impressionable Masses</td>
<td>$160,352</td>
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<tr>
<td>115A-19</td>
<td>Dr. Manavi Jadhav</td>
<td>Physics/Astronomy</td>
<td>University of Louisiana at Lafayette</td>
<td>3 Years</td>
<td>Laboratory investigations of Stardust</td>
<td>$199,283</td>
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<tr>
<td>116A-19</td>
<td>Dr. Seonhee Jung</td>
<td>Engineering A [Chemical, Civil, Electrical, etc.]</td>
<td>University of Louisiana at Lafayette</td>
<td>3 Years</td>
<td>Development of thin film hard mask materials replacing conventional polymer photoresists for high resolution features in semiconductor device fabrication</td>
<td>$149,375</td>
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<tr>
<td>117A-19</td>
<td>Dr. Michelle Jeanis</td>
<td>Social Sciences</td>
<td>University of Louisiana at Lafayette</td>
<td>3 Years</td>
<td>A Training Program for Law Enforcement Agency Social Media Use</td>
<td>$151,713</td>
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<tr>
<td>118A-19</td>
<td>Dr. Ahmed Khattab</td>
<td>Engineering A [Chemical, Civil, Electrical, etc.]</td>
<td>University of Louisiana at Lafayette</td>
<td>1 Year</td>
<td>NANOREINFORCED PIEZOELECTRIC CERAMIC FOR POWER GENERATION</td>
<td>$19,938</td>
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<tr>
<td>119A-19</td>
<td>Prof. Sungsu Kim</td>
<td>Mathematics</td>
<td>University of Louisiana at Lafayette</td>
<td>3 Years</td>
<td>STATISTICAL MODELING AND APPLICATIONS FOR DIRECTIONAL DATA ON SMOOTH MANIFOLDS</td>
<td>$144,772</td>
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<tr>
<td>120A-19</td>
<td>Dr. Robin Korycheff</td>
<td>Mathematics</td>
<td>University of Louisiana at Lafayette</td>
<td>3 Years</td>
<td>Algebraic structures and geometric phenomena in spaces of embeddings</td>
<td>$189,342</td>
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<tr>
<td>121A-19</td>
<td>Dr. Sun-A Lee</td>
<td>Social Sciences</td>
<td>University of Louisiana at Lafayette</td>
<td>1 Year</td>
<td>Cross-Cultural Study of Parental Psychological Control and Adolescents' Psychosocial Outcomes</td>
<td>$20,000</td>
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<tr>
<td>122A-19</td>
<td>Dr. Man Li</td>
<td>Social Sciences</td>
<td>University of Louisiana at Lafayette</td>
<td>3 Years</td>
<td>Multimethod approaches to understanding the complexity of psychological, social and community influences on academic outcomes</td>
<td>$148,618</td>
</tr>
<tr>
<td>123A-19</td>
<td>Dr. Justin Lynd</td>
<td>Mathematics</td>
<td>University of Louisiana at Lafayette</td>
<td>3 Years</td>
<td>Structure and cohomology in fusion systems</td>
<td>$190,632</td>
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<tr>
<td>124A-19</td>
<td>Dr. Robert Michael</td>
<td>Social Sciences</td>
<td>University of Louisiana at Lafayette</td>
<td>1 Year</td>
<td>SMART: Strengthening Mental Abilities through Relational Training</td>
<td>$20,000</td>
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<tr>
<td>125A-19</td>
<td>Dr. Robert Miller</td>
<td>Earth/Environmental Sciences</td>
<td>University of Louisiana at Lafayette</td>
<td>3 Years</td>
<td>Modeling the Effects of Regional Flood Mitigation on Water Quality Dynamics in Tidal Watersheds</td>
<td>$141,422</td>
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<tr>
<td>126A-19</td>
<td>Dr. M. Hussan Najafi</td>
<td>Computer and Information Sciences</td>
<td>University of Louisiana at Lafayette</td>
<td>3 Years</td>
<td>Energy-Efficient Machine Learning Systems with Deterministic Bit-Stream Processing</td>
<td>$160,262</td>
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<tr>
<td>127A-19</td>
<td>Dr. Davide Oppo</td>
<td>Earth/Environmental Sciences</td>
<td>University of Louisiana at Lafayette</td>
<td>3 Years</td>
<td>Marine fluids escape related to depositional setting and climate change [MARINE]</td>
<td>$185,961</td>
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<tr>
<td>128A-19</td>
<td>Dr. Emmanuel Revellame</td>
<td>Engineering A [Chemical, Civil, Electrical, etc.]</td>
<td>University of Louisiana at Lafayette</td>
<td>1 Year</td>
<td>Conversion of Wastewaters into Biopower and Bioproducts through Microbial Fuel Cell</td>
<td>$19,875</td>
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<tr>
<td>129A-19</td>
<td>Dr. Yongli Sang</td>
<td>Mathematics</td>
<td>University of Louisiana at Lafayette</td>
<td>3 Years</td>
<td>Jackknife Empirical Likelihood and its' Application</td>
<td>$136,632</td>
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<tr>
<td>130A-19</td>
<td>Dr. Erin Sigel</td>
<td>Biological Sciences II</td>
<td>University of Louisiana at Lafayette</td>
<td>3 Years</td>
<td>An Integrated Approach to Investigating Generic Variation in the Highly Invasive Fern Salvinia molesta</td>
<td>$125,181</td>
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<tr>
<td>131A-19</td>
<td>Dr. Charles Taylor</td>
<td>Computer and Information Sciences</td>
<td>University of Louisiana at Lafayette</td>
<td>3 Years</td>
<td>Spatial Descriptor of Cardiovascular Anatomy for Compression and Comparative Analytics</td>
<td>$162,856</td>
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<tr>
<td>132A-19</td>
<td>Dr. Amy Vesperkuas</td>
<td>Mathematics</td>
<td>University of Lafayette at Lafayette</td>
<td>3 Years</td>
<td>Understanding species persistence under reoccurring and interacting disturbances</td>
<td>$157,539</td>
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<tr>
<td>133A-19</td>
<td>Dr. Xiang-Sheng Wang</td>
<td>Mathematics</td>
<td>University of Lafayette at Lafayette</td>
<td>3 Years</td>
<td>Asymptotic analysis of difference and differential equations</td>
<td>$140,160</td>
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<tr>
<td>Proposal #</td>
<td>PI Name</td>
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<td>Institution</td>
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<td>Project Title</td>
<td>Amount Requested</td>
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<tr>
<td>134A-19</td>
<td>Dr. Yang Yang</td>
<td>Social Sciences</td>
<td>University of Louisiana at Lafayette</td>
<td>3 Years</td>
<td>Life after incarceration: The dynamic process of early reentry and family involvement for substance-involved offenders</td>
<td>$73,132</td>
</tr>
<tr>
<td>135A-19</td>
<td>Dr. Pengfei Zhang</td>
<td>Engineering A</td>
<td>University of Louisiana at Lafayette</td>
<td>3 Years</td>
<td>Self-healing of Composites under Various Fracture Modes and Monitoring of Crack Healing by Lamb Wave based Non-destructive Testing</td>
<td>$56,271</td>
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<tr>
<td>136A-19</td>
<td>Dr. Nektarios Barabtis</td>
<td>Biological Sciences II</td>
<td>University of Louisiana at Monroe</td>
<td>3 Years</td>
<td>Activation of the Unfolded Protein Response protects against LPS - induced lung endothelial barrier dysfunction</td>
<td>$65,262</td>
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<tr>
<td>137A-19</td>
<td>Dr. Jean Christopher Chamcheu</td>
<td>Biological Sciences II</td>
<td>University of Louisiana at Monroe</td>
<td>3 Years</td>
<td>Developing fiestin, a novel natural product co-targeting the PI3K/AKT/mTOR and MAPK for the management of psoriasis</td>
<td>$60,495</td>
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<tr>
<td>138A-19</td>
<td>Dr. Georgios Matthaiolampakis</td>
<td>Biological Sciences I</td>
<td>University of Louisiana at Monroe</td>
<td>3 Years</td>
<td>Novel miRNA Function in Reprogramming Tumor-Associated Macrophages</td>
<td>$40,000</td>
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<tr>
<td>139A-19</td>
<td>Dr. Siva Muru</td>
<td>Biological Sciences II</td>
<td>University of Louisiana at Monroe</td>
<td>3 Years</td>
<td>Synthesis and Anti-Cancer Activity Evaluation of Heterocyclic Compounds and Their Metal-Complexes</td>
<td>$44,082</td>
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<tr>
<td>140A-19</td>
<td>Dr. Catherine Newman</td>
<td>Biological Sciences II</td>
<td>University of Louisiana at Monroe</td>
<td>1 Year</td>
<td>Phylogenetics and genome evolution of woodland salamanders [genus Plethodon] in the US Coastal Plain</td>
<td>$15,000</td>
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<tr>
<td>141A-19</td>
<td>Dr. Ebrahim Amiri</td>
<td>Engineering A</td>
<td>University of New Orleans</td>
<td>3 Years</td>
<td>Design Analysis and Prototyping of Modular Axial Flux Switched Reluctance Motor for In-Wheel Drive Electric Vehicle</td>
<td>$43,278</td>
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<tr>
<td>142A-19</td>
<td>Dr. Christopher Belser</td>
<td>Biological Sciences II</td>
<td>University of New Orleans</td>
<td>3 Years</td>
<td>Influencing Success in Emerging Biology Majors through Career Planning</td>
<td>$52,475</td>
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<tr>
<td>143A-19</td>
<td>Prof. Peter Bierhorst</td>
<td>Physics/Astronomy</td>
<td>University of New Orleans</td>
<td>3 Years</td>
<td>New measures of quantum nonlocality for multiple parties</td>
<td>$49,445</td>
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<tr>
<td>144A-19</td>
<td>Dr. Sarah Black</td>
<td>Social Sciences</td>
<td>University of New Orleans</td>
<td>3 Years</td>
<td>Hormone profiles in children of depressed versus non-depressed mothers</td>
<td>$77,990</td>
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<tr>
<td>145A-19</td>
<td>Dr. Traci Cox</td>
<td>Biological Sciences II</td>
<td>University of New Orleans</td>
<td>3 Years</td>
<td>Coastal warming and acidification effects on submerged aquatic vegetation early life history stages</td>
<td>$59,910</td>
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<tr>
<td>146A-19</td>
<td>Prof. Christopher Harshaw</td>
<td>Biological Sciences II</td>
<td>University of New Orleans</td>
<td>1 Year</td>
<td>Effects of Early Antipyretic Exposure on Social-Emotional Behavior in a Mouse Model</td>
<td>$19,991</td>
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<tr>
<td>147A-19</td>
<td>Dr. Xueyan Liu</td>
<td>Mathematics</td>
<td>University of New Orleans</td>
<td>3 Years</td>
<td>Normalized Distribution-Based Clustering and Colocalization Methods for Spatial Data</td>
<td>$44,259</td>
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<tr>
<td>148A-19</td>
<td>Prof. Robert Mahon</td>
<td>Earth/Environmental Sciences</td>
<td>University of New Orleans</td>
<td>3 Years</td>
<td>3-dimensional sediment transport dynamics over river dunes</td>
<td>$60,938</td>
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<tr>
<td>149A-19</td>
<td>Dr. Bernard Rees</td>
<td>Biological Sciences II</td>
<td>University of New Orleans</td>
<td>1 Year</td>
<td>Genomic Basis of Individual Variation in Hypoxia Tolerance in Fish</td>
<td>$18,400</td>
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<tr>
<td>150A-19</td>
<td>Dr. Guillermo Rincon</td>
<td>Engineering A</td>
<td>University of New Orleans</td>
<td>2 Years</td>
<td>Inactivation of E. coli in secondary municipal wastewater effluents using a hybrid electrochemical photocatalytic technology</td>
<td>$56,409</td>
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<tr>
<td>151A-19</td>
<td>Dr. Benjamin Samuel</td>
<td>Computer and Information Sciences</td>
<td>University of New Orleans</td>
<td>3 Years</td>
<td>Skill and Empathy Building Through Interactive Storytelling</td>
<td>$49,020</td>
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<tr>
<td>152A-19</td>
<td>Dr. Krishna Phani Vadrevu</td>
<td>Computer and Information Sciences</td>
<td>University of New Orleans</td>
<td>3 Years</td>
<td>Defending against attacks on web browsers and users using machine learning techniques</td>
<td>$54,194</td>
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<tr>
<td>153A-19</td>
<td>Dr. Minhaz Zibtan</td>
<td>Computer and Information Sciences</td>
<td>University of New Orleans</td>
<td>2 Years</td>
<td>SecForce: Enforcing secure coding patterns in software engineering</td>
<td>$31,250</td>
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</table>

Total Number of Proposals submitted: 153
Total Funds Requested for First Year: $7,778,113
Total Funds Requested for Second Year: $6,826,072
Total Funds Requested for Third Year: $4,770,527
Total Funds Requested: $20,374,712