REPORT OF THE FINAL PANEL

BOARD OF REGENTS SUPPORT FUND R&D PROGRAM

RESEARCH COMPETITIVENESS SUBPROGRAM

FISCAL YEAR 2020-21

March 4, 2021

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BACKGROUND INFORMATION

One hundred eight (108) research proposals requesting a total of $5,236,350 in first-year funds were submitted for funding consideration in fiscal year (FY) 2020-21 to the Research Competitiveness Subprogram (RCS) of the Board of Regents Support Fund (BoRSF) R & D Program. Seven disciplines were eligible, including biological sciences I, biological sciences II, chemistry, computer and information sciences, earth and environmental sciences, engineering "B" (i.e., i.e., industrial, materials, mechanical, and other), and health and medical 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 eight proposals were assigned to seven subject-area panels, for funding consideration in FY 2020-21. 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 2020-21 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 seven 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.

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

[1]RCS 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.

comprehensive experience with EPSCoR-type programs, convened on March 4, 2021, 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-two proposals were discussed at length during this meeting.

The Panel was informed that approximately $1,350,000 had been budgeted to fund the first year of work of the RCS projects. Utilizing the criteria described previously, the Panel recommended thirty-six proposals, totaling **$1,642,954** 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-six are listed in descending order of merit for funding. It should be noted that although the Panel was informed that $1,350,000 was available for funding, it 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-six 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-six 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 information provided relative to who the consultants were or why their services were needed. The rationale for including 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 projects from 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 institutions should be strongly encouraged to provide release time to their investigators. The institutional provision of release time serves as 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 monies 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) (36)

Rank	Proposal No.	Institution	Recommended BoRSF 1st Year Funds	Recommended BoRSF 2nd Year Funds	Recommended BoRSF 3rd Year Funds
1	058A	Pennington	$29,594	$29,594	$24,594
1	102A	UNO	$47,855	$47,855	$47,855
1	031A	LSU A&M	$48,505	$46,005	$45,005
1	089A	ULM	$48,725	$38,100	$36,750
1	017A	LSU A&M	$55,401	$52,751	$52,401
1	048A	LA-TECH	$52,704	$52,629	$52,629
1	049A	LA-TECH	$46,206	$46,206	$46,206
1	093A	UNO	$38,284	$35,284	$35,284
1	013A	LSU A&M	$68,950	$56,950	$45,450
1	079A	TUHSC	$49,692	$48,793	$47,927
1	091A	ULM	$32,000	$32,000	$32,000
1	024A	LSU A&M	$59,229	$49,729	$------
1	072A	TULANE	$58,816	$58,816	$49,117
1	104A	UNO	$18,750	$------	$------
15	053A	LOYOLA	$19,350	$------	$------
16	020A	LSU A&M	$20,000	$------	$------
17	074A	TULANE	$65,300	$51,066	$39,959
18	106A	UNO	$47,535	$47,535	$-----
19	060A	Southeastern	$47,051	$37,051	$32,051
20	047A	LA-TECH	$45,689	$42,989	$20,033
21	087A	ULL	$58,915	$55,415	$54,915

APPENDIX A (continued)

RCS PROPOSALS HIGHLY RECOMMENDED FOR FUNDING (PRIORITY ONE)

22	032A	LSU A&M	$58,500	$48,700	$39,800
23	078A	TUHSC	$66,584	$66,584	$66,584
24	081A	ULL	$56,733	$45,733	$42,733
25	076A	TULANE	$61,211	$61,211	$61,211
26	100A	UNO	$55,166	$48,998	$43,276
27	045A	LA-TECH	$45,661	$42,911	$42,911
28*	077A	TUHSC	$37,091	$37,091	$37,091
29	037A	LSU A&M	$59,820	$41,600	$------
30	010A	LSU A&M	$20,000	$------	$------
31	054A	NICHOLLS	$20,000	$------	$------
32	008A	LSU-AG	$46,504	$46,000	$45,200
33	080A	TUHSC	$41,304	$41,304	$41,304
34	038A	LSU A&M	$19,000	$------	$------
35	092A	ULM	$46,329	$44,231	$44,201
36	050A	LA-TECH	$50,500	$47,500	$47,500
	TOTALS		**$1,642,954**	**$1,400,631**	**$1,173,987**

****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 (6)

011A 014A 018A 043A 082A 086A

***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 2021.

APPENDIX C

MERITORIOUS PROPOSALS RANKED PRIORITY TWO BY THE SUBJECT-AREA PANELS AND CONSIDERED BY THE FINAL PANEL BUT NOT RECOMMENDED FOR FUNDING (47)

002A	025A	041A	065A	096A
004A	026A	042A	068A	098A
006A	027A	044A	069A	099A
007A	028A	046A	073A	101A
015A	029A	056A	075A	103A
016A	030A	057A	083A	105A
019A	033A	059A	084A	107A
021A	034A	061A	085A	------
022A	035A	063A	088A	------
023A	036A	064A	094A	------

***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 2021.

APPENDIX D

PROPOSALS RANKED PRIORITY THREE OR DECLARED INELIGIBLE BY THE SUBJECT-AREA PANELS AND NOT RECOMMENDED FOR FUNDING (19)

001A	090A
003A	095A
005A	097A
009A	108A
012A	------
039A	------
040A	------
051A	------
052A	------
055A	------
062A	------
066A	------
067A	------
070A	------
071A	------

***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 2021.

APPENDIX E

COMMENTS AND FUNDING STIPULATIONS
ON PROPOSALS HIGHLY RECOMMENDED FOR FUNDING
(PRIORITY ONE)

General Comments and Stipulations

This section provides comments and stipulations set forth as conditions of funding for the thirty-six (36) proposals highly recommended for awards by the Panel. The Panel would again like to emphasize that it considered the first fourteen (14) proposals to be of relatively equal merit and, therefore, the order in which they have been listed is arbitrary. Proposals ranked fifteen through thirty-six 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, it 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: 058A-21 **RANK: 1**

TITLE: Central Zbtb16 Function in the Control of Energy Balance

INSTITUTION: Pennington Biomedical Research Center

PRINCIPAL INVESTIGATOR: Sangho Yu, Ph.D.

COMMENTS: Weight regain after weight loss is a major problem in obesity treatment and is attributed to the powerful counterregulatory mechanism of the energy homeostasis system. The PI has discovered a novel transcription factor, Zinc finger and BTB domain containing 16 (Zbtb16), in the mouse hypothalamus and accumulated preliminary data supporting its role in energy homeostasis, especially in response to energy deficit. The PI proposes to investigate the physiological function and mechanism of Zbtb16 in the arcuate nucleus of the hypothalamus (ARC) in the control of energy balance, with a particular emphasis on weight regain after weight loss. The PI hypothesizes that Zbtb16 in the ARC ($Zbtb16^{ARC}$) serves to coordinate adaptive responses to energy deficit favoring the restoration of energy balance. The overarching goal of the proposed research is to establish the functional importance of the mechanistic basis of $Zbtb16^{ARC}$ in regulation of energy homeostasis.

It is recommended that the proposed budget be reduced to provide one-month summer salary, including fringe benefits, for the PI and other expense charges of $5,000, for a year one budget of $29,594. A similar budget of $29,594 that provides other expense charges of $10,000 is recommended for year two. A budget of $24,594 is recommended for year three.

Year 1: $29,594 **Year 2: $29,594** **Year 3: $24,594**

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

Appendix E (continued):

PROPOSAL: 102A-21 **RANK: 1**

TITLE: Evaluating Shared Authorship in Interactive Story Worlds

INSTITUTION: University of New Orleans

PRINCIPAL INVESTIGATOR: Benjamin Samuel, Ph.D.

COMMENTS: Recent work performed by the PI and others has begun to explore the capabilities of procedurally generated narrative—using computational methods to produce and track character personalities, dramatic plot points, social relationships, settings, and other narrative material—and how such dynamically produced works could be applied to allow players to produce stories of their own. The PI's previous work in this area has shown promise and has led to research and development of multiple works of computational narrative, interdisciplinary collaborations, and publications in traditional computer science conferences and journals, as well as conferences focusing specifically on games, electronic literature, and digital storytelling. The objective of this research is to generate data from these existing computational narrative experiences to automatically determine the types of stories being told within them, and then apply those determinations towards enhancing the player experience of engaging with the stories. The PI's previous work tracked complicated narrative states but enforced little to no dramatic structure. This led to experiences that—though unique for each player—might not adhere to the notion of a structurally sound narrative. The PI hypothesizes that providing the ability to recognize dramatic structure, familiar plots, story tropes, and causal chains of events—i.e., narrative patterns—for computational narrative experiences will lead players to feel more creative ownership, pride in the resulting narratives, and confidence as writers and storytellers.

It is recommended that the proposed budget be reduced to provide limited travel support of $2,000, resulting in a year one budget of $47,855. Similar budgets of $47,855 are recommended for year two and year three.

Year 1: $47,855 **Year 2: $47,855** **Year 3: $47,855**

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

Appendix E (continued):

PROPOSAL: 031A-21 **RANK: 1**

TITLE: Synthesis of Acorane Natural Products Against Metabolic Disorders

INSTITUTION: Louisiana State University and A&M College

PRINCIPAL INVESTIGATOR: Fatima Rivas, Ph.D.

COMMENTS: Natural products (NPs) are a traditional source of medicines, and about 30% of NPs are in clinical trials. NPs exhibit a high degree of stereochemistry, which contributes to their ability to exert selective biological activity. The PI recently disclosed the exact mode of action of the acorane NP, colletoic acid (CA), as a selective inhibitor of 11β-Hydroxysteriod dehydrogenase type 1 (11β-HSD1), which ultimately regulates glucocorticoid action. Dysregulated glucocorticoid signaling drives adipose dysfunction, which is observed in metabolic syndrome (MetS). The development of improved methodologies to access the acorane NPs and the corresponding probes will provide a drug discovery platform. Previous total synthesis of CA highlighted a Heck reaction to install the required quaternary spirocenter via chiral auxiliary. The PI is currently pursuing an asymmetric catalytic ene reaction via Lewis acid-Lewis acid assisted (LLA) and innovative photocatalytic asymmetric intramolecular spirocyclization (PAIS) strategies to readily access the CA core to improve potency and solubility properties. The PI will investigate the fundamental reactivity of these reactions to generate superior CA derivatives and evaluate them in cellular models in combination with other modulators to maximize their therapeutic effect against MetS.

The PI has (1) pending proposal:

- DoD – entitled "Validating the Mode of Action of Ergosterol Peroxide as a Selective Breast Cancer Inhibitor" in the amount of $375,000 for the period 08/01/2021 – 07/01/2024

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 support for one full-time GRA at $26,500, rather than two GRAs at 75% effort, resulting in a year one budget of $48,505. Budgets of $46,005 and $45,005 are recommended for year two and year three, respectively.

Year 1: $48,505 **Year 2: $46,005** **Year 3: $45,005**

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

Appendix E (continued):

PROPOSAL: 089A-21 **RANK: 1**

TITLE: Role and Modulation of mTOR/Rac1 Pathway in Skin Inflammation and Psoriasis

INSTITUTION: University of Louisiana at Monroe

PRINCIPAL INVESTIGATOR: Jean Christopher Chamcheu, Ph.D.

COMMENTS: The goal of the proposed research is to define the role of the mTOR signaling pathway in skin inflammation, focusing on psoriasis and to develop fisetin, a dietary small molecule co-targeting as a safe and effective option. Psoriasis is the most common chronic and currently incurable immune-mediated skin disease, affecting over eight million Americans. Psoriasis pathogenesis is not fully understood, but involves dynamic interplay among immune cells and the skin where dysregulated immune-mediators and signaling pathways correlate with severity. The PI identified P13K/Akt/mTOR/Rho pathway activation in human psoriatic and imiquimod-(IMQ)-induced mouse psoriasiform dermatitis, and later identified fisetin as a mTOR/Rac1/S6K1 pathway inhibitor. The PI hypothesizes that co-targeting the mTOR and IL-17 networks by fisetin/bioactive analogs may be effective for treating psoriasis. The PI aims to (1) validate mTOR's role in psoriasis through its modulation in keratinocytes and yb assessing fisetin's efficacy in altering mTOR/Rac1 modulated challenges in 2D and FTRHSP cultures, and (2) develop a keratinocyte-specific mTOR knockout mouse model for studying complex interactions and establishing the *in vivo* role of mTOR in psoriasis. Successful completion of this project will enhance understanding of mTOR's role in psoriasis and facilitate development of fisetin or analogs thereof as agents against psoriasis and other autoimmune disorders.

It is recommended that the proposed budget be reduced to provide undergraduate student support of $2,000 and eliminate consultant and other expense charges, resulting in a year one budget of $48,725. Budgets of $38,100 and $36,750 are recommended for year two and year three, respectively.

Year 1: $48,725 **Year 2: $38,100** **Year 3: $36,750**

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

Appendix E (continued):

PROPOSAL: 017A-21 **RANK: 1**

TITLE: Flood Performance of Above Ground Storage Tanks

INSTITUTION: Louisiana State University and A&M College

PRINCIPAL INVESTIGATOR: Sabarethinam Kameshwar, Ph.D.

COMMENTS: Above-ground storage tanks (ASTs) are extensively used in petrochemical facilities for storing large volumes of hazardous substances, and their proximity to water bodies, such as rivers, makes them susceptible to floods. Even though past flood-related AST failures have been observed to cause catastrophic spills, tank design guidelines and previous studies have not addressed flood failures. The overarching goal of the proposed research is to model and quantify the flood performance of ASTs, specifically for some of the most common modes of failure: flotation and sliding damage modes (considering failure of connection, pipelines, and shell rupture), bottom plate failure, and debris impact. Finite element models will be developed for the failure modes to understand the flood performance of ASTs. Failure probability models parameterized on key variables, such as the level of flooding, tank dimensions, properties of the stored contents, and material properties, will be developed. The results from the proposed research will yield new knowledge of failure mechanisms of ASTs and insight into the relative likelihood of different damage modes of ASTs during floods.

The PI has (2) pending proposals:

- NSF – entitled "Collaborative Research: Cascading Effects of Tsunami-Built-Environment-Debris Interaction on Community Level Building Resilience" in the amount of $259,789 for the period 01/2021 – 12/2024
- NSF – entitled "Collaborative Research: Quantifying Time Varying Hurricane Surge and Wave Induced Pressure, Damage, and Fragility of Elevated Residential Structures" in the amount of $234,899 for the period 06/2021 – 05/2024

Should the PI receive funding for either of the 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 undergraduate student support of $2,000 and supplies charges of $2,000, resulting in a year one budget of $55,401. A budget of $52,751 that provides limited travel support of $2,000 is recommended for year two. In year three, it is recommended that the project be funded at the level requested, i.e., $52,401.

Year 1: $55,401 **Year 2: $52,751** **Year 3: $52,401**

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

Appendix E (continued):

PROPOSAL: 048A-21 **RANK: 1**

TITLE: Developing Continuous Measures of Trust for Human-Machine Automation Systems

INSTITUTION: Louisiana Tech University

PRINCIPAL INVESTIGATOR: Mary Fendley, Ph.D.

COMMENTS: In today's complex systems, a mismatch between the reliability of automation and operator trust can cause the operator either to ignore the automated assistance or to become overly reliant upon it. Either outcome can result in costly errors. The goal of the proposed research is to develop continuous, non-intrusive measures of trust in those human-machine interactions that influence systems use and performance. Specifically, this project will evaluate eye tracking as a valid measure of human trust in automation. The project proposes a series of studies involving eye tracking and validated subjective trust methods to determine which visual behavior metrics best correlate with human trust in automation. Identifying these metrics will provide a more complete picture of operator trust; support development of a more informed and likely more nuanced automated support aid; and help a diverse set of entities, from the military to biomedical and healthcare device manufacturers, improve human-machine system performance in their individual domains.

It is recommended that the project be funded at the level requested, i.e., $52,704 for year one, $52,629 for year two, and $52,629 for year three.

Year 1: $52,704 **Year 2: $52,629** **Year 3: $52,629**

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

Appendix E (continued):

PROPOSAL: 049A-21 **RANK: 1**

TITLE: Enhanced Investigation of Material Flood Damage to Support Multi-Scale Flood Damage Prediction

INSTITUTION: Louisiana Tech University

PRINCIPAL INVESTIGATOR: Elizabeth Matthews, Ph.D.

COMMENTS: Current flood-loss prediction (FLP) practice shows great limitations in accurately predicting losses at multiple scales. Much of the inadequacy is based on whole-building approaches that can accurately predict only high-level losses. This can result in significant analysis error, which leaves states like Louisiana with a very limited tool for accurately calculating the benefits of mitigation projects. The primary goal of the proposed research is to develop a more robust and universal component-level FLP model for buildings. The model will allow a more detailed analysis of individual buildings, but can also be translated effectively to estimate flood losses for building groups. Two phases of work are proposed achieve the project objective. In Phase 1, experimental testing will be used to collect flood-damage material behavior data; in Phase 2, an FLP model will be developed to estimate component-level losses considering Phase 1 results. The results of this project will serve as the foundation for finding ways through improved data collection and damage function development to significantly modernize approaches to quantifying risks to communities and benefits of mitigation projects.

The PI has (1) pending proposal:

- NSF ITEST – entitled "Bulldog Grand Challenge Research, Education, and Training (Be-GREAT) Program" in the amount of $1,403,935 for the period 05/2021 – 04/2025

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 project be funded at the level requested, i.e., $46,206 for year one, $46,206 for year two, and $46,206 for year three.

Year 1: $46,206 **Year 2: $46,206** **Year 3: $46,206**

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

Appendix E (continued):

PROPOSAL: 093A-21 **RANK: 1**

TITLE: Dual-Pole Permanent Magnet Synchronous Machines for Marine Propulsion: Analytical Modeling and Magnetic Volume Reduction

INSTITUTION: University of New Orleans

PRINCIPAL INVESTIGATOR: Ebrahim Amiri, Ph.D.

COMMENTS: Given the costs of high-energy Rare-Earth (RE) materials, there is a growing interest within the naval industry in breakthrough technologies that reduce the consumption of high-energy Permanent Magnets (PMs) in electromechanical energy conversion systems. The project proposes innovative solutions to minimize the use of expensive high-energy magnetic materials in electric machines. The first solution is based on the concept of hybrid magnetic structures, in which a portion of the high-energy RE magnet is replaced by the low-energy Ferrite magnet. The second solution is based on the concept of "Induced Poles", in which a portion of the physical RE magnets is removed and replaced by induced magnets. The proposed research will focus on PM motors used for electric propulsion of naval and security ships. These vessels are often powered by synchronous motors at low speed, for loitering and station-keeping, and by diesels or gas turbines at high speed, for cruising and evasive maneuvers, often with efficiency and reliability concerns. An important objective is to improve the efficiency and the reliability of the drive unit by replacing existing CODLAD/CODLAG propulsion systems with the emerging technology of dual-pole synchronous machines. The design process will involve analytical modeling at the early design stage and numerical analysis during the final stages, for design refinement. A down-scale prototype of the final design will be built for experimental validation.

It is recommended that the proposed budget be reduced to provide one-half (½) month summer salary, including fringe benefits, for the PI (not to include support for the co-PI), resulting in a year one budget of $38,284. Budgets of $35,284 are recommended for year two and year three. Two charges in year three should be moved to the appropriate budget category: equipment charges of $3,000 to supplies and other expense charges (conference registration) of $500 to travel.

Year 1: $38,284 **Year 2: $35,284** **Year 3: $35,284**

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

Appendix E (continued):

PROPOSAL: 013A-21 **RANK: 1**

TITLE: Coupled Ecological Function of Shoals and Production Platforms as Refuge from Hypoxia-Induced Habitat Compression

INSTITUTION: Louisiana State University and A&M College

PRINCIPAL INVESTIGATOR: Michael Dance, Ph.D.

COMMENTS: An improved understanding of how mobile marine organisms respond to and avoid hypoxia is critically needed. The growing impacts of coastal land loss in Louisiana from changing climate, hurricanes, and changes in freshwater (and sediment) flow have increased demand for sand resources from important nursery habitat shoals to support coastal restoration projects and to mitigate future land loss. It has been proposed that shoals and production platforms may function as refuges from hypoxia by providing vertical relief from surrounding hypoxic waters; however, this hypothesis has yet to be tested, and there is a need to examine the complex dynamics between shoals, platforms, and hypoxia to better understand the ecological function of shoal ecosystems as nursery habitat in the northern Gulf of Mexico. This project will utilize acoustic positioning technology to track three-dimensional movements of a model finfish species at high spatial and temporal resolutions, to examine avoidance behaviors and response to hypoxia. Specifically, the proposed study will characterize three-dimensional movement and habitat use of juvenile finfish at a model platform habitat located on Ship Shoal during normoxic and hypoxic events. Data will be used to develop and inform new models to improve understanding of organismal response to hypoxia and the potential of oil and gas platforms to serve as vertical refuge for juvenile finfish during hypoxia.

The PI has (2) pending proposals:

- NOAA – entitled "Examining the Ecological Function of Fish Aggregating Devices (FADs) as Habitat for Highly Migratory Species in the Northern Gulf of Mexico" in the amount of $247,108 for the period 09/2021 – 08/2022
- NOAA – entitled "Stock Structure of King Mackerel and Cobia in the U.S. Gulf of Mexico" in the amount of $513,447 for the period 09/2021 – 08/2024

Should the PI receive funding for either of the 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 project be funded at the level requested, i.e., $68,950 for year one, $56,950 for year two, and $45,450 for year three.

Year 1: $68,950 **Year 2: $56,950** **Year 3: $45,450**

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

Appendix E (continued):

PROPOSAL: 079A-21 **RANK: 1**

TITLE: Enhancing In Vivo Efficacy of Klebsiella Pneumoniae-Specific T Cells for Therapeutic Development

INSTITUTION: Tulane University Health Sciences Center

PRINCIPAL INVESTIGATOR: Janet McCombs, Ph.D.

COMMENTS: Infections due to *Klebsiella pneumoniae* cause millions of deaths worldwide every year, with a significant impact on older adults and the immunocompromised. Importantly, there is an increasing prevalence of multidrug resistant (MDR) *K. pneumoniae* strains for which there are limited therapeutic options, underscoring the need for novel treatment strategies. To address this issue, the PI's long-term goal is to develop an adoptive cell transfer (ACT)-based immunotherapy for combatting *K. pneumoniae* infections. In ACT therapy, antigen-specific T cells are transferred into the host to provide a directed and potent immune response to disease. While such methods have shown promise in viral and fungal infections, antimicrobial efficacy could be improved through optimization of T cell homing to sites of infection and better understanding of T cell-mediated signaling pathways necessary for eliciting a robust immune response. In this project, the PI will use *K. pneumoniae*-specific polyclonal T cells, RNAseq, and an *in vivo* model of infections to (1) identify genes required for efficient T cell homing and (2) elucidate mechanisms of T cell-mediated bacterial clearance. These studies will enhance the development of ACT-based therapies for treating bacterial infections and will offer much-needed insights into T cell-mediated mechanisms of host defense against *K. pneumoniae*.

The PI has (1) pending proposal:

- NIH – entitled "Novel T Cell Therapies for Treating Multi-Drug Resistant *Klebsiella Pneumoniae*" in the amount of $1,500,000 for the period 08/2021 – 06/2026

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 project be funded at the level requested, i.e., $49,692 for year one, $48,793 for year two, and $47,927 for year three.

Year 1: $49,692 **Year 2: $48,793** **Year 3: $47,927**

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

Appendix E (continued):

PROPOSAL: 091A-21 **RANK: 1**

TITLE: Novel miRNA-Based Therapeutics for Regulating Cell Cycle Progression

INSTITUTION: University of Louisiana at Monroe

PRINCIPAL INVESTIGATOR: Georgios Matthaiolampakis, Ph.D.

COMMENTS: Despite significant efforts to develop early detection and treatment capabilities, Lung Cancer (LC) is often diagnosed at an advanced stage, with the average five-year survival rate being <15%. The absence of drugs to treat LC that directly target the cell cycle and cell cycle-associated genes, such as Cyclin-Dependent Kinases (CDKs), presents a gap in current therapeutic approaches. The proposed research (a) studies the effect of natural products on targeting the cell cycle and their mechanism of action against LC; and (b) evaluates a novel combination of miRs. The proposed work addresses the treatment of LC, the most lethal human cancer, utilizes natural agents to target the cell cycle, and develops a translatable approach for nucleic acid-based therapeutic applications. The proposed research is clinically translatable, with significant potential to benefit patients with LC or other types of cancers.

The PI has (1) pending proposal:

- NIH – entitled "Microneedle-Based Treatment for Parkinson's Disease" in the amount of $409,801 for the period 7/2021 – 6/2024

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 limit supplies charges to $30,000, resulting in a year one budget of $32,000. Similar budgets of $32,000 are recommended for year two and year three that eliminate other expense charges (publication costs) of $2,000.

Year 1: $32,000 **Year 2: $32,000** **Year 3: $32,000**

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

Appendix E (continued):

PROPOSAL: 024A-21 **RANK: 1**

TITLE: Stem Cell Mediated Remodeling of the Breast Cancer Microenvironment

INSTITUTION: Louisiana State University and A&M College

PRINCIPAL INVESTIGATOR: Elizabeth Martin, Ph.D.

COMMENTS: Prognostic indicators for identifying breast cancer response to therapy utilize receptor status: estrogen receptor (ER), progesterone receptor (PGR), and epidermal growth factor receptor (HER2). Despite this, many estrogen receptor positive (ER^+) breast cancers are resistant to therapy. This suggests a need for better prognostic markers for tumor progression and response to therapy. The tumor microenvironment (TME) is composed of the extracellular matrix, signaling factors (cytokines, growth factors, and hormones) and a heterogeneous cell population (vasculature, stem cells, cancer cells). All of these cellular and molecular variables can maintain and promote cancer resistance to therapy and are currently under investigation. To date, what is not being evaluated is how differences in stromal age will contribute to endocrine resistance and progression of ER^+ breast cancer. In this proposal, the PI will evaluate how patient age mediates the estrogen response in ER^+ breast cancer. The PI will identify mechanisms driving breast cancer heterogeneity and alternative signaling through the evaluation of breast cancer stem-cell cross talk and test the overall hypothesis: that the age of the stromal component, specifically ASCs, contributes to endocrine signaling in ER^+ breast cancer through increased pro-inflammatory signaling.

The PI has (3) pending proposals:

- NIH – entitled "Center for Pre-Clinical Cancer Research" in the amount of $1,109,760 for the period 01/01/2021 – 12/31/2025
- NIH – entitled "Subtype Specific Matrix Composition and Breast Cancer Progression" in the amount of $140,944 for the period 04/01/2021 – 03/31/2023
- NIH – entitled "Evaluating How Fluid Shear Stress Alters Estrogen Receptor Phenotype in Metastatic Breast Cancer" in the amount of $140,272 for the period 07/01/2021 - 06/30/2023

Should the PI receive funding for any of the 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 project be funded at the level requested for year one, i.e., $59,229. A budget of $49,729 that eliminates printing charges of $2,000 is recommended for year two.

Year 1: $59,229 **Year 2: $49,729**

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

Appendix E (continued):

PROPOSAL: 072A-21 **RANK: 1**

TITLE: Molecular Mechanisms of Cortical Output Neuron Differentiation and Fate Reprogramming

INSTITUTION: Tulane University

PRINCIPAL INVESTIGATOR: Maria Galazo, Ph.D.

COMMENTS: Neuron loss by neurodegenerative disease or trauma causes neurological dysfunction. Currently there is no treatment to replace lost or damaged neurons. Neuron *in vivo* reprogramming is an emergent strategy that entails conversion of one neuron type into another, potentially damaged, type. This strategy holds promise for brain repair, but its underlying mechanisms and functional outcomes are still unknown. The PI proposes to study the potential of Neuron *in vivo* reprogramming to produce functional neurons in the cerebral cortex as well as determine its molecular underpinnings and temporal limitations. The PI will study the mechanisms of *in vivo* reprogramming in the cortical output neurons: corticothalamic (CTn) and subcerebral (SCn). SCns connect the cortex to the brainstem and spinal cord and are clinically important as they are affected by spinal cord injury, ALS, and Fronto-temporal dementia. The PI has also identified Bce1, a gene necessary to distinguish CTn and Scn during development. The Bce1 mutation converts developing CTns into SCns. Importantly, Bce1 is constitutively expressed in CTns and likely required throughout life to maintain CTn identity. Preliminary data indicate that Bce1 manipulation induces reprogramming of differentiated CTns into SCns. The PI hypothesizes that Bce1 controls a molecular mechanism that can induce reprogramming of mature CTns into functional SCns *in vivo*.

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, with ½ of the year two supplies cost moved to year one, and full-time GRA support, rather than 75% effort, provided, resulting in a year one budget of $58,816. A similar budget of $58,816 is recommended for year two. A budget of $49,117 that provides GRA support at 75% effort and limited supplies charges of $5,769 is recommended for year three.

Year 1: $58,816 **Year 2: $58,816** **Year 3: $49,117**

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

Appendix E (continued):

PROPOSAL: 104A-21 **RANK: 1**

TITLE: Memory Forensics for Programmable Logic Controllers

INSTITUTION: University of New Orleans

PRINCIPAL INVESTIGATOR: Hyunguk Yoo, Ph.D.

COMMENTS: Industrial control systems (ICSs) control major portions of the U.S.'s critical infrastructure, such as the power grid, gas pipelines, water treatment systems, and oil platforms. Since the unavailability of these systems can have a severe impact on the economic stability and safety of people, protecting their availability and integrity is of primary importance to national security. In case of a security breach or catastrophic event, digital forensics investigation is crucial to incident response. In this project, the PI will focus on developing memory forensic capabilities for cyberattacks against programmable logic controllers (PLCs). Components of real-world cyber-weapons such as Stuxnet and TRISIS, they are often targeted by state-backed actors who want to sabotage critical infrastructures of a hostile country. Since PLCs provide an interface between the cyber-world and physical world, adversaries can inflict physical damage through cyberattacks on PLCs. Despite PLCs' importance to national security, current forensic capabilities are insufficient to investigate cyberattacks on PLCs, especially with regard to memory forensics. Memory forensics in the traditional IT domain has become mature in recent years and is important in providing unique insights into runtime system activity and advanced malware. However, there is a significant lack of PLC-specific memory forensics methods or tools. The primary goals of this project are to develop memory forensics techniques and tools for investigating control logic attacks on PLCs, along with a large repository of datasets of attacks with PLC memory dumps.

It is recommended that the project be funded at the level requested, i.e., $18,750 for year one.

Year 1: $18,750

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

Appendix E (continued):

PROPOSAL: 053A-21 **RANK: 15**

TITLE: Synthesis and Characterization of Charge Transfer Complexes of Electron-Rich Aromatic Molecules as Potential New Organic Superconductors

INSTITUTION: Loyola University New Orleans

PRINCIPAL INVESTIGATOR: Qian Qin, Ph.D.

COMMENTS: The goal of this project is to synthesize a series of novel charge transfer complexes and optimize their electronic and magnetic properties for use as superconductors. Currently available superconductors are based on a very limited number of structural motifs. Other classes of organic molecules that might give rise to superconductivity are largely unexplored. The proposed complexes will have planar, electron-rich heterocyclic aromatic molecules as donors, and various organic and inorganic molecules as acceptors. Careful variation of the molecular geometry of the donor, along with superconductivity measurements, will give a deeper understanding of such materials. New superconductors might have a variety of uses, such as improving the efficiency of electric power transmission through the grid and generating high magnetic fields for biomedical applications. The PI's research focus is on searching for new organic superconductors based on electron-rich aromatic donor molecules.

It is recommended that the proposed budget be reduced to eliminate fringe benefit charges of $459, resulting in a year one budget of $19,350.

Year 1: $19,350

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

Appendix E (continued):

PROPOSAL: 020A-21 **RANK: 16**

TITLE: A Neurotomographic Approach for Identifying and Recording Long-Range Neural Circuit Activity

INSTITUTION: Louisiana State University and A&M College

PRINCIPAL INVESTIGATOR: Charles Lee, Ph.D.

COMMENTS: The current gold standard for characterizing the neurophysiological response properties of neuron, single-unit electrode recordings offers only a glimpse of the forest through the trees. In principle, studying global interactions among brain regions would benefit from the resolution afforded by simultaneous multi-electrode recordings among the interacting components of the network. However, such simultaneous recordings are technically very challenging, especially among deep structures in the brain, i.e., it is nearly impossible to know, *a priori*, the precise regions of the brain that are connected together in a network for multiple-site recordings. Consequently, such simultaneous recordings in practice often rely on methodically searching for connected regions, which are usually identified physiologically. Ideally, one would know *a priori* the precise neuroanatomical location of the constituent neurons in a globally connected network before conducting any physiological recordings. With a complete neuroanatomical map of a connected network, one could specifically and precisely target the placement of multiple electrodes for simultaneous recordings in the pre-defined connected network. This can be extended to identifying cell-type-specific connections *a priori*. The PI proposes to develop a novel solution to this problem by visualizing globally connected neural circuits for simultaneous *in vivo* physiological recordings. The PI will employ a novel micro-CT imaging approach to identify connected neural networks for the precise targeting of simultaneous global multi-electrode recordings.

It is recommended that the project be funded at the level requested, i.e., $20,000 for year one.

Year 1: $20,000

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

Appendix E (continued):

PROPOSAL: 074A-21 **RANK: 17**

TITLE: Subducting Salt: An Experimental Investigation of Halogen Partitioning in Slab Environments

INSTITUTION: Tulane University

PRINCIPAL INVESTIGATOR: Colin Jackson, Ph.D.

COMMENTS: The goal of this proposal is to determine how efficiently halogens are lost from subducting plates and returned back to Earth's crust and oceans. The project seeks to expand knowledge through the execution of partitioning experiments on the full suit halogens (F, CL, Br, and I) in subduction environments. The PI will focus on the altered oceanic crust chemical system. Specific experiments will constrain the effects of halogen doping level, pressure, temperature, and composition. Chemical analysis will be by electron microprobe, ion chromatography, and secondary ionization mass spectrometry. The net result of this work will be a systematic dataset of halogen partition coefficients between minerals contained in subducted altered oceanic crust, fluids and magma. The proposal is specifically focused on altered oceanic crust, but preliminary results will be used to develop proposals for federal support to expand investigation to include halogen partitioning in subducted sediment and serpentinite systems.

The PI has (2) pending proposals:

- NASA – entitled "A Combined Chemical and Physical Investigation of Metal-Silicate Reactions in Magma Oceans" in the amount of $297,761 for the period 04/2021 – 03/2024
- NSF – entitled "A Plan to Determine if the Core Can Be the Ultimate High 3He/4He Source" in the amount of $438,823 for the period 08/2021 – 07/2024

Should the PI receive funding for either of the 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 $2,103, resulting in a year one budget of $65,300. Budgets of $51,066 and $39,959 that limit travel support of $2,915 and $3,759 are recommended for year two and year three, respectively.

Year 1: $65,300 **Year 2: $51,066** **Year 3: $39,959**

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

Appendix E (continued):

PROPOSAL: 106A-21 **RANK: 18**

TITLE: MineBug: Mining Bug-Fix Patterns for Secure and Reliable Software

INSTITUTION: University of New Orleans

PRINCIPAL INVESTIGATOR: Minhaz Zibran, Ph.D.

COMMENTS: Software systems have become ubiquitous these days and technology rarely exists without a software interface or component. At the same time, cyber security has become a top concern of industries and government agencies due to their ever-growing dependence on technology. Thus, secure and reliable software systems have become a critical need. Bugs/defects in software systems cause software failure and nearly all security vulnerabilities are rooted in software bugs. While 80% of software cost is typically spent in maintenance, a vast majority of this cost is invested in fixing bugs and patching security holes in a program's source code. The objective of this research is to discover new bug patterns, i.e., patterns in code constructs, which commonly cause software defects and vulnerabilities. These patterns will be discovered by mining repositories of thousands of revisions of software systems, capturing bug-fixing changes, and tracing back to the original buggy code. Two categories of patterns will be detected: (a) bug-fixing edit patterns, which capture the fine-grain edits made to fix a bug; and (b) bug-fixing nesting patterns, which capture the nesting structures of code constructs that commonly surround the bug-fixing edits.

It is recommended that the proposed budget be reduced to provide travel support of $2,000, resulting in a year one budget of $47,535. A similar budget of $47,535 is recommended for year two.

Year 1: $47,535 **Year 2: $47,535**

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

Appendix E (continued):

PROPOSAL: 060A-21 **RANK: 19**

TITLE: Development of Diastereo- and Enantioselective Aldol and Mannich-Type Reaction of Substituted Phenylacetates and Tertiary Amides

INSTITUTION: Southeastern Louisiana University

PRINCIPAL INVESTIGATOR: Prem Chanda, Ph.D.

COMMENTS: Chiral β-amino- or hydroxy-α-substituted carbonyl compounds are key synthons in various bioactive natural and unnatural products. Aldol reactions are routinely used as important tools in asymmetric synthesis of β-hydroxy carbonyl compounds. Boron-medicated aldol reactions offer several advantages over other metal-mediated synthetic methodologies. Enolboration-aldolization of ketones, thioesters, propionates, 3,3,3,-trifluoropropionates, vinylogous esters, and phenylacetates have been well studied in the development of stereoselective synthesis of such compounds. However, a systematic investigation of the enolboration-aldolization of substituted phenylacetates remains unexplored, and only one comprehensive study of enolboration-aldolization of tertiary amides is available to date. Furthermore, this reported methodology remains unsuccessful in providing a route to anti-aldols of N,N-dialkylphenylacetamides. A Boron-mediated Mannich-type reaction of esters and tertiary amides also remains completely underdeveloped. It requires a detailed study of stereoselective enolboration of substituted phenylacetates and tertiary amides followed by nucleophilic addition reaction with various electrophiles. To solve the inherent problem associated with poor anti-selectivity of aldol products of N,N-dialkylphenylacetamides, it is essential to investigate the optimum conditions for stereoselective formation of boron enolate of tertiary amides. This project will involve a systematic study of the boron-mediated stereoselective enolate formation of substituted phenyl acetates and different tertiary amides by altering various reaction parameters such as temperature, solvent, nature of amine, and sterics in boron reagents/substrates. The proposed asymmetric synthetic methodology development project also aims to understand the effects of various factors on diastereo- and enantioselectivity of aldol and Mannich-type reactions of substituted phenylacetates and different tertiary amides, including N,N-dialkylphenylacetamides.

The PI has (1) pending proposal:

- NSF – entitled "RUI: Exploring of Diastereo- and Enantioselective Aldol and Mannic-Type Reactions Toward the Synthesis of Novel Chiral Building Blocks" in the amount of $282,248 for the period 06/01/2021 – 06/30/2024

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 one-month summer salary, including fringe benefits, for the PI, rather than two-months requested, resulting in a year one budget of $47,051. Budgets of $37,051 and $32,051, which limit travel costs to $2,000, are recommended for year two and year three, respectively.

Year 1: $47,051 **Year 2: $37,051** **Year 3: $32,051**

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

Appendix E (continued):

PROPOSAL: 047A-21 **RANK: 20**

TITLE: Effects and Mechanisms of Biological Diversity on Community Assembly

INSTITUTION: Louisiana Tech University

PRINCIPAL INVESTIGATOR: Julia Earl, Ph.D.

COMMENTS: Biological diversity affects ecosystem stability and function. Understanding these relationships is key to predicting effects of biodiversity loss and maintaining ecosystem services that support human health and the economy. Previous work has greatly advanced theory by examining different types of biological diversity (e.g., species and functional diversity) and moving from correlations towards mechanism. One key mechanism for biodiversity within ecosystems is community assembly, the process by which organisms colonize and deposit offspring in new habitats. However, it is unclear whether biodiversity of basal resources (e.g., leaf litter) alters community assembly and the diversity of colonizing organisms. If these effects do occur, community assembly may be a mechanism by which increasing biodiversity of one organismal group increases the biodiversity of other groups, a common correlation in field studies. The PI will examine how diversity of leaf litter alters community assembly of aquatic insects at different spatial scales in ponds and different aquatic ecosystems at the microhabitat scale. The PI will compare the effects of leaf litter taxonomic diversity and functional diversity on the abundance and diversity of colonizing insects. High tree and insect diversity in the study will allow for large variability in species and trait diversity for experimental manipulation. The comparison of effects at different spatial scales and in different aquatic environments allows a holistic analysis of the importance of diversity to community assembly.

It is recommended that the project be funded at the level requested for year one, i.e., $45,689. Budgets of $42,989 and $20,033, which provide undergraduate student support of $4,000, are recommended for year two and year three, respectively.

Year 1: $45,689 **Year 2: $42,989** **Year 3: $20,033**

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

Appendix E (continued):

PROPOSAL: 087A-21 **RANK: 21**

TITLE: Evaluation of Extractive Butyric Acid Fermentation Using Alcohol Ethoxylates as Solvent

INSTITUTION: University of Louisiana at Lafayette

PRINCIPAL INVESTIGATOR: Emmanuel Revellame, Ph.D.

COMMENTS: Volatile organic acids (VOAs) in the C_1-C_4 range are important commodity chemicals with a wide range of applications. Among these VOAs, butyric acid is of particular interest due to its wide-range application as solvent, diluent, drug additive, plasticizer, perfume, fiber, additive, and raw material in different industries. Among these applications, it is projected that the food industry (animal feed) will be the fastest-growing end-user of butyric acid due to the increasing human population. Butyric acid can be sustainably produced using urban waste streams through anaerobic digestion. Butyric acid produced through this route is termed "renewable butyric acid" and is preferred for use in the food, flavor and pharmaceutical sectors. The valorization of urban wastes into useful products aligns well with the Food-Energy-Water Nexus, with the aim of developing urban biorefineries. However, large-scale fermentative production of butyric acid is hindered by low product concentration and productivity due to product inhibition. To overcome these hindrances, the proposed research will evaluate the use of alcohol ethoxylates (AEOs) as solvents for extractive butyric acid fermentation (i.e., *in-situ* butyric acid extraction). Previous efforts on extractive butyric acid (and other COA) fermentation showed that the success of this strategy is hindered by solvent toxicity and biodegradability. AEOs can satisfy both of these major challenges and the results from the PI's initial assessment indicate that AEO can be used to extract (*ex-situ*) butyric acids and other acids for aqueous mixtures.

It is recommended that the proposed budget be reduced to provide undergraduate student support of $2,000, resulting in a year one budget of $58,915. Budgets of $55,415 and $54,915, which limit travel costs to $2,000 and delete other expenses (publication) charges, are recommended for year two and year three, respectively.

Year 1: $58,915 **Year 2: $55,415** **Year 3: $54,915**

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

Appendix E (continued):

PROPOSAL: 032A-21 **RANK: 22**

TITLE: Improving Photosynthetic Efficiency of Lettuce in Response to High CO2 and Radiation Stress Stimuli Experienced During Lunar, Mars and Deep Space Missions

INSTITUTION: Louisiana State University and A&M College

PRINCIPAL INVESTIGATOR: Paul South, Ph.D.

COMMENTS: The supply of food needed for long-duration space travel makes the use of packaged food diets and long-distance resupply chains impractical. Stowing seed and growing plants for food can be a cost-effective and smaller payload option to provide improved nutrition and diversity to the diet of a space flight crew. The central metabolism that drives plant growth is photosynthesis, which requires light, water and CO2. There are multiple projects underway to increase the photosynthetic efficiency of crops on Earth, including via the use of synthetic biology and genetic modification. Environments on the International Space Station (ISS), future long-distance space vehicles and extra-planetary colonies provide a unique challenge. The environment on the ISS is highly controlled for human health, but also contains CO2 concentrations as much as 10 times higher than experienced by terrestrial plants, changing the constraints for optimizing carbon capture and conversion. The high CO2 environment can promote photosynthesis but can also reduce nitrogen use efficiency and limit plant growth. In addition to the increased CO2 environment, light levels and unique radiation not experienced on the surface of the Earth can influence the light-absorbing pigments and electron transport chain essential for photosynthesis. Crop varieties that have evolved and have been bred to grow in Earth environments are not necessarily suitable for growth in interplanetary space or the surface of non-Earth planets. The PI will test the hypothesis that improving photosynthetic efficiency by engineering the carbon-capturing enzyme Rubisco will improve growth and nitrogen use of lettuce suitable for high CO2 environments. Increasing the repair function of photosystem II through genetic engineering will improve light capture in low-light and high-radiation environments, increasing light use efficiency and plant growth.

The PI has (1) pending proposal:

- Searle Scholars – entitled "Development and Application of an Inducible CRISPR/miRNA Genetic Switches of Simultaneous Gene Editing and Transcriptional Regulation in Plants" in the amount of $300,000 for the period 2021-2024

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 project be funded at the level requested for year one and year two, i.e., $58,500 and $48,700, respectively. A budget of $39,800 that eliminates printing/publication charges of $3,000 is recommended for year three.

Year 1: $58,500 **Year 2: $48,700** **Year 3: $39,800**

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

Appendix E (continued):

PROPOSAL: 078A-21 **RANK: 23**

TITLE: Epigenetic Regulation of Six2 in Nephron Endowment

INSTITUTION: Tulane University Health Sciences Center

PRINCIPAL INVESTIGATOR: Hongbing Liu, Ph.D.

COMMENTS: Adult health depends on the number of nephrons generated during embryonic development. Low nephron endowment and the consequent reduction in functional renal mass leads to progressive renal disease and hypertension. However, determination of the final nephron number is poorly understood. The broad range of nephron numbers strongly suggests the contribution of gene-environment interaction to nephron endowment. The developing kidneys are especially vulnerable to intervention during embryonic and fetal periods, which is believed to be mediated by gene expression reprogramming, including epigenetic changes. Sine oculis homeobox 2 (Six2) has been demonstrated to play an essential role in balancing self-renewal and differentiation of nephron progenitor cells (NPCs) for appropriate nephron endowment. A recent study found a paradoxical 18% increase of the final nephron number of Six2 heterozygotes and revealed a dose response of NPCs to the level of Six2 protein. The overall objective of this proposal is to determine how Six2 is functionally regulated during nephrogenesis by the microenvironment via epigenetic mechanisms for nephron endowment. The rationale for this work is that successful identification of the molecular requirements for Six2 function will provide new opportunities for the subsequent development of strategies to manipulate its activity for the prevention of congenital anomalies of the kidney and urinary tract (CAKUT) and chronic kidney disease. A mechanistic determination of nephron formation will provide a strong conceptual framework for the subsequent development of a clinical approach to prevent and treat kidney disease.

The PI has (1) pending proposal:

- DoD Kidney Cancer Research – entitled "Idea Award/Combined Inhibition of Histone Deacetylases and EZH2 for the Treatment of Wilms Tumors" in the amount of $600,000 for the period 07/2021 – 06/2024

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 one-month summer salary, including fringe benefits, for the PI, rather than the 1.8 months requested, with supplies and travel charges limited to $14,000 and $2,000, respectively, resulting in a year one budget of $66,584 Similar budgets of $66,584 are recommended for year two and year three. The panel noted that the institution did not provide tuition waivers for the GRAs supported by the project. The institution should reconsider this omission, as GRA support should include not only wages, but tuition support as well.

Year 1: $66,584 **Year 2: $66,584** **Year 3: $66,584**

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

Appendix E (continued):

PROPOSAL: 081A-21 **RANK: 24**

TITLE: Exploring the Role of Emerging Technologies in Digital Health Interventions for Older Adults

INSTITUTION: University of Louisiana at Lafayette

PRINCIPAL INVESTIGATOR: Beenish Chaudhry, Ph.D.

COMMENTS: By 2060, the number of individuals aged 65 and above will constitute about 23% of the total population of the United States, placing a massive burden on its healthcare system. There is a growing recognition that digital health innovations are needed to help alleviate this burden and improve care for older populations. To ensure successful adoption of digital health interventions (DHIs), the needs and requirements of older adults and their care networks must be addressed. This is only possible if these stakeholders are involved in the technology design and development process. Existing literature has knowledge gaps that make it challenging for researchers and practitioners to effectively involve older adults and their care networks in the design and development process and implement digital health interventions (DHIs) for them. The PI aims to fill these gaps by proposing to design, develop, and evaluate a multi-device DHI that will support older adults in self-managing their chronic conditions and health goals in collaboration with their caregivers. The PI will use a qualitative approach to investigate how the target users imagine their relationship with various technologies. The challenges and opportunities of three types of formative co-design activities (reflective, generative, and narrative) will be studied. Moreover, the PI will study methodological and ethical issues related to conduction co-design activities via online platforms such as Facebook groups and teleconferencing apps. The PI will formalize design principles and explore the feasibility of the developed DHI by conducting a pilot study with older adults and their care networks.

It is recommended that the proposed budget be reduced to provide undergraduate support of $2,000, with publication charges of $1,000 deleted, resulting in a year one budget of $56,733. Budgets of $45,733 and $42,733 are recommended for year two and year three, respectively.

Year 1: $56,733 **Year 2: $45,733** **Year 3: $42,733**

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

Appendix E (continued):

PROPOSAL: 076A-21 **RANK: 25**

TITLE: Two-Dimensional Transition Metal-Based Materials and their Heterostructures as Electrocatalysts

INSTITUTION: Tulane University

PRINCIPAL INVESTIGATOR: Michael Naguib, Ph.D.

COMMENTS: The overarching goal of this project is to exploit metastability in bulk layered materials to synthesize two-dimensional materials and heterostructures. The PI selected transition metal carbochalcogenides as the model system for this project. To achieve the goal for the selected model system (viz. TMCDCs), three specific aims have been identified: (1) develop an understanding of the formation reaction mechanism of metastable vdW bonded layered transition metal carbo-chalcogenides; (2) understand the exfoliation mechanism of layered transition metal carbo-chalcogenides to form 2D materials of TM carbo-chalcogenides; and (3) unveil the role of interfaces between 2D materials of transition metal carbo-chalcogenides and transition metal chalcogenides in electrocatalytic performance. If successful, the project could result in the development of a new family of TMCDCs that will unlock new properties paradigms (e.g., combining the outstanding electrical conductivity of the carbide core and the excellent electrochemical activity and chemical stability of the chalcogenides surface).

The PI has (1) pending proposal:

- NSF – entitled "Synthesis of Novel Two-Dimensional Materials from Metastable Layered Materials" in the amount of $607,788 for the period 06/2021 – 05/2026

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 project be funded at the level requested in year one, i.e., $61,211. A similar budget of $61,211 is recommended for year two. A budget of $61,211 is recommended for year three that provides limited travel support of $2,000.

Year 1: $61,211 **Year 2: $61,211** **Year 3: $61,211**

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

Appendix E (continued):

PROPOSAL: 100A-21 **RANK: 26**

TITLE: 3-Dimensional Sediment Transport Dynamics and Evolution of River Dunes

INSTITUTION: University of New Orleans

PRINCIPAL INVESTIGATOR: Robert Mahon, Ph.D.

COMMENTS: The proposed research seeks to develop a set of methods for evaluating the three-dimensional flow, sediment transport, morphologic evolution, and stratigraphic preservation of river dunes in laboratory flumes. The methods will include: three-component flow velocity at high temporal resolution using acoustic Doppler velocimetry and laser particle image velocimetry instrumentation; grain-scale particle tracking using fluorescent sand grains under black light; and repeat measurement of three-dimensional dune topography over long timescales using laser sheets. These defined methods will be used to collect seed data. The data collected over a range of flow and sediment transport conditions will include coeval time series measurements of flow velocities, particle motions, and bed topography.

The PI has (1) pending proposal:

- NSF EPSCoR – entitled "RII-Track 4: 3-Dimensional Sediment Transport Dynamics Over River Dunes" in the amount of $224,104 for the period 06/2021 – 05/2023

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 $2,000, resulting in a year one budget of $55,166. A budget of $48,998 that limits other expense costs to $2,250 (not to include publication cost and with removal of conference registration charges, which should be included in travel) is recommended for year two. In year three, it is recommended that the project be funded at the level requested, i.e., $43,276.

Year 1: $55,166 **Year 2: $48,998** **Year 3: $43,276**

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

Appendix E (continued):

PROPOSAL: 045A-21 **RANK: 27**

TITLE: Understanding the Effect of Microstructures on the Reversibility of Shape Memory Alloys

INSTITUTION: Louisiana Tech University

PRINCIPAL INVESTIGATOR: Xiang Chen, Ph.D.

COMMENTS: Shape memory alloys (SMAs) are among the most well-known smart materials, with phase-transformation-induced shape recovery phenomena that have attracted intense research interest. Despite decades of study, low reversibility associated with phase transformation remains the preeminent unsolved issue and has greatly limited the materials' lifetime and, therefore, applications. Recent studies have revealed the dominant role of dislocations in determining the reversibility. In addition, large regions of dislocation arrays observed in the state-of-the-art additively manufactured SMAs further underline the urgent need to understand dislocation in this class of material. However, the characterization of plastic response in SMAs is a topic still in its infancy. The major difficulties lie in the intrinsic complex stress states at the atomic scale and the extreme sensitivity to mesoscale microstructures such as grain boundaries and precipitates. The proposed work aims to (1) further develop the theory and computational implementation of the Concurrent Atomistic-Continuum (CAC) method, to establish a unique multiscale simulation capability for predictive study of SMAs and smart materials in general; and (2) provide a fundamental understanding of the isolated and combined effects of different mesoscale factors on plastic deformation mechanisms and repeatability in SMAs.

It is recommended that the project be funded at the level requested, i.e., $45,661 for year one, $42,911 for year two, and $42,911 for year three.

Year 1: $45,661 **Year 2: $42,911** **Year 3: $42,911**

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

Appendix E (continued):

PROPOSAL: 077A-21 **RANK: 28**

TITLE: Role of Autophagy in Hepatic Metabolism

INSTITUTION: Tulane University Health Sciences Center

PRINCIPAL INVESTIGATOR: Bilon Khambu, Ph.D.

COMMENTS: Autophagy function is required for liver metabolic homeostasis. Autophagy dysfunction disrupts hepatic metabolism and directly contributes to the development and progression of metabolic diseases such as alcoholic and non-alcoholic fatty liver diseases. However, the mechanism by which deregulated autophagy contributes to liver metabolic abnormality is unclear. The goal of this study is to investigate the potential mechanism of metabolic regulation by hepatic autophagy. The PI hypothesizes that autophagy regulates FXR functionality (expression and activity) as an important mechanism to maintain hepatic metabolic homeostasis.
To test the hypothesis, two specific aims are proposed, each of which will emphasize the key role of autophagy in regulating the FXR functionality, and on the liver metabolism. Aim (1) will determine how autophagy regulates FXR functionality and Aim (2) will determine the functional significance of autophagy-mediated FXR regulation in branched-chain amino acid (BCAA) catabolism and gluconeogenesis. The study will provide mechanistic insights into regulation of liver metabolism by autophagy and also identify the new role of the NRF2-CRY1 signaling axis in regulating hepatic FXR functionality.

The PI has (1) pending proposal:

- NIH – entitled "Role of Autophagy in Hepatic Zonation and Xenobiotic-Induced Liver Injury" in the amount of $1,900,000 for the period 04/01/2021 – 03/31/2026

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 one-month summer salary, including fringe benefits, for the PI, rather than the two-months requested, limited travel support of $2,000, and deleted other expense charges ($472), resulting in a year one budget of $37,091. Similar budgets of $37,091 are recommended for year two and year three. Note: Requested undergraduate student support should be moved to the GRA budget category, consistent with the budget justification.

Year 1: $37,091 **Year 2: $37,091** **Year 3: $37,091**

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

Appendix E (continued):

PROPOSAL: 037A-21 **RANK: 29**

TITLE: Exploring the Role of STING Signaling in Promoting the Immunomodulatory Effects of Radiation in Osteosarcoma

INSTITUTION: Louisiana State University and A&M College

PRINCIPAL INVESTIGATOR: Sita Withers, Ph.D.

COMMENTS: Cancer cell-intrinsic mechanisms affecting radiation-induced immune stimulation are not well described in osteosarcoma. Osteosarcoma is a highly aggressive malignant primary bone tumor occurring in humans and companion dogs. Understanding the factors that influence radiation immunomodulation in osteosarcoma will uncover strategies to optimize these effects. DNA damage due to radiation is sensed by cyclic GMP-AMP synthase (cGAS), which then activates stimulators of interferon genes (STING). STING activation results in type I interferon (IFN) expression, which is essential for triggering anti-tumor immunity. The overall goal this proposal is to determine the dependency of osteosarcoma on macrophages to complete STING signaling, which links radiation-induced DNA damage with type I IFN production. The PI will utilize Western blot, ELISAs, RT-qPCR, and single-cell and bulk RNA-sequencing to determine STING expression and the ability of soluble factors release by irradiate osteosarcoma cells to induce STING-dependent cytokine/chemokine expression in macrophages. The PI hypothesizes that osteosarcoma cells are deficient in STING but retain the ability to detect cytoplasmic DNA via CGAS, which can then signal through normally expressed STING in neighboring macrophages to promote radiation-induced inflammation.

It is recommended that the proposed budget be reduced to provide one-month summer salary, including fringe benefits, for the PI, rather than the 1.2 months requested, and undergraduate student support of $2,000, resulting in a year one budget of $59,820. A budget of $41,600 is recommended for year two.

Year 1: $59,820 **Year 2: $41,600**

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

Appendix E (continued):

PROPOSAL: 010A-21 **RANK: 30**

TITLE: Multi-Scale Multi-Physics Approach for Resilient Coastal Infrastructure under Hurricanes

INSTITUTION: Louisiana State University and A&M College

PRINCIPAL INVESTIGATOR: Aly Mousaad Aly, Ph.D.

COMMENTS: The goal of the proposed research is to advance knowledge that, when implemented, will reduce losses related to hurricanes and other natural disasters and create a safer infrastructure to protect communities and businesses along the coast. The project focuses on modeling scour at full scale, computationally, using unsteady turbulence closures. This project looks at altering the flow around the piers of bridges, elevated buildings, and wind turbines, thereby reducing the strength of the downflow and horseshoe vortices. The numerical results will be compared with those obtained experimentally and from full-scale data collection. The validated model with the turbulence closure will be employed to predict velocity distribution profiles and bed shear stress for different pier configurations: streamlined pier shape, tapered streamlined pier shape, delta-wing plate attached to a circular pier, and guide wall with slanting vanes on a circular pier, as possible countermeasures.

It is recommended that the project be funded at the level requested, i.e., $20,000 for year one.

Year 1: $20,000

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

Appendix E (continued):

PROPOSAL: 054A-21 **RANK: 31**

TITLE: Development of Ligand Free, Open-Air Cu [ll] Catalyzed C-N, C-O and C-S Bond Formation Reactions

INSTITUTION: Nicholls State University

PRINCIPAL INVESTIGATOR: Rajesh Komati, Ph.D.

COMMENTS: C-X (X=N, O, S) bond formation reactions play an important role in organic chemistry. Because compounds with these bonds have a wide variety of applications, including use in fungicides, herbicides, antineoplastic, anti-HIV, and anti-inflammatory agents and also as polymers, photovoltaics, organic semi-conductors, OLEDS, fluorescent tags, and dyes. A comprehensive literature search indicates that these bonds are formed by cross-coupling reactions with the use of catalysts like Pd, Pt. However, they are associated with drawbacks as well, like expense, use of external ligands, harsh reaction conditions, and less substrate tolerability. For these reasons, it is necessary to create a novel catalytic system for cross-coupling reactions to form C- hetero bonds. The goal of this project is to develop such a system, which will be used for cross-coupling reactions to form C-N, C-O and C-S bonds with the following criteria: (1) simple, efficient, economical, insensitive to air and with no use of external ligands; (2) tolerant of a variety of functional groups; and (3) able to be used by industry and on a large scale.

It is recommended that the project be funded at the level requested, i.e., $20,000 for year one.

Year 1: $20,000

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

Appendix E (continued):

PROPOSAL: 008A-21 **RANK: 32**

TITLE: Molecular Mechanisms of Exploratory Foraging Behavior in the Formosan Subterranean Termite

INSTITUTION: Louisiana State University Agricultural Center

PRINCIPAL INVESTIGATOR: Qian Sun, Ph.D.

COMMENTS: The Formosan subterranean termite, *Coptotermes formosanus*, is an invasive species and the most destructive termite in the world. Louisiana is one of the areas in the United States worst affected by Formosan termite damage. Subterranean termites are wood-feeding insects that nest underground and construct extensive tunnels in soil to explore for food. The foraging behavior is a collective activity performed by workers in response to a variety of social and environmental conditions, such as the presence of soldiers, trail pheromones, and food availability. While mechanisms of foraging behavior have been widely studied in *Drosophila* and social *Hymenoptera* (ants, wasps, and bees), the molecular underpinnings of this behavior remain unknown in termites, a group of social insects with unique evolutionary history, ecological niches, and economic importance. The proposed research will apply an integration of a quantitative behavioral assay, transcriptome analysis, and RNA interference (RNAi) technique to investigate the molecular mechanism of exploratory foraging behavior in *C. formosanus.* Specifically, the PI will (1) evaluate the effects of social and environmental cues on foraging tunnel construction and determine the foraging stimuli; (2) investigate the differential transcriptomic response of workers to the foraging stimuli compared with controls and identify candidate genes involved in tunneling behavior; and (3) functionally characterize genes essential for tunneling behavior using dietary RNAi.

It is recommended that the proposed budget be reduced to provide undergraduate student support of $2,000, resulting in a year one budget of $46,504. Budgets of $46,000 and $45,200 are recommended for year two and year three, respectively.

Year 1: $46,504 **Year 2: $46,000** **Year 3: $45,200**

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

Appendix E (continued):

PROPOSAL: 080A-21 **RANK: 33**

TITLE: Immune Modulation by SARS-CoV2

INSTITUTION: Tulane University Health Sciences Center

PRINCIPAL INVESTIGATOR: Kislay Parvatiyar, Ph.D.

COMMENTS: Coronavirus disease 2019 (CoVID-19), instigated by the severe acute respiratory syndrome novel coronavirus type 2 (SARS-CoV2), constitutes a serious global public health concern, resulting in more than 120 million infections and 2.6 million deaths worldwide in one year. The annual economic burden of viral infections in the United States alone is estimated at $8 billion in direct medical costs and $30 billion in productivity losses. While it typically takes years to develop efficacious vaccines, the threat of newly emerging viral infections requires immediate therapeutic strategies to minimize potential outbreaks and epidemics. The host innate immune system provides broad protection against invading viruses by eliciting the production of type 1 interferon cytokines, which lead to the inhibition of viral replication and the initiation of T cell mediated adaptive immunity. The PI's data uncovered a novel role for a central regulation of inflammation in elevating the host type I interferon response. The underlying mechanisms by which these disparate pathways cross-talk with each other during infection are unknown. The PI has shown alterations in key factors that regulate the inflammatory pathway upon viral infection which coincide with increased host-cell antiviral activity. The PI is pursuing the mechanisms that initiate, sustain, and terminate this viral-elicited inflammatory pathway. Based upon additional preliminary data and published works, the PI hypothesizes that the dynamic editing of post-translational modifications on key signaling substrates in the inflammatory pathway is essential to facilitate cross-talk with signaling components that control the innate immune response to viral infections.

It is recommended that the project be funded at the level requested in year one, i.e., $41,304. Similar budgets of $41,304 are recommended for year two and year three.

Year 1: $41,304 **Year 2: $41,304** **Year 3: $41,304**

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

Appendix E (continued):

PROPOSAL: 038A-21 **RANK: 34**

TITLE: Novel Real-Time Road Mapping Technology Using Vehicle-to-Vehicle Communications

INSTITUTION: Louisiana State University and A&M College

PRINCIPAL INVESTIGATOR: Hsiao-Chun Wu, Ph.D.

COMMENTS: Intelligent transportation systems and autonomous cars have emerged as intriguing and convenient technologies which will shape tomorrow's traffic. These cutting-edge technologies involve tremendous renovations and breakthroughs in electrical and computer engineering research. The crucial research aspects include simultaneous charting, mapping, and navigation (SCMN). In order to facilitate such an intelligent SCMN system, advanced research in source-coding, algorithm design, graph-theoretical analysis, and wireless communication strategy-making is required. To catch the new industrial trend of building intelligent transportation and autonomous vehicles, the PI will focus on the design, analysis, and prototyping of a smart SCMN system. The collaborative intelligence will be acquired and established by individual vehicles through information sharing and exchange, which will be enabled by vehicle-to-vehicle (V2V) communications. By use of this new intelligence, every vehicle in the network can make a dynamic situation-, emergency-, and risk-centric map (SERM) which will be charted in real time with prioritized alerts about road conditions, accidents, and hazards.

It is recommended that the proposed budget be reduced to eliminate publication/printing charges of $1,000, resulting in a year one budget of $19,000.

Year 1: $19,000

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

Appendix E (continued):

PROPOSAL: 092A-21 **RANK: 35**

TITLE: Design, Synthesis and Evaluation of Pyrazole-Based Molecular Hybrids as Potential Anticancer Agents

INSTITUTION: University of Louisiana at Monroe

PRINCIPAL INVESTIGATOR: Siva Murru, Ph.D.

COMMENTS: Despite immense advances in the fields of basic and clinical research, cancer remains one of the leading causes of death in the world. Globally, lung cancer kills more people than any other form of cancer (>13%). In the U.S., more deaths are caused by lung cancer every year than by breast, prostate, and colon cancer combined. Although the available drugs on the market show remarkable effects during initial treatment, a substantial majority of patients develop resistance as treatment proceeds. Even though combinatorial therapy is an available option to treat drug-resistant cancers, the administration of multiple drugs leads to critical side effects from higher doses and possible drug-drug interactions, which must be minimized. The PI has been involved in design, synthesis and anticancer activity evaluation of heterocyclic compounds. Based on preliminary studies, the PI selected active pyrazolone pharmacophore (P8) as a core unit to build pyrazolone-based molecular hybrids and Ru-complexes, which will be evaluated for antiproliferative activities against selected non-small cell lung cancer cell lines. The PI's hypothesis is that the incorporation of a privileged heterocyclic moiety or metal ion would improve the ability of the pyrazolone compounds to interact with two or more binding sites on target proteins simultaneously, thereby enhancing anticancer efficacy and the therapeutic index. Using the compounds that exhibit the highest potent antiproliferative activity, further *in vitro* and *in vivo* biological assays will be performed to gain additional insights into signaling pathways and the mechanism of action.

The PI has (1) pending proposal:

- NIH – entitled "Design, Synthesis, and Evaluation of Pyrazolone-Based Molecular Hybrids and Their Metal Complexes as Potential Anticancer Agents" in the amount of $352,500 for the period 07/01/2021 – 06/31/2024

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 undergraduate student support of $2,000, resulting in a year one budget of $46,329. Budgets of $44,231 and $44,201 are recommended for year two and year three, respectively.

Year 1: $46,329 **Year 2: $44,231** **Year 3: $44,201**

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

Appendix E (continued):

PROPOSAL: 050A-21 **RANK: 36**

TITLE: Design of Supersingular Isogeny-Based Post-Quantum Cryptographic Functions

INSTITUTION: Louisiana Tech University

PRINCIPAL INVESTIGATOR: Manki Min, Ph.D.

COMMENTS: With the advance of quantum computing technologies, network/computer security finds an urgent need for different cryptographic functions that can survive novel, more powerful quantum computer-based attacks. The integer factoring which has been a fundamental basis for the widely used RSA encryption algorithm can be efficiently solved by Shor's algorithm, and it can be a serious threat when quantum computers become widely available. In this project, the PI will pursue the design and application of a new cryptographic function based on supersingular isogenies to defend against quantum computer-based attacks. The main target functions include hash function and encryption function, though other types of functions will also be studied. Successful completion of this project could provide a set of post-quantum cryptographic functions as well as their application implementations.

It is recommended that the project be funded at the level requested, i.e., $50,500 for year one, $47,500 for year two, and $47,500 for year three.

Year 1: $50,500 **Year 2: $47,500** **Year 3: $47,500**

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: 011A-21

TITLE: Utilizing Polymeric Nanoparticles as an Antioxidant Delivery System for the Treatment of Intraocular Inflammatory Disorders

INSTITUTION: Louisiana State University and A&M College

PRINCIPAL INVESTIGATOR: Renee Carter, Ph.D.

COMMENTS: The reported incidences of ocular disease resulting in vision loss are steadily increasing. Two of the most common causes for visual impairment are age-related macular degeneration (AMD) and senile cataract formation. Although the etiology of these disorders is multifactorial, oxidative stress has been heavily implicated in the pathogenesis of both conditions. Current therapeutic strategies include invasive procedures such as intraocular injections and surgery, which pose significant risk to the eye, which could suffer retinal detachment, endophthalmitis and/or hemorrhage. In order to counter oxidative stress, oral antioxidant agents are often recommended for both conditions. However, the benefits of this modality are limited due to poor bioavailability of some compounds as well as limited distribution within the eye. Nanoparticle delivery systems will be explored as an alternate mode of delivering antioxidant therapy in a topical form to increase bioavailability in the eye and reduce risks associated with systematic therapy. Research in this area is limited and, therefore, development of topical therapeutic formulations should be explored. The goals of this project are to entrap antioxidants of interest in nanoparticles, determine their stability, and evaluate the ability of these entrapped products to mitigate photo-oxidative and subsequent cellular injury. *In vivo* studies of the impact of the products on mitigating cataract formation will open the door to further investigations of intraocular conditions such as AMD.

Although the proposal is of good quality, it did not rank high enough in comparison with other Health & Medical Sciences proposals to warrant funding. It was not placed in the “Priority I” category by the Panel because there is not enough money, even if additional funds become available, to fund more than the thirty-six (36) proposals listed in Appendix A.

Appendix F (continued):

PROPOSAL: 014A-21

TITLE: A Systematic Modeling Framework for a Transformative Understanding of Continuum Robots

INSTITUTION: Louisiana State University and A&M College

PRINCIPAL INVESTIGATOR: Hunter Gilbert, Ph.D.

COMMENTS: The research goals of this project are (1) to discover the models and model structures that unify the modeling of all continuum robots and (2) to demonstrate major improvements in robotic capability resulting from a new understanding of modeling. The research objective of this proposal is to study two hypotheses: (1) rapidly computable dynamic models of continuum robots dominated by low-order approximations, learning-enabled sub-models, and assembled via novel methods of system reticulation have sufficient predictive accuracy for model-based design; and (2) optimization of the proposed path spectral abscissa index (PSAI) and global spectral abscissa index (GSAI) will result in significant performance improvements for deformable robots in terms of load-carrying capacity and stable interaction.

Although the proposal is of good quality, it did not rank high enough in comparison with other Engineering B proposals to warrant funding. It was not placed in the "Priority I" category by the Panel because there is not enough money, even if additional funds become available, to fund more than the thirty-six (36) proposals listed in Appendix A.

Appendix F (continued):

PROPOSAL: 018A-21

TITLE: Modeling the Mechanics of Fluid-Bed-Vegetation Interactions in Coastal and Riverine Ecosystems

INSTITUTION: Louisiana State University and A&M College

PRINCIPAL INVESTIGATOR: Chris Kees, Ph.D.

COMMENTS: This project seeks to construct an accurate model of the interactions among water flow, wave action, soil, and vegetation. The model is critical for predicting the evolution of coastal and riverine systems. Specifically, an accurate but computationally tractable model of these complex interactions is needed to inform larger-scale models of coastal and riverine ecosystems in Louisiana and around the world, particularly as we seek to protect communities and restore ecosystem function along coast and rivers. Communities across the globe face increasing threats to these systems due to sea level rise, subsidence, invasive species, and climate change. While many of these threats are man-made, there is no obvious set of policy changes that will counter them. Instead, a reliable quantitative model of these processes at small scales (i.e., a high-fidelity model) must be developed and used to inform larger-scale predictive models already in use; accurate, objective, predictions can then guide effective policy. The goal of this project is to develop a computational model capable of predicting the evolution of natural riverine and coastal plan forms through the physics-based (mechanistic), mathematical modeling of coupled wave, hydrodynamic, sediment transport, bank erosion and vegetative modulation processes.

Although the proposal is of good quality, it did not rank high enough in comparison with other Earth & Environmental Sciences proposals to warrant funding. It was not placed in the “Priority I” category by the Panel because there is not enough money, even if additional funds become available, to fund more than the thirty-six (36) proposals listed in Appendix A.

Appendix F (continued):

PROPOSAL: 043A-21

TITLE: Reconstructing Femoral Stem Implants on Joint Biomechanics

INSTITUTION: Louisiana State University Health Sciences Center-Shreveport

PRINCIPAL INVESTIGATOR: Gulshan Sunavala, Ph.D.

COMMENTS: Hip arthroplasty prostheses are often constructed of metal and there is an inherent disparity in the modulus of elasticity between the prosthesis and the bone. It is the difference in material properties that underlies the common complication of aseptic loosening of the implant and the eventual need for revision surgery. The incidence of peri-implant fractures increases substantially after revision surgeries, and reoperations are often associated with poor functional outcome and higher mortality. In an effort to reduce stress shielding, porous femoral stems have been investigated, but consensus is lacking with respect to balancing strength and elasticity. An innovative hip prosthesis concept was developed to replicate the behavior of the proximal femur and to promote load sharing. In the study, three-dimensional mesh models of conventional and truss-based implants will be constructed and finite element analysis under static loads will evaluate stress-strain distribution in the prosthesis and in perioprosthetic bone. Design features will be refined for optimal load distribution and, considering femoral characteristics, an algorithm will be developed for prosthesis selection. Using additive manufacturing technology, prototypes will be printed in stainless steel and surface characteristic analyzed using dyes and SEM.

Although the proposal is of good quality, it did not rank high enough in comparison with other Engineering B proposals to warrant funding. It was not placed in the “Priority I” category by the Panel because there is not enough money, even if additional funds become available, to fund more than the thirty-six (36) proposals listed in Appendix A.

Appendix F (continued):

PROPOSAL: 082A-21

TITLE: Pathomechanics of Cartilage: A Systematic Analysis of Pathological Degradation of Articular Cartilage in Early-Stage Osteoarthritis

INSTITUTION: University of Louisiana at Lafayette

PRINCIPAL INVESTIGATOR: Tanvir Faisal, Ph.D.

COMMENTS: Osteoarthritis (OA) is a pathological process involving matrix damage of articular cartilage and is primarily characterized by the degradation of the two principal macromolecular constituents of cartilage extracellular matrix (ECM)—type II collagen fibrillar network and proteoglycan (PG) aggregates. The early stage of the disease process characterized by initial damage to the collagen at the articular surface is primarily due to injurious (excessive mechanical loads) and enzyme-mediated cleavage. While the notion of load-induced cartilage response is traditionally of interest, the exploration of biomechanical properties of cartilage due to enzyme-mediated degradation is notably limited but more appropriate to interpret the cartilage pathology. The PI aims to investigate the effect of a relative abundance of degradative enzymes, in particular Matrix Metalloproteinases subfamilies MMP-1 and MMP-9, on the mechanical integrity of knee articular cartilage. The goal of this project is to analyze the bio-chemo-mechanical behavior of cartilage holistically, combining *in vitro* and *in silico* modeling to understanding the pathomechanics of cartilage during early-stage OA.

Although the proposal is of good quality, it did not rank high enough in comparison with other Engineering B proposals to warrant funding. It was not placed in the “Priority I” category by the Panel because there is not enough money, even if additional funds become available, to fund more than the thirty-six (36) proposals listed in Appendix A.

Appendix F (continued):

PROPOSAL: 086A-21

TITLE: Assessing Heavy Metal Contamination in Community Gardens Along the Southern Louisiana-Texas Petro -Chemical Corridor

INSTITUTION: University of Louisiana at Lafayette

PRINCIPAL INVESTIGATOR: Anna Paltseva, Ph.D.

COMMENTS: While urban soil is a sink for contaminants derived from historical anthropogenic activities, most studies have focused on large urban centers, leaving smaller communities unexplored. To address this problem, better characterization of the varieties, concentration, and spatial distribution of metals in urban gardens is needed across different cities. This research is a pilot study to determine the significance of metal contamination in community gardens (or urban farms) along the I-10 corridor in New Orleans, Baton Rouge, Lafayette, Beaumont, and Houston, cities impacted by a wide range of current and historical petrochemical industries, highways, and railroads. A total of 10-20 gardens from each city will be analyzed *in situ* for lead, arsenic, manganese, nickel, zinc, chromium, and copper by a portable X-ray fluorescence (XRF) analyzer, accompanied by a GPS logger and pH measurements in the topsoil. Socioeconomic data will be also collected. Deliverables will include maps of contamination; a publicly available database providing GPS locations, metal concentrations, and pH levels; and a soil archive for future studies.

Although the proposal is of good quality, it did not rank high enough in comparison with other Earth & Environmental Sciences proposals to warrant funding. It was not placed in the “Priority I” category by the Panel because there is not enough money, even if additional funds become available, to fund more than the thirty-six (36) 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

Michael E. Prudich, Ph.D.
Professor Emeritus
Department of Chemical and Biomolecular Engineering
Ohio 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

Gregory Blayne Cunningham, Ph.D.
Professor
Department of Biology
St. John Fisher College

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

CHEMISTRY

Alexander Li, Ph.D., Chairman
Professor
Department of Chemistry
Washington State University

Kathleen Kilway, Ph.D.
Professor and Chair
Department of Chemistry
University of Missouri at Kansas City

Appendix G (continued):

COMPUTER & INFORMATION SCIENCES

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

Sanguthevar Rajasekaran, Ph.D.
Professor
Department of Computer Science & Engineering
University of Connecticut

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

Jeffrey A. Lee, Ph.D.
Professor
Department of Geosciences
Texas Tech University

ENGINEERING B

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

James R. Wilson, Ph.D.
Professor
Department of Industrial Engineering
North Carolina State University

Preston S. Wilson, Ph.D.
Professor
Walker Department of Mechanical Engineering
University of Texas at Austin

Amit Bandyopadhyay, Ph.D.
Professor
School of Mechanical & Materials Engineering
Washington State University

Appendix G (continued):

HEALTH & MEDICAL SCIENCS

Gerald Sonnenfeld, Ph.D., Chair
Microbiologist and Immunologist
Research Administration Consultant

Terrence Deak, Ph.D.
Associate Director
Center for Developmental and Behavioral Neuroscience
State University of New York at Binghamton (SUNY at Binghamton)

Karen J. L. Burg, Ph.D.
Harbor Lights Endowed Chair & Professor
College of Veterinary Medicine
University of Georgia

APPENDIX H

RESEARCH COMPETITIVENESS SUBPROGRAM
FY 2020-21
SUMMARY OF PROPOSALS

108	**TOTAL PROPOSALS**	
13	BS I	Biological Sciences I
23	BS II	Biological Sciences II
14	CHEM	Chemistry
15	C/IS	Computer and Information Sciences
11	EAR	Earth and Environmental Sciences
23	ENG B	Engineering B
9	H/M	Health and Medical Sciences

TOTAL FIRST-YEAR FUNDS REQUESTED: $5,236,350

Proposals Submitted to the Research and Development Program - Research Competitiveness Subprogram (RCS)
FY 2020-21 Review Cycle

Proposal #	PI Name	Category	Institution	Duration	Project Title	Amount Requested			
						Year 1	Year 2	Year 3	Total
001A-21	Prof. Ruipu Mu	Biological Sciences I	Centenary College	1 Year	Small intestinal organoid model [enteric stem cell] responses to heavy metal stress	$19,500.00	$0.00	$0.00	$19,500.00
002A-21	Dr. Waneene Dorsey	Biological Sciences II	Grambling State University	2 Years	Epigenetic Inflammatory Responses in A549 Alveolar Epithelial and HEPG2 Cells Exposed to Pentachlorophenol	$83,959.00	$73,959.00	$0.00	$157,918.00
003A-21	Prof. Kenneth Bondioli	Biological Sciences I	Louisiana State University Agricultural Center	1 Year	Lipid Profiles of Bovine Oocytes After in Vitro and In Vivo Maturation.	$20,000.00	$0.00	$0.00	$20,000.00
004A-21	Prof. Kevin Hoffseth	Engineering B	Louisiana State University Agricultural Center	3 Years	Characterizing surface damage in machining of bioinspired additively manufactured materials	$40,531.00	$38,281.00	$37,781.00	$116,593.00
005A-21	Dr. Zongliang (Carl) Jiang	Biological Sciences I	Louisiana State University Agricultural Center	1 Year	High-resolution ribosome profiling to characterize translational selectivity in the preimplantation embryo development	$20,000.00	$0.00	$0.00	$20,000.00
006A-21	Dr. Erin McKinley	Health and Medical Sciences	Louisiana State University Agricultural Center	1 Year	An Exploratory Study of Pregnant Persons Response to Patient-Centered-Care in Louisiana using Mind Genomics Cognitive Science	$12,625.00	$0.00	$0.00	$12,625.00
007A-21	Prof. Ely Oliveira Garcia	Biological Sciences I	Louisiana State University Agricultural Center	3 Years	Dissecting the mechanism of translocation of effectors into living rice cells by the blast fungus Magnaporthe oryzae	$39,000.00	$36,000.00	$35,000.00	$110,000.00
008A-21	Dr. Qian Sun	Biological Sciences II	Louisiana State University Agricultural Center	3 Years	Molecular mechanisms of exploratory foraging behavior in the Formosan subterranean termite	$51,504.00	$51,000.00	$50,200.00	$152,704.00
009A-21	Dr. Sara Thomas-Sharma	Biological Sciences I	Louisiana State University Agricultural Center	3 Years	Cercosporin production and self-resistance: Deciphering the Achilles' heel of Louisiana's devastating soybean disease	$57,100.00	$52,116.00	$48,018.00	$157,234.00
010A-21	Prof. Aly Mousaad Aly	Engineering B	Louisiana State University and A & M College	1 Year	Multi-Scale Multi-Physics Approach for Resilient Coastal Infrastructure under Hurricanes	$20,000.00	$0.00	$0.00	$20,000.00
011A-21	Dr. Renee Carter	Health and Medical Sciences	Louisiana State University and A & M College	3 Years	Utilizing polymeric nanoparticles as an antioxidant delivery system for the treatment of intraocular inflammatory disorders	$67,324.00	$65,977.00	$63,337.00	$196,638.00
012A-21	Dr. Chen Chen	Biological Sciences I	Louisiana State University and A & M College	3 Years	Staphylococcal Superantigen-like Protein 11, a Unique Bacterial Toxin	$74,875.00	$62,975.00	$58,025.00	$195,875.00
013A-21	Dr. Michael Dance	Earth/Environmental Sciences	Louisiana State University and A & M College	3 Years	Coupled ecological function of shoals and production platforms as refuge from hypoxia-induced habitat compression	$68,950.00	$56,950.00	$45,450.00	$171,350.00
014A-21	Dr. Hunter Gilbert	Engineering B	Louisiana State University and A & M College	3 Years	A Systematic Modeling Framework for a Transformative Understanding of Continuum Robots	$53,629.00	$52,345.00	$49,345.00	$155,319.00
015A-21	Dr. Achim Herrmann	Earth/Environmental Sciences	Louisiana State University and A & M College	1 Year	Development of laser-ablation based biogeochemical methods at LSU A&M	$12,205.00	$0.00	$0.00	$12,205.00
016A-21	Dr. Amirhosein Jafari	Computer and Information Sciences	Louisiana State University and A & M College	3 Years	Developing a Smart and Automated Occupant-Centric Energy Management System [OCEMS] for Office Buildings	$59,250.00	$52,250.00	$43,250.00	$154,750.00
017A-21	Dr. Sabarethinam Kameshwar	Engineering B	Louisiana State University and A & M College	3 Years	Flood Performance of Above Ground Storage Tanks	$59,401.00	$54,751.00	$52,401.00	$166,553.00
018A-21	Prof. Chris Kees	Earth/Environmental Sciences	Louisiana State University and A & M College	3 Years	Modeling the mechanics of fluid-bed-vegetation interactions in coastal and riverine ecosystems	$61,749.00	$60,749.00	$60,249.00	$182,747.00
019A-21	Dr. Yong-ha Kim	Earth/Environmental Sciences	Louisiana State University and A & M College	3 Years	Behavior of Radionuclides in Water	$50,430.00	$47,012.00	$43,087.00	$140,529.00
020A-21	Dr. Charles Lee	Biological Sciences II	Louisiana State University and A & M College	1 Year	A Neurotomographic Approach for Identifying and Recording Long-Range Neural Circuit Activity	$20,000.00	$0.00	$0.00	$20,000.00
021A-21	Dr. Daijiang Li	Biological Sciences II	Louisiana State University and A & M College	3 Years	Understanding the effects of urbanization on plant phenology	$60,726.00	$53,826.00	$51,826.00	$166,378.00
022A-21	Prof. Omar Magana-Loaiza	Computer and Information Sciences	Louisiana State University and A & M College	3 Years	Smart Quantum Cameras	$72,113.00	$64,850.00	$60,498.00	$197,461.00
023A-21	Dr. Anas Mahmoud	Computer and Information Sciences	Louisiana State University and A & M College	1 Year	Utilizing Sharing Economy to Foster Economic Growth in Louisiana	$20,000.00	$0.00	$0.00	$20,000.00
024A-21	Dr. Elizabeth Martin	Biological Sciences I	Louisiana State University and A & M College	2 Years	Stem Cell Mediated Remodeling of the Breast Cancer Microenvironment	$59,229.00	$51,729.00	$0.00	$110,958.00
025A-21	Dr. Nicholas Mason	Biological Sciences II	Louisiana State University and A & M College	3 Years	Natural history collections: windows on Louisiana’s changing avifauna and ecosystems	$76,240.00	$62,415.00	$51,390.00	$190,045.00
026A-21	Prof. Kevin McPeak	Engineering B	Louisiana State University and A & M College	1 Year	Chiral Colloids: A Platform Technology for Molecular Optical Coherence Tomography	$20,000.00	$0.00	$0.00	$20,000.00

Proposals Submitted to the Research and Development Program - Research Competitiveness Subprogram (RCS)
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Proposal #	PI Name	Category	Institution	Duration	Project Title	Amount Requested			
						Year 1	Year 2	Year 3	Total
027A-21	Dr. Xiangyu Meng	Engineering B	Louisiana State University and A & M College	1 Year	Developing Eco-Platooning Algorithms for Connected Autonomous Vehicles Using Reinforcement Learning	$20,000.00	$0.00	$0.00	$20,000.00
028A-21	Dr. Shyam Menon	Engineering B	Louisiana State University and A & M College	3 Years	Investigation of microbubble dynamics through ultrafast microscopy and high-fidelity simulations	$52,000.00	$50,000.00	$48,000.00	$150,000.00
029A-21	Dr. Olalekan Ogundele	Biological Sciences II	Louisiana State University and A & M College	3 Years	A novel mechanism for coupling neural excitability with network adaptation in the hippocampus	$60,000.00	$50,000.00	$45,000.00	$155,000.00
030A-21	Dr. Olufemi Olorode	Earth/Environmental Sciences	Louisiana State University and A & M College	3 Years	A Study of the Multiscale Coupled Physical Mechanisms of Induced Seismicity Associated with the Development of Resource Shales	$49,500.00	$46,000.00	$39,500.00	$135,000.00
031A-21	Prof. Fatima Rivas	Chemistry	Louisiana State University and A & M College	3 Years	Synthesis of Acorane Natural Products against Metabolic Disorders	$65,068.00	$62,568.00	$61,568.00	$189,204.00
032A-21	Dr. Paul South	Biological Sciences I	Louisiana State University and A & M College	3 Years	Improving photosynthetic efficiency of lettuce in response to high CO2 and radiation stress stimuli experienced during lunar, mars and deep space missions.	$58,500.00	$48,700.00	$42,800.00	$150,000.00
033A-21	Dr. Chao Sun	Engineering B	Louisiana State University and A & M College	1 Year	Developing a Novel Paradigm for Damage Diagnosis of Aircraft Structures	$18,500.00	$0.00	$0.00	$18,500.00
034A-21	Dr. Jiaqi Tan	Biological Sciences II	Louisiana State University and A & M College	3 Years	Engineered nanomaterials: An emerging threat to plant microbiomes	$57,442.00	$54,104.00	$50,147.00	$161,693.00
035A-21	Prof. Xun Tang	Engineering B	Louisiana State University and A & M College	3 Years	Machine Learning-based Feedback Control for Colloidal Self-Assembly	$56,250.00	$55,950.00	$55,750.00	$167,950.00
036A-21	Dr. Anastasios Vourekas	Biological Sciences I	Louisiana State University and A & M College	3 Years	Novel roles of tRNA processing enzymes in regulation of gene expression	$65,000.00	$48,749.00	$47,049.00	$160,798.00
037A-21	Dr. Sita Withers	Health and Medical Sciences	Louisiana State University and A & M College	2 Years	Exploring the role of STING signaling in promoting the immunomodulatory effects of radiation in osteosarcoma	$71,220.00	$48,100.00	$0.00	$119,320.00
038A-21	Prof. Hsiao-Chun Wu	Computer and Information Sciences	Louisiana State University and A & M College	1 Year	Novel Real-Time Road Mapping Technology Using Vehicle-to-Vehicle Communications	$20,000.00	$0.00	$0.00	$20,000.00
039A-21	Dr. Amy Xu	Chemistry	Louisiana State University and A & M College	3 Years	Exploring the impacts of protein charge anisotropy on the short-term and long-term colloidal stability and viscosity of biopharmaceutical formulations	$62,150.00	$49,925.00	$43,875.00	$155,950.00
040A-21	Dr. Gerard Dumancas	Chemistry	Louisiana State University at Alexandria	3 Years	Development of an accurate, robust, and non-destructive spectroscopy-guided approach to determine honey authenticity and its geographical origin	$54,473.00	$57,473.00	$51,473.00	$163,419.00
041A-21	Prof. Monica Cartelle Gestal	Health and Medical Sciences	Louisiana State University Health Sciences Center Shreveport	3 Years	Bordetella bronchiseptica blocks eosinophil recruitment to increase persistence in the respiratory tract	$57,759.00	$57,759.00	$57,759.00	$173,277.00
042A-21	Prof. Reggie Lee	Biological Sciences II	Louisiana State University Health Sciences Center Shreveport	3 Years	Mechanisms of serum/glucocorticoid regulated kinase 1-mediated ischemic brain injury	$51,251.00	$51,251.00	$51,251.00	$153,753.00
043A-21	Dr. Gulshan Sunavala	Engineering B	Louisiana State University Health Sciences Center Shreveport	1 Year	Reconstructing femoral stem implants on joint biomechanics	$38,825.00	$0.00	$0.00	$38,825.00
044A-21	Dr. Amy Erickson	Biological Sciences II	Louisiana State University in Shreveport	3 Years	Controlling the invasive water fern Salvinia molesta by allelopathic effects of common aquatic plants	$49,091.00	$48,571.00	$43,466.00	$141,128.00
045A-21	Dr. Xiang Chen	Engineering B	Louisiana Tech University	3 Years	Understanding the Effect of Microstructures on the Reversibility of Shape Memory Alloys	$45,661.00	$42,911.00	$42,911.00	$131,483.00
046A-21	Dr. Michael Crosby	Earth/Environmental Sciences	Louisiana Tech University	3 Years	The Economic and Ecological Impacts of Hurricane Laura on Agriculture in Louisiana	$52,370.00	$53,646.00	$54,971.00	$160,987.00
047A-21	Dr. Julia Earl	Biological Sciences II	Louisiana Tech University	3 Years	Effects and mechanisms of biological diversity on community assembly	$45,689.00	$45,489.00	$22,533.00	$113,711.00
048A-21	Dr. Mary Fendley	Engineering B	Louisiana Tech University	3 Years	Developing Continuous Measures of Trust for Human-Machine Automation Systems	$52,704.00	$52,629.00	$52,629.00	$157,962.00
049A-21	Dr. Elizabeth Matthews	Engineering B	Louisiana Tech University	3 Years	Enhanced Investigation of Material Flood Damage to Support Multi-scale Flood Damage Prediction	$46,206.00	$46,206.00	$46,206.00	$138,618.00
050A-21	Dr. Manki Min	Computer and Information Sciences	Louisiana Tech University	3 Years	Design of Supersingular Isogeny-based Post-Quantum Cryptographic Functions	$50,500.00	$47,500.00	$47,500.00	$145,500.00

Proposals Submitted to the Research and Development Program - Research Competitiveness Subprogram (RCS)
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Proposal #	PI Name	Category	Institution	Duration	Project Title	Amount Requested			
						Year 1	Year 2	Year 3	Total
051A-21	Dr. Jamie Newman	Biological Sciences I	Louisiana Tech University	2 Years	Canonical and Noncanonical Notch Signaling Regulate Adipogenesis and Metabolism	$74,905.00	$74,905.00	$0.00	$149,810.00
052A-21	Dr. Christine Heinecke	Chemistry	Loyola University New Orleans	1 Year	Synthesis of Cationic and Zwitterionic Nanoparticle Scaffolds for Antimicrobial Applications	$10,911.00	$0.00	$0.00	$10,911.00
053A-21	Prof. Qian Qin	Chemistry	Loyola University New Orleans	1 Year	Synthesis and Characterization of Charge Transfer Complexes of Electron-Rich Aromatic Molecules As Potential New Organic Superconductors	$19,924.00	$0.00	$0.00	$19,924.00
054A-21	Dr. Rajesh Komati	Chemistry	Nicholls State University	1 Year	Development of Ligand Free, Open- Air Cu [II] Catalyzed C-N, C-O and C-S bond formation reactions	$20,000.00	$0.00	$0.00	$20,000.00
055A-21	Dr. Uttam Pokharel	Chemistry	Nicholls State University	1 Year	Redox-driven single molecular rotor and metal-organic supramolecules from ferrocene-linked tetradentate ligand	$20,000.00	$0.00	$0.00	$20,000.00
056A-21	Dr. Justine Whitaker	Biological Sciences II	Nicholls State University	3 Years	A Genomic Approach to Assessing Population Structure in a Long-lived Federally Threatened Species	$56,685.00	$60,530.00	$20,415.00	$137,630.00
057A-21	Dr. Enmin Zou	Biological Sciences II	Nicholls State University	1 Year	Using RNAi to determine the role of epidermal carbonic anhydrase in exoskeletal calcification in the post-ecdysial blue crab, Callinectes sapidus	$20,000.00	$0.00	$0.00	$20,000.00
058A-21	Dr. Sangho Yu	Biological Sciences II	Pennington Biomedical Research Center	3 Years	Central Zbtb16 function in the control of energy balance	$48,025.00	$60,025.00	$38,025.00	$146,075.00
059A-21	Dr. Mehmet Bahadir	Earth/Environmental Sciences	Southeastern Louisiana University	1 Year	Life Cycle Assessment [LCA] of the Atomic Diffusion Additive Manufacturing [ADAM] Technology	$18,529.00	$0.00	$0.00	$18,529.00
060A-21	Dr. Prem Chanda	Chemistry	Southeastern Louisiana University	3 Years	Development of diastereo- and enantioselective aldol and Mannich-type reactions of substituted phenylacetates and tertiary amides	$57,101.00	$48,905.00	$43,740.00	$149,746.00
061A-21	Dr. Priyadarshini Dasgupta	Engineering B	Southeastern Louisiana University	2 Years	Adoption of an Assistive Device for Ceiling Panel Installation: An Ergonomic Innovation in the Construction Sector	$43,155.00	$42,739.00	$0.00	$85,894.00
062A-21	Dr. Ephraim Massawe	Engineering B	Southeastern Louisiana University	3 Years	Robotic Mannequin-Based Performance Evaluations of Respirators Against Engineered Nanoparticles and Biological Aerosols	$62,591.00	$62,253.00	$63,462.00	$188,306.00
063A-21	Dr. Christopher Murray	Biological Sciences II	Southeastern Louisiana University	3 Years	TESTING THE EVOLUTIONARY MAINTENANCE OF ENVIRONMENTAL SEX DETERMINATION	$57,393.00	$41,388.00	$44,781.00	$143,562.00
064A-21	Dr. Michael O'Mara	Biological Sciences II	Southeastern Louisiana University	3 Years	Powering social networks: bat energetics in unpredictable environments	$69,926.00	$65,703.00	$37,056.00	$172,685.00
065A-21	Dr. Rebecca Parker	Health and Medical Sciences	Southeastern Louisiana University	1 Year	Developmental Trajectories of Written Expression for Children with Visual Impairments	$15,054.00	$0.00	$0.00	$15,054.00
066A-21	Dr. Kyle Piller	Biological Sciences I	Southeastern Louisiana University	1 Year	Distilling Darwin's Spirits: A novel study of fish DNA from the Voyage of the Beagle	$20,000.00	$0.00	$0.00	$20,000.00
067A-21	Dr. Benjamin Wicker	Chemistry	Southeastern Louisiana University	3 Years	Synthesis and Feasibility of NacNac Platinum Complexes as Anti-Tumor Agents	$73,120.00	$52,439.00	$53,288.00	$178,847.00
068A-21	Dr. April Wright	Biological Sciences II	Southeastern Louisiana University	3 Years	Assessing Bayesian model adequacy in phylogenetic estimation	$61,415.00	$76,549.00	$61,193.00	$199,157.00
069A-21	Dr. Yasser Ismail	Engineering B	Southern University and A&M College - Baton Rouge	3 Years	Efficient Internet of Video Surveillance Systems [IoVSS] for Smart Cities	$54,325.00	$52,025.00	$52,025.00	$158,375.00
070A-21	Dr. Maryam Jahan	Chemistry	Southern University and A&M College - Baton Rouge	1 Year	Cost effective & environmental friendly Bifunctional Oxygen reduction and Oxygen evolution catalyst	$20,000.00	$0.00	$0.00	$20,000.00
071A-21	Dr. Jung-Im Seo	Health and Medical Sciences	Southern University and A&M College - Baton Rouge	3 Years	Influences of the Online Grocery Shopping Behaviors on Obesity Health Condition through Body Mass Index [BMI] and Body Shape Index [BSI]	$56,704.00	$64,804.00	$70,804.00	$192,312.00
072A-21	Prof. Maria Galazo	Biological Sciences II	Tulane University	3 Years	Molecular mechanisms of cortical output neuron differentiation and fate reprogramming	$57,644.00	$65,001.00	$60,000.00	$182,645.00
073A-21	Dr. Alex Gunderson	Biological Sciences II	Tulane University	3 Years	Developing a lizard species as a novel model system to study the effects of lead [Pb] contamination in Louisiana and beyond	$93,564.00	$57,025.00	$48,597.00	$199,186.00
074A-21	Prof. Colin Jackson	Earth/Environmental Sciences	Tulane University	3 Years	Subducting salt: an experimental investigation of halogen partitioning in slab environments	$66,500.00	$51,816.00	$42,059.00	$160,375.00

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Proposal #	PI Name	Category	Institution	Duration	Project Title	Amount Requested			
						Year 1	Year 2	Year 3	Total
075A-21	Prof. Alexander McSkimming	Chemistry	Tulane University	3 Years	Exploring Small Molecule Activation at High-Spin Metal Centers	$75,444.00	$57,100.00	$42,825.00	$175,369.00
076A-21	Dr. Michael Naguib	Engineering B	Tulane University	3 Years	Two-Dimensional Transition Metal-based Materials and their Heterostructures as Electrocatalysts	$61,211.00	$61,636.00	$62,076.00	$184,923.00
077A-21	Dr. Bilon Khambu	Health and Medical Sciences	Tulane University Health Sciences Center	3 Years	Role of Autophagy in Hepatic Metabolism	$46,936.00	$47,062.00	$47,679.00	$141,677.00
078A-21	Dr. Hongbing Liu	Biological Sciences II	Tulane University Health Sciences Center	3 Years	Epigenetic Regulation of Six2 in Nephron Endowment	$78,346.00	$78,346.00	$78,346.00	$235,038.00
079A-21	Dr. Janet McCombs	Health and Medical Sciences	Tulane University Health Sciences Center	3 Years	Enhancing in vivo efficacy of Klebsiella pneumoniae-specific T cells for therapeutic development	$49,692.00	$48,793.00	$47,927.00	$146,412.00
080A-21	Dr. Kislay Parvatiyar	Biological Sciences I	Tulane University Health Sciences Center	3 Years	Immune modulation by SARS-CoV2	$41,304.00	$41,544.00	$41,794.00	$124,642.00
081A-21	Dr. Beenish Chaudhry	Computer and Information Sciences	University of Louisiana at Lafayette	3 Years	Exploring the Role of Emerging Technologies in Digital Health Interventions for Older Adults	$58,983.00	$49,686.00	$48,473.00	$157,142.00
082A-21	Dr. Tanvir Faisal	Engineering B	University of Louisiana at Lafayette	3 Years	Pathomechanics of cartilage: A systematic analysis of pathological degradation of articular cartilage in early-stage osteoarthritis	$66,740.00	$66,338.00	$65,235.00	$198,313.00
083A-21	Dr. Farzad Ferdowsi	Computer and Information Sciences	University of Louisiana at Lafayette	3 Years	An IoT-Based Robust Control Scheme (RCS) to Protect Electric Power Networks from Cyber Attacks	$47,809.00	$46,503.00	$42,745.00	$137,057.00
084A-21	Dr. Aminul Islam	Computer and Information Sciences	University of Louisiana at Lafayette	3 Years	Computationally Efficient and Accurate Classification with Minimal Observations	$55,750.00	$49,794.00	$46,120.00	$151,664.00
085A-21	Dr. Davide Oppo	Earth/Environmental Sciences	University of Louisiana at Lafayette	3 Years	Impact of sea-level rise on the dynamics of natural methane seepage	$68,882.00	$55,805.00	$26,322.00	$151,009.00
086A-21	Prof. Anna Paltseva	Earth/Environmental Sciences	University of Louisiana at Lafayette	1 Year	Assessing Heavy Metal Contamination in Community Gardens Along the Southern Louisiana-Texas Petro-Chemical Corridor	$15,960.00	$0.00	$0.00	$15,960.00
087A-21	Dr. Emmanuel Revellame	Engineering B	University of Louisiana at Lafayette	3 Years	Evaluation of Extractive Butyric Acid Fermentation using Alcohol Ethoxylates as Solvent	$61,215.00	$60,940.00	$60,665.00	$182,820.00
088A-21	Dr. Xiang-Sheng Wang	Health and Medical Sciences	University of Louisiana at Lafayette	3 Years	Real-time forecast and optimal control of infectious disease dynamics	$48,366.00	$47,066.00	$45,794.00	$141,226.00
089A-21	Dr. Jean Christopher Chamcheu	Biological Sciences II	University of Louisiana at Monroe	3 Years	Role and modulation of mTOR/Rac1 pathway in skin inflammation and psoriasis	$55,675.00	$45,550.00	$43,000.00	$144,225.00
090A-21	Dr. Emad El-Giar	Chemistry	University of Louisiana at Monroe	3 Years	The Use of Electropolymerized Polyphenols for Prevention of Galvanic Corrosion between Mg and Steel Alloys in the Automotive Industry	$45,000.00	$35,000.00	$32,750.00	$112,750.00
091A-21	Dr. Georgios Matthaiolampakis	Biological Sciences I	University of Louisiana at Monroe	3 Years	Novel miRNA-based therapeutics for regulating cell cycle progression	$55,000.00	$47,500.00	$36,000.00	$138,500.00
092A-21	Dr. Siva Murru	Chemistry	University of Louisiana at Monroe	3 Years	Design, Synthesis and Evaluation of Pyrazole-Based Molecular Hybrids as Potential Anticancer Agents	$46,642.00	$44,859.00	$44,829.00	$136,330.00
093A-21	Dr. Ebrahim Amiri	Engineering B	University of New Orleans	3 Years	Dual-pole Permanent Magnet Synchronous Machines for Marine Propulsion: Analytical Modeling and Magnetic Volume Reduction	$45,110.00	$45,669.00	$49,508.00	$140,287.00
094A-21	Dr. Satish Bastola	Engineering B	University of New Orleans	3 Years	Quantifying Potential Trade-offs and Synergies between Food, Water and Carbon Footprint, under Range of Water Management and Climate Change Scenarios, in the Lower Mississippi river Basin	$50,213.00	$55,396.00	$55,381.00	$160,990.00
095A-21	Prof. Uttam Chakravarty	Engineering B	University of New Orleans	3 Years	Understanding the Detection Technologies of Synthetic Opioids	$60,008.00	$60,800.00	$61,625.00	$182,433.00
096A-21	Dr. Traci Cox	Biological Sciences II	University of New Orleans	3 Years	Resiliency of seagrass to environmental stress: the role of genotypic variation and seedling vulnerability for Halodule wrightii	$47,523.00	$46,988.00	$43,618.00	$138,129.00
097A-21	Dr. Farjana Eishita	Computer and Information Sciences	University of New Orleans	3 Years	Intervention of Serious Games to Ameliorate the Aptitude of Psychotherapeutic Strategies: A Neoteric Approach	$53,539.00	$53,568.00	$33,500.00	$140,607.00
098A-21	Prof. Christopher Harshaw	Biological Sciences II	University of New Orleans	3 Years	Oxytocin, Social Hyperthermia, and Mouse Models of Autism Spectrum Disorder	$62,845.00	$67,471.00	$69,087.00	$199,403.00

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						Year 1	Year 2	Year 3	Total
099A-21	Dr. Md Hoque	Computer and Information Sciences	University of New Orleans	1 Year	Using Artificial Intelligence with Designed Disorder Ligands to Neutralize Mutating Germs	$19,918.00	$0.00	$0.00	$19,918.00
100A-21	Prof. Robert Mahon	Earth/Environmental Sciences	University of New Orleans	3 Years	3-dimensional sediment transport dynamics and evolution of river dunes	$56,166.00	$52,498.00	$43,276.00	$151,940.00
101A-21	Dr. Abdullah Nur	Computer and Information Sciences	University of New Orleans	3 Years	Topology Aware Collaborative Filtering Against DDoS Attacks	$49,670.00	$50,520.00	$51,406.00	$151,596.00
102A-21	Dr. Benjamin Samuel	Computer and Information Sciences	University of New Orleans	3 Years	Evaluating Shared Authorship in Interactive Story Worlds	$48,355.00	$50,009.00	$51,429.00	$149,793.00
103A-21	Dr. James Wagner	Computer and Information Sciences	University of New Orleans	3 Years	Computing Data Lineage within Database Management Systems	$34,774.00	$71,454.00	$72,081.00	$178,309.00
104A-21	Dr. Hyunguk Yoo	Computer and Information Sciences	University of New Orleans	1 Year	Memory Forensics for Programmable Logic Controllers	$18,750.00	$0.00	$0.00	$18,750.00
105A-21	Prof. Vincent Yu	Engineering B	University of New Orleans	3 Years	Stochastic Modelling and Experimental Tests of Solid Objects Dropped into Water	$57,226.00	$55,515.00	$26,375.00	$139,116.00
106A-21	Dr. Minhaz Zibran	Computer and Information Sciences	University of New Orleans	2 Years	MineBug: Mining Bug-fix Patterns for Secure and Reliable Software	$48,535.00	$49,136.00	$0.00	$97,671.00
107A-21	Dr. Ian Davenport	Biological Sciences II	Xavier University	2 Years	The evolution of viviparity in chondrichthyan fishes, a study in the evolution, structure, and function of follicle cell processes.	$42,793.00	$43,619.00	$0.00	$86,412.00
108A-21	Dr. Samrat Dutta	Chemistry	Xavier University	3 Years	Investigating kinetics in imidazolium-based and solvate ionic liquid	$64,000.00	$65,820.00	$67,714.00	$197,534.00

Proposals Submitted	108
Total Funds Requested for First Year	$5,236,350
Total Funds Requested for Second Year	$4,482,808
Total Funds Requested for Third Year	$3,727,270
Total Funds Requested	$13,446,428