LOUISIANA BOARD OF REGENTS
BOARD OF REGENTS SUPPORT FUND

RESEARCH & DEVELOPMENT PROGRAM

REVIEW OF COMPETITIVE PROPOSALS SUBMITTED FOR FUNDING CONSIDERATION IN THE RESEARCH COMPETITIVENESS SUBPROGRAM

FY 2019-20 COMPETITION

March 2020

REPORT OF THE FINAL PANEL

BOARD OF REGENTS SUPPORT FUND
RESEARCH COMPETITIVENESS SUBPROGRAM
FY 2019-20

BACKGROUND INFORMATION

One hundred sixty-nine (one withdrawn) research proposals requesting a total of $8,348,464 in first-year funds were submitted for funding consideration in fiscal year (FY) 2019-20 to the Research Competitiveness Subprogram (RCS) of the Board of Regents Support Fund (BoRSF) R & D Program. Nine disciplines were eligible, including agricultural sciences, biological sciences I, biological sciences II, computer and information sciences, earth and environmental sciences, engineering "A" (i.e., chemical, civil, and electrical and electronics), mathematics, physics and astronomy, and social sciences.

THE REVIEW PROCESS

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

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

In Phase I of the review process the one hundred sixty-nine (one withdrawn) proposals were assigned to nine subject-area panels, for funding consideration in FY 2019-20. 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 2019-20 R & D Request for Proposals (RFP), panel members worked individually and then collaboratively by telephone and email to decide which proposals in their subject area met all four eligibility requirements (i.e., the applicant and the proposal fit the EPSCoR mold; the proposal contained a significant research component; the proposal had the potential to make fundamental [basic] research contributions; and the research topic fit one of the nine eligible disciplines as defined in the RFP). In this phase of the review process, each subject-area panel member acted as “primary discussant” for an assigned portion of the proposals and completed an in-depth consensus critique form for each of his/her assigned proposals after discussing its relative merits and shortcomings with the other panel members. Through a telephone conference, the subject-area panel members jointly ranked the proposals in the order in which they believed that the proposals should be funded. The panel carefully scrutinized the budgets of those proposals ranked high enough to merit serious consideration for funding and recommended modifications where appropriate.

[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.

Phase II: Final Panel Review and Interdigitation of Recommended Proposals

In Phase II of the review process a final panel (hereafter referred to as the "Panel"), composed of three senior out-of-state professionals whose expertise spans the eligible disciplines and who possess comprehensive experience with EPSCoR-type programs, convened on March 12, 2020, 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. Fifty-seven proposals were discussed at length during this meeting.

The Panel was informed that approximately $1.3M 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 **$1,506,329** 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 $1.3M was available for funding, the Panel recommended additional proposals in the event a recommended applicant became nationally competitive or received stimulus funding comparable to the RCS, resulting in a vacated award.

Note: Funds anticipated to be available will currently support Priority One proposals ranked 1-31. 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 identification of who the consultants were or why their services were needed. The needed for consultants must be clearly articulated.

9. General Comments.

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

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

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

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

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

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

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

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

   b) Applicants whose proposals have been declined two or more times are encouraged to seek assistance in proposal/grant writing from a mentor or an established, nationally competitive investigator in the same field, perhaps at a nearby institution.

c) Applicants whose proposals were submitted and declined for the first time this year should look to the reviewer comments for guidance in strengthening future proposals.

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

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

To the Board of Regents:

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

2. Limitations on Overall Funding Requests. In no year of the RCS's operation have the 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)

Rank	Proposal No.	Institution	Recommended BoRSF 1st Year Funds	Recommended BoRSF 2nd Year Funds	Recommended BoRSF 3rd Year Funds
1	068A	LA-TECH	$43,330	$43,330	$43,330
1	079A	LA-TECH	$43,320	$42,920	$42,920
1	153A	UNO	$65,226	$56,396	$32,500
1	137A	ULL	$48,226	$46,828	$45,461
1	041A	LSU A&M	$49,315	$49,315	$40,780
1	059A	LSU A&M	$18,875	$------	$------
1	141A	ULL	$15,288	$------	$------
1	168A	UNO	$50,189	$50,189	$49,250
1	128A	ULL	$44,418	$44,418	$44,418
1	132A	ULL	$49,808	$49,203	$48,614
1	070A	LA-TECH	$44,245	$44,245	$44,245
1	008A	LSU-Ag	$18,365	$------	$------
1	033A	LSU A&M	$61,701	$60,701	$59,701
1	125A	ULL	$56,398	$55,690	$55,515
15	065A	LSUHSC-Shrev	$16,000	$------	$------
16	050A	LSU A&M	$59,445	$47,451	$39,625
17	040A	LSU A&M	$52,325	$50,681	$48,850
18	148A	ULM	$17,200	$-----	$-----
19	037A	LSU A&M	$63,600	$60,600	$58,100
20	136A	ULL	$50,292	$40,052	$40,052
21	029A	LSU A&M	$20,000	$------	$------

APPENDIX A (continued)

RCS PROPOSALS HIGHLY RECOMMENDED FOR FUNDING (PRIORITY ONE)

22	066A	LSU-Shrev	$18,819	$------	$------
23	030A	LSU A&M	$41,858	$41,808	$39,908
24	073A	LA-TECH	$47,341	$44,841	$43,841
25	016A	LSU A&M	$49,825	$49,825	$44,825
26	086A	NICHOLLS	$51,686	$50,280	$47,715
27	006A	LSU-Ag	$58,271	$57,271	$56,271
28	057A	LSU A&M	$57,250	$55,250	$55,250
29	142A	ULL	$47,296	$44,899	$42,730
30	133A	ULL	$48,919	$34,500	$34,500
31*	081A	LOYOLA	$35,699	$27,981	$25,744
32	123A	ULL	$40,371	$40,371	$40,371
33	005A	LSU-Ag	$20,000	$-----	$-----
34	014A	LSU A&M	$44,770	$28,080	$28,080
35	146A	ULM	$37,000	$37,000	$34,000
36	076A	LA-TECH	$19,658	$------	$------
	TOTALS		**$1,506,329**	**$1,254,125**	**$1,186,596**

*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 (22)

012A 022A 024A 031A 036A 060A 078A 095A 116A 117A 118A 121A 124A 126A 127A

130A 131A 139A 144A 150A 165A 167A

***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 2020.

APPENDIX C

MERITORIOUS PROPOSALS RANKED PRIORITY TWO BY THE SUBJECT-AREA PANELS AND CONSIDERED BY THE FINAL PANEL BUT NOT RECOMMENDED FOR FUNDING (64)

001A	026A	047A	071A	103A	122A	161A
002A	028A	048A	072A	104A	138A	162A
004A	032A	053A	074A	107A	140A	163A
007A	034A	055A	084A	108A	145A	169A
009A	035A	058A	085A	109A	149A	-----
010A	038A	061A	090A	110A	151A	-----
011A	043A	063A	091A	111A	152A	-----
018A	044A	064A	096A	112A	154A	-----
019A	045A	067A	098A	114A	156A	-----
021A	046A	069A	099A	120A	159A	-----

***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 2020.

APPENDIX D

PROPOSALS RANKED PRIORITY THREE OR DECLARED INELIGIBLE/WITHDRAWN BY THE SUBJECT-AREA PANELS AND NOT RECOMMENDED FOR FUNDING (47)

003A	062A	102A	164A
013A	075A	105A	166A
015A	077A	106A	-----
017A	080A	113A	-----
020A	082A	115A	-----
023A	083A	119A	-----
025A	087A	129A	-----
027A	088A	134A	-----
039A	089A	135A	-----
042A	092A	143A	-----
049A	093A	147A	-----
051A	094A	155A	-----
052A	097A	157A	-----
054A	100A	158A	-----
056A	101A	160A	-----

***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 2020.

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 proposals highly recommended for awards by the Panel. The Panel would again like to emphasize that it considered the first fourteen proposals to be of relatively equal merit and, therefore, the order in which they have been listed is arbitrary. Proposals ranked fifteen through thirty-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, the Panel did not reduce any budget to such an extent that achievement of a project's goals or execution of its work plan would be impaired. Therefore, **no reductions in the scope of work plans of projects recommended for funding should be allowed.** If the work plan submitted for a project does not correspond in scope to that of the original proposal, the award should be vacated and funds thereby made available should be used to fund other worthy projects in the RCS or other R & D subprogram(s) of the Board of Regents Support Fund.

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

Appendix E (continued):

PROPOSAL: 068A-20 **RANK: 1**

TITLE: Adaptive Algorithms for Sonar Systems that Employ Sparse Sensor Arrays

INSTITUTION: Louisiana Tech University

PRINCIPAL INVESTIGATOR: Kaushallya Adhikari, Ph.D.

COMMENTS: The Navy has a strategic interest in being able to detect and localize enemy submarines using sonar systems on ships that employ sensor arrays. For a given number of sensors, a sparse array provides more degrees of freedom than a full array. However, there are two primary challenges involved in the implementation of sparse arrays for sonar systems. The first challenge is the absence of definitive criteria that indicate which sparse arrays are optimal. The proposed research will overcome this challenge by formulating measures to characterize sparse arrays. The second challenge is that an overwhelming majority of the existing research on sparse arrays has been limited to non-adaptive algorithms, which are not applicable to real sonar data. The proposed research will overcome the second challenge by designing adaptive algorithms for sparse arrays operating in a real sonar environment. The PI will conduct this research, leveraging connections to national labs such as Oakridge National Laboratory (ORNL) in Tennessee and MIT Lincoln Laboratory in Massachusetts. The outcomes of this research will enhance the Navy's overall technical capabilities, while strengthening the PI's competitiveness in research and establishing Louisiana Tech as an emerging naval research institution.

The PI has (2) pending proposals:

- Office of Naval Research – entitled "Sensing and Sense-Ability: Building Critical Thinking About Signal Processing and Acoustics" in the amount of $749,465 for the period 6/2020 – 5/2023
- Office of Naval Research – entitled "Information Theoretic Design of Sparse Arrays and Adaptive Algorithms to Maximize Detection in Real Sonar Systems" in the amount of $440,725 for the period 12/2019 – 11/2022

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

It is recommended that the proposed budget be reduced to eliminate publication charges, resulting in a year one budget of $43,330. Similar budgets of $43,330 are recommended for year two and year three.

Year 1: $43,330 **Year 2: $43,330** **Year 3: $43,330**

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

Appendix E (continued):

PROPOSAL: 079A-20 **RANK: 1**

TITLE: Precise Arrangement of Nanoparticles via Block Copolymer Grafts

INSTITUTION: Louisiana Tech University

PRINCIPAL INVESTIGATOR: Andrew Peters, Ph.D.

COMMENTS: Polymer nanocomposites have attracted extensive attention in recent years because of their ability to enhance mechanical, thermal, optical, magnetic, and transport properties. This has led to an explosion in the nanocomposite market, which reached $1.6 billion in 2016 and is predicted to increase to $7.3 billion by 2022. By controlling the placement of particles within a polymer matrix, the effect of particles can be maximized and new emergent properties which do not exist in the constituent materials such as enhanced catalytic properties, increase cathode capacity, and many stimuli-responsive properties can be produced. One way to control the placement is to use a block copolymer (BCP) matrix. BCPs have the unique ability to phase separate and organize into various nanostructures at length scales determined primarily by the length of the copolymer chain. By chemically bonding (grafting) block copolymers to the particles, precise control over nanoparticle placement and nanoparticles-nanoparticle spacing will be achieved, leading to materials with greatly enhanced and emergent properties. The PI recently developed a simulation technique (PCND) specifically designed to overcome the most difficult obstacle in modeling organized nanocomposites, namely, sampling over the very large time and space scales required because of their hierarchical/multi-scale nature. This proposal will use the new technique to demonstrate the ability of grafted block copolymers and homopolymers to precisely order nanoparticles and obtain a systematic understanding of how these grafts can control the placement of particles and the kinetics of the system. The effect on properties will then be measured and optimized.

The PI has (1) pending proposal:

- NSF – entitled "CAREER: Precise Arrangement of Block Copolymer Grafted Nanoparticles via Development of Protracted Colored Noise Dynamics" in the amount of $516,718 for the period 6/2020 – 5/2025

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 proposed budget be reduced to eliminate publication charges, resulting in a year one budget of $43,320. Budgets of $42,920 are recommended for year two and year three.

Year 1: $43,320 **Year 2: $42,920** **Year 3: $42,920**

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

Appendix E (continued):

PROPOSAL: 153A-20 **RANK: 1**

TITLE: Anthropogenic Noise Impacts on Acoustic Communication of Sound Producing Fishes of the Northern Gulf of Mexico

INSTITUTION: University of New Orleans

PRINCIPAL INVESTIGATOR: Kelly Boyle, Ph.D.

COMMENTS: Anthropogenic noise from boats and vessels may adversely impact behavior of marine and aquatic animals, especially species that communicate acoustically. Many commercially and ecologically important fish species produce sounds during reproduction and there is growing concern that noise could disrupt spawning success. Noise impacts, however, are unknown for most species. The proposed research addresses the hypothesis that anthropogenic noise has negative impacts on sound transmission and hearing for soniferous fishes of the Gulf of Mexico that vary in severity among species. The PI will test predictions of the hypothesis with (1) direct field observations; and (2) experiments testing hearing before and after noise exposure. Soundscape recorders will be used to measure sound emission rate and chorus intensity before and after vessel noise events in the field. In the laboratory, auditory evoked potentials will be used to test baseline hearing thresholds of three species and temporary threshold shifts following noise exposure. Experimental subjects and controls will be examined for morphological and histological signs of trauma from noise. Experiments will be conducted to test for changes in sound emission rate following noise exposure. Electromyography will be used to measure sonic noise. Results from this research will elucidate impacts of anthropogenic noise on sound-producing fishes and will provide novel data in the research field, making the principal investigator more competitive for national funding.

The PI has (1) pending proposal:

- NSF – entitled "Influence of the Natural Noise Environment on the Morphological and Functional Evolution of Hearing in Otophysan Fishes" in the amount of $802,923 for the period 8/2020 – 7/2025

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 proposed budget be reduced to provide undergraduate student support of $2,000, and travel support of $2,000, for a year one budget of $65,226. A budget of $56,396 that provides limited travel support of $3,000 is recommended for year two. A budget of $32,500 is recommended for year three.

Year 1: $65,226 **Year 2: $56,396** **Year 3: $32,500**

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

Appendix E (continued):

PROPOSAL: 137A-20 **RANK: 1**

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

INSTITUTION: University of Louisiana at Lafayette

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

COMMENTS: Data processing using stochastic logic has been used in recent years for low-cost design of machine learning (ML) systems. Data are converted from traditional weighted binary to random bit-streams and processed using stochastic computing (SC) circuits. Inherent inaccuracy and long latency of processing random bit-streams have made prior bit-stream-based ML systems inefficient compared to conventional fixed-point binary implementations. The bit-stream often needs to be processed for a very long time to produce acceptable results. This long latency further translates to high energy consumption. While some deterministic and accurate approaches to SC have been proposed, these approaches (1) lack the property of progressive precision enjoyed by conventional SC and (2) do not scale well. As a result, the approaches are not competitive for applications where some degree of inaccuracy can be tolerated, such as ML applications. This proposal introduces several fast-converging scalable deterministic approaches for processing bit-streams. Based on these approaches, the PI developed low-cost, low-latency, and energy-efficient ML systems. Early synthesis results on the implementation of convolutional neural networks (CNNs) show a significant reduction in the processing time and energy consumption compared to the conventional random bit-stream implementation and to the optimized fixed-point binary designs, with no quality degradation. Such low-cost and energy-efficient ML systems can enhance many economically important U.S. industries in developing cost-efficient scalable intelligent systems.

The PI has (1) pending proposal:

- NSF – entitled "Adaptive Monitoring and Inspection for Effective Risk Exposure via Outlier Detection in Social Networks" in the amount of $1,180,000 for the period 3/1/2020 – 2/29/2023

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 for a year one budget of $48,226. Budgets of $46,828 and $45,461 are recommended for year two and year three, respectively.

Year 1: $48,226 **Year 2: $46,828** **Year 3: $45,461**

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

Appendix E (continued):

PROPOSAL: 041A-20 **RANK: 1**

TITLE: Neural Dynamics of the Interplay Between Memory and Information Sampling Across the Adult Lifespan

INSTITUTION: Louisiana State University and A&M College

PRINCIPAL INVESTIGATOR: Heather Lucas, Ph.D.

COMMENTS: Memory decline is a hallmark of the aging process and a significant source of concern for many older adults. Age-related changes to memory abilities have been linked to reduced integrity of a brain region called the hippocampus and its connectivity with distributed cortical regions. Traditionally, hippocampal-cortical brain networks have been viewed as important primarily for retaining information in memory across long delays. However, recent work by the PI and others suggests that the hippocampus becomes involved much earlier in the learning process, providing input into how learners study and interact with information as it is first encountered. This new perspective calls for an increased focus on how aging impacts patterns of information sampling during memorization attempts, perhaps resulting in disorganized or otherwise suboptimal choices about what information to inspect and when. The PI recently identified an information-theoretic property of eye movements that predicts performance on visuospatial memory tasks, and thus provides a behavioral marker of the ability to adaptively constrain saccadic exploration. Building on this work, the proposed research tests the hypotheses that (1) specific hippocampal-cortical pathways promote the effective use of saccades to organize and optimize visuospatial memory formation; and (2) changes in eye movement behaviors partially mediate the relationship between age-related changes to the brain and corresponding changes in memory performance. In addition to providing insight about how brain aging impacts memory, the proposed research will inform the development of tools and strategies to scaffold memory across the adult lifespan.

It is recommended that the proposed budget be reduced to provide one-month summer salary including fringe benefits (not to include course release time) for the PI, GRA support of $20,066, and consultant charges deleted, resulting in a year one budget of $49,315. A similar budget of $49,315 is recommended for year two. A budget of $40,780 is recommended for year three.

Year 1: $49,315 **Year 2: $49,315** **Year 3: $40,780**

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

Appendix E (continued):

PROPOSAL: 059A-20 **RANK: 1**

TITLE: Molecular Base of Loss of Osteogenic Differentiation Capability in Human Tissue-Derived Stem Cells

INSTITUTION: Louisiana State University and A&M College

PRINCIPAL INVESTIGATOR: Shaomian Yao, Ph.D.

COMMENTS: The capability of differentiation is the most important property of tissue-derived stem cells (TDSCs) for regenerative medicine. Due to the limited quantity of primary stem cells, the *in vitro* expansion of primary cells to large quantities is needed for their therapeutic applications. However, *in vitro* expansion results in the TDSCs losing differentiation capability. This greatly hampers therapeutic applications of the TDSCs. The molecular mechanisms that cause stem cells to lose differentiation capability during *in vitro* expansion are largely unknown. Elucidating such mechanisms would facilitate the development of methods to preserve differentiation capability, such that large quantities of high-potency TDSCs can be obtained from *in vitro* expansion. Osteogenic differentiation is the most important capability of stem cells, which are valuable for regeneration, repair, and engineering of musculoskeletal, dental, and craniofacial tissue. The PI has found in preliminary studies that expression of cysteine-rich secretory protein LCCL domain-containing-2 (Crispld2) was dramatically decreased in major TDSCs, resulting in dysregulation of transcriptional factors (TFs) of Crispld2, which causes downregulation of Crsipld2 expression. This in turn leads to the loss of osteogenic differentiation capability. Because human bone marrow stem cells (hBMSCs) are the most important TDSCs, the PI will use hBMSCs to test the hypothesis. The goal of this project is to identify the TFs that regulate Crispld2 expression, affecting osteogenic differentiation during hBMSCs expansion.

It is recommended that the proposed budget be reduced to eliminate printing charges of $1,000, resulting in a year one budget of $18,875.

Year 1: $18,875

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

Appendix E (continued):

PROPOSAL: 141A-20 **RANK: 1**

TITLE: The Endogenous Opioid System in Self Injury

INSTITUTION: University of Louisiana at Lafayette

PRINCIPAL INVESTIGATOR: Karen Smith, Ph.D.

COMMENTS: Self-injurious behavior (SIB) is characterized by deliberate self-harm or mutilation outside the context of body modification practices. SIB is expressed in various neuropsychiatric disorders and is associated with suicide risk. A reduction of endogenous opioid signaling in affected individuals (and animals) has been hypothesized; however, we lack an understanding of what ligands or receptors are afflicted, what brain areas are disrupted, or the underlying regulators of this signaling. Preliminary studies indicate a decreased expression of the mu-opioid receptor (MOR) in the amygdala of animals with self injury. The PI will (1) use RNA transcriptomics to determine molecular or neurotransmitter pathways disrupted in the amygdala of animals with SIB; and (2) measure the levels of endogenous opioids and their receptors in the brains of animals with SIB compared to controls. The amygdala is essential to the regulation of stress and emotional processing, and preliminary evidence indicates involvement of the amygdala in self injury. The PI will confirm changes in mu-opioid receptors in SIB at the protein level and will examine additional endogenous ligands not yet tested in preliminary studies.

It is recommended that the project be funded at the level requested, i.e., $15,288 for year one.

Year 1: $15,288

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

Appendix E (continued):

PROPOSAL: 168A-20 **RANK: 1**

TITLE: Interactions and Physiochemical Processes of Nanoparticles in Aquatic Environments

INSTITUTION: University of New Orleans

PRINCIPAL INVESTIGATOR: Phoebe Zito, Ph.D.

COMMENTS: The influence of nanoparticles (NPs), along with their rates, mechanisms and molecular-level transformations associated with photochemical processes governing dissolution and subsequent degradation in aquatic environments, is an important dynamic to consider in terms of human health and aquatic ecosystems. Due to their small size (<100 nm), NPs can enter the environment through treated industrial and domestic wastewater effluent. Once NPs enter the aquatic environment, they can undergo physiochemical processes and react with organic compounds. NPs such as titanium dioxide can undergo photocatalysis, producing reactive oxygen species (ROS) which can cause ecotoxicological effects to aquatic organisms. The proposed research seeks to study the fate, persistence, and transport of NPs once they are bound to emerging contaminants in order to understand how binding affects their overall presence and persistence in the environment. The research approach is divided into (5) objectives: (1) determine the fundamental surface interactions and binding of NPs to various emerging contaminants; (2) determine the composition of emerging contaminants after they have undergone various treatments in the presence of NPs; (3) utilize analytical instrumentation to investigate the physical and chemical changes to emerging contaminants after undergoing different treatments; (4) measure mechanisms and rates of degradation on NPs bound to emerging contaminants and released in a simulated environment; and (5) determine the rates, mechanisms and ROS pathways of emerging contaminants when bound to NPs. The methodologies and advanced analytical techniques applied to interlaboratory studies with NPs will be applied to study the Mississippi River Delta and coastal Louisiana.

It is recommended that the proposed budget be reduced to provide equipment support of $4,689, based on 25% institutional cash match of $1,563, resulting in a year one budget of $50,189. A similar budget of $50,189 is recommended for year two. In year three, it is recommended that the project be funded at the level requested, i.e., $49,250.

Year 1: $50,189 **Year 2: $50,189** **Year 3: $49,250**

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

Appendix E (continued):

PROPOSAL: 128A-20 **RANK: 1**

TITLE: Modeling Across-Scale Feedbacks of Pathogen Virulence, Host Immunity, and Disease Control

INSTITUTION: University of Louisiana at Lafayette

PRINCIPAL INVESTIGATOR: Hayriye Gulbudak, Ph.D.

COMMENTS: A current challenge for disease modeling and public health is to understand pathogen dynamics across scales from within-host to between-host. However, immunology and epidemiology are traditionally treated separately in disease modeling. For example, dengue virus (DENV) burden and host immunity are intricately linked. A better understanding of the coupled immunological and epidemiological dynamics is critical for control strategies against DENV, highlighted by recent debate over whether vaccination may increase severe dengue infection. In this proposal, population-wide epidemic models are linked to individual infection dynamics to examine complex attributes of diseases such as infection by multiple strains, waning/boosting of immunity, and vector competence, along with disease control. While multi-scale models have been utilized for infectious diseases, a major limitation has been lack of bidirectional dependence of epidemiological and immunological scales, which is addressed by allowing for variable within-host (or vector) trajectories dependent on the population level epidemic and control strategies. The PI will develop multi-scale modeling frameworks with dynamical analysis, computational methods and data fitting for deciphering disease outcomes across scales. Three case studies are considered: (1) the role of pre-existent antibodies on DENV severity and vaccination; (2) feedbacks in pathogen persistence and host immunity in Foot and Mouth Disease Virus (FMDV); and (3) the effect of in-vector viral kinetics on vector-borne disease epidemics and control. By combining the studies, the PI expects to identify how the across-scale feedbacks influence disease burden and host immunity, and provide insights for disease control and predictions.

The PI has (1) pending proposal:

- NSF – entitled "Modeling Across-Scale Feedbacks of Pathogen Virulence, Host Immunity, and Disease Control" in the amount of $289,926 for the period 8/1/2020 – 7/30/2023

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 undergraduate student support of $2,000, and limit travel support to $2,000 for a year one budget of $44,418. Similar budgets of $44,418 are recommended for year two and year three.

Year 1: $44,418 **Year 2: $44,418** **Year 3: $44,418**

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

Appendix E (continued):

PROPOSAL: 132A-20 **RANK: 1**

TITLE: Dielectric Failure and Recovery Mechanisms in Flexible Electronics

INSTITUTION: University of Louisiana at Lafayette

PRINCIPAL INVESTIGATOR: Seonhee Jang, Ph.D.

COMMENTS: As the device features of integrated circuits (ICs) continue to shrink, the RC delay associated with the resistance (R) and the capacitance (C) between wires is the dominant factor for its performance and reliability. To reduce the RC delay, it is necessary to replace the present interlayer dielectric silicon oxide (dielectric constant $k \sim 4.1$), with low-k (≤ 3.5). Various low -k materials have been developed for existing semiconductor device fabrication. Meanwhile, a variety of flexible electronic devices will be common in everyday use in the near future, like recently released foldable smartphones and rollable TVs/displays. Flexible electronic materials exhibiting high electrical and mechanical performance are required in the emerging field of flexible electronics. Among flexible electronic materials, flexible high-k ($k > 7$) materials have been developed with polymers. However, the wide applications of high-k materials are restricted due to their limiting electrical properties and mechanical durability. Moreover, little research has been conducted for flexible low-k materials. In this project, carbon-doped oxide (CDO) films, $Si_xO_yH_z(CH_3)_u$ with the stoichiometry ($x:y:z:u$), are introduced as flexible and transparent low-k materials, which have excellent optical/electrical/mechanical stability. The microstructure, chemical composition, and electrical and mechanical performance of CDO film will be analyzed, depending on the deposition parameters and resultant stoichiometry. The degradation mechanism due to environmental exposures and the recovery mechanism induced by hydrophobic surface modification will be investigated for the material's reliability and durability.

The PI has (2) pending proposals:

- NSF – entitled "Highly Transparent, Strong, and Flexible Low-k Materials" in the amount of $398,605 for the period 1/1/2020 – 12/31/2023
- NSF – entitled "Design and Synthesis of Sustainable Dielectrics Materials for Flexible Electronics" in the amount of $395,675 for the period 8/1/2020 – 7/31/2023

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

It is recommended that the proposed budget be reduced to provide limited travel support of $3,100, resulting in a year one budget of $49,808. Budgets of $49,203 and $48,614 are recommended for year two and year three, respectively.

Year 1: $49,808 **Year 2: $49,203** **Year 3: $48,614**

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

Appendix E (continued):

PROPOSAL: 070A-20 **RANK: 1**

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

INSTITUTION: Louisiana Tech University

PRINCIPAL INVESTIGATOR: Pradeep Chowriappa, Ph.D.

COMMENTS: Computer-tailored health communication (CTHC) is a tool that is frequently adopted to support behavior changes in patients. CTHC provides personalized alerts (either SMS or emails) as timely interventions to boost the morale of patients who are subject to long-term treatments. These tools have been frequently used to gain valuable insights into the personal preferences, cultural similarity, and behavior of patients. These insights have been crucial for advances in reasoned action, social cognitive theory, and self-determination theory. Fueled by the onset of web technologies and wearable mobile technologies, there is a need for patients, clinicians, and researchers to work together to embrace newer forms of mobile health interventions to support self-management of long-term conditions such as diabetes, obesity, asthma or cancer recovery. Existing CTHC systems are basically expert systems that require domain experts to monitor selected variables of a patient's baseline profile. Using machine learning, if-then rules are extracted to send tailored messages to patients over time. The success of CTHC systems requires "the human-in-the-loop" to map selected variables and develop rules that dictate how content should be tailored. Newer approaches to CTHC adopt collective intelligence that uses previous successes of patients to overcome the limitations inherent to rule-based systems. The goal of this proposal is to provide a scalable, situationally aware CTHC system that will adopt a patient-centric approach to leverage a personalized Smart App, wearable technology, and active machine learning for timely intervention in mitigating the role of the oracle for decision making.

It is recommended that the project be funded at the level requested, i.e., $44,245 for year one, $44,245 for year two, and $44,245 for year three.

Year 1: $44,245 **Year 2: $44,245** **Year 3: $44,245**

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

Appendix E (continued):

PROPOSAL: 008A-20 **RANK: 1**

TITLE: Nudges to Encourage Healthy and Sustainable Dietary Behaviors: Using Louisiana as a Case Study to Reduce Consumer Food Waste and Obesity

INSTITUTION: Louisiana State University Agricultural Center

PRINCIPAL INVESTIGATOR: Danyi Qi, Ph.D.

COMMENTS: Addressing the concurrence of undernutrition, obesity, and climate change is a high priority for sustainable food system transformation. Food waste (FW) attracts attention due to its adverse impacts on food security (i.e., lost nutrients) and the environment (i.e., wasted resources and landfill volume). U.S. consumers are the largest source of FW along the supply chain and are the key to halving national FW by 2030. The creation of choice-environments that facilitate favorable consumer practices is a promising approach to benefit health and environmental outcomes, although it is understudied from both perspectives. The investigator's preliminary results suggest FW messaging to diners may unintentionally promote obesity (e.g., "clean your plate"). More research is needed to understand the potential for co-nudges to encourage both environmentally sustainable practices (i.e., reduce FW) and favorable nutrition outcomes (i.e., improve food security and reduce obesity) as a strategy to promote sustainable food systems. In the proposed study, the PI aims to (1) pilot test the effectiveness of behavioral nudges on food intake and waste in a randomized controlled trial while exploring potential moderators of this behavior (e.g., dietary quality, attitudes toward food security, obesity and sustainability); (2) develop partnerships with campus, local community, and other key stakeholders to understand opportunities for co-nudges to support sustainable food system practices; and (3) leverage additional federal funding for policy-relevant interventions in the field. The results from this study could advance strategies that encourage healthy and sustainable eating habits, which is a priority research area of funding sources like the USDA and NIH.

It is recommended that the proposed budget be reduced to eliminate printing charges of $1,595, resulting in a year one budget of $18,365.

Year 1: $18,365

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

Appendix E (continued):

PROPOSAL: 033A-20 **RANK: 1**

TITLE: Deep Coral Reef Refuges in the Contexts of Emergent Disease and Reproductive Capacity

INSTITUTION: Louisiana State University and A&M College

PRINCIPAL INVESTIGATOR: Daniel Holstein, Ph.D.

COMMENTS: Rising sea surface temperatures and localized stressors pose challenges to the persistence of coral reefs within this century. Deep "mesophotic" coral reefs have been postulated as refuges from the combined stresses of temperatures, light, and human activity, and may be critical to coral reef persistence. Despite this, we know little about how depth affects the reproductive viability of corals. In addition, an emergent coral disease (Stony Coral Tissue Loss Disease, SCTLD) is causing massive mortality on affected Caribbean reefs, and it is unknown if mesophotic reefs will be spared. If disease significantly affects depth-refuges, coral reef metapopulation resilience may be compromised. Corals have species-specific SCTLD susceptibility and mortality, implying that community composition can influence the local severity of disease. Mesophotic reefs dominated by orbicellid corals may be particularly at risk; however, that risk may be mediated by poritid and montastraeid corals, which have lower disease susceptibility. These community-level disease relationships are further influenced by spatial patterns of disease transmission between reefs via ocean currents. The PI proposes to parameterize and integrate disease epidemic models with metapopulation models to assess the persistence of coral communities in the U.S. Virgin Islands with spatial- and depth-realism. Alongside modeling, the PI proposes the reproductive histological examination of corals over their depth ranges. Results will contribute to the understanding of mesophotic coral reproductive biology and parameterize the coral larval dispersal and metapopulation model. The integrated models will provide insight into community persistence during both predictable climate-related perturbation, and less predictable disease-related perturbation.

It is recommended that the project be funded at the level requested, i.e., $61,701 for year one, $60,701 for year two, and $59,701 for year three.

Year 1: $61,701 **Year 2: $60,701** **Year 3: $59,701**

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

Appendix E (continued):

PROPOSAL: 125A-20 **RANK: 1**

TITLE: Single Cell Resolution Level Relationship Between Extra-Cellular Matrix Stiffness and Tumor Regrowth

INSTITUTION: University of Louisiana at Lafayette

PRINCIPAL INVESTIGATOR: Dilip Depan, Ph.D.

COMMENTS: The major goal of the proposed research is to determine if a single cell analysis of the mechanical properties of metastatic tumor cells can improve our understanding of extravasation to other locations. The innovative and transformative aspect of this approach is the mechanical property analysis of metastatic tumor at a single cell resolution using atomic force microscopy (AFM). Such an experimental system will help us understand how ECM mechanical properties affect the migration of cancer cells to other locations. This proposal requests funding to complete two stages of the project. The first stage will be devoted to the design of the biomimetic extra-cellular matrices (ECM) for the purpose of cancer cell culture. The ECM will be constructed using a biopolymer, chitosan (CS), followed by culturing of cancer and bone cells. In the second stage, the biomimetic porous scaffold will be studied for its matrix stiffness, and its role in cancer cell metastasis (i.e., movement and re-growth) at a single cell resolution. If successful, the fundamental understanding of matrix stiffness at a single cell level will expedite the development of novel therapeutic approaches.

The PI has (1) pending proposal:

- NSF – entitled "CAREER: Understanding the Nanoscale Level Reinforcement of Novel Graphene Nanoscrolls" in the amount of $551,491 for the period 1/1/2020 – 12/31/2024

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 project be funded at the level requested, i.e., $56,398 for year one, $55,690 for year two, and $55,515 for year three.

Year 1: $56,398 **Year 2: $55,690** **Year 3: $55,515**

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

Appendix E (continued):

PROPOSAL: 065A-20 **RANK: 15**

TITLE: The Role of UCP2 in Wnt Signaling

INSTITUTION: Louisiana State University Health Sciences Center – Shreveport

PRINCIPAL INVESTIGATOR: Yunfeng Zhao, Ph.D.

COMMENTS: Gallbladder cancer is the most frequently encountered malignancy of the biliary tract, with dismal overall survival rates. Identifying novel molecular mechanisms associated with its tumorigenesis and chemoresistance may provide a potential therapeutic approach for the treatment of this aggressive cancer. Uncoupling protein 2 (UCP2) is a member of the mitochondrial uncoupling protein family, which is highly expressed in several cancers. However, the role of UCP2 in gallbladder cancer has not been defined. Using patient samples, the PI found highly expressed UCP2 in gallbladder cancer tissues, which correlated with worse clinical outcomes. UCP2 stable knockdown gallbladder cancer cells were generated; and cell proliferation, migration, and 3D spheroid growth were suppressed in these knockdown cells. The UCP2 inhibitor genipin suppressed xenograft tumor growth and sensitized grafted tumors to chemotherapy. How does UCP2 contribute to gallbladder cancer progression? The PI's studies found β-catenin downregulated in UCP2 knockdown cells. The Wnt/β-catenin pathway is key oncogenic signaling in many human cancers. The PI hypothesizes that UCP2 promotes the activation of the Wnt signaling in gallbladder cancer. The PI will test the hypothesis in the following studies: A Wnt signaling PCR array will be performed using established UCP2 knockdown and control gallbladder cancer cells. The results will be verified in human gallbladder cancer tissue samples. Selected candidates will be examined by a gene knockout or overexpression approach in gallbladder cancer cells; Wnt signaling, cell migration, and 3D spheroid growth will be studied.

It is recommended that the project be funded at the level requested, i.e., $16,000 for year one.

Year 1: $16,000

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

Appendix E (continued):

PROPOSAL: 050A-20 **RANK: 16**

TITLE: Measuring the Impact of Alpha-Element Abundances on Giant Planet Occurrence Rates

INSTITUTION: Louisiana State University and A&M College

PRINCIPAL INVESTIGATOR: Matthew Penny, Ph.D.

COMMENTS: The occurrence rate of giant planets is strongly affected by the host star metallicity (the amount of elements heavier than helium), but the elements that have the most impact are still unknown. This uncertainty results from a tight correlation between a star's elemental mix (traced by the abundance of alpha elements like oxygen) and the star's overall metallicity (traced by iron abundance) in the local stellar populations that are usually searched for planets. This correlation is set by the star formation history of the Galaxy's disk. Breaking the degeneracy between the effects of alpha and iron abundances on giant planet occurrence rates therefore requires surveying a second stellar population with a different formation history. The PI proposes to measure the giant planet occurrence rate in the distant Galactic bulge, which at fixed metallicity has higher alpha-element abundances than the Galactic disk. The PI has begun a 3-year survey program, the Multi-band Imaging Survey for High-Alpha PlanetS (MISHAPS), using the 4-m Blanco telescope. The PI expects to discover >100 hot Jupiter planets in the Galactic bulge, more than enough to make a statistically significant measurement of a difference in the occurrence rate of hot Jupiters relative to measurements in the Galactic disk from Kepler and TESS satellites. Should such a difference exist, the PI will assess the relative role that alpha elements play in the planet formation process and show that the chemical composition of a star affects the number and type of planets it is likely to host.

It is recommended that in year one the project be funded at the level requested, i.e., $59,445. Budgets of $47,451 and $39,625 that eliminate printing charges are recommended for year two and year three, respectively.

Year 1: $59,445 **Year 2: $47,451** **Year 3: $39,625**

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

Appendix E (continued):

PROPOSAL: 040A-20 **RANK: 17**

TITLE: Utilizing the Bovine Ocular Microbiome to Detect Therapeutic Targets for Infectious Keratoconjunctivitis

INSTITUTION: Louisiana State University and A&M College

PRINCIPAL INVESTIGATOR: Andrew Lewin, Ph.D.

COMMENTS: Bovine eye disease caused by infectious bovine keratoconjunctivitis (IBK) represents a major animal welfare and economic concern in the state of Louisiana and worldwide. IBK is caused by *Moraxella bovis* and leads to significant production losses. Current strategies for control of IBK rely heavily on antibiotics and do not prevent disease. The proposed study will identify therapeutic targets for IBK using cutting-edge 16S amplicon Next Generation Sequencing (NGS) ocular microbiome assessment. It is expected that animals with IBK will have markedly different ocular microbiomes compared with normal animals. Ocular swabs will be obtained from a large cohort of normal cattle and cattle with confirmed IBK. DNA will be extracted from the swabs and the 16S V4 hypervariable region amplified. Following DNA quantification, library preparation and 16S amplicon NGS will be performed, with subsequent analysis using the QIIME2 framework. Phylogeny assessment using the DADA2 pipeline and QIIME2 will allow for the calculation of relative proportions of bacterial species on the bovine ocular surface. These proportions of bacterial species will be compared using Beta diversity UniFrac analysis between animals with and without eye disease. Although it is expected that IBK animals will have greater proportions of *Moraxella bovis* present in the eye than normal animals, it is unknown what concurrent alterations occur in secondary bacterial pathogen populations in IBK. These pathogens will be assessed for utility as therapeutic targets for IBK. In addition, components of the bovine ocular microbiome which contribute to homeostasis of the healthy eye will be identified and exploited in future therapeutic interventions.

The PI has (1) pending proposal:

- USDA – entitled "Assessment of the Bovine Ocular Microbiome for Therapeutic Targets in Disease States" in the amount of $199,855 for the period 7/2020 – 7/2022

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

It is recommended that the proposed budget be reduced to eliminate fringe benefit charges for the GRA, which are disallowed, resulting in a year one budget of $52,325. GRA support should be moved to the appropriate budget category, i.e., Graduate Assistants, rather than Research. A budget of $50,681 is recommended for year two. A budget of $48,850 that eliminates publication charges of $1,000 is recommended for year three.

Year 1: $52,325 **Year 2: $50,681** **Year 3: $48,850**

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

Appendix E (continued):

PROPOSAL: 148A-20 **RANK: 18**

TITLE: Phylogenetics and Genome Evolution of Woodland Salamanders [genus Plethodon] in the US Coastal Plain

INSTITUTION: University of Louisiana at Monroe

PRINCIPAL INVESTIGATOR: Catherine Newman, Ph.D.

COMMENTS: This project will be part of a larger research plan focusing on reconstructing the evolutionary (genetic) relationships among populations and species of salamanders of the genus *Plethodon* in the Coastal Plain of the southeastern U.S., using population genetic analyses of DNA sequences and analyses of genome size evolution. The genus *Plethodon* is the most species-rich and ecologically diverse genus of salamanders in North America, with 55 species. Because many species of *Plethodon* are relatively young and the genus diversified quickly, we do not currently have a good understanding of the evolutionary relationships among populations and species of *Plethodon*, which is critical information for conservation and designing appropriate management strategies. In addition, because salamander genome size varies widely among species, understanding of the evolutionary history of this variation in genome size will provide a crucial foundation for future studies on the biology of plethodontid salamanders. The project will focus on a group of morphologically similar species of *Plethodon* with uncertain range boundaries: *P. dorsalis, P. ventralis,* and *P. websteri*. Specimens will be collected from the field and deposited in the LSU Museum of Natural Science Herpetology Collection. Tissue samples will be collected from those specimens for generation of a large multilocus genetic data set by next-generation sequencing, and blood smears will be collected for genome size analysis.

It is recommended that the proposed budget be reduced to provide limited travel support of $2,000, and other expenses charges limited to $10,000 (not to include publication charges), resulting in a year one budget of $17,200.

Year 1: $17,200

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

Appendix E (continued):

PROPOSAL: 037A-20 **RANK: 19**

TITLE: Multifunctional Precision Polymers for Metal-Free Magnetic Resonance Imaging and Sensing

INSTITUTION: Louisiana State University and A&M College

PRINCIPAL INVESTIGATOR: Jimmy Lawrence, Ph.D.

COMMENTS: Repeated use of gadolinium-based contrast agents to enhance magnetic resonance imaging (MRI) leads to *in vivo* Gd accumulation in the brain and other organs. Such a major health concern has provided the impetus for designing metal-free contrast agents, such as water-soluble semi-fluorinate polymer (^{19}F-PCA). While the chemical versatility of synthetic polymers opens the door for designing multifunctional and high-performance ^{19}F-PCAs, chain length dispersity and non-uniform placement of fluorinated comonomer cause broadened signals and inconsistent solubility. To overcome this challenge, the proposed research aims to investigate the properties of discrete polymer models having periodically sequenced fluorinated and hydrophilic units. Creating a chemically homogenous environment around the sensing (^{19}F) units through precise sequencing of comonomers is posited to simultaneously suppress signal broadening and improve aqueous solubility. Specifically, the PI aims to investigate: (1) the impact of monomer sequence to the ^{19}F signal in random, block, and periodic polymers; (2) the optimum periodic sequence for hydrophilic (A) and fluorinated (B) macromonomers (e.g., -A_2B-, -AB_2-); and (3) the impact of polymer architecture (linear vs cyclic) to ^{19}F NMR dynamics in complex media. The outcome of this will provide valuable insights for designing multifunctional precision polymers that offer great promise for metal-free imaging and sensing applications.

It is recommended that the proposed budget be reduced to provide undergraduate student support of $2,000 and limited travel support of $2,000, resulting in a year one budget of $63,600. Budgets of $60,600 and $58,100 are recommended for year two and year three, respectively.

Year 1: $63,600 **Year 2: $60,600** **Year 3: $58,100**

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

Appendix E (continued):

PROPOSAL: 136A-20 **RANK: 20**

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

INSTITUTION: University of Louisiana at Lafayette

PRINCIPAL INVESTIGATOR: Robert Miller, Ph.D.

COMMENTS: Catastrophic flood events have recently sparked national interest in comprehensive flood mitigation strategies in coastal regions. While immediate public safety benefits of large flood mitigation projects are undeniable, the unintended consequences can be permanent. Public agencies run the risk of inadvertently amplifying downstream flooding, inland hypoxia, saltwater intrusion, and accelerating fish habitat decline in fragile ecosystems. The aim of this study is to develop a monitoring program and baseline numerical models to explore the interaction between regional flood mitigation and water quality dynamics in low-gradient watersheds. The Teche-Vermilion Watershed located in South Louisiana has been selected as the test-bed for the initiative. Largely unstudied except for regulatory compliance purposes, the region experienced catastrophic floods in March 2012 and August 2016 and suffers from chronic water quality challenges (e.g., hypoxia, fecal contamination, turbidity, pesticides, and saltwater intrusion). Moreover, the region was disconnected from the Atchafalaya Basin by a vast levee system following the Flood Control Act of 1928 authorizing the Mississippi River and Tributaries (MR&T) project, until the introduction of a baseflow augmentation project in 1983. These factors, in addition to the flat topography, rapid urbanization, and artificial flow regulation, provide an ideal testing environment aimed at developing a better understanding of the role of hydromodification on water quality in hydraulically complex regions.

It is recommended that the proposed budget be reduced to provide limited travel support of $3,000 and other expenses charges deleted, resulting in a year one budget of $50,292. Budgets of $40,052 are recommended for year two and year three.

Year 1: $50,292 **Year 2: $40,052** **Year 3: $40,052**

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

Appendix E (continued):

PROPOSAL: 029A-20 **RANK: 21**

TITLE: A Bayesian Phase II Design for Immunotherapy by Jointly Modeling the Longitudinal Immune Response and Time-to-Event Efficacy

INSTITUTION: Louisiana State University and A&M College

PRINCIPAL INVESTIGATOR: Beibei Guo, Ph.D.

COMMENTS: Immunotherapy has been hailed as the most promising new cancer treatment approach since the development of the first chemotherapies. A unique feature of immunotherapy is the immune response. For each patient, the immune response is typically measured repeatedly over time in a longitudinal setting. Since immunotherapy achieves its treatment effect by activating a patient's immune system, the immune response is typically closely associated with the treatment effect, as previous studies have confirmed. The pattern and magnitude of the immune response are important indications of the disease progression. Thus it is critical to incorporate the longitudinal immune response in the trial design and leverage its close relationship with efficacy for decision-making. Conventional clinical trial designs ignore the immune response and are unsuitable for immunotherapy. The PI proposes a two-arm Bayesian adaptive phase II clinical trial design for immunotherapy that jointly models the longitudinal immune response and time-to-event efficacy with a fraction of patients assumed to be cured by the treatment. The cure fraction is modeled by a probit link. The longitudinal immune response is modeled using hierarchical nonlinear mixed-effects models with possibly different trajectory patterns for the cured and susceptible groups. Conditional on the immune response trajectory, the time-to-event efficacy data for patients in the susceptible group are modeled via a time-dependent COX-type regression model. The PI will quantify the desirability of the treatment using a utility function and propose a two-stage design to adaptively randomize patients to treatments and make treatment recommendations at the end of the trial.

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: 066A-20 **RANK: 22**

TITLE: Assessment and Monitoring Critical Port Infrastructure Through Heterogeneous Human-Autonomous Systems Teams

INSTITUTION: Louisiana State University in Shreveport

PRINCIPAL INVESTIGATOR: Tauhidul Alam, Ph.D.

COMMENTS: The surveillance and assessment of Louisiana's critical port infrastructure are essential to enhance security against any attacks and disruptions on the ports' crucial operations. Currently surveillance and assessment operations in ports are carried out with fixed cameras and scheduled patrols by the Coast Guard, which are limited by being static and having predictable areas of coverage. The Coast Guard also cannot patrol some regions of port areas, such as nearby forests. The limitations create a critical gap in such surveillance systems. The PI envisions the use of an ensemble of heterogeneous patrollers consisting of autonomous systems, such as ground, aerial, and underwater robots, coupled with human-operated cars that can monitor the entire port area to enhance critical infrastructure resilience and complement current surveillance systems. The PI will investigate the motion, visibility, and adversary models for heterogeneous patrollers in ports and develop their randomized patrolling strategies. The strategies will satisfy the motion constraints of heterogeneous vehicles, optimize their patrolling times to prevent intrusion, and be validated through prototype software and experiments.

It is recommended that the project be funded at the level requested, i.e., $18,819 for year one.

Year 1: $18,819

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

Appendix E (continued):

PROPOSAL: 030A-20 **RANK: 23**

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

INSTITUTION: Louisiana State University and A&M College

PRINCIPAL INVESTIGATOR: Eileen Haebig, Ph.D.

COMMENTS: The majority of young children with autism spectrum disorder (ASD) have significant vocabulary deficits. This is alarming because current research underscores the importance of early language for broader child outcomes. To reduce the cascading effects of early vocabulary deficits, high-quality intervention is necessary. Although the cost of ASD intervention is large, it can be reduced with the use of more effective techniques that are evidence-based. Currently, we have a limited understanding of how children with ASD construct their lexicon. The proposed research will address the gap in knowledge by pursuing three specific aims. Aim (1) is to examine the organization of early word knowledge (semantic networks) between young children with ASD and typically developing (TD) toddlers. Parent-reported child vocabulary will be analyzed to characterize the structure of each child's word knowledge and to test theories of vocabulary learning. The models will provide insight into the learning strategies that children with ASD employ during learning. The PI will apply the semantic network models from Aim (1) to word processing tasks that will be directly administered to children when addressing Aims (2) and (3). Aim (2) is to directly test whether semantic-level word characteristics predict word processing differences in TD and ASD children using a lexical decision task and a word association task that include words with different semantic characteristics. Aim (3) will extend the behavioral findings by assessing neural word processing data (electroencephalogram; EEG). These finding can provide valuable information with important clinical implications.

The PI has (1) pending proposal:

- NIH – entitled "Retrieval-Based Word Learning in Autism Spectrum Disorder" in the amount of $297,587 for the period 6/2020 – 6/2023

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 one-month summer salary including fringe benefits for the PI, rather than two-months of summer salary requested, and consultant charges deleted, resulting in a year one budget of $41,858. Budgets of $41,808 and $39,908 are recommended for year two and year three, respectively.

Year 1: $41,858 **Year 2: $41,808** **Year 3: $39,908**

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

Appendix E (continued):

PROPOSAL: 073A-20 **RANK: 24**

TITLE: The Investigation of Sustainable Methods for the Synthesis and Processing of Rare Earth Materials

INSTITUTION: Louisiana Tech University

PRINCIPAL INVESTIGATOR: Elisabeth Maria Fatila, Ph.D.

COMMENTS: Rare earth elements, which include the lanthanides and yttrium, are ubiquitous in catalysis, optical materials, ceramic materials and as magnets in clean energy technologies. Rare earth materials have been deemed critical to the economy and national security because of their substantial role in modern technology. In order to maintain a secure supply of rare earth elements, several strategies have been envisioned and implemented including substituting in non-critical materials, recycling rare earth materials, and reducing waste by increasing the efficiency of rare earth processing. Mechanochemistry is a strategy that can reduce the amount of rare earth elements lost to a solvent waste stream in an environmentally friendly manner. Using mechanochemistry, the PI plans to reduce lanthanide and yttrium losses in coordination reactions. Lanthanide coordination complexes are well studied because of their catalytic, optical and magnetic properties. Lanthanide beta-diketonate complexes are among the most studied lanthanide complexes because of their ease of fabrication and their potential for acting as chemical vapor deposition precursors. Using multiple spectroscopic techniques, the project aims to determine the scope of mechanochemical syntheses for lanthanide beta-diketonate complexes, investigate the effect of high- and low-impact ball milling, and probe the effect of moisture on the mechanochemical reactions in terms of yield and purity. The proposed work is tethered to the PI's greater plan to synthesize structurally and functionally diverse lanthanide beta-diketonate complexes for optical and magnetic materials using efficient and environmentally sustainable methods.

It is recommended that the project be funded at the level requested, i.e., $47,341 for year one, $44,841 for year two, and $43,841 for year three.

Year 1: $47,341 **Year 2: $44,841** **Year 3: $43,841**

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

Appendix E (continued):

PROPOSAL: 016A-20 **RANK: 25**

TITLE: Transgenerational Control of Mitochondrial Health and Homeostasis

INSTITUTION: Louisiana State University and A&M College

PRINCIPAL INVESTIGATOR: Adam Bohnert, Ph.D.

COMMENTS: Animals age and die over time but produce young progeny. This raises a fundamental question: how is age reset with each generation? Recently, the PI described a germline rejuvenation program that reverses signs of aging in *C. elegans* oocytes just before fertilization. The PI found that lysosomes, digestive organelles that eliminate molecular waste through autophagy, are activated in maturing, soon-to-be-fertilized oocytes by signals from sperm. These lysosomes may erase several forms of age-related damage in preparation for fertilization; but, the full scope and regulation of this rejuvenation program are still mysterious. A possibility is that mitochondria may be regulated as part of transgenerational rejuvenation. Mitochondria act as metabolic hubs of the cell. With advanced age, they become fragmented and oxidatively-damaged, and their dysfunction drives several degenerative diseases, including Parkinson's Disease and ALS. The PI's germline studies suggest that mitochondrial damage may be naturally reversible; though fragmented, damaged mitochondria accumulate in arrest oocytes before maturation, only healthy, metabolically-active mitochondria are detected once maturation is triggered. The PI hypothesizes that lysosomes may help to restore mitochondrial health and homeostasis to maturing oocytes by removing dysfunctional mitochondrial fragments via mitophagy (lysosome-based mitochondrial destruction, or "mitochondrial autophagy"). In this study, the PI will express mitophagy sensors to track mitochondrial turnover in real-time as oocytes mature and will evaluate a role for mitophagy factors in the regulation of germline mitochondria. The research will shed light on biological pathways important for fertility and germ-cell health, while also highlighting natural age-defying strategies of the immortal germ-cell lineage.

The PI has (4) pending proposals:

- W.M. Keck Foundation – entitled "Tubular lysosomes: New Players in Cellular Health and Homeostasis" in the amount of $1,000,000 for the period 12/2019 – 11/2022
- NIH – entitled "Transgenerational Regulation of Organelle Function and Homeostasis" in the amount of $1,739,734 for the period 7/2020 – 6/2025
- NIH – entitled "Lysosomes in Spermatocyte Development and Male Reproductive Health" in the amount of $399,244 for the period 7/2020 – 6/2022
- *NIH – entitled "Evaluating Pexophagy as an Early Cellular Marker of Aging" in the amount of $144,230 for the period 4/2020 – 3/2022

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

*Should the PI receive funding for this pending proposal, he/she should be considered receiving support for similar/overlapping research and the requested funds from the BoRSF program should not be awarded.

It is recommended that the proposed budget be reduced to provide limited supplies charges of $15,000, resulting in a year one budget of $49,825. A similar budget of $49,825 is recommended for year two that eliminates printing charges. A budget of $44,825 is recommended for year three.

Year 1: $49,825 **Year 2: $49,825** **Year 3: $44,825**

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

Appendix E (continued):

PROPOSAL: 086A-20 **RANK: 26**

TITLE: Population Demographics of Diamondback Terrapins and the Influence of the Blue Crab Fishery in Louisiana

INSTITUTION: Nicholls State University

PRINCIPAL INVESTIGATOR: Timothy Clay, Ph.D.

COMMENTS: The blue crab fishery in Louisiana usually contributes $50 million (dockside) to the Louisiana economy. Although historically rated sustainable by two internationally recognized rating systems, starting in 2019 the blue crab fishery in Louisiana was red listed on Seafood Watch. However, this red listing is based on isolated, sporadic, and short-term terrapin research conducted outside of Louisiana waters and, importantly, a lack of terrapin research in Louisiana. The diamondback terrapin is an estuarine turtle whose range broadly overlaps with the blue crab fishery in salt marshes, bays, and estuaries of the western Atlantic and Gulf of Mexico. Major threats to the continued existence of terrapins include habitat loss and fragmentation, nest predation, and incidental capture and drowning in crab traps. Given the magnitude of the potential habitat and abundance of restoration projects, coastal Louisiana offers the ability to study the complex interactions between diamondback terrapins and blue crabs. The proposed research will simultaneously examine the population demographics of terrapins, the impacts of each of the major terrapin mortality threats, and the effectiveness of coastal restoration projects. Specifically, systematic sampling of blue crab traps and fyke nets across coastal areas of Louisiana will be conducted to understand the population demographics of terrapins, the impact of the blue crab fishery on terrapins, and the effectiveness of turtle excluder devices on crab traps. The latter is important because turtle excluder devices, despite implementation in other areas, have not been required for commercial fishermen in Louisiana waters, and their lack of use is a major component of the red listing of Louisiana's blue crab fishery. Crab trap and fyke net sampling will also occur in a variety of areas that have been and are currently being restored. This will examine the effectiveness of restoration efforts in promoting the persistence of both blue crabs and terrapins. Lastly, nesting surveys will be conducted across coastal areas to both examine the effectiveness of restoration efforts in providing suitable habitat and identify sources of nesting mortality. Results from the study will provide a comprehensive evaluation of terrapin populations, impacts of the blue crab fishery on terrapins, and a better understanding of the ecology and socioeconomic effects of the blue crab fishery in Louisiana.

It is recommended that the proposed budget be reduced to provide undergraduate student support of $2,000, and subcontracts deleted, resulting in a year one budget of $51,686. Budgets of $50,280 and $47,715 are recommended for year two and year three, respectively.

Year 1: $51,686 **Year 2: $50,280** **Year 3: $47,715**

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

Appendix E (continued):

PROPOSAL: 006A-20 **RANK: 27**

TITLE: In Vitro Reprogramming of Monolignol Biosynthesis

INSTITUTION: Louisiana State University – Agricultural Center

PRINCIPAL INVESTIGATOR: Yongchan Kwon, Ph.D.

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

The PI has (2) pending proposals:

- NSF – entitled "CAREER: Reprogramming Cell-Free Biomanufacturing System" in the amount of $500,000 for the period 7/2020 – 6/2025
- American Heart Association – entitled "Precision Delivery of Basement Membrane Proteoglycans to Promote Cardiac Repair After Myocardial Infarction (LOI)" in the amount of $750,000 for the period 7/2020 – 6/2023

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

It is recommended that the proposed budget be reduced to provide limited travel support of $2,000 and printing charges deleted, resulting in a year one budget of $58,271. Budgets of $57,271 and $56,271 are recommended for year two and year three, respectively.

Year 1: $58,271 **Year 2: $57,271** **Year 3: $56,271**

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

Appendix E (continued):

PROPOSAL: 057A-20 **RANK: 28**

TITLE: Smart Anti-Visual-Hacking Methods to Protect Mobile Device Screen Privacy

INSTITUTION: Louisiana State University and A&M College

PRINCIPAL INVESTIGATOR: Chen Wang, Ph.D.

COMMENTS: As the most common personal devices, mobile devices (e.g., smartphones) contain much of the user's private information. While people use mobile devices anytime and anywhere, the sensitive contents of their screens (e.g., logins, payrolls, and messages) might be leaked. A visual hacker could simply steal a glimpse over the user's shoulder or covertly take a photo of the screen to violate the user's privacy. To defend against visual hackers, existing methods either attach a privacy screen film to block side-views or generate color patterns (e.g., snowflakes) to obscure the screen. However, these methods degrade user experience by dimming colors and reducing resolutions. Moreover, they have limited capabilities to defend against diversified visual hacks (e.g., zoom cameras). The main goal of this research is to provide a software-based solution for mobile users to defend against visual hacking without sacrificing user experience. In particular, the proposed framework ensures that the sensitive information is only displayed privately and securely to the user by addressing three critical security aspects: to whom, when and how to display the onscreen contents. The proposal contributes to the theories and algorithms in the area of cybersecurity and privacy with three research thrusts: (1) developing unobtrusive user authentication methods to confirm user identities via their holding-hands before displaying any information; (2) enabling mobile devices to detect surrounding visual hackers (both human snoopers and camera-based hackers) based on WiFi sensing and deep learning; and (3) designing privacy-preserving screen display methods leveraging the screen's liquid crystal molecules to prevent unpermitted visual captures.

It is recommended that the proposed budget be reduced to provide limited supplies charges of $3,000 (not to include the purchase of a computer workstation), and printing charges deleted, resulting in a year one budget of $57,250. In year two, it is recommended that supplies costs are limited to $1,000, for a budget of $55,250. A similar budget of $55,250 is recommended for year three.

Year 1: $57,250 **Year 2: $55,250** **Year 3: $55,250**

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

Appendix E (continued):

PROPOSAL: 142A-20 **RANK: 29**

TITLE: Understanding Species Persistence Under Reoccurring Environmental Disturbances

INSTITUTION: University of Louisiana at Lafayette

PRINCIPAL INVESTIGATOR: Amy Veprauskas, Ph.D.

COMMENTS: An important focus for management and conservation is determining whether a species, a collection of interacting species, or an entire ecosystem is able to sustain itself. The question becomes increasingly important as populations are exposed to various disturbances, both natural and anthropogenic, such as hurricanes, habitat fragmentation, toxicants, and invasive species. The PI proposes to use mathematical modeling, specifically stage-structured matrix models with stochastic environments, to study how reoccurring environmental disturbances may impact species persistence. Stochastic modeling of biological systems is a growing field with numerous open questions and potential applications. Further, though general theory has been developed to establish when persistence in a stochastic environment is possible, the lack of analytical formulas for key terms, such as the stochastic growth rate, make these results difficult to apply. The overall goal of this proposal is to develop methods for examining and quantifying species persistence under reoccurring disturbances.

It is recommended that the project be funded at the level requested, i.e., $47,296 for year one, $44,899 for year two, and $42,730 for year three.

Year 1: $47,296 **Year 2: $44,899** **Year 3: $42,730**

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

Appendix E (continued):

PROPOSAL: 133A-20 **RANK: 30**

TITLE: Modelling the Thermal and Photophysical Decay of Criegee Intermediates

INSTITUTION: University of Louisiana at Lafayette

PRINCIPAL INVESTIGATOR: Tolga Karsili, Ph.D.

COMMENTS: Climate change is one of the most significant global challenges of the 21st century. Anthropogenic activities, such as fossil fuel burning, are the leading cause of such environmental problems. The PI proposes to explore the fundamental details of the atmospheric chemistry associated with the unimolecular decay of Criegee intermediates (CrIs), which are formed via the reaction of ozone with alkenes. Alkenes of varying molecular weights are abundant in the atmosphere and arise *via* a mixture of anthropogenic (e.g., burning of fossil fuels) and natural (e.g., emission from vegetation) processes. The resulting CrIs are also prepared with a variety of molecular weights, depending on the hydrocarbon length of the alkene. CrIs are the leading source of non-photolytic hydroxyl (OH) radicals in the troposphere and are responsible for the breakdown of molecules that are detrimental to the atmosphere. It is therefore important to understand the mechanisms of the unimolecular decay of a range of CrIs and the dominant electronic and geometric factors that contribute to the yield of OH radicals in CrIs of varying size. The PI is interested in the extent to which non-Born Oppenheimer (non-adiabatic) dynamics contribute and control the OH radical yield upon unimolecular decay of various CrIs, in addition to the competition between ground-state OH radical formation and light-induced photophysics of various CrIs.

The PI has (2) pending proposals:

- NASA – entitled "Understanding the Mechanisms of the Light- and Electron-Induced Formation of Prebiotic Biomolecules" in the amount of $538,171 for the period 2020 – 2023
- NSF – entitled "Quantum Chemical Studies of the Thermal and Photo-Induced Chemistry of Criegee Intermediates" in the amount of $246,204 for the period 2020 – 2023

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

It is recommended that the proposed budget be reduced to provide undergraduate student support of $2,000, resulting in a year one budget of $48,919. Budgets of $34,500 are recommended for year two and year three.

Year 1: $48,919 **Year 2: $34,500** **Year 3: $34,500**

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

Appendix E (continued):

PROPOSAL: 081A-20 **RANK: 31**

TITLE: Molecular Determinants of Specialization in Bacterial Topoisomerases from Extreme Environments

INSTITUTION: Loyola University New Orleans

PRINCIPAL INVESTIGATOR: Allyn Schoeffler, Ph.D.

COMMENTS: Bacterial type IIA topoisomerases (topos) are essential enzymes that manage genome topology. They are rich in macromolecular interfaces and large-scale, catalytically-triggered motions, making them an excellent model system for studying molecular machines. Since topos are present in all classes of bacteria, including extremophiles, they also present an opportunity to study molecular machines at extreme temperatures, a topic of great interest in biotechnology and biocatalyst design. The proposed research aims to characterize the molecular determinants of specialization in bacterial type IIA topos evolved for hot and cold environments. This will include assessing a panel of mesophilic and extremophilic topoisomerases for overall function (DNA topology modification) and catalytic sub-steps (ATP hydrolysis, DNA binding). Along with these biochemical analyses, the PI will perform detailed bioinformatic analysis and mutagenesis to connect the temperature dependence of topo function to differentially conserved elements of sequence and structure.

It is recommended that the project be funded at the level requested, i.e., $35,699 for year one, $27,981 for year two, and $25,744 for year three.

Year 1: $35,699 **Year 2: $27,981** **Year 3: $25,744**

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

Appendix E (continued):

PROPOSAL: 123A-20 **RANK: 32**

TITLE: Modeling of Topological Defects and Emergent Magnetic States in Nanostructures

INSTITUTION: University of Louisiana at Lafayette

PRINCIPAL INVESTIGATOR: Michalis Charilaou, Ph.D.

COMMENTS: In the past two decades, theory and experiment have confirmed the existence of exotic magnetization textures with non-trivial topology and emergent properties in materials with competing symmetric and antisymmetric interactions. The zoology of topological magnetic objects has seen a stunning flourish, ranging from skyrmions and antiskyrmions to chiral bobbers and associated hedgehogs, Bloch points or emergent monopoles. The elusive emergent magnetic monopole is a topological point defect, where the magnetization vanishes and the continuum micromagnetic tenet breaks down. Fueled by the important role of these objects in the promise for novel logic and storage devices, increasing attention has been devoted to modeling these phenomena in order to capture the physics of topologically non-trivial objects and their emergent electrodynamics. The PI proposes to perform multiscale computational modeling of magnetic nanoparticles and nanostructures in order to obtain a deeper understanding of the winding and unwinding processes by which topological defects are created, controlled, and annihilated. The PI's hypothesis is that the geometry of nanoparticles, which determines the effect of long-range magnetostatic interactions, can enable the creation and stabilization of topological objects.

The PI has (1) pending proposal:

- NSF – entitled "Deciphering the Effect of Defects on the Stability of Magnetic States in Nanostructures" in the amount of $510,181 for the period 1/1/2020 – 12/31/2025

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 proposed budget be reduced to provide undergraduate student support of $2,000 and limited travel support of $2,000, for a year one budget of $40,371. Similar budgets of $40,371 are recommended for year two and year three.

Year 1: $40,371 **Year 2: $40,371** **Year 3: $40,371**

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

Appendix E (continued):

PROPOSAL: 005A-20 **RANK: 33**

TITLE: Prebiotics and Probiotics to Control Antibiotic Resistance in Food

INSTITUTION: Louisiana State University – Agricultural Center

PRINCIPAL INVESTIGATOR: Joan King, Ph.D.

COMMENTS: Antibiotic resistance has become a greater issue over the past few years. Similar antimicrobials used in humans have been used in food animals for treatment of diseases and to promote growth. Continuous exposure to the same antimicrobials has resulted in antimicrobial resistance of some pathogenic bacteria, for example *Salmonella* and *Campylobacter*. These resistant pathogenic bacteria are the types that are likely to be found in human foods through the food chain. This in turn can lead to problems in treating human diseases. A viable alternative for dealing with the issue of treating humans and animals due to antimicrobial-resistant bacteria may be the use of probiotics in combination with prebiotics. Probiotics are health-beneficial bacteria in the gut that outcompete harmful bacteria. Prebiotics, such as resistant starch, have been shown to enhance the levels of intestinal probiotic bacteria, which in turn can result in improved health. No one has yet studied the combined effects of prebiotics with probiotics on microbial resistance of pathogens. The PI's hypothesis is that the combined use of resistant starch and the probiotic that best outcompetes a particular pathogen will decrease the antimicrobial resistance of that pathogen. One of the USDA funding priority areas in food safety is mitigation of antimicrobial resistance. Funding will help the PI obtain preliminary data to utilize in national grant proposals in a new research area.

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: 014A-20 **RANK: 34**

TITLE: Feminizing Political Institutions: Does Increasing the Number of Women in Politics Change How Citizens Stereotype Political Institutions?

INSTITUTION: Louisiana State University and A&M College

PRINCIPAL INVESTIGATOR: Nichole Bauer, Ph.D.

COMMENTS: Citizens overwhelmingly associate political institutions and political leadership with masculinity. This strong association with masculinity originates, in part, from the dominance of men and the under-representation of women in positions of power and political leadership. But women's representation in the U.S. is at an all-time high and has the potential to increase in future elections. The masculinity of politics also has the potential to shift as women increase their ranks in elected office at the local, state, and federal levels. The PI proposes to examine whether having more women in political office leads citizens to associate political institutions and political leadership with more feminine stereotypic qualities and fewer masculine stereotypic qualities; and if these shifts can open up more pathways for women, and other marginalized groups, to enter into politics. The PI will conduct experiments that expose individuals to female-dominated political institutions, and collect extensive data documenting where, at the local level, female majority legislative institutions exist throughout the U.S. as well as conduct content analyses of political news coverage.

It is recommended that the proposed budget be reduced to provide one-month summer salary, including fringe benefits, for the PI (rather that two-months summer and 1.12 month academic release time salaries requested), and other expense charges of $13,000 (requested in year two) moved to year one, resulting in a year one budget of $44,770. Budgets of $28,080 are recommended for year two and year three.

Year 1: $44,770 **Year 2: $28,080** **Year 3: $28,080**

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

Appendix E (continued):

PROPOSAL: 146A-20 **RANK: 35**

TITLE: Pathway and Efficacy Analysis of Novel miR-Based Therapeutics

INSTITUTION: University of Louisiana at Monroe

PRINCIPAL INVESTIGATOR: Georgios Matthaiolampakis, Ph.D.

COMMENTS: Despite significant efforts in early detection and treatment, Lung Cancer (LC) is often diagnosed at an advanced stage, with the average 5-year survival rate at <15%. There is a gap in current therapeutic approaches against LC, with an absence of drugs that directly target the cell cycle and the cell-cycle associated genes, such as Cyclin-Dependent Kinases (CDKs). miRs, natural products present in all cells, have emerged as important regulators of gene activity. Last year, several clinical trials were underway using promising miRNAs (miRs). The PI identified two miRs, miR-143 and miR-506, which are consistently downregulated in LC samples and regulate the cell cycle progression. These miRs can induce G1/S and G2/M arrest of the cell cycle, inhibit proliferation, induce apoptosis, and downregulate the expression of three of the most crucial cell cycle CDKs: CDK4, 6, and 1. More important, the combinatorial miR treatment had minimal apoptotic activity to normal cells and did not affect the expression of crucial-for-normal-cell-function CDKs (i.e., CDK7/9). The proposal (a) studies the effect of natural products on targeting the cell cycle and their mechanism of action; and (b) evaluates a novel combination of miRs.

The PI has (2) pending proposals:

- NIH – entitled "MIRNA Therapeutics for Regulating Cell Cycle Progression in Lung Cancer" in the amount of $1,389,035 for the period 7/2020 – 6/2024
- DoD – entitled "Modulation of CDK Signaling in NSCLC with MicroRNA Therapeutics" in the amount of $351,349 for the period 7/2019 – 6/2023

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

It is recommended that the proposed budget be reduced to limit supplies charges of $35,000, resulting in a year one budget of $37,000. A similar budget of $37,000 is recommended for year two. A budget of $34,000 is recommended for year three.

Year 1: $37,000 **Year 2: $37,000** **Year 3: $34,000**

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

Appendix E (continued):

PROPOSAL: 076A-20 **RANK: 36**

TITLE: Numerical Studies of Pain-Free Microneedles for Transdermal Drug Delivery

INSTITUTION: Louisiana Tech University

PRINCIPAL INVESTIGATOR: Don Liu, Ph.D.

COMMENTS: Traditional hypodermic injection uses metallic needles on syringes to deliver liquid medicine into a sufficient depth of skin. It requires bio-hazardous materials, e.g., sharp metallic needles and syringes, and poses high risk of cross infections. According to a prior study, clients reported that on average, 8.7% of all injections employed shared syringes or needles. Data from the Coalition for Safe Community Needle Disposal showed that in the year 2011, 13.5 million people in the United States used 7.8 billion sharp needles and glass syringes. In addition, 1 to 1.5 million metal needles were used for illegal drug injections. Since blood-borne infections, e.g., HIV, HBV, and HCV, could spread by sharing intravenous syringes, the huge number of substandard needles and illegal usage, with a high rate of needle-sharing, indicates a high risk of spreading infectious diseases and cross infections. The objective of this research is to gain quantitative insight about composite processes in the emerging transdermal skin injection device, painless microneedle patches (MP), to advance the PI's expertise and assessment of microneedles, to gain further knowledge about composite processes of this transdermal skin treatment, to furnish numerical evidence and insight to help improve the design and performance of MP, and to lower manufacturing and operating costs. The ultimate goal is to commercialize the new technology. A two-stage computational model will be developed to simulate medicine transport processes from microneedles into the subdermal tissue of human skin. Produced numerical data will be verified, cross-compared, and assessed to assist improvements in better designs and lowered manufacturing and operational costs.

It is recommended that the project be funded at the level requested, i.e., $19,658 for year one.

Year 1: $19,658

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: 012A-20

TITLE: Bridge Scour: Modelling and Countermeasures

INSTITUTION: Louisiana State University and A&M College

PRINCIPAL INVESTIGATOR: Aly Mousaad Aly, Ph.D.

COMMENTS: Despite the importance of bridges to the nation's economy and the safety of the traveling public, due to insufficient maintenance and the increasing number of aging bridges, the American Society of Civil Engineers (ASCE) has given our national bridges a "C^+" grade and Louisiana bridges a "D^+" grade. Scour at bridge piers, which contributes to failure during and after floods and natural hazards, is not fully understood, due to the lack of sophisticated modeling. This project focuses on modelling scour at full-scale, computationally, using unsteady turbulence closures. The project looks at altering the flow around piers (of bridges and elevated buildings) and 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.

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

Appendix F (continued):

PROPOSAL: 022A-20

TITLE: Assessing Privacy Concerns and Behaviors of Smart Device Users in Louisiana and the United States

INSTITUTION: Louisiana State University and A&M College

PRINCIPAL INVESTIGATOR: Erin Coyle, Ph.D.

COMMENTS: Smart devices that use artificial intelligence and wireless internet access to share and gather information have gained popularity in recent years. The market for such devices will continue growing at least through 2024. Smart devices, however, have caused privacy concerns because they can collect personal information without people's knowledge or consent. Smart device users inevitably expose sensitive parts of their lives without their knowledge or consent. Losing control over who accesses personal information may harm privacy. Thus, it is important to study users' perceptions of privacy concerns and privacy protecting behaviors for specific smart devices. Second, it is important to consider how Louisiana smart device users compare to other smart device users. Previous studies have found superstructures (e.g., demographic, socio-economic, and cultural characteristics) influence people's lives. The proposed study will examine how Louisiana's unique superstructures influence privacy concerns and protecting behaviors and whether those vary from people's privacy concerns and protecting behaviors in other states. The study will conduct online surveys and in-depth interviews to assess factors influencing privacy concerns and protecting behaviors in Louisiana and the United States to help policy makers, technology manufacturers, and device users.

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

Appendix F (continued):

PROPOSAL: 024A-20

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. Likewise, the growing impact 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 a refuge 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. The project will utilize cutting technology (acoustic positioning system) 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 platform habitat located on Ship Shoal during normoxic and hypoxic events. Data will be used to inform and develop 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.

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 Final 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: 031A-20

TITLE: Examining the Potential Impacts of Connected Vehicles on Traffic Safety and Operation Under Different Traffic and Weather Conditions in Louisiana

INSTITUTION: Louisiana State University and A&M College

PRINCIPAL INVESTIGATOR: Hany Hassan, Ph.D.

COMMENTS: Connected and automated vehicle (CAV) technologies in which vehicles communicate with other vehicles (V2V), roadway infrastructures (V2I), and pedestrians (V2P) in real-time have been recently suggested as a potentially effective means to improve traffic safety, traffic operations and fuel consumption. However, knowledge regarding to what extent the current transportation system can be improved through the deployment of this new technology is still limited. In addition, human factors are often disregarded in recent relevant efforts; traffic flow will likely be composed of a mixture of conventional vehicles and CAVs in the coming years. Therefore, it is crucial to consider drivers' behavior while evaluating the impacts of CAVs. The proposed research aims to address a gap in evidence with respect to providing better understanding regarding the potential improvements in traffic safety and operations to be attained by CAVs under different traffic and weather conditions. Consequently, driving simulator experiments and microsimulation analysis will be developed to better achieve these goals while taking into consideration drivers' behaviors compared to CAVs. A driving simulator testbed will be developed that includes different simulation scenarios representing different real-world driving conditions (i.e., peak hours, adverse weather conditions such as heavy rain or fog). A well-calibrated and validated microsimulation environment in VISSIM replicating a portion of the roads' network (freeway segment and intersections) in Baton Rouge, Louisiana will also be created.

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

Appendix F (continued):

PROPOSAL: 036A-20

TITLE: Fate and Removal of Radioactive Particles in Aqueous Environments

INSTITUTION: Louisiana State University and A&M College

PRINCIPAL INVESTIGATOR: Yong-ha Kim, Ph.D.

COMMENTS: Nuclear power plant accidents in coastal regions and near rivers will lead to the release of numerous radioactive particles into marine and freshwater environments. These particles will be widely dispersed in the environment and cause excessive radiation exposure to biota in aquatic ecosystems. To accurately assess and reduce environmental and public health risks caused by radioactive contamination, it is necessary to better understand the fate of radioactive particles in water and to develop novel approaches for efficient radionuclide removal. Radioactive decay generates electrical charge, which can affect the dispersion, sedimentation, and resuspension of radioactive particles in the environment. However, there has been little information on the charging of radioactive particles in water, and thus radioactivity-induced charging has not been considered in studying their fate in and removal from aqueous environments. The main goals of this proposed work are (1) to understand the fate of radioactive particles in aqueous systems; and (2) to develop a novel removal process for radionuclides by investigating radiological and physicochemical processes of radioactive material in water. The work will combine computational simulations and experimental investigations. Experimental investigations are aimed at measuring electrical properties of radioactive particles and their growth rates in water and at developing an approach to efficiently separate charged radionuclides using bubbles. Computation simulations will be focused on developing a theoretical framework to simultaneously simulate various radiological and physicochemical processes involving radioactive particles. The framework will be useful to improve the accuracy of conventional oceanic radionuclide transport models by incorporating the effects of radioactivity.

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

Appendix F (continued):

PROPOSAL: 060A-20

TITLE: Accurate Tracking of Patient Position and Dose Based on Volumetric Modulated Arc Therapy-Computed Tomography

INSTITUTION: Louisiana State University and A&M College

PRINCIPAL INVESTIGATOR: Rui Zhang, Ph.D.

COMMENTS: Radiotherapy (RT) is included in the treatments of more than half of all cancer patients, and it is evolving rapidly with the adoption of new technologies. Among the advanced RT techniques, volumetric modulated arc therapy (VMAT) has been increasingly used due to the fast delivery and improved dose conformity. However, VMAT possesses a high degree of complexity and high dose gradients, so the requirement of delivery accuracy has increased. Pre-treatment quality assurance and image guidance are not sufficient to detect intrafractional errors, cannot provide information on actual patient dose, and can induce extra imaging doses. Megavoltage computed tomography (CT) reconstruction based on portal images acquired during VMAT, so called "VMAT-CT", was proposed in 2010. Although it has the advantage of not introducing additional patient doses because only therapy beams are used, it has multiple disadvantages, including the limited field of view (FOV) and no accurate patient density or dose information. The goal of the project is to develop a technique to track VMAT and patient dose by combining the VMAT-CT concept with novel image reconstruction methods and patient-specific prior information.

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

Appendix F (continued):

PROPOSAL: 078A-20

TITLE: Enhanced Damage Model for Supporting Flood Risk Mitigation Programs

INSTITUTION: Louisiana Tech University

PRINCIPAL INVESTIGATOR: Elizabeth Matthews, Ph.D.

COMMENTS: Current flood-damage analysis practice shows great limitation in accurately predicting damages at multiple scales. Much of this inadequacy is based on whole-building approaches that can accurately predict only high-level damages. 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. In this proposal, the PI seeks to develop a more robust data-driven infrastructure damage model. The new approach will focus on incorporating material component-level damage details, which support a detailed analysis of individual buildings and translate to improved damage estimation for building groups. Historical data and data collected from experimental tests will be used to fully develop and validate the model. Two phases of work are proposed to achieve the project's objectives. In Phase 1, experimental testing will be used to collect flood-damage behavior data. This will include the construction of a set of structures with differing material combinations which will be exposed to various flood-condition scenarios. In Phase 2, a model will be developed to estimate component-level damages considering Phase 1 results. The model will be capable of calculating cumulative damages to individual and multiple buildings, and validated by historical data.

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

Appendix F (continued):

PROPOSAL: 095A-20

TITLE: Facilitating the Adoption of Innovative Techniques in Ceiling Panel Installation

INSTITUTION: Southeastern Louisiana University

PRINCIPAL INVESTIGATOR: Priyadarshini Dasgupta, Ph.D.

COMMENTS: The drywall installation task has a number of physical ergonomic exposures (overhead arm postures, awkward trunk posture and heavy manual handling) that may lead to musculoskeletal injuries and illness in installers. Installers are exposed to such risks when they lift and attach heavy drywall panels to the ceiling. Two pilot studies showed a reduction in the physical ergonomic exposures for ceiling drywall installation with the use of a 'deadman' (a narrow piece of scrap drywall), which supported the ceiling drywall panels during their installation. Based on the 'deadman' concept, a prototype tool with adjustable length of 8' – 12' height was constructed and implemented as an intervention at a commercial-residential construction site. The prototype tool was efficacious in reducing the musculoskeletal disorder risks of the panel installers. The PI hypothesizes that the tool's efficacy in reducing the physical ergonomic exposures will trigger its routine adoption for ceiling installation. Although the challenges associated with supervisors, contractors and other hierarchy are mentioned in the literature, too little research on adoption of an efficacious tool was ever conducted in the area of construction intervention. The aim of this proposal is to investigate the factors behind the tool's adoption by the workers and the perception of the company executives (safety officers, directors and CEOs) that will influence them positively or negatively to buy the tool for use at their sites.

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

Appendix F (continued):

PROPOSAL: 116A-20

TITLE: Optical Superoscillations in Time Domain for Enhanced Sensing and Spectroscopy

INSTITUTION: Tulane University

PRINCIPAL INVESTIGATOR: Diyar Talbayev, Ph.D.

COMMENTS: Superoscillations occur when a signal locally varies faster than any of its band-limited Fourier components. This usually happens when the signal's Fourier components combine over a brief interval, into an almost perfect destructive interference. Then, in this short interval, one finds a weak oscillation, the superoscillation, that is faster than the fastest Fourier component of the signal. Superoscillations have been implemented in the spatial domain and were utilized to increase spatial resolution in microscopy. The PI proposes to focus on time-domain superoscillations. Time-domain superoscillations of the laser pulse envelop function have been demonstrated. However, the superoscillations of electric fields in a light wave (not of the pulse envelop) have not been achieved in an experiment. The main goal of this project is to develop a setup for direct synthesis of time-domain superoscillations.

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

Appendix F (continued):

PROPOSAL: 117A-20

TITLE: Probing Topological Superconductivity in Iron Chalcogenides

INSTITUTION: Tulane University

PRINCIPAL INVESTIGATOR: Jiang Wei, Ph.D.

COMMENTS: The PI proposes to investigate the topological nature of superconductivity in iron chalcogenides with a focus on $FeTe_{0.5}Se_{0.5}$, formerly an interesting iron-based superconductor which has just recently been proposed as an "intrinsic" topological superconductor in which all ingredients for creating Majorana Fermions are expected to be self-contained. However, little is known about the nature of the newly proposed topological surface state. The proposed research will serve as a pilot program to seek answers to fundamental questions that include (1) how to detect Majorana Fermions with transport measurement; and (2) how do other factors, including the alloying ration of Te and Se and the dimensionality shift from 3D to 2D, affect the topological surface state? Systematic and progressive experiments are proposed to address these questions, including achieving atomic-level thick $FeTe_{0.5}Se_{0.5}$ nanoflake devices to probe the Majorana Fermion behavior through the measurement of tunneling and Josephson Junction devices. A long-term goal and plan has also been proposed to investigate the relationship between emerging topological superconductivity and essential parameters of the alloying ratio of Te and Se and dimensionality.

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

Appendix F (continued):

PROPOSAL: 118A-20

TITLE: Evaluating Arsenic and Metals Contamination in Private Well Waters, Cereal Grains, and Soils: A Health Risk to Louisiana Residents

INSTITUTION: Tulane University Health Sciences Center

PRINCIPAL INVESTIGATOR: Tewodros Godebo, Ph.D.

COMMENTS: Nearly half of the population of Louisiana receives drinking water from groundwater resources. Thousands of the domestic wells extracting these groundwaters are excluded from the EPA's drinking water monitoring requirement for more than 85 contaminants. This highlights the health implications stemming from the possibility that private wells in the state are potentially contaminated with one or more toxic chemicals, including arsenic, lead, and fluoride. Arsenic (As) is a toxic chemical that occurs widely in the environment and is known for its neurologic and carcinogenic effects. The source of arsenic has not yet been clearly identified but could be naturally occurring in or transmitted from anthropogenic sources to soils and shallow groundwaters, linked to the legacy of arsenical pesticides used primarily on cotton fields. As a result, rice grown in Louisiana and other southern states contains higher As than rice produced in many other countries. Rice and other cereal grains could therefore be a source of additional As and other toxicant exposures for Louisiana residents. The PI proposes to collect drinking water from wells, cereal grains, and soil samples from private well owners' properties. The goal of the research is to obtain a better understanding of the risks of inorganic contaminant exposure to residents of southern Louisiana, by quantifying the concentrations of As (and its species) and other toxicants measured in private wells, cereal grains, and soils collected around Lake Pontchartrain.

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 Final 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: 121A-20

TITLE: Physiological Basis of Early Conduct Problems in Young Children

INSTITUTION: Tulane University Health Sciences Center

PRINCIPAL INVESTIGATOR: Amy Mikolajewski, Ph.D.

COMMENTS: The project is focused on discovering the underlying physiological basis of severe disruptive behaviors in very young children as part of the investigator's broader program of research to understand risk and protective factors for developing violence and aggression at later ages. While the PI has experience with the assessment of autonomic nervous system (ANS) functioning, the proposed study allows the PI to gain experience with the assessment of hypothalamic-pituitary-adrenal (HPA) system functioning, and thus utilize a multisystem approach. The early manifestation of conduct problems in young, developing children is heterogeneous, and can manifest as irritability, defiance, and vindictiveness, making prediction of future behavior based on these behaviors alone difficult. The addition of underlying physiological metrics provides a more comprehensive understanding of the heterogeneity of conduct problems and risk for persistent and severe antisocial behavior.

Dr. Mikolajewski is the current recipient of an NIH grant entitled "Psychophysiology and Social Processes in Very Young Children with Externalizing Problems" in the amount of $540,784 for the period 4/2019 – 3/2024. For this reason the PI is considered nationally competitive and therefore ineligible for RCS funding.

Appendix F (continued):

PROPOSAL: 124A-20

TITLE: Designing a Digital Health Intervention to Support Health Goals of Community-Dwelling Older Adults

INSTITUTION: University of Louisiana at Lafayette

PRINCIPAL INVESTIGATOR: Beenish Chaudhry, Ph.D.

COMMENTS: In the United States, nearly half (approximately 45% or 133 million) of all Americans suffer from at least one chronic condition. An aging population and changes in societal behavior are the major contributors to this costly problem. The Centers for Disease Control and Prevention reports that approximately 85% of older adults have at least one chronic health condition, 68% have two or more chronic conditions, and 43% have three or more. Chronic conditions cannot be cured; therefore, patients must manage their daily behaviors to control the severity of secondary problems and maintain quality of life. Goal setting is a promising health behavior change technique that has been consistently applied in many behavioral change applications to help people self-manage their chronic conditions. The Human-Computer Interaction (HCI) design research in this domain has focused on designing apps that support pursuit of single goals, typically physical activity or diet, and self-management of one chronic condition. Moreover, a majority of these applications are targeted towards young individuals. It is well known that, as aging progresses, people experience a corresponding decrease in their ability to plan and organize functional and goal-oriented behaviors. Therefore, the existing tools may not be suitable for older people. To address the complex needs of older adults and support them in self-management of their conditions, it is necessary to understand their requirements and challenges. The PI will investigate these issues and design a multi-device mobile health application to support setting, pursuit and attainment of health and wellness goals in the target population.

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

Appendix F (continued):

PROPOSAL: 126A-20

TITLE: Systemic Differences: Comparing Semantic Systems Across Languages

INSTITUTION: University of Louisiana at Lafayette

PRINCIPAL INVESTIGATOR: Michele Feist, Ph.D.

COMMENTS: The ability to talk and reason about spatial location is fundamental to human cognition. Research comparing spatial meaning across languages has uncovered substantial variations in the sets of contrasts marked and in the ways in which contrasting meanings are distinguished, fueling interest within linguistics and cognitive science. Alongside evidence of cross-linguistic semantic variation, recent cross-linguistic surveys suggest that languages build their spatial semantic systems upon a common set of factors, raising questions about how deep the cross-linguistic variation may run. Recently, researchers compared the semantic systems of English and Mandarin Chinese, asking whether system-level similarities noted in large cross-linguistic datasets would replicate in a more fine-grained comparison of spatial semantic systems. They found that there were abstract similarities between the systems, but that the similarities diminished at finer-grained levels of analysis, suggesting a way to home in on the loci of similarity and variation in the semantics of space. The proposed research seeks to build on this exploratory study in two ways. The PI will expand the set of languages in order to determine whether the abstract limitations on similarity will replicate over a broad sample of languages. Second, the PI will examine fine-grained connections between spatial terms within and across systems in order to determine whether there is overlap between languages in the kinds of lexical connections that structure spatial semantic systems.

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

Appendix F (continued):

PROPOSAL: 127A-20

TITLE: A Preventive-Curative Approach to Enhance Power Systems Resilience

INSTITUTION: University of Louisiana at Lafayette

PRINCIPAL INVESTIGATOR: Farzad Ferdowsi, Ph.D.

COMMENTS: Research on cyber-physical resilience is of great importance in power systems, significantly contributes to the United States' economy, safety and security, and was recently targeted by the President in the form of an executive order issued in March 2019. This project focuses on resilience enhancement in power distribution grids from the operational viewpoint. The goal is to make the power grid as resilient as possible against man-made/natural attacks through real-time control actions. The PI's proposed resilience enhancement package is both "preventive" and "curative" as it detects and identifies specific attacks and attempts to return the system back to a normal operating point as soon as possible by real-time decision-making strategies. This makes the approach different than proposed analyses in different sets of literature, which are more focused on risk assessment. This project aims to develop a clear understanding of associated failure modes for the power distribution system, and coordinate preparedness and mitigation measures from the big picture of project goals. A modified real-time complexity metric will be used to quantify the operational resilience in the face of specific attacks. The PI will be able to measure resilience enhancement at either the component or the system level. Different classification techniques will be used to identify disturbances and power quality events in the distribution grids, leading to intelligent real-time decision making. Different dynamical scenarios will be tested through both power hardware and controller hardware in the loop in order to create test/train datasets that will be used by intelligent classifiers.

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

Appendix F (continued):

PROPOSAL: 130A-20

TITLE: Semantics, Authenticity, Intent and Propagating Information Patterns in Natural Language Processing

INSTITUTION: University of Louisiana at Lafayette

PRINCIPAL INVESTIGATOR: Aminul Islam, Ph.D.

COMMENTS: The proposed research solves fundamental problems of finding latent semantics, authenticity, intent and propagation patterns of dynamic information in Natural Language Processing (NLP). Apart from advancing the theory of understanding semantics through novel algorithmic contributions, the proposed research solves several practical problems such as assessment of the trustworthiness of information, detection of fake news, checking the validity of information on the web, and development of educational tools for such purposes. The research develops novel word embeddings, mathematical models, deep learning algorithms, testing suites, and solutions in software. The research integrates and utilizes fundamental human cognition and behavior theories developed across various disciplines such as psychology, social sciences, philosophy, and communications as they provide invaluable insights for dynamic information. The proposed novel methods circumvent the limitations of existing methods that use generalized word embeddings and produce suboptimal results as they are oblivious to task-specific features of dynamic information.

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

Appendix F (continued):

PROPOSAL: 131A-20

TITLE: Laboratory Investigations of Stardust

INSTITUTION: University of Louisiana at Lafayette

PRINCIPAL INVESTIGATOR: Manavi Jadhav, Ph.D.

COMMENTS: The laboratory study of stardust is an important sub-field of astrophysics. It combines sophisticated chemical, structural, and isotopic measurements of micron-sub-micron stardust particles with the theoretical ideas of nucleosynthesis and stellar evolution to understand astrophysical observations. Isotopic data for these grains reveal more precise information about their parent stars than do spectroscopic observations of circumstellar dust. The goal of laboratory measurements is to provide clues about the stellar environments in which the grains formed and their subsequent histories. Additionally, investigations into the preservation of these grains in different meteorites provide information about early Solar System conditions and chronology. These goals can be achieved by coordinated, multi-technique investigations of stardust grains in the laboratory. The proposed research is to carry out a chemical and physical separation of stardust grains from two meteorites. The isolated grains will then be analyzed at facilities with various microanalytical tools, which include scanning electron microscopy and secondary ion and resonant ionization mass spectrometry. Such multi-technique analyses on individual grains could lead to the discovery of new varieties of subgrains, establish their origins, and provide tight constraints to circumstellar environments in supernovae and post-asymptotic giant branch stars, as well as to the stellar nucleosynthesis models of these stars.

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

Appendix F (continued):

PROPOSAL: 139A-20

TITLE: Evaluation of a Non-Ionic Surfactant as Solvent for Extractive Butyric Acid Fermentation

INSTITUTION: University of Louisiana at Lafayette

PRINCIPAL INVESTIGATOR: Emmanuel Revellame, Ph.D.

COMMENTS: Volatile fatty acid (VFAs) in the C_1-C_4 range are important commodity chemicals with a wide range of applications. Among these VFAs, butyric acid is of particular interest due to its importance as a 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 increasing human population. Butyric acid can be sustainably produced using urban waste streams through anaerobic digestion. The valorization of urban wastes into useful products aligns well with the Food-Energy-Water Nexus to develop urban biorefineries, which could utilize existing wastewater treatment facilities. However, large-scale fermentative production of butyric acid is hindered by low product concentration and productivity due to product (VFA) inhibition. To overcome these hindrances, the proposed work aims to evaluate a non-ionic surfactant as a solvent for extractive butyric acid fermentation. This fermentation strategy will extract butyric acid as it is produced, thereby eliminating product inhibition. Despite tremendous previous efforts on extractive VFA fermentation, the success of this strategy is hampered by solvent toxicity to VFA-producing microbes. Success in this area of research could advance the fermentative production of butyric acid and other fermentation metabolites.

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

Appendix F (continued):

PROPOSAL: 144A-20

TITLE: Investigation of Acoustic Agglomeration of Fine Inhalable Particulate Matter with Binding Droplet Injection

INSTITUTION: University of Louisiana at Lafayette

PRINCIPAL INVESTIGATOR: Peng Yin, Ph.D.

COMMENTS: Fine inhalable (aerodynamic diameter <2.5 μm) particulate matter (PM) has drawn worldwide attention because of its harmful effects on the atmosphere and human health. While conventional particle removal devices suffer from high energy consumption and low efficiency to remove $PM_{2.5}$, acoustic agglomeration is a promising air pretreatment technology to increase the particle removal efficiency. Acoustic agglomeration uses high-intensity sound waves to promote particle collision and enlarge fine particles. However, the application of acoustic agglomeration is currently limited by its high energy consumption (high sound pressure level) and low agglomeration efficiency due to fragmentation. The goal of this project is to investigate the agglomeration efficiency at a lower sound pressure level (SPL) by injecting commercially available, water-soluble polymer binding droplets into the process airstream. Acting as coarse seed particles, the droplets are expected to increase particle collision frequency and promote aggregates at lower SPL. Also, the fragmentation of aggregates is expected to be suppressed using binding droplets due to stronger liquid and solid bridges among particles.

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

Appendix F (continued):

PROPOSAL: 150A-20

TITLE: The Emergence of Dual-Pole Interior Magnet Synchronous Machines

INSTITUTION: University of New Orleans

PRINCIPAL INVESTIGATOR: Ebrahim Amiri, Ph.D.

COMMENTS: Design and analysis of electric machines have been dominantly performed based on Finite Element (FE) numerical methods. The FE solution, although powerful, is computationally costly for complex machine structures and therefore is not advised in early design stages. In contrast, analytical solution methods provide a physical insight on various performance metrics of the machine such as the magnetic field's harmonic content, radial and tangential forces, and their relation with machine geometry. This project aims to develop a comprehensive analytical solution to predict the performance characteristics of interior magnet synchronous motors, in particular the emerging technology of interior magnet dual-pole Line Start Synchronous Motors (LSSMs). The concept of dual-pole LSSM has recently been developed by the PI to enable the two-speed operation in line start synchronous motors. Three different classes of dual-pole synchronous motors are presented in this project: motor with dual magnetic polarity, motor with hybrid polarity, and motor with dual saliency. All three motor classes will be refined to improve start-up and transition processes from one speed to another, provide synchronization capability, and mitigate electromechanical vibrations. The proposed dual-pole structure is an economically viable solution for two-speed applications such as evaporative coolers, pumps, compressors, etc. For modern industrial applications, the combination of the proposed variable pole machine and variable frequency drive can offer a wider speed range. The project also involves designing an unconventional flux weakening system with DC excitation. A prototype of the hybrid excited, optimized dual-pole machine will be built for experimental measurement/testing.

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

Appendix F (continued):

PROPOSAL: 165A-20

TITLE: Measuring Shared Authorship in Interactive Story Worlds

INSTITUTION: University of New Orleans

PRINCIPAL INVESTIGATOR: Benjamin Samuel, Ph.D.

COMMENTS: The research goal of this project is to perform user studies of existing interactive narrative experiences, including two interactive narrative experiences developed by the PI, and to apply that analysis toward the development of future simulations that are capable of facilitating user ownership, creativity, and self-expression. The goal fits with the PI's long-term research goals involving interactive narrative experiences. By conducting user-centric evaluations of these experiences with an eye for user authorial ownership, the research will illuminate the connection between specific affordances of interactive storytelling technology and the impact they have on the user's perception of the resulting narratives. The proposed research approach is to collect qualitative and quantitative data on existing interactive narrative systems, including two of the PI's previous experiments: the social simulation game Prom Week and the computationally assisted theatre piece Bad News. This data will answer three questions: (1) how much authorial ownership does the player have over the narratives of the current systems; (2) which qualities of the existing systems most affect user authorial ownership; and (3) how can authorial ownership be operationalized for future experiences?

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

Appendix F (continued):

PROPOSAL: 167A-20

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

INSTITUTION: University of New Orleans

PRINCIPAL INVESTIGATOR: Minhaz Zibran, Ph.D.

COMMENTS: This project will create new knowledge about the patterns of bugs (i.e., defects) in software systems by mining bug-fix patterns in source code repositories. The core of the techniques will rely on version control history of individual projects, parsing source code into Abstract Syntax Trees (ASTs) and computing AST differences. Earlier work on bug-patterns strove to identify bug-fixing edits/changes to source code elements, ignoring the location of those edits within the nested code structure. The project will identify both the *edit-patterns* and *nesting-patterns* to capture a complete picture of the content and context of the bug-fix patterns. Capturing these bug-fix patterns with better completeness, including both the edit-patterns and nesting-patterns, will enhance existing approaches for bug prediction, bug localization, and automatic program repair. The project will also distinguish patterns of bugs that are exploitable and lead to security vulnerabilities. This new knowledge will inform and advance existing tools and techniques for software security analysis.

Although the proposal is of good quality, it did not rank high enough in comparison with other Computer & Information Sciences proposals to warrant funding. It was not placed in the "Priority I" category by the Final Panel because there is not enough money, even if additional funds become available, to fund more than the thirty-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

AGRICULTURAL SCIENCES

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

Kevin E. Kenworthy, Ph.D.
Agronomy Department
University of Florida

Appendix G (continued):

COMPUTER & INFORMATION SCIENCES

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

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

Patricia Solis, Ph.D.
Research Associate Professor
Department of Geoscience
Texas Tech University

Appendix G (continued):

ENGINEERING A

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

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

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

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

MATHEMATICS

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

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

PHYSICS & ASTRONOMY

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

Gary Scott Collins, Ph.D.
Professor
Department of Physics & Astronomy
Washington State University

Appendix G (continued):

SOCIAL SCIENCES

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

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

APPENDIX H

RESEARCH COMPETITIVENESS SUBPROGRAM
FY 2019-20
SUMMARY OF PROPOSALS

***169**	**TOTAL PROPOSALS**	
9	AGR	Agricultural Sciences
18	BS I	Biological Sciences I
29	BS II	Biological Sciences
20	C/IS	Computer and Information Sciences
14	EAR	Earth and Environmental Sciences
36	ENG A	Engineering A
14	MATH	Mathematics
9	PHY	Physics and Astronomy
20	SS	Social Sciences

TOTAL FIRST-YEAR FUNDS REQUESTED: $8,348,464

*one withdrawn

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

Proposal #	PI Name	Category	Institution	Duration	Project Title	Amount Requested				Confidential Info
						Year 1	Year 2	Year 3	Total	
001A-20	Prof. Kenneth Bondioli	Agricultural Sciences	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	No
002A-20	Prof. Kevin Hoffseth	Biological Sciences II	Louisiana State University Agricultural Center	3 Years	Simulating Functional Effects of Age and Disease on Regenerated Bone Structure	$54,357.00	$52,617.00	$52,616.00	$159,590	No
003A-20	Dr. Changyoon Jeong	Agricultural Sciences	Louisiana State University Agricultural Center	1 Year	Modeling the global warming potential of nitrous oxide emissions under legume cover cropping with residue management	$18,588.00	$0.00	$0.00	$18,588	No
004A-20	Dr. Zongliang (Carl) Jiang	Agricultural Sciences	Louisiana State University Agricultural Center	1 Year	Polysome profiling to characterize translational control of bovine preimplantation embryo development	$19,000.00	$0.00	$0.00	$19,000	No
005A-20	Dr. Joan King	Agricultural Sciences	Louisiana State University Agricultural Center	1 Year	Prebiotics and Probiotics to Control Antibiotic Resistance in Food	$20,000.00	$0.00	$0.00	$20,000	No
006A-20	Prof. Yongchan Kwon	Engineering A [Chemical, Civil, Electrical, etc.]	Louisiana State University Agricultural Center	3 Years	In vitro reprogramming of monolignol biosynthesis	$60,771.00	$59,771.00	$58,771.00	$179,313	No
007A-20	Dr. Nathan Lord	Biological Sciences II	Louisiana State University Agricultural Center	1 Year	Big Data for Bad Beetles: Draft Genomes of Jewel Beetles for NSF Preliminary Data	$19,800.00	$0.00	$0.00	$19,800	No
008A-20	Dr. Danyi Qi	Social Sciences	Louisiana State University Agricultural Center	1 Year	Nudges to encourage healthy and sustainable dietary behaviors: Using Louisiana as a case study to reduce consumer food waste and obesity	$19,960.00	$0.00	$0.00	$19,960	No
009A-20	Dr. Jonathan Richards	Biological Sciences II	Louisiana State University Agricultural Center	3 Years	Uncovering the molecular mechanisms of the Cercospora janseana-rice interaction through genomic investigation	$50,250.00	$45,250.00	$42,250.00	$137,750	No
010A-20	Dr. Qian Sun	Biological Sciences II	Louisiana State University Agricultural Center	3 Years	Characterization of the olfactory system in the Formosan subterranean termite	$59,073.00	$56,200.00	$51,000.00	$166,273	No
011A-20	Dr. Sara Thomas-Sharma	Agricultural Sciences	Louisiana State University Agricultural Center	3 Years	Developing a deeper understanding of toxin biology to identify novel tools for the management of Cercospora leaf blight on soybean	$56,100.00	$55,850.00	$48,650.00	$160,600	No
012A-20	Prof. Aly Mousaad Aly	Engineering A [Chemical, Civil, Electrical, etc.]	Louisiana State University and A & M College	1 Year	Bridge Scour: Modelling and Countermeasures	$20,000.00	$0.00	$0.00	$20,000	No
013A-20	Dr. Corina Barbalata	Computer and Information Sciences	Louisiana State University and A & M College	3 Years	Adaptability behaviour for underwater manipulation	$87,899.00	$43,830.00	$33,250.00	$164,979	No
014A-20	Dr. Nichole Bauer	Social Sciences	Louisiana State University and A & M College	3 Years	Feminizing Political Institutions: Does increasing the number of women in politics change how citizens stereotype political institutions?	$62,750.00	$55,659.00	$42,659.00	$161,068	No
015A-20	Prof. Bhuvnesh Bharti	Engineering A [Chemical, Civil, Electrical, etc.]	Louisiana State University and A & M College	1 Year	Disordering colloidal crystals and directing structural color	$20,000.00	$0.00	$0.00	$20,000	No
016A-20	Dr. Adam Bohnert	Biological Sciences I	Louisiana State University and A & M College	3 Years	Transgenerational control of mitochondrial health and homeostasis	$59,825.00	$50,825.00	$46,825.00	$157,475	No
017A-20	Dr. Jeffery Chancellor	Physics/Astronomy	Louisiana State University and A & M College	2 Years	Development of a Ground-Based Space Radiation Analog	$69,968.00	$59,968.00	$0.00	$129,936	No
018A-20	Dr. Shengli Chen	Engineering A [Chemical, Civil, Electrical, etc.]	Louisiana State University and A & M College	1 Year	THEORETICAL MODELLING OF CAVITY EXPANSION IN ANISOTROPIC ELASTOPLASTIC SOILS WITH APPLICATIONS TO IN SITU TEST INTERPRETATION	$20,000.00	$0.00	$0.00	$20,000	No
019A-20	Dr. Henrique / H Cheng	Biological Sciences II	Louisiana State University and A & M College	2 Years	Development of a novel non-mammalian model of internal fertilization	$56,505.00	$55,505.00	$0.00	$112,010	No
020A-20	Prof. Jin-Woo Choi	Engineering A [Chemical, Civil, Electrical, etc.]	Louisiana State University and A & M College	1 Year	Embedding Machine Learning on a Portable Optical Sensing Platform	$20,000.00	$0.00	$0.00	$20,000	No
021A-20	Dr. Christopher Cox	Social Sciences	Louisiana State University and A & M College	3 Years	Decoding contextualized meaning from distributed brain networks: Applying machine learning with structured sparsity	$64,291.00	$59,791.00	$57,541.00	$181,623	No
022A-20	Dr. Erin Coyle	Social Sciences	Louisiana State University and A & M College	1 Year	Assessing Privacy Concerns and Behaviors of Smart Device Users in Louisiana and the United States	$14,938.00	$0.00	$0.00	$14,938	No
023A-20	Dr. Tad Dallas	Biological Sciences I	Louisiana State University and A & M College	3 Years	Understanding large-scale patterns of helminth parasite diversity	$64,501.00	$62,550.00	$59,425.00	$186,476	No

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						Year 1	Year 2	Year 3	Total	
024A-20	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	No
025A-20	Dr. Thomas Douthat	Social Sciences	Louisiana State University and A & M College	3 Years	Network Methods for Assessing Planning Governance Capabilities in the Face of Multi-Jurisdictional & Multi-Dimensional Regional Challenges: A Novel Approach Illustrated with Watershed Planning in Coastal Louisiana	$66,131.00	$58,000.00	$49,000.00	$173,131	No
026A-20	Dr. Niloufar Emami	Engineering A [Chemical, Civil, Electrical, etc.]	Louisiana State University and A & M College	3 Years	Enhancing 3D Printed Flexible Formworks for Novel Applications in Building Design and Construction	$49,999.00	$47,499.00	$45,499.00	$142,997	No
027A-20	Dr. Hunter Gilbert	Computer and Information Sciences	Louisiana State University and A & M College	3 Years	Computationally efficient, physically accurate simulation of deformable robots	$53,629.00	$52,345.00	$49,345.00	$155,319	No
028A-20	Dr. M Guerrero-Plata	Biological Sciences I	Louisiana State University and A & M College	1 Year	Novel molecular mechanism of inhibition of antiviral response to respiratory syncytial virus	$19,500.00	$0.00	$0.00	$19,500	No
029A-20	Dr. Beibei Guo	Mathematics	Louisiana State University and A & M College	1 Year	A Bayesian Phase II Design for Immunotherapy by Jointly Modeling the Longitudinal Immune Response and Time-to-event Efficacy	$20,000.00	$0.00	$0.00	$20,000	No
030A-20	Dr. Eileen Haebig	Social Sciences	Louisiana State University and A & M College	3 Years	Word Knowledge in Young Children with Autism Spectrum Disorders: The Developing Lexicon	$62,004.00	$61,954.00	$58,635.00	$182,593	No
031A-20	Dr. Hany Hassan	Engineering A [Chemical, Civil, Electrical, etc.]	Louisiana State University and A & M College	3 Years	Examining the potential impacts of connected vehicles on traffic safety and operation under different traffic and weather conditions in Louisiana	$77,201.00	$58,126.00	$56,251.00	$191,578	No
032A-20	Dr. Matthew Hiatt	Earth/Environmental Sciences	Louisiana State University and A & M College	3 Years	Effects of frontal passage on hydrodynamics in a heterogeneous coastal environment	$65,271.00	$52,364.00	$47,740.00	$165,375	No
033A-20	Dr. Daniel Holstein	Biological Sciences II	Louisiana State University and A & M College	3 Years	Deep coral reef refuges in the contexts of emergent disease and reproductive capacity	$61,701.00	$60,701.00	$59,701.00	$182,103	No
034A-20	Dr. Amirhosein Jafari	Engineering A [Chemical, Civil, Electrical, etc.]	Louisiana State University and A & M College	3 Years	Development of Buildings Occupant-Centric Energy Management System [OCEMS]	$76,950.00	$51,350.00	$51,350.00	$179,650	No
035A-20	Dr. Sabarethinam Kameshwar	Engineering A [Chemical, Civil, Electrical, etc.]	Louisiana State University and A & M College	3 Years	Adaptive decision support framework for community resilience planning under extreme events	$59,624.00	$52,874.00	$50,249.00	$162,747	No
036A-20	Dr. Yong-ha Kim	Engineering A [Chemical, Civil, Electrical, etc.]	Louisiana State University and A & M College	3 Years	Fate and Removal of Radioactive Particles in Aqueous Environments	$66,950.00	$65,675.00	$52,252.00	$184,877	No
037A-20	Prof. Jimmy Lawrence	Engineering A [Chemical, Civil, Electrical, etc.]	Louisiana State University and A & M College	3 Years	Multifunctional Precision Polymers for Metal-Free Magnetic Resonance Imaging and Sensing	$67,350.00	$64,850.00	$62,850.00	$195,050	No
038A-20	Dr. Charles Lee	Biological Sciences II	Louisiana State University and A & M College	1 Year	Functional architecture of central gustatory networks	$20,000.00	$0.00	$0.00	$20,000	No
039A-20	Dr. YONG-CHEOL LEE	Engineering A [Chemical, Civil, Electrical, etc.]	Louisiana State University and A & M College	3 Years	A Digital Twin City Model for Improving Disaster Resilience of Communities and Infrastructure Systems	$59,156.00	$58,744.00	$58,492.00	$176,392	No
040A-20	Dr. Andrew Lewin	Agricultural Sciences	Louisiana State University and A & M College	3 Years	Utilizing the bovine ocular microbiome to detect therapeutic targets for infectious keratoconjunctivitis	$66,713.00	$65,069.00	$63,238.00	$195,020	No
041A-20	Dr. Heather Lucas	Social Sciences	Louisiana State University and A & M College	3 Years	Neural dynamics of the interplay between memory and information sampling across the adult lifespan	$76,525.00	$72,459.00	$44,915.00	$193,899	No
042A-20	Dr. Anas Mahmoud	Computer and Information Sciences	Louisiana State University and A & M College	1 Year	Engineering Resilient Sharing Economy Systems	$20,000.00	$0.00	$0.00	$20,000	No
043A-20	Prof. Giulio Mariotti	Earth/Environmental Sciences	Louisiana State University and A & M College	3 Years	Developing, validating, and applying a comprehensive coastal morphodynamic model to predict decadal to centennial effects of barrier island restoration and to identify optimal restoration strategies	$51,063.00	$50,263.00	$49,663.00	$150,989	No
044A-20	Dr. Elizabeth Martin	Biological Sciences I	Louisiana State University and A & M College	2 Years	Breast Cancer Subtype Specific Stromal Remodeling and Polarization	$64,079.00	$46,979.00	$0.00	$111,058	No
045A-20	Dr. Xiangyu Meng	Engineering A [Chemical, Civil, Electrical, etc.]	Louisiana State University and A & M College	3 Years	The Penetration Rate Effect of Distributed Control and Optimization of Connected and Autonomous Vehicles	$64,250.00	$57,250.00	$57,250.00	$178,750	No

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046A-20	Dr. Paul Miller	Earth/Environmental Sciences	Louisiana State University and A & M College	3 Years	Hydrometeorological responses to abrupt earth surface change	$49,700.00	$48,200.00	$46,700.00	$144,600	No
047A-20	Dr. Olalekan Ogundele	Biological Sciences II	Louisiana State University and A & M College	3 Years	SK channel regulation of firing rate homeostasis in cognition	$58,000.00	$50,000.00	$45,000.00	$153,000	No
048A-20	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	No
049A-20	Dr. Hyojung Park	Social Sciences	Louisiana State University and A & M College	1 Year	A Social-Ecological Model Approach to Addressing the Opioid Epidemic in Louisiana	$17,113.00	$0.00	$0.00	$17,113	No
050A-20	Prof. Matthew Penny	Physics/Astronomy	Louisiana State University and A & M College	3 Years	Measuring the impact of alpha-element abundances on giant planet occurrence rates	$59,445.00	$48,201.00	$41,125.00	$148,771	No
051A-20	Dr. Jyotsna Sharma	Physics/Astronomy	Louisiana State University and A & M College	2 Years	A Feasibility Study of Quantum Gravimetry for Application in the Oil Industry	$89,925.00	$88,925.00	$0.00	$178,850	No
052A-20	Prof. Jenny Sones	Biological Sciences I	Louisiana State University and A & M College	3 Years	The role of kisspeptin in placental dysfunction and adverse pregnancy outcomes	$45,325.00	$40,325.00	$13,700.00	$99,350	No
053A-20	Prof. George Strain	Biological Sciences II	Louisiana State University and A & M College	2 Years	Molecular Genetics of Canine Pigment-Associated Deafness	$50,000.00	$46,600.00	$0.00	$96,600	No
054A-20	Dr. Chao Sun	Engineering A [Chemical, Civil, Electrical, etc.]	Louisiana State University and A & M College	3 Years	High-fidelity modeling of residential communities exposed to windstorm induced multi-hazards	$56,190.00	$55,244.00	$55,316.00	$166,750	No
055A-20	Dr. Fang-Ting Tu	Mathematics	Louisiana State University and A & M College	3 Years	Modular Forms and Hypergeometric Systems	$46,635.00	$45,635.00	$44,835.00	$137,105	No
056A-20	Dr. Anastasios Vourekas	Biological Sciences I	Louisiana State University and A & M College	3 Years	Host cell mechanisms regulating HIV at the level of translation initiation	$67,049.00	$64,049.00	$61,049.00	$192,147	No
057A-20	Prof. Chen Wang	Computer and Information Sciences	Louisiana State University and A & M College	3 Years	Smart Anti-visual-hacking Methods to Protect Mobile Device Screen Privacy	$60,250.00	$58,250.00	$56,250.00	$174,750	No
058A-20	Prof. Hsiao-Chun Wu	Engineering A [Chemical, Civil, Electrical, etc.]	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	No
059A-20	Dr. Shaomian Yao	Biological Sciences I	Louisiana State University and A & M College	1 Year	Molecular base of loss of osteogenic differentiation capability in human tissue-derived stem cells	$19,875.00	$0.00	$0.00	$19,875	No
060A-20	Dr. Rui Zhang	Physics/Astronomy	Louisiana State University and A & M College	1 Year	Accurate tracking of patient position and dose based on volumetric modulated arc therapy-computed tomography	$20,000.00	$0.00	$0.00	$20,000	No
061A-20	Dr. Yimin Zhu	Engineering A [Chemical, Civil, Electrical, etc.]	Louisiana State University and A & M College	1 Year	Design and engineering for human wellbeing: Understanding the potential of immersive virtual environments for supporting biophilic building design	$20,000.00	$0.00	$0.00	$20,000	No
062A-20	Prof. Guoyi Ke	Mathematics	Louisiana State University at Alexandria	3 Years	Developing New Preconditioning Techniques for the Magnetohydrodynamic Problems	$22,598.00	$22,598.00	$22,798.00	$67,994	No
063A-20	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	No
064A-20	Dr. Xiao-Hong Lu	Biological Sciences II	Louisiana State University Health Sciences Center Shreveport	3 Years	Genetic dissection of the pathogenic role of 7q36.3 duplication in schizophrenia	$55,090.00	$55,090.00	$55,090.00	$165,270	No
065A-20	Dr. Yunfeng Zhao	Biological Sciences I	Louisiana State University Health Sciences Center Shreveport	1 Year	The Role of UCP2 in Wnt Signaling	$16,000.00	$0.00	$0.00	$16,000	No
066A-20	Dr. Tauhidul Alam	Computer and Information Sciences	Louisiana State University in Shreveport	1 Year	Assessment and Monitoring Critical Port Infrastructure through Heterogeneous Human-Autonomous Systems Teams	$18,819.00	$0.00	$0.00	$18,819	No
067A-20	Dr. Cory Coehoorn	Biological Sciences II	Louisiana State University in Shreveport	2 Years	The impact of rapid heat stress on neural function, decision-making, and salivary cortisol	$70,160.00	$65,360.00	$0.00	$135,520	No
068A-20	Dr. Kaushallya Adhikari	Engineering A [Chemical, Civil, Electrical, etc.]	Louisiana Tech University	3 Years	Adaptive Algorithms for Sonar Systems that Employ Sparse Sensor Arrays	$49,080.00	$46,830.00	$45,830.00	$141,740	No
069A-20	Dr. Xiang Chen	Engineering A [Chemical, Civil, Electrical, etc.]	Louisiana Tech University	3 Years	Advancing Shape Memory Alloy Design and Capabilities: A Multiscale Insight	$45,570.00	$42,920.00	$42,920.00	$131,410	No

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

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070A-20	Dr. Pradeep Chowriappa	Computer and Information Sciences	Louisiana Tech University	3 Years	A Situationally Aware Tailored Health Communications System for Mobile Health Interventions.	$44,245.00	$44,245.00	$44,245.00	$132,735	No
071A-20	Prof. John Doyle	Mathematics	Louisiana Tech University	3 Years	Moduli spaces and Galois theory in arithmetic dynamics	$38,199.00	$38,199.00	$38,199.00	$114,597	No
072A-20	Dr. Julia Earl	Biological Sciences II	Louisiana Tech University	3 Years	Effects and mechanisms of biological diversity on community assembly	$42,006.00	$63,206.00	$40,242.00	$145,454	No
073A-20	Prof. Elisabeth Maria Fatila	Engineering A [Chemical, Civil, Electrical, etc.]	Louisiana Tech University	3 Years	The Investigation of Sustainable Methods for the Synthesis and Processing of Rare Earth Materials	$47,341.00	$44,841.00	$43,841.00	$136,023	No
074A-20	Dr. Levi Good	Biological Sciences II	Louisiana Tech University	3 Years	Modulation of Thalamocortical Circuitry in Epilepsy	$50,420.00	$50,420.00	$47,920.00	$148,760	No
075A-20	Dr. Lorraine Jacques	Computer and Information Sciences	Louisiana Tech University	3 Years	CSWherever: An Online Computer Science Learning Environment	$44,618.00	$40,868.00	$40,868.00	$126,354	No
076A-20	Prof. Don Liu	Mathematics	Louisiana Tech University	1 Year	Numerical Studies of Pain-free Microneedles for Transdermal Drug Delivery	$19,658.00	$0.00	$0.00	$19,658	No
077A-20	Dr. Michele Maasberg	Computer and Information Sciences	Louisiana Tech University	3 Years	Development of Metrics for Identifying Insider Threats to Classified Information [Risk in Person]	$56,719.00	$54,719.00	$53,719.00	$165,157	No
078A-20	Dr. Elizabeth Matthews	Engineering A [Chemical, Civil, Electrical, etc.]	Louisiana Tech University	3 Years	Enhanced Damage Model for Supporting Flood Risk Mitigation Programs	$45,715.00	$45,715.00	$45,715.00	$137,145	No
079A-20	Prof. Andrew Peters	Engineering A [Chemical, Civil, Electrical, etc.]	Louisiana Tech University	3 Years	Precise Arrangement of Nanoparticles via Block Copolymer Grafts	$43,420.00	$43,020.00	$43,020.00	$129,460	No
080A-20	Dr. Joshua Vandenbrink	Biological Sciences I	Louisiana Tech University	3 Years	Identifying Genes Associated with Gravitropic and Phototropic Interactions in Arabidopsis thaliana	$50,703.00	$50,703.00	$50,703.00	$152,109	No
081A-20	Dr. Allyn Schoeffler	Biological Sciences I	Loyola University New Orleans	3 Years	Molecular determinants of specialization in bacterial topoisomerases from extreme environments	$35,699.00	$27,981.00	$25,744.00	$89,424	No
082A-20	Dr. Ahmed Abdel-Mohti	Engineering A [Chemical, Civil, Electrical, etc.]	McNeese State University	2 Years	Making Louisiana RC Bridge Decks More Resilient	$63,302.00	$60,520.00	$0.00	$123,822	No
083A-20	Dr. Steven Rainey	Social Sciences	McNeese State University	3 Years	Preliminary Research into Potential Impacts of Large-Scale Infrastructure on Riverine Environments and Communities in Brazil	$61,034.00	$80,887.00	$23,678.00	$165,599	No
084A-20	Dr. Firouz Rosti	Engineering A [Chemical, Civil, Electrical, etc.]	McNeese State University	2 Years	Numerical and Analytical Modeling of Pressured Grouted Helical Piles for Application in Louisiana Subsurface Soils	$35,103.00	$50,633.00	$0.00	$85,736	No
085A-20	Dr. Ning Zhang	Computer and Information Sciences	McNeese State University	2 Years	Quantum Computing for Computational Fluid Dynamics	$57,749.00	$57,749.00	$0.00	$115,498	No
086A-20	Dr. Timothy Clay	Biological Sciences II	Nicholls State University	3 Years	Population demographics of diamondback terrapins and the influence of the blue crab fishery in Louisiana	$54,568.00	$53,162.00	$50,763.00	$158,493	No
087A-20	Dr. Michelle Fowler	Social Sciences	Nicholls State University	3 Years	The Role of Autobiographical Memory and Self-Perception in Normative Adjustment of Veterans	$47,424.00	$31,141.00	$29,367.00	$107,932	No
088A-20	Prof. Xiaoxu Jiang	Biological Sciences I	Nicholls State University	1 Year	The Relationship between Transition Metal Nutrients Uptake and Petroleum Hydrocarbons Biodegradation in Marine Hydrocarbonoclastic Bacterium Alcanivorax borkumensis	$20,000.00	$0.00	$0.00	$20,000	No
089A-20	Dr. Justine Whitaker	Biological Sciences II	Nicholls State University	3 Years	Potential Spread of Rat Lungworm, Angiostrongylus cantonensis, by Invasive Apple Snails, Pomacea maculata in South Louisiana	$75,816.00	$29,746.00	$18,518.00	$124,080	No
090A-20	Dr. Jonathan Willis	Biological Sciences II	Nicholls State University	3 Years	Elucidating interactions between wetland vegetation and microplastics	$49,525.00	$46,464.00	$50,529.00	$146,518	No
091A-20	Dr. Enmin Zou	Biological Sciences II	Nicholls State University	1 Year	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	No
092A-20	Prof. Alexei Muravitsky	Mathematics	Northwestern State University	1 Year	Consequence Relation: Tarski-Lindenbaum Method	$5,584.00	$0.00	$0.00	$5,584	No
093A-20	Mr. Trenton O'Neal	Biological Sciences I	Northwestern State University	1 Year	Biodegradation of the Antimicrobial Chloroxylenol by Aquatic and Terrestrial Microorganisms	$9,672.00	$0.00	$0.00	$9,672	Yes
094A-20	Prof. Gerard Blanchard	Physics/Astronomy	Southeastern Louisiana University	2 Years	Design, Construction, and Testing of a Terrestrial Gamma-ray Flash (TGF) Detection System for Balloon-based Observations	$29,399.00	$33,575.00	$0.00	$62,974	No

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Proposal #	PI Name	Category	Institution	Duration	Project Title	Amount Requested				Confidential Info
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095A-20	Dr. Priyadarshini Dasgupta	Engineering A [Chemical, Civil, Electrical, etc.]	Southeastern Louisiana University	2 Years	Facilitating the adoption of innovative techniques in ceiling panel installation	$44,239.00	$43,863.00	$0.00	$88,102	No
096A-20	Dr. Corie Hebert	Social Sciences	Southeastern Louisiana University	3 Years	Creating and Implementing a Recovery Focused Intervention for Survivors of Human Trafficking	$48,320.00	$46,774.00	$47,244.00	$142,338	No
097A-20	Dr. Lisa Kuhn	Mathematics	Southeastern Louisiana University	3 Years	Modeling and Control of Smart Material Distributed Parameter Systems	$38,471.00	$40,029.00	$41,757.00	$120,257	No
098A-20	Dr. Christopher Murray	Biological Sciences II	Southeastern Louisiana University	3 Years	Aquaculture and enigmatic endocrine-disrupting pollutants: how point-source environmental androgens fuel conservation threats and human-wildlife conflict	$70,785.00	$60,385.00	$36,171.00	$167,341	No
099A-20	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	No
100A-20	Dr. Paulo Regis	Computer and Information Sciences	Southeastern Louisiana University	3 Years	Smart-City Applications Infrastructure Initiative	$38,417.00	$38,204.00	$40,011.00	$116,632	No
101A-20	Dr. Mohammad Saadeh	Social Sciences	Southeastern Louisiana University	3 Years	Increasing underrepresented student success in STEM pathways by building social capital through comprehensive communities of practice.	$81,123.00	$52,672.00	$52,672.00	$186,467	No
102A-20	Dr. Omer Soysal	Computer and Information Sciences	Southeastern Louisiana University	3 Years	A CAR framework for recognition of lung tumors utilizing ARM-based hierarchical deep learning	$58,559.00	$59,373.00	$60,606.00	$178,538	No
103A-20	Dr. Radian Belu	Engineering A [Chemical, Civil, Electrical, etc.]	Southern University and A&M College - Baton Rouge	2 Years	Heterogeneous Swarm Sensing [HSS]: Integrating Intelligence from UAVs and WSNs	$58,870.00	$40,231.00	$0.00	$99,101	No
104A-20	Dr. Christopher Chappell	Agricultural Sciences	Southern University and A&M College - Baton Rouge	3 Years	Assessing the Potential of Urban Forested Wetlands in Mitigating Greenhouse Gas Emissions in Louisiana	$66,663.00	$66,663.00	$66,663.00	$199,989	No
105A-20	Dr. Lorraine Fuller	Social Sciences	Southern University and A&M College - Baton Rouge	1 Year	Cultivating Diversity and Inclusion in Television Commercials	$55,654.00	$0.00	$0.00	$55,654	No
106A-20	Dr. Yemane Ghebreiyessus	Agricultural Sciences	Southern University and A&M College - Baton Rouge	2 Years	Determining the growing requirements for industrial hemp plants that contain high CBD [Cannabidiol] and CBG [Cannabigerol] for smallholder farm producers	$123,550.00	$73,695.00	$0.00	$197,245	No
107A-20	Dr. Yasser Ismail	Engineering A [Chemical, Civil, Electrical, etc.]	Southern University and A&M College - Baton Rouge	3 Years	Internet of Video Surveillance Systems [IoVSS] for Smart Cities	$52,849.00	$50,549.00	$50,549.00	$153,947	No
108A-20	Dr. Conrad Jones	Earth/Environmental Sciences	Southern University and A&M College - Baton Rouge	2 Years	Green Synthesis and Potential Application of Quantum Dots as Fuel Markers for Biofuels	$63,430.00	$48,022.00	$0.00	$111,452	No
109A-20	Prof. Devaiah Kambiranda	Agricultural Sciences	Southern University and A&M College - Baton Rouge	3 Years	Anti-Inflammatory Role of Ellagic Acid Metabolites in Lung Epithelial Cells Exposed to E-Cigarette Vapor Condensate	$56,558.00	$57,558.00	$58,558.00	$172,674	No
110A-20	Prof. Kathleen Ferris	Biological Sciences II	Tulane University	3 Years	How predictable is evolution? The genetic basis of parallel adaptation to elevation in North and South American yellow monkeyflowers	$86,329.00	$90,776.00	$22,551.00	$199,656	No
111A-20	Prof. Maria Galazo	Biological Sciences II	Tulane University	3 Years	Molecular mechanisms of cortical output neuron differentiation and fate reprogramming	$70,000.00	$65,000.00	$60,000.00	$195,000	No
112A-20	Dr. Alex Gunderson	Biological Sciences II	Tulane University	3 Years	Establishing a long-term study of adaptation to climatic variation in wild populations of native and invasive lizards in Louisiana	$70,873.00	$64,242.00	$64,354.00	$199,469	No
113A-20	Dr. Tai Ha	Mathematics	Tulane University	3 Years	Investigations of powers of homogeneous ideals	$57,087.00	$55,476.00	$56,392.00	$168,955	No
114A-20	Dr. Julie Markant	Social Sciences	Tulane University	3 Years	Mechanisms underlying the development of infants' biased selective attention to caregivers in complex visual scenes	$50,314.00	$50,668.00	$48,165.00	$149,147	No
115A-20	Dr. Mark Mondrinos	Biological Sciences I	Tulane University	3 Years	Defining Lineage-specific Transcriptomic Responses of Human Pulmonary Cells in Organotypic Microphysiological Models of Vaping-induced Lung Injury	$75,000.00	$75,000.00	$49,029.00	$199,029	No
116A-20	Dr. Diyar Talbayev	Physics/Astronomy	Tulane University	1 Year	Optical superoscillations in time domain for enhanced sensing and spectroscopy	$17,835.00	$0.00	$0.00	$17,835	No
117A-20	Prof. Jiang Wei	Physics/Astronomy	Tulane University	1 Year	Probing Topological Superconductivity in Iron Chalcogenides	$18,000.00	$0.00	$0.00	$18,000	No

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Proposal #	PI Name	Category	Institution	Duration	Project Title	Amount Requested				Confidential Info
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118A-20	Dr. Tewodros Godebo	Earth/Environmental Sciences	Tulane University Health Sciences Center	3 Years	Evaluating arsenic and metals contamination in private well waters, cereal grains, and soils: A health risk to Louisiana residents	$57,890.00	$63,499.00	$48,774.00	$170,163	No
119A-20	Dr. Hongbing Liu	Biological Sciences I	Tulane University Health Sciences Center	3 Years	Epigenetic Regulation of Six2 in Nephron Endowment	$74,291.00	$74,377.00	$74,465.00	$223,133	No
120A-20	Dr. Janet McCombs	Biological Sciences I	Tulane University Health Sciences Center	3 Years	Identifying mechanisms of host immune subversion by hypervirulent Klebsiella pneumoniae for discovery of new therapeutic targets	$44,753.00	$43,099.00	$41,454.00	$129,306	No
121A-20	Dr. Amy Mikolajewski	Social Sciences	Tulane University Health Sciences Center	3 Years	Physiological basis of early conduct problems in young children	$61,513.00	$65,896.00	$62,228.00	$189,637	No
122A-20	Dr. Kislay Parvatiyar	Biological Sciences I	Tulane University Health Sciences Center	3 Years	Defining the regulatory mechanism controlling type I interferon activation during viral infection	$46,690.00	$47,850.00	$49,045.00	$143,585	No
123A-20	Prof. Michalis Charilaou	Physics/Astronomy	University of Louisiana at Lafayette	3 Years	Modeling of topological defects and emergent magnetic states in nanostructures	$47,151.00	$46,964.00	$45,269.00	$139,384	No
124A-20	Dr. Beenish Chaudhry	Computer and Information Sciences	University of Louisiana at Lafayette	3 Years	Designing a Digital Health Intervention to Support Health Goals of Community-Dwelling Older Adults	$59,511.00	$46,320.00	$47,806.00	$153,637	No
125A-20	Dr. DILIP DEPAN	Engineering A [Chemical, Civil, Electrical, etc.]	University of Louisiana at Lafayette	3 Years	Single cell resolution level relationship between extra-cellular matrix stiffness and tumor regrowth	$56,398.00	$55,690.00	$55,515.00	$167,603	No
126A-20	Dr. Michele Feist	Social Sciences	University of Louisiana at Lafayette	2 Years	Systemic differences: Comparing semantic systems across languages	$49,837.00	$56,758.00	$0.00	$106,595	No
127A-20	Dr. Farzad Ferdowsi	Engineering A [Chemical, Civil, Electrical, etc.]	University of Louisiana at Lafayette	3 Years	A Preventive-Curative Approach to Enhance Power Systems Resilience	$71,748.00	$56,300.00	$38,456.00	$166,504	No
128A-20	Dr. Hayriye Gulbudak	Mathematics	University of Louisiana at Lafayette	3 Years	Modeling across-scale feedbacks of pathogen virulence, host immunity, and disease control	$53,367.00	$50,549.00	$50,435.00	$154,351	No
129A-20	Dr. Philip Hackney	Mathematics	University of Louisiana at Lafayette	3 Years	Homotopy coherent operads and their generalizations	$64,992.00	$60,275.00	$60,255.00	$185,522	No
130A-20	Dr. Aminul Islam	Computer and Information Sciences	University of Louisiana at Lafayette	3 Years	Semantics, Authenticity, Intent and Propagating Information Patterns in Natural Language Processing	$57,039.00	$53,476.00	$50,396.00	$160,911	No
131A-20	Dr. Manavi Jadhav	Physics/Astronomy	University of Louisiana at Lafayette	3 Years	Laboratory investigations of stardust	$74,265.00	$68,879.00	$56,736.00	$199,880	No
132A-20	Dr. Seonhee Jang	Engineering A [Chemical, Civil, Electrical, etc.]	University of Louisiana at Lafayette	3 Years	Dielectric failure and recovery mechanisms in flexible electronics	$50,208.00	$49,953.00	$49,014.00	$149,175	No
133A-20	Prof. Tolga Karsili	Earth/Environmental Sciences	University of Louisiana at Lafayette	3 Years	Modelling the Thermal and Photophysical Decay of Criegee Intermediates	$57,339.00	$42,920.00	$42,920.00	$143,179	No
134A-20	Prof. Sungsu Kim	Mathematics	University of Louisiana at Lafayette	3 Years	STATISTICAL MODELING AND APPLICATIONS FOR DIRECTIONAL DATA	$39,511.00	$43,861.00	$41,808.00	$125,180	No
135A-20	Dr. Robert Michael	Social Sciences	University of Louisiana at Lafayette	1 Year	SMART: Strengthening Mental Abilities through Relational Training	$19,938.00	$0.00	$0.00	$19,938	No
136A-20	Dr. Robert Miller	Earth/Environmental Sciences	University of Louisiana at Lafayette	3 Years	Modeling the Effects of Regional Flood Mitigation on Water Quality Dynamics in Tidal Watersheds	$54,032.00	$44,138.00	$43,359.00	$141,529	No
137A-20	Dr. M. Hassan Najafi	Computer and Information Sciences	University of Louisiana at Lafayette	3 Years	Deterministic Bit-Stream Processing for Energy-Efficient Machine Learning Systems	$48,310.00	$46,912.00	$45,545.00	$140,767	No
138A-20	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	$66,596.00	$64,049.00	$54,511.00	$185,156	No
139A-20	Dr. Emmanuel Revellame	Engineering A [Chemical, Civil, Electrical, etc.]	University of Louisiana at Lafayette	1 Year	Evaluation of a Non-ionic Surfactant as Solvent for Extractive Butyric Acid Fermentation	$19,875.00	$0.00	$0.00	$19,875	No
140A-20	Dr. Yongli Sang	Mathematics	University of Louisiana at Lafayette	3 Years	High dimensional jackknife empirical likelihood approach via energy distance	$46,220.00	$45,695.00	$45,195.00	$137,110	No
141A-20	Prof. Karen Smith	Biological Sciences II	University of Louisiana at Lafayette	1 Year	The Endogenous Opioid System in Self Injury	$15,288.00	$0.00	$0.00	$15,288	No
142A-20	Dr. Amy Veprauskas	Mathematics	University of Louisiana at Lafayette	3 Years	Understanding species persistence under reoccurring environmental disturbances	$47,296.00	$44,899.00	$42,730.00	$134,925	No

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143A-20	Dr. Xiang-Sheng Wang	Mathematics	University of Louisiana at Lafayette	3 Years	Mathematical modeling and multiple-scale analysis in cellular dynamics	$48,180.00	$46,875.00	$45,596.00	$140,651	No
144A-20	Dr. Peng Yin	Engineering A [Chemical, Civil, Electrical, etc.]	University of Louisiana at Lafayette	1 Year	Investigation of Acoustic Agglomeration of Fine Inhalable Particulate Matter with Binding Droplet Injection	$16,489.00	$0.00	$0.00	$16,489	No
145A-20	Dr. Pengfei Zhang	Engineering A [Chemical, Civil, Electrical, etc.]	University of Louisiana at Lafayette	3 Years	Soft Material with Self-Healing/Shape-Memory Ability and Its Evaluation Methods	$57,371.00	$54,364.00	$51,990.00	$163,725	No
146A-20	Dr. Georgios Matthaiolampakis	Biological Sciences I	University of Louisiana at Monroe	3 Years	Pathway and efficacy analysis of novel miR-based therapeutics	$55,000.00	$47,500.00	$36,000.00	$138,500	No
147A-20	Dr. Siva Murru	Biological Sciences I	University of Louisiana at Monroe	3 Years	Design, Synthesis, and Evaluation of Anti-Cancer and Anti-Inflammatory Activities of Pyrazole and Phthalazinone Derivatives	$44,082.00	$46,642.00	$44,836.00	$135,560	No
148A-20	Dr. Catherine Newman	Biological Sciences II	University of Louisiana at Monroe	1 Year	Phylogenetics and genome evolution of woodland salamanders [genus Plethodon] in the US Coastal Plain	$20,000.00	$0.00	$0.00	$20,000	No
149A-20	Dr. Matthew Overturf	Biological Sciences II	University of Louisiana at Monroe	2 Years	Development of Adverse Outcome Pathways for Progesterone Receptor Agonism Leading to Reproductive Failure in Fish	$47,000.00	$42,000.00	$0.00	$89,000	No
150A-20	Dr. Ebrahim Amiri	Engineering A [Chemical, Civil, Electrical, etc.]	University of New Orleans	3 Years	The emergence of dual-pole interior magnet synchronous machines	$43,676.00	$44,429.00	$48,213.00	$136,318	No
151A-20	Dr. Satish Bastola	Earth/Environmental Sciences	University of New Orleans	3 Years	NUTRIENT LIMITATION AND TEMPERATURE ACCLIMATION PARAMETERIZATION IN DYNAMIC ECOHYDROLOGICAL MODELS USING META- STUDIES AND DATA ASSIMILATION.	$53,581.00	$55,636.00	$55,601.00	$164,818	No
152A-20	Dr. Sarah Black	Social Sciences	University of New Orleans	3 Years	Physiological and behavioral attunement in depressed mother-child dyads during middle childhood	$57,481.00	$56,756.00	$54,197.00	$168,434	No
153A-20	Dr. Kelly Boyle	Biological Sciences II	University of New Orleans	3 Years	Anthropogenic noise impacts on acoustic communication of sound producing fishes of the northern Gulf of Mexico	$71,476.00	$68,396.00	$43,500.00	$183,372	No
154A-20	Prof. Uttam Chakravarty	Biological Sciences II	University of New Orleans	3 Years	An Investigation on the Detection Technologies of Synthetic Opioids	$60,184.00	$60,985.00	$61,819.00	$182,988	No
155A-20	Dr. Gianna Cothren	Engineering A [Chemical, Civil, Electrical, etc.]	University of New Orleans	3 Years	Effective Imperviousness Optimization with sUAS for Stormwater Model Calibration	$68,812.00	$66,752.00	$64,411.00	$199,975	No
156A-20	Dr. Traci Cox	Biological Sciences II	University of New Orleans	3 Years	Climate change effects on submerged aquatic vegetation early life history stages	$64,610.00	$59,561.00	$51,995.00	$176,166	No
157A-20	Dr. Farjana Eishita	Computer and Information Sciences	University of New Orleans	3 Years	Intervention of Serious Games to ameliorate the aptitude of Cognitive Behavioral Therapy [CBT]: A gamified approach to leverage the assorted forms of mental disorder	$55,294.00	$54,136.00	$55,741.00	$165,171	No
158A-20	Dr. Malay Ghose Hajra	Engineering A [Chemical, Civil, Electrical, etc.]	University of New Orleans	3 Years	Integrated urban watershed modeling and flood prediction using advanced sensors and real-time monitoring	$51,153.00	$49,855.00	$50,079.00	$151,087	No
159A-20	Dr. Md Hoque	Computer and Information Sciences	University of New Orleans	1 Year	Advanced Paradigm to Neutralize Mutating Germs using Disorder Ligands	$19,990.00	$0.00	$0.00	$19,990	No
160A-20	Dr. Elizabeth Jeffers	Social Sciences	University of New Orleans	3 Years	Withdrawn by Instiution	$65,549.00	$65,609.00	$67,191.00	$198,349	No
161A-20	Dr. Yuliya Kotelnikova	Social Sciences	University of New Orleans	3 Years	Methodological Issues in Examining the Nature and Structure of Child Temperament	$60,124.00	$74,583.00	$41,321.00	$176,028	No
162A-20	Prof. X. Rong Li	Engineering A [Chemical, Civil, Electrical, etc.]	University of New Orleans	3 Years	Development of a General Performance-Evaluation Approach	$56,243.00	$58,810.00	$58,611.00	$173,664	No
163A-20	Prof. Robert Mahon	Earth/Environmental Sciences	University of New Orleans	3 Years	3-dimensional sediment transport dynamics over river dunes	$61,543.00	$60,071.00	$57,280.00	$178,894	No
164A-20	Dr. Abdullah Nur	Computer and Information Sciences	University of New Orleans	3 Years	Collaborative Topological Defense Against DDoS Attacks	$49,544.00	$50,386.00	$50,991.00	$150,921	No
165A-20	Dr. Benjamin Samuel	Computer and Information Sciences	University of New Orleans	3 Years	Measuring Shared Authorship in Interactive Story Worlds	$52,020.00	$53,665.00	$55,080.00	$160,765	No

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166A-20	Dr. Krishna Phani Vadrevu	Computer and Information Sciences	University of New Orleans	3 Years	A multi-pronged approach to understand and defend against technical support scams	$54,194.00	$51,736.00	$52,341.00	$158,271	No
167A-20	Dr. Minhaz Zibran	Computer and Information Sciences	University of New Orleans	2 Years	MineBug: Mining Bug-fix Patterns for Secure and Reliable Software	$47,481.00	$48,310.00	$0.00	$95,791	No
168A-20	Prof. Phoebe Zito	Earth/Environmental Sciences	University of New Orleans	3 Years	Interactions and physiochemical processes of nanoparticles in aquatic environments	$50,500.00	$50,500.00	$49,250.00	$150,250	No
169A-20	Dr. Morewell Gasseller	Earth/Environmental Sciences	Xavier University	3 Years	Characterization of Ambient Atmospheric Aerosol particles by Atomic Force Microscopy	$58,861.00	$52,438.00	$51,143.00	$162,442	No

Total Number of Proposals submitted	169
Total Funds Requested for First Year	$8,348,464
Total Funds Requested for Second Year	$7,151,777
Total Funds Requested for Third Year	$5,648,182
Total Funds Requested	$21,148,423