

**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 (RCS)**

FY 2016-17 COMPETITION

March 2017

REPORT OF THE FINAL PANEL

BOARD OF REGENTS SUPPORT FUND RESEARCH COMPETITIVENESS SUBPROGRAM FY 2016-17

BACKGROUND INFORMATION

One hundred fifty-five research proposals requesting a total of \$7,335,489 in first-year funds were submitted for funding consideration in fiscal year (FY) 2016-17 to the Research Competitiveness Subprogram (RCS) of the Board of Regents Support Fund (BoRSF) R & D Program. Seven disciplines were eligible, including biological sciences I, biological sciences II, chemistry, computer and information sciences, earth and environmental sciences, engineering "B" (i.e., industrial, materials, mechanical, and other), and health and medical sciences.

THE REVIEW PROCESS

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

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

In Phase I of the review process the one hundred fifty-five proposals were assigned to seven subject-area panels, for funding consideration in FY 2016-17. 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 2016-17 R & D Request for Proposals (RFP), panel members worked individually and then collaboratively by telephone and email to decide which proposals in their subject area met all four eligibility requirements (i.e., the applicant and the proposal fit the EPSCoR mold; the proposal contained a significant research component; the proposal had the potential to make fundamental [basic] research contributions; and the research topic fit one of the seven eligible disciplines as defined in the RFP). In this phase of the review process, each subject-area panel member acted as "primary discussant" for an assigned portion of the proposals and completed an in-depth consensus critique form for each of his/her assigned proposals after discussing its relative merits and shortcomings with the other panel members. Through a telephone conference, the subject-area panel members jointly ranked the proposals in the order in which they believed that the proposals should be funded. The panel carefully scrutinized the budgets of those proposals ranked high enough to merit serious consideration for funding and recommended modifications where appropriate.

¹RCS is modeled after the National Science Foundation's Experimental Program to Stimulate Competitive Research (EPSCoR). NSF EPSCoR programs currently exist in 31 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 10, 2017, 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.

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

The Panel was informed that approximately \$1.35M had been budgeted to fund the first year of work of the RCS projects, though reductions were likely due to low revenues in the Support Fund. Utilizing the criteria described previously, the Panel recommended thirty-four proposals, totaling \$1,596,283 in first-year funds, which it strongly believed were worthy of support and placed them in the “Priority One” category in **Appendix A**. The first fourteen proposals in Appendix A are ranked “1” (i.e., first). In the Panel’s opinion, these proposals are of nearly equal merit, and the order in which these proposals are listed is arbitrary. Proposals ranked fifteen through thirty-four are listed in descending order of merit for funding. It should be noted that although the Panel was informed that \$1.35M was available for funding, the Panel recommended additional proposals in the event an 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 1-27. However, should additional funds become available the panel recommends that the Board of Regents fund in rank order as many additional Priority One proposals as possible.

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

Several other highly meritorious proposals ranked Priority One by the subject-area panels and considered at the final panel meeting but, for a variety of reasons, not recommended for 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 the decision to resubmit a proposal to this program.

Appendix C lists those proposals that were ranked Priority Two by the subject-area panels but not recommended for funding by the final panel. In general, the proposals listed in **Appendix C** were considered scientifically sound, but possessed one or more problems that precluded a recommendation for funding, such as poor or unconvincing identification of barriers to national competitiveness; a scope of work either too broad or poorly defined; and/or research proposed in an area in which federal dollars are not currently expended.

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

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

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

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

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

FINAL PANEL COMMENTS AND RECOMMENDATIONS

The Research Competitiveness Subprogram of the Board of Regents Support Fund is designed to help those researchers in Louisiana who have strong potential to become nationally competitive for research funding from federal granting agencies. The Panel compliments the Board of Regents and the State of Louisiana on the establishment of such a quality program. It is the consensus of the Panel that this program has helped to establish a number of principal investigators who, in turn, have been able to 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 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 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 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. 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 marginally changing research directions. It should also be noted that some highly ranked proposals were submitted by scientists who had already received three years of BoRSF R & D support. In those cases where three years of previous BoRSF R & D support did not enable the PI to become nationally competitive, the Panel found it difficult to recommend or justify additional support when so many other equally worthy applicants had yet to receive BoRSF R & D funds. In the Panel's view, three years of BoRSF R & D support should enable a scientist to become nationally competitive, if the research area is capable of attracting support from national funding agencies. All proposals recommended for funding by the Panel are believed to have strong potential for overcoming the barriers that have prevented the submitting scientists from achieving national competitiveness.

To the Board of Regents:

1. Limitations on Salary Requests as applicable and Requests for Post-Doctoral Researchers. The Panel strongly believes that the investigators funded through the RCS should be involved actively (i.e., play a "hands-on" role) in their research. For this reason, some requests for post-doctoral researchers were declined when budgets were reviewed. In most cases the Panel recommended Board funding for only one month's summer salary for principal investigators. The Panel believes that the institutions should be strongly encouraged to provide release time to their investigators. The institutional provision of release time provides tangible evidence to reviewers and the Board that the institution is committed to the research endeavors of its investigators and frees up Board funds that would otherwise be committed to salary support, thereby helping to ensure that the maximum number of excellent projects will be funded.
2. Limitations on Overall Funding Requests. In no year of the RCS's operation have the funds available sufficed to fund all proposals worthy of support. The Panel must cut proposal budgets significantly each year to ensure that the maximum possible number of worthy projects is funded. Therefore, the Panel strongly recommends that the Board maintain the existing overall cap on the amount of funds that may be requested (\$200,000 over a three-year period or \$20,000 for a one-year period).

APPENDIX A

RCS PROPOSALS HIGHLY RECOMMENDED FOR FUNDING (PRIORITY ONE)

Rank	Proposal		Recommended BoRSF	Recommended BoRSF	Recommended BoRSF
	No.	Institution	<u>1st Year Funds</u>	<u>2nd Year Funds</u>	<u>3rd Year Funds</u>
1	075A	LA-TECH	\$44,435	\$43,635	\$43,635
1	009A	LSU A&M	\$56,850	\$56,850	\$56,475
1	153A	UNO	\$53,235	\$51,086	\$48,041
1	092A	NICHOLLS	\$41,109	\$39,398	\$19,463
1	023A	LSU A&M	\$58,638	\$49,863	\$39,684
1	140A	ULL	\$40,461	\$40,461	\$40,461
1	122A	ULL	\$42,739	\$38,993	\$38,993
1	114A	TUHSC	\$70,797	\$66,693	\$57,974
1	061A	LSU A&M	\$53,250	\$42,250	\$39,250
1	025A	LSU A&M	\$51,750	\$50,750	\$49,790
1	072A	LA-TECH	\$67,930	\$56,030	\$54,180
1	109A	TUHSC	\$47,851	\$42,851	\$38,351
1	032A	LSU A&M	\$20,000	\$-----	\$-----
1	057A	LSU A&M	\$48,200	\$44,600	\$42,250
15	148A	UNO	\$44,919	\$44,919	\$44,919
16	113A	TUHSC	\$20,000	\$-----	\$-----
17	055A	LSU A&M	\$53,000	\$47,000	\$47,000
18	123A	ULL	\$42,774	\$35,606	\$30,300
19	047A	LSU A&M	\$55,000	\$48,750	\$45,000
20	102A	TULANE	\$51,650	\$50,750	\$1,500
21	039A	LSU A&M	\$60,750	\$59,127	\$56,250

APPENDIX A (continued)**RCS PROPOSALS HIGHLY RECOMMENDED FOR FUNDING (PRIORITY ONE)**

22	006A	LSU-AG	\$20,000	\$-----	\$-----
23	134A	ULL	\$50,334	\$29,256	\$28,300
24	149A	UNO	\$43,986	\$40,736	\$37,236
25	139A	ULL	\$48,500	\$48,500	\$48,500
26	108A	TULANE	\$49,333	\$48,233	\$-----
27*	101A	TULANE	\$55,943	\$53,443	\$50,443
28	128A	ULL	\$59,217	\$57,586	\$55,441
29	093A	NICHOLLS	\$19,600	\$-----	\$-----
30	050A	LSU A&M	\$56,749	\$52,749	\$51,749
31	125A	ULL	\$19,050	\$-----	\$-----
32	001A	GRAMBLING	\$42,306	\$40,306	\$40,306
33	151A	UNO	\$49,314	\$49,314	\$49,314
34	053A	LSU A&M	\$56,613	\$56,403	\$55,715
TOTALS			<u>\$1,596,283</u>	<u>\$1,386,138</u>	<u>\$1,210,520</u>

*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 (5)**

011A 034A 046A 059A 067A

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 2017.

APPENDIX C**MERITORIOUS PROPOSALS RANKED PRIORITY TWO
BY THE SUBJECT-AREA PANELS AND CONSIDERED BY THE FINAL PANEL
BUT NOT RECOMMENDED FOR FUNDING (40)**

005A	035A	082A	105A
010A	037A	084A	110A
013A	041A	085A	115A
014A	045A	086A	117A
017A	051A	090A	120A
018A	063A	094A	131A
026A	064A	097A	135A
027A	066A	098A	143A
028A	070A	103A	145A
033A	071A	104A	152A

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 2017.

APPENDIX D

**PROPOSALS RANKED PRIORITY THREE OR DECLARED INELIGIBLE/WITHDRAWN (*)
BY THE SUBJECT-AREA PANELS AND NOT RECOMMENDED FOR FUNDING (76)**

002A	031A	065A	091A	127A	155A
003A	036A	068A	095A	129A	-----
004A	038A	069A	096A	130A	-----
007A	040A	073A	099A	132A	-----
008A	042A	074A	100A	133A	-----
012A	043A	076A	106A	136A	-----
015A	044A	077A	107A	137A	-----
016A	048A	078A	111A	138A	-----
019A	049A	079A	112A	141A	-----
020A	052A	080A	116A	142A	-----
021A	054A	081A	118A	144A	-----
022A	056A	083A	119A	146A	-----
024A	058A	087A	121A	147A	-----
029A	060A	088A	124A	150A	-----
030A	062A	089A	126A	154A	-----

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 2017.

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

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

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

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

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

Appendix E (continued):

PROPOSAL: 075A-17

RANK: 1

TITLE: Deep Eutectic Solvents for Deconstruction of Rice Hulls and Sugarcane Bagasse

INSTITUTION: Louisiana Tech University

PRINCIPAL INVESTIGATOR: Joan Lynam, Ph.D.

COMMENTS: Finding an environmentally friendly and economically feasible method to deconstruct non-food byproducts that result from harvesting food crops is a major challenge in the field of biomass conversion. The US Department of Energy's Renewable Fuel Standard targets 36 billion gallons of renewable fuel to be blended into transportation fuel by 2022. Specifically, DOE highlights using cellulosic biofuels derived from non-food-based renewable feed-stocks. However, very little cellulosic ethanol has been produced to date, making such biomass conversion a national priority.

Traditional methods for making cellulose-rich pulp require high pressures and strong bases or acids. Another obstacle is the low density of biomass, which necessitates the transport of large volumes to distant bio-refineries. The objective of this proposal is to develop an environmentally friendly, economically feasible method to deconstruct non-food byproducts that result from harvesting food crops, while also reducing the volume of material that must be transported to bio-refineries for conversion. Deep eutectic solvents (DES) have shown to be very promising in this regard. DES are inexpensive, relatively non-volatile, non-flammable, and non-toxic liquids that are biocompatible and biodegradable. At present, no data are available for the use of DES on secondary agricultural residue. The PI proposes to investigate these solvents' effectiveness on rice hulls and sugarcane bagasse deconstruction and their viability for a commercial process, thus establishing the PI as an emerging leader in the area of cellulosic biofuel research.

It is recommended that the proposed budget be reduced to provide undergraduate student support of \$1,000, for a year one budget of \$44,435. Budgets of \$43,635 that provide limited travel support of \$1,500 are recommended for year two and year three.

Year 1: \$44,435

Year 2: \$43,635

Year 3: \$43,635

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

Appendix E (continued):

PROPOSAL: 009A-17

RANK: 1

TITLE: Nanopatterning Electrochemical Materials via Block Copolymer Lithography

INSTITUTION: Louisiana State University and A&M College

PRINCIPAL INVESTIGATOR: Christopher Arges, Ph.D.

COMMENTS: Block copolymer lithography is a low-cost nano-manufacturing platform capable of generating uniform, periodic feature sizes of 2 to 50 nm over large areas with varying geometries (e.g., line or dot patterns). Research in the field is mature for semiconductor materials manufacturing, but the platform has not been extended for patterning materials used in energy storage and water treatment. Nanopatterning electrochemical materials, like electrode surfaces and polymer electrolyte membranes, will lead to large electrode-electrolyte interfacial areas capable of greater charge storage and realizing smaller charge-transfer resistances. In particular, the charge-transfer resistances manifest themselves as irreversible thermodynamic losses in electrochemical technologies that purify water and store and convert energy.

The PI proposes to use self-assembled and perpendicularly aligned poly(styrene-block-methylmethacrylate) or poly(styrene-*block*-2-vinyl pyridine) block copolymers to fabricate nanopatterned (i) graphitic materials for electrochemical supercapacitors, (ii) working electrodes for electrochemical carbon dioxide reduction, and (iii) polymer electrolyte membranes for fuel cells, electrolyzers, and membrane capacitive deionization (used in water desalination). Furthermore, the block copolymer lithography platform is conducive for systematically understanding how the salient structural feature sizes and geometries of electrochemical materials influence functionality (e.g., redox kinetics and multi-component species transport). The proposed research could potentially deliver a unique and powerful fabrication scheme capable of interrogating kinetic and transport phenomena occurring in nanostructured electrochemical materials with unprecedented reliability and clarity.

The PI has (3) pending proposals:

- National Security Technology Accelerator – entitled “Energy Recovery from Waste Heat Using Flexible, Solid-State Electrochemical Devices Featuring Thin Film, Single Ion Conducting Polymer Electrolytes Separated by Interdigitated Electrodes” in the amount of \$389,699 for a 3-year period.
- NSF – entitled “Block Copolymer Lithography for Nanopatterning Electrode and Polymer Electrolyte Materials for Electrochemical Devices” in the amount of \$330,818 for the period 2/1/2017 – 1/30/2020.
- NSF – entitled “Nanobipolar Junction Interfaces for Ion-Exchange Membrane and Resin Materials for Electrochemical Systems” in the amount of \$313,818 for the period 5/1/2017 – 4/30/2020.

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

It is recommended that the proposed budget be reduced to provide limited travel support of \$1,500 for a year one budget of \$56,850. It is recommended that the project be funded at the level requested for year two and year three, i.e., \$56,850 and \$56,475, respectively.

Year 1: \$56,850

Year 2: \$56,850

Year 3: \$56,475

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

Appendix E (continued):

PROPOSAL: 153A-17

RANK: 1

TITLE: Nanoparticle Additives for 3D Printing of Multifunctional Composites

INSTITUTION: University of New Orleans

PRINCIPAL INVESTIGATOR: Damon Smith, Ph.D.

COMMENTS: Fused filament fabrication (FFF) is a 3D printing technique that uses thermoplastic filaments as feedstock for layer-by-layer assembly of parts and products. The proposed research will focus on the development of nanoparticle additives for extrusion of filaments with tunable multifunctional properties compatible with currently available printers. FFF has become the most popular 3D printing platform for businesses, universities, and home consumers due to the wide availability of inexpensive systems in recent years. Despite its popularity, unfavorable mechanical properties limit printed objects to non-load bearing applications and more complex electronic and optoelectronic devices are not feasible. The PI will explore the extrusion of thermoplastic filaments infused with high-strength and flexible semiconductor nanowires that can impart multifunctional properties in the same manner that dyes are added to extrude filaments of various colors. By tuning the nanowire composition, morphology, and surface passivation, filaments can be fabricated with optimized mechanical and optical properties. Towards these goals, the PI will address: (1) the effect of nanowire morphology and organic coatings on mixing and distribution of extruded filaments; (2) analysis of the effects of nanowire morphology and process parameters on shear-induced alignment; and (3) analysis of the effects of nanowire composition, morphology, coatings, and distribution on mechanical and optical properties of 3D printed specimens. The proposed research will provide the groundwork to enable the PI to pursue federal funding to advance the area of additive manufacturing of advanced materials and devices.

It is recommended that the proposed budget be reduced to provide undergraduate student support of \$1,000 and delete other expenses, for a year one budget of \$53,235. Budgets of \$51,086 and \$48,041 are recommended for year two and year three, respectively.

Year 1: \$53,235

Year 2: \$51,086

Year 3: \$48,041

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

Appendix E (continued):

PROPOSAL: 092A-17

RANK: 1

TITLE: Multi-Decade Scale Effects of Nutrient Enrichment on Soil Carbon Dynamics in Coastal Wetlands

INSTITUTION: Nicholls State University

PRINCIPAL INVESTIGATOR: Sean Graham, Ph.D.

COMMENTS: Anthropogenic modification of nutrient availability is among the most important pollution sources currently impacting estuarine environments around the world. In coastal wetlands, the effects of nutrient enrichment on rates of soil organic matter accumulation have specific implications for the capacity of these systems to keep pace with sea level rise and continue to provide important ecological services to coastal communities. However, establishing critical links between nutrient enrichment impacts on ecosystems and sustainability is currently constrained by limited long-term data, with definitive responses in the soil environment particularly lacking. Thus, identifying the long-term effects of eutrophication on stability regulating functional processes such as below-ground wetland plant growth and decay patterns is of importance from ecological, economics, and social perspectives worldwide. The proposed research will continue two long-term marsh fertilization experiments, among the longest to date, and thus offers a unique opportunity to investigate the direct effects of nutrient enrichment on ecosystem function and stability over a multi-decade timescale. The PI will (1) identify long-term (18-year) effects of enhanced nutrient supply on below-ground plant biomass, soil organic matter distribution, and decomposition as related to substrate quality and microbial activity, and (2) identify the long-term (21-year) effects of nutrient enrichment on organic and mineral matter accumulation, soil accretion and shallow subsidence, and ultimately ecosystem stability as defined by the rate at which soil surface elevations change. These experiments will provide invaluable insights into the carbon dynamics and future sustainability of coastal wetlands experiencing chronic nutrient enrichment worldwide.

It is recommended that the proposed budget be reduced to provide support for one graduate research assistant (GRA), rather than two GRAs requested, \$1,377 FICA deleted, undergraduate support of \$1,000, limited travel support of \$5,220 (\$3,720 travel to test site and \$1,500 travel to a conference) and limited supplies charges of \$14,000, for a year one budget of \$41,109. A budget of \$39,398 is recommended that provides limited travel support of \$3,389 (\$1,889 travel to test site and \$1,500 travel to a conference) for year two. A budget of \$19,463 is recommended that provides limited travel support of \$2,917 (\$1,417 travel to test site and \$1,500 travel to a conference) for year three.

Year 1: \$41,109

Year 2: \$39,398

Year 3: \$19,463

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

Appendix E (continued):

PROPOSAL: 023A-17

RANK: 1

TITLE: Clinical Feasibility of Transcranial Direct Current Stimulation [tDCS] with Standard Aphasia Therapy

INSTITUTION: Louisiana State University and A&M College

PRINCIPAL INVESTIGATOR: Ellen Duncan, Ph.D.

COMMENTS: Language is one of our most fundamentally human skills. However, for approximately two million Americans with aphasia, this skill is impaired, often with devastating effects on social and vocational roles. The proposed research is particularly crucial in Louisiana, which has the lowest regional awareness of aphasia despite its status as a “stroke belt” state. Behavioral therapy alone offers limited gains, but there is promise for greater improvement through the combination of therapy with noninvasive brain stimulation, such as transcranial direct current stimulation (tDCS). tDCS has been successfully paired with aphasia therapy to enhance treatment effects in several small studies and clinical trials. However, important differences between these studies and standard aphasia therapy may impede direct translation. The overall objectives of the proposed research are (i) to determine whether such intervention, tDCS, can practically and effectively be combined with existing clinical infrastructure, and (ii) to delineate the neural processes (both functional and structural) underlying observed behavioral changes. The PI’s long-term goal is to identify key characteristics of adaptive neuroplasticity in aphasia in order to enhance treatment outcomes through biologically based interventions with real-world applications.

It is recommended that the proposed budget be reduced to provide one-month summer salary including fringe benefits for the PI, rather than the 2-months requested, and limited travel support of \$1,500 for a year one budget of \$58,638. Budgets of \$49,863 and \$39,684 are recommended for year two and year three, respectively.

Year 1: \$58,638

Year 2: \$49,863

Year 3: \$39,684

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

Appendix E (continued):

PROPOSAL: 140A-17

RANK: 1

TITLE: Investigating Reaction Mechanism of Water-Gas Shift Reaction on Mesoporous Ceria-Based Catalysts

INSTITUTION: University of Louisiana at Lafayette

PRINCIPAL INVESTIGATOR: Hui Yan, Ph.D.

COMMENTS: The water-gas shift reaction (WGSR) is a critical process for industry to achieve desired $H_2/CO/CO_2$ ratios in syngas. Industrial WGSR involves high-temperature (350-450 °C) and low-temperature (200-300 °C) stages using corresponding catalysts. Low-temperature WGSR catalysts such as Pt/ceria are preferred for WGSR due to WGSR's exothermic property. Mesoporous ceria-based catalysts are proposed to be supreme low-temperature WGSR catalysts due to their high surface area and pore size resulting in a high density of active sites for WGSR. Active sites and reaction mechanisms of WGSR on mesoporous ceria-based catalysts at conditions close to industrial operation (*operando*) need to be investigated and discussed for a better design of supreme catalysts with high activity and selectivity. The objective of the proposed research is to gain a better understanding of the mechanisms of the water-gas shift reaction on mesoporous ceria-based catalysts under *operando* conditions. The PI's long-term goal is to understand surface sciences at the molecular level by fabricating functional nanomaterials and investigating their role in catalysis. The development of high-quality preliminary data will support the PI's future submission for federal funding.

It is recommended that the proposed budget be reduced to provide undergraduate student support of \$1,000, for a year one budget of \$40,461. Similar budgets of \$40,461 that eliminate \$900 in publication charges are recommended for year two and year three. The PI should note that Support Fund money requested for successive years of a research project should not increase.

Year 1: \$40,461

Year 2: \$40,461

Year 3: \$40,461

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

Appendix E (continued):

PROPOSAL: 122A-17

RANK: 1

TITLE: Dynamic Access Control in IoT Deployments

INSTITUTION: University of Louisiana at Lafayette

PRINCIPAL INVESTIGATOR: Khalid Elgazzar, Ph.D.

COMMENTS: In its 2015 privacy report, the Federal Trade Commission (FTC) identified privacy as a core requirement in the Internet of Things (IoT) and a major concern that inhibits widespread user adoption. The ultimate source of user discomfort is the lack of control over personal raw data that is directly streamed from sensors to the outside world. Conventional access control techniques are generally static and fall short of satisfying the unique requirements of IoT deployments. The proposed research will address the major access control and privacy challenges present in IoT environments. The PI will study these challenges in-depth and develop an IoT-oriented access control technique that caters to user privacy through dynamically changing access permissions based on various context information. In addition to preventing non-authorized access, the proposed research will also limit access permission to the minimum requirements of the user's current intent of access to prevent unintended harm from actions taken by authorized users. The core concept of the research design is to place users in central control of the fidelity and distribution of their data in IoT scenarios.

The PI has (2) pending proposals:

- US Army Research Laboratory – entitled “An Adaptive Service Oriented IoT Framework for Risk and Time-Critical Mission Management” in the amount of \$333,000 for the period 6/1/2017 – 6/30/2018.
- NSF – entitled “A Community-Centric Intelligent IoT Framework” in the amount of \$1.2 M for the period 6/1/2017 – 6/30/2021.

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

It is recommended that the proposed budget be reduced to provide support for one graduate research assistant (GRA), rather than two GRAs requested, undergraduate support of \$1,000, limited travel support of \$1,500, limited supplies charges of \$4,010, and other expense charges deleted for a year one budget of \$42,739. Budgets of \$38,993 are recommended for year two and year three.

Year 1: \$42,739

Year 2: \$38,993

Year 3: \$38,993

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

Appendix E (continued):

PROPOSAL: 114A-17

RANK: 1

TITLE: Targeted Kinase Inhibition as a Novel Therapy for an Incurable Childhood Cancer

INSTITUTION: Tulane University Health Sciences Center

PRINCIPAL INVESTIGATOR: Sean Lee, Ph.D.

COMMENTS: Rational-based target-specific drugs have shown great promise in the clinic due to their high specificity and reduced cytotoxicity. Desmoplastic Small Round Cell Tumor (DSRCT) is caused by a recurrent chromosomal translocation that creates a chimeric transcription factor, EWS-WT1, which initiates and drives tumorigenesis. Despite the presence of a tumor-specific target, drugs that inhibit EWS-WT1 have not been developed since oncogenic transcription factors are considered undruggable. DSRCT is a highly lethal tumor (85% mortality) affecting mostly children and young adults despite an aggressive multimodal therapy. Thus, rational-based targeted therapy is urgently needed to treat DSRCT, but not much is known about vulnerable oncogenic targets. The goal of this proposal is to identify vulnerable oncogenic targets and demonstrate that inhibiting these targets impairs tumor cell growth. To achieve this, the PI has performed extensive gene expression profiling analysis and identified a number of potential targets in DSRCT that are amenable for therapy. To demonstrate the potential therapeutic effects of inhibiting these targets in DSRCT, the PI will (1) investigate the oncogenic role of SIK1 kinase and its downstream pathways in DSRCT cells, and (2) determine the role of BLK in TIC formation. Successful completion of the proposed research will allow the PI to submit a competitive NIH-R01 application that will have addressed major barriers.

The PI has (1) pending proposal:

- NIH-R01 – entitled “An Integrative Approach to Identify Novel Druggable Targets and Therapeutic Agents for an Incurable Cancer” requested to start 7/1/2016 in the amount of \$1,964,685.

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., \$70,797 for year one. A budget of \$66,693 is recommended for year two. A budget of \$57,974 that eliminates printing charges of \$2,500 is recommended for year three.

Year 1: \$70,797

Year 2: \$66,693

Year 3: \$57,974

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

Appendix E (continued):

PROPOSAL: 061A-17

RANK: 1

TITLE: Development of Novel Battery Systems to Harvest Salinity Gradient Energy Between Seawater and River Water

INSTITUTION: Louisiana State University and A&M College

PRINCIPAL INVESTIGATOR: Xiuping Zhu, Ph.D.

COMMENTS: When two waters of different salt concentrations (e.g., seawater and river water) mix, a release of free energy occurs, driven by the difference in chemical potentials between them, called salinity gradient (SG) energy. The SG energy that naturally exists between seawater and river water has emerged as an attractive renewable resource for clean energy production. The extractable energy from the estuarial salinity gradient is estimated to be 625 TWh per year in the world, equivalent to 3% of global electricity consumption. Several approaches have been proposed to capture SG energy, including pressure-retarded osmosis (PRO), reverse electrodialysis (RED), capacitive mixing (CapMix), and hydrogel expansion (Hex). However, there are some limits for these technologies. The aim of the proposed research is to develop novel battery systems to harvest SG energy from seawater and river water. The battery systems will work based on alternating Na^+ intercalulation with the cathode in seawater and deintercalulation with the anode in river water, and thus are called Na-ion salinity gradient (NaSG) batteries. The working principle of NaSG batteries is different from previous technologies for SG energy harvest, and could work more efficiently considering the fast electrode reaction in Na-ion batteries. If successful, the research could have important implications for global energy production using environmentally friendly technologies.

It is recommended that the proposed budget be reduced to provide undergraduate student support of \$1,000, for a year one budget of \$53,250. Budgets of \$42,250 and \$39,250 are recommended for year two and year three, respectively.

Year 1: \$53,250

Year 2: \$42,250

Year 3: \$39,250

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

Appendix E (continued):

PROPOSAL: 025A-17

RANK: 1

TITLE: Dipole-Photonic-Plasmonic Resonance Energy Transfer [DiP-PRET] for Injection Seeded Amplification

INSTITUTION: Louisiana State University and A&M College

PRINCIPAL INVESTIGATOR: Manas Ranjan Gartia, Ph.D.

COMMENTS: The overall goal of the proposed research is to develop a new label-free optical biosensor and detection system using integration of photonic microspheres and plasmonic structures. A new photon energy transfer principle called Dipole-Photonic-Plasmonic Resonance Energy Transfer (DiP-PRET) will be studied using the proposed system. Multiplexed sensing will be achieved by integrating thousands of microsphere lasers in a lithographically patterned chip made of silicon core with plasmonic metal on top, and integrated microfluidic flow cells. The proposed system will produce emission line-width on an order-of-magnitude less than the typical fluorescence emission enabling order-of-magnitude higher sensitivity compared to state-of-the-art fluorescence detection. The proposed system has application in identifying agents of biological warfare, pharmaceutical screening, life sciences, and a new class of plasmonic laser for on-chip optical data communications. The specific aims of the research are (1) to develop an Active Microsphere Biosensor Chip using the DiP-PRET mechanism, and (2) to demonstrate Multiplex and High-Throughput Analysis. The proposed research could potentially advance LSU's strategic area of Biological, Biotechnological and Biomedical Research (B³R) and establish the PI's national competitiveness in the emerging area of advanced nanobiosensing.

It is recommended that the proposed budget be reduced to provide undergraduate student support of \$1,000, for a year one budget of \$51,750. Budgets of \$50,750 and \$49,790 are recommended for year two and year three, respectively.

Year 1: \$51,750

Year 2: \$50,750

Year 3: \$49,790

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

Appendix E (continued):

PROPOSAL: 072A-17

RANK: 1

TITLE: The Impacts of Sub-Lethal Pesticide Concentrations on Predator-Prey Interactions in Marine and Freshwater Communities

INSTITUTION: Louisiana Tech University

PRINCIPAL INVESTIGATOR: Jennifer Hill, Ph.D.

COMMENTS: Over 400 pesticides (insecticides, herbicides, and fungicides) are used in the US annually at a rate of over half a billion pounds per year to control urban and agricultural pest populations. Although these chemicals can increase agricultural yields or limit the spread of disease, pesticides can also have significant impacts on the health and abundance of non-target species such as aquatic (freshwater and marine) animals and plants. Pesticides are detected >95% of the time in US watersheds, where they often accumulate through direct application, terrestrial run-off, and spray drift. Once in aquatic habitats, these compounds influence the mortality, health, and behavior of fish, crustaceans, and insects.

The goal of the proposed research is to determine how sub-lethal pesticide concentration can impact macroinvertebrate behavior and trophic cascades mediated by consumptive and non-consumptive effects in estuarine and freshwater macrophyte habitats. The PI's specific aims are (1) to identify pesticide concentrations that affect the foraging and behavior of marine and freshwater invertebrate predators and prey using laboratory assays, and (2) to determine if pesticide-induced changes to animal behavior will indirectly affect estuarine and freshwater macrophyte habitats using field and mesocosm experiments.

It is recommended that the proposed budget be reduced to provide undergraduate student support of \$1,000 and equipment support of \$8,400 (consistent with the \$2,800 minimum 25% cash provided by the institution), rather than \$11,195 requested, for a year one budget of \$67,930. Budgets of \$56,030 and \$54,180 that provide limited travel support of \$1,500 are recommended for year two and three, respectively.

Year 1: \$67,930

Year 2: \$56,030

Year 3: \$54,180

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

Appendix E (continued):

PROPOSAL: 109A-17

RANK: 1

TITLE: Advancing Next Generation Genomic Tools for Discovery of the Watershed Microbiome

INSTITUTION: Tulane University Health Sciences Center

PRINCIPAL INVESTIGATOR: Tiong Gim Aw, Ph.D.

COMMENTS: Nutrient input, organic enrichment and fecal pollution are the leading causes of degraded water quality in rivers and estuaries. Moreover, changing weather patterns including storm events can exacerbate water quality issues in coastal areas. Estuarine systems within Louisiana are critical for coastal ecosystem function and seafood production. However, limited research has focused on the impact of land use and climate change on the incidence of microbial fecal pollution and the dominant sources of fecal pollution in estuarine systems. In this research, the PI proposes to (i) use metagenomics to generate microbial fingerprints, targeting viruses, representing a series of watershed samples (including protected and impacted watersheds); (ii) use bioinformatics to analyze the microbial fingerprints in the context of environmental metadata to identify genetic markers which best distinguish healthy versus impacted watersheds; and (iii) develop genetic markers using a toolbox approach to provide population diagnostics for monitoring water quality. If successful, the research could potentially develop new knowledge that provides a better understanding of how an estuarine watershed microbiome is perturbed by various biotic and abiotic factors and development of a new microbial pollution profiling approach that enables identification of specific sources of fecal pollution.

The PI has (1) pending proposal:

- USDA-NIFA – entitled “Detection of Emerging Viruses from Environmental Sources During Fresh Produce Production” the amount of \$499,422 for a proposed 3-year period.

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 10% effort requested, and limited supplies charges of \$20,000, for a year one budget of \$47,851. A budget of \$42,851 that provides limited supplies charges of \$15,000 is recommended for year two. A budget of \$38,351 that provides limited supplies charges of \$10,000 is recommended for year three.

Year 1: \$47,851

Year 2: \$42,851

Year 3: \$38,351

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

Appendix E (continued):

PROPOSAL: 032A-17

RANK: 1

TITLE: New Synthetic Methodologies Towards Biologically Relevant Heterocyclic Compounds

INSTITUTION: Louisiana State University and A & M College

PRINCIPAL INVESTIGATOR: Rendy Kartika, Ph.D.

COMMENTS: Heterocycles are classified as carbon-based cyclic structures that contain one or more non-carbon substituents within the ring. The assembly of these electronically dissimilar atoms often dramatically impacts the physicochemical properties of the rings, including their propensity to participate in intermolecular interactions with biological targets. Unsurprisingly, heterocycles are among the most common molecular units in pharmaceutical agents as evidenced by the fact that 38 out of the 70 most prescribed small-molecule drugs in 2013 contained heterocyclic motifs in their pharmacophores. Due to their medicinal relevance, the development of robust reactions to construct heterocyclic compounds remains an essential challenge in organic synthesis. In this research, the PI proposes the development of synthetic methodologies towards formation of biologically relevant heterocycles. The proposed chemistries will be enabled by strategic coupling of bifunctional nucleophiles to unsymmetrical oxyallyl and azaallyl cations under Brønsted acid catalysis.

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: 057A-17

RANK: 1

TITLE: Design and Synthesis of Superconducting Materials via Geometrical and Electronic Links in Solids

INSTITUTION: Louisiana State University and A&M College

PRINCIPAL INVESTIGATOR: Weiwei Xie, Ph.D.

COMMENTS: The proposed research will combine theoretical approaches and experimental efforts to design and synthesize new ternary intermetallic superconductors which will promote the fundamental understanding of new functional non-molecular materials from the viewpoint of chemistry. A series of empirical rules that focuses on specific chemical features will be generated by examining the database of reported compounds. With these empirical rules many candidates, especially unexplored ternary phases, will be fast-screened and synthesized. Subsequently, the synthesis of the new compounds potentially adopting the candidate structures will be conducted. All of the new compounds prepared will be characterized using a multitude of techniques to determine their structure and properties, such as X-ray and neutron diffraction, electron microscopy, and physical properties measurements. The proposed research also focuses on the chemical origin, including chemical compositions and atomic interactions of superconductors.

It is recommended that the proposed budget be reduced to eliminate \$1,000 in printing charges, for a year one budget of \$48,200. Budgets of \$44,600 and \$42,250 are recommended for year two and year three, respectively.

Year 1: \$48,200

Year 2: \$44,600

Year 3: \$42,250

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

Appendix E (continued):

PROPOSAL: 148A-17

RANK: 15

TITLE: Scalable Community Detection in Big Social and Information Networks Using Hidden Centrality Measures

INSTITUTION: University of New Orleans

PRINCIPAL INVESTIGATOR: Shaikh Arifuzzaman, Ph.D.

COMMENTS: A network (graph) is a powerful abstraction for interactions among entities in a complex system. Examples include various social, biological, co-purchase, and citation networks. Complex systems are organized in clusters or communities, each having a distinct role or function. A community is often interpreted as a clique, a functional unit, or a scientific discipline in social, biological, or citation networks, respectively. Communities reveal crucial organization information of a network, which helps us understand and improve the corresponding system. Thus detecting communities has become a fundamental problem in network mining.

The emergence of network big data from numerous scientific disciplines poses significant challenges for network mining and analysis. Online social networks such as Twitter and Facebook have millions to billions of users. Such massive networks often do not fit in the main memory of a single machine, and the existing sequential methods take a prohibitively large runtime. The PI proposes to design scalable parallel algorithms for community detection in large networks. Additionally, the PI proposes to devise high-performance computing (HPC) techniques for diverse platforms such as shared-memory, distributed-memory, and hybrid systems. The PI's definition of communities uses implicit triangle-based centrality measures to be justified with an extensive theoretical analysis and empirical evaluation. The PI will design fast approximation algorithms using sampling-based heuristics to discover provably good communities. If successful, these methods could prove useful in revealing crucial structural and organizational insights about large-scale socio-technical systems.

It is recommended that the proposed budget be reduced to provide one-month summer salary including fringe benefits for the PI, rather than 2-months requested, and other expenses limited to \$1,500 (not to include publication charges) and moved to travel—the appropriate budget category—for a year one budget of \$44,919. Similar budgets of \$44,919 are recommended for year two and year three. The PI should note that Support Fund money requested for successive years of a research project should not increase.

Year 1: \$44,919

Year 2: \$44,919

Year 3: \$44,919

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

Appendix E (continued):

PROPOSAL: 113A-17

RANK: 16

TITLE: *The Role of L1 Retrotransposition in Mammalian Infertility*

INSTITUTION: *Tulane University Health Sciences Center*

PRINCIPAL INVESTIGATOR: *Jeffrey Han, Ph.D.*

COMMENTS: L1s are mammalian mobile elements that are major drivers of human genome evolution, responsible for generating over 1/3 of human genome mass. In the past, these sequences were often dismissed as “junk DNA” and largely ignored. However, recently the PI has recognized the potential relevance of L1 replication to human health – loss of L1 regulation has been associated with germ cell defects, cancer and neurological disorders. The PI’s lab extends beyond these associations to ask whether L1 plays a causative role in mammalian disease. The proposed research will focus on the role that L1 dysregulation plays in infertility. It is known that mice deleted for the gene for Maelstrom (*Mael^{-/-}*) have massive overexpression of L1, fail to progress past meiotic prophase I, and are sterile. The PI proposes to block L1 activity in these mice to ask whether the meiotic arrest or infertility phenotypes can be overcome. The PI will use his recent discovery that the endosomal sorting complex required for transport (ESCRT) plays a critical role for productive LINE retrotransposition in human cells. The PI will determine whether ESCRT is required for L1 activity in mouse cells, and will conditionally knockdown ESCRT in mouse testes to determine whether loss of ESCRT alone hinders spermatogenesis. Ultimately, beyond the one-year grant, the PI will determine if conditional knockout of ESCRT in (*Mael^{-/-}*) mice can rescue germ cell phenotypes.

The PI has (2) pending proposals:

- NIH – entitled “R01GM124490/Biology of LINE Retrotransposition” in the amount of \$1,881,250 for the period 7/2017 – 6/2022.
- NIH – entitled “R21HD091554/The Role of LINE Retrotransposition in Male Infertility” in the amount of \$413,875 for the period 4/2017 – 3/2019.

Should the PI receive funding for the NIH-R01 pending proposal, 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 the NIH-R21 pending proposal, it is the panel’s position that the PI will have received stimulus funding comparable to the RCS, and therefore 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., \$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: 055A-17

RANK: 17

TITLE: Environmental Redox Chemistry of Soluble Mn(III): Potential Game Changer of Subsurface Biogeochemical Dynamics

INSTITUTION: Louisiana State University and A&M College

PRINCIPAL INVESTIGATOR: Zimeng Wang, Ph.D.

COMMENTS: Manganese (Mn) participates in a wide spectrum of biogeochemical processes, exerting major influence on the environmental behavior of many contaminants even if Mn is only a minor subsurface constituent. Traditional environmental geochemistry of Mn has been largely based on the paradigm that dissolved Mn is exclusively Mn(II) and that higher oxidation states of Mn only exist in solids. However, recent evidence has highlighted soluble Mn(III) complexes, stabilized by certain ligands as reactive and mobile geochemical oxidants. The clearness of the Mn biogeochemistry is at present obscured by the “cloud” of soluble Mn(III) species regarding their environmental occurrence, chemical speciation, redox activity and geochemical roles in conjunction with other subsurface constituents. The involvement of soluble Mn(III) species may challenge the existing paradigm about how Mn mediates subsurface biogeochemical dynamics through under-appreciated reaction pathways. The PI proposes a bottom-up fundamental approach to fill the critical knowledge gap about Mn(III) environmental chemistry by elucidating its *speciation* (stoichiometry with respect to ligands and stability constants), quantifying its *redox activity* (reaction kinetics as oxidants), and tracing its *in-situ production and dynamics* (from Mn oxides) in simulated subsurface media. The PI will integrate aqueous analytical techniques, electrochemical and capillary electrophoresis methods, and synchrotron X-ray spectroscopy to probe into the complicated environmental chemical processes from different aspects and at different scales. The new information about reaction kinetics, pore-scale dynamics, and molecular-scale mechanisms will be interpreted using quantitative models informed by experimentally determined chemical speciation. The fundamental knowledge will refine subsurface biogeochemical models of Mn and other contaminants.

It is recommended that the proposed budget be reduced to provide limited travel support of \$2,500 (must include travel to a national laboratory which has been provided above the customary \$1,500 for conference participation), for a year one budget of \$53,000. Budgets of \$47,000 are recommended for year two and year three.

Year 1: \$53,000

Year 2: \$47,000

Year 3: \$47,000

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

Appendix E (continued):

PROPOSAL: 123A-17

RANK: 18

TITLE: Exploration of A Robust and Efficient Algorithm for Fluid Flow in Complex Fracture Network

INSTITUTION: University of Louisiana at Lafayette

PRINCIPAL INVESTIGATOR: Yin Feng, Ph.D.

COMMENTS: As it becomes increasingly difficult to find large conventional natural gas resources, shale gas is one of the most promising alternatives, with huge reserves located around the world. Gas flow in such extremely low-permeability formations is complicated and controlled by diffusion rather than viscous flow. Artificial fractures locally increase the permeability of the formation, which allows trapped gas to flow into the wellbore. Therefore, accurate fracture network modeling and representation are critical to the understanding of shale gas flow behavior in fractures, prediction of productivity, and optimal fracturing design. However, current models are either 2D or oversimplified 3D, which cannot describe the true fracture geometry. Additionally, gridding algorithms used in these models decrease the computational efficiency and make the implementation complicated.

The goal of the project is to conduct exploratory research in developing a more robust and efficient algorithm of fluid flow in a complex fracture network in a 3D domain. The research consists of three phases: Phase (1) constructing a general purpose solution framework by implementing Element Boundary Methods on Discrete Fracture Network coupled with point and line source theories; Phase (2) evaluating the connectivity of a fracture network and visualizing flow field using streamlines; and Phase (3) exploring the feasibility to implement the proposed algorithm in simulating the process of shale gas production in artificial fractures. The project aims to establish the PI's reputation in developing computational algorithms for flow in fracture systems.

The PI has (1) pending proposal:

- NSF – entitled “Numerical Investigation of Adsorptive and Reactive Transport in a Complex Subsurface System” in the amount of \$302,542 for the period 7/2017 – 6/2020.

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., \$42,774 for year one, \$35,606 for year two, and \$30,300 for year three.

Year 1: \$42,774

Year 2: \$35,606

Year 3: \$30,300

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

Appendix E (continued):

PROPOSAL: 047A-17

RANK: 19

TITLE: Development of Materials for Combined Photocatalysis and Adsorption

INSTITUTION: Louisiana State University and A&M College

PRINCIPAL INVESTIGATOR: Samuel Snow, Ph.D.

COMMENTS: Photocatalytic materials have been studied extensively for their possible applications in solar-based technologies. The use of photocatalytic materials for water treatment could allow a technological breakthrough for cheap and sustainable drinking water. Despite decades of research on photocatalysis, no practical applications have come to fruition to date. Two fundamental challenges are the diffusion limitation of reactive oxygen species (ROS) and interference from natural water constituents. To overcome these challenges, the PI proposes the development of a material that would simultaneously adsorb contaminants of concern (i.e., viruses, bacteria, or pharmaceuticals) and produce ROS, capable of degrading these contaminants. Specifically, the PI will fabricate two materials, an inorganic, hybrid TiO₂–Alumina/Silica oxide sorbent and a covalently attached fullerene-silica that will be tuned for adsorption properties. The data and publication on the synthesis and characterization of the new materials will enhance the PI's credibility and the materials derived could provide a foundation for further studies within the field of environmental technology.

It is recommended that the project be funded at the level requested, i.e., \$55,000 for year one. A budget of \$48,750 that limits equipment support to \$3,750 (consistent with the \$1,250 minimum 25% cash provided by the institution), rather than \$5,000 requested, is recommended for year two. In year three, it is recommended that the project be funded at the level requested, i.e., \$45,000.

Year 1: \$55,000

Year 2: \$48,750

Year 3: \$45,000

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

Appendix E (continued):

PROPOSAL: 102A-17

RANK: 20

TITLE: Global Change and Plant Invasions: Will Microbes Enhance Invasion in a Changing World?

INSTITUTION: Tulane University

PRINCIPAL INVESTIGATOR: Emily Farrer, Ph.D.

COMMENTS: Invasive species have well-documented negative impacts on ecosystems; however, we know little about how global change may intensify invasive spread. Global change can directly affect invasion by altering abiotic conditions, but it can also indirectly affect plants via alteration of microbial communities, which play a large role in feedbacks that promote invasion. In the Gulf Coast, climate change is causing sea level rise and an increase in hurricanes and storms which deposit saline water in freshwater and brackish habitats. The PI will test whether this saltwater intrusion impacts the invasion of coastal wetlands by *Phragmites australis*, a highly problematic weed in North America. The PI will test three hypotheses: (1) saltwater intrusion will alter microbes and increase *Phragmites* invasion in freshwater and brackish marshes; (2) indirect effects of global change via alteration of soil microbes will be as strong as direct effects of increased salinity on invasion; and (3) salt water intrusion intensifies plant-soil feedbacks benefiting *Phragmites* at the expense of native plants. Understanding how global change may exacerbate invasion is essential for forecasting future change in coastal wetlands, which perform critical ecosystem services for humans including protection from storm surges, pollutant filtration, and habitat for commercial fish species.

It is recommended that the proposed budget be reduced to provide undergraduate student support of \$1,000, for a year one budget of \$51,650. A budget of \$50,750 that provides limited travel support of \$2,300 is recommended for year two. A budget of \$1,500 that provides limited travel support of \$1,500 and printing charges deleted is recommended for year three.

Year 1: \$51,650

Year 2: \$50,750

Year 3: \$1,500

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

Appendix E (continued):

PROPOSAL: 039A-17

RANK: 21

TITLE: Visible-Light-Driven Plasmonic Water Purification

INSTITUTION: Louisiana State University and A&M College

PRINCIPAL INVESTIGATOR: Kevin McPeak, Ph.D.

COMMENTS: Access to high-quality drinking water is essential for maintaining public health in a community. New waterborne pathogens are continuously coming online, mandating continual reevaluation of current water purification methods. Photo-disinfection of water offers a low-cost, widely accessible means of purifying water but current photo-disinfection methods (e.g. SODIS) primarily rely on the ultraviolet portion of the solar spectrum for inactivation of pathogens. Ultraviolet light makes up only 5% of this energy, whereas approximately 40% is the visible light of wavelengths between 400 nm and 700 nm. Therefore, traditional photo-disinfection of waterborne pathogens using only ultraviolet light vastly underutilizes the full capability of solar radiation to perform chemical oxidation reactions for water purification. Harnessing visible light for the photo-disinfection of water is expected to drastically improve the efficiency of waterborne pathogen inactivation without the potentially harmful byproducts of chlorine disinfection. The high efficiency of plasmonic photo-disinfection could both reduce the treatment time and improve the overall quality of water throughout the world, especially in remote areas where access to electrical power is scarce.

The research objectives are to (a) conduct fundamental studies on the geometry and materials of metal-semiconductor-metal (MSM) plasmonic absorbers as they relate to *in situ* reactive oxygen species (ROS) production, (b) investigate the mechanism for plasmonic hot carrier ROS generation, and (c) identify the ROS and quantify their availability and efficacy for disinfection of waterborne pathogens. Plasmonic absorbers can have an average measured absorbance of ~99% across the wavelengths from 400 nm to 10 μ m. However, the absorbed photon-to-electron conversion efficiency for current plasmonic hot-carrier devices is ~1%. This low efficiency is due to the rapid decay of hot carriers via scattering in the conduction band of the metal which competes with electron transfer reactions. The PI seeks the development of strongly coupled MSM structures resulting in >90% absorption in the visible range, ultra-fast charge separation, efficient generation of long-range ROS (e.g., H_2O_2) and rapid photo-disinfection of waterborne pathogens. Preliminary results show over 7 μ M H_2O_2 generated from the MSM absorber after only 2.5 minutes of illumination with artificial sunlight (AM 1.5G, 400 – 900 nm). This rate of H_2O_2 production is an 8-fold increase over the state-of-the-art visible-light-driven semiconductor photo-catalyst (e.g. C_3N_4 , MoS_2).

The PI has (1) pending proposal:

- NSF – entitled “CAREER: OP: Ultraviolet Superchiral Light-Matter Interactions: Plasmonic Devices for Enhanced Structural Biology Characterization” in the amount of \$503,660 for the period 1/1/2017 – 1/1/2022.

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

It is recommended that the proposed budget be reduced to provide undergraduate student support of \$1,000, for a year one budget of \$60,750. A budget of \$59,127 is recommended for year two. A budget of \$56,250 that provides limited travel support of \$1,500 is recommended for year three.

Year 1: \$60,750

Year 2: \$59,127

Year 3: \$56,250

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

Appendix E (continued):

PROPOSAL: 006A-17

RANK: 22

TITLE: Cellulose Nanofiber-Supported Batteries: Energy Density Control

INSTITUTION: Louisiana State University Agricultural Center

PRINCIPAL INVESTIGATOR: Qinglin Wu, Ph.D.

COMMENTS: The long-term goal of the proposed research is to develop a new class of sustainable cellulose nanofiber (CNF)-supported energy storage devices (ESDs) that have both high energy and power densities. For the devices to be viable for use in agriculture, food, infrastructure and other industries, they must (a) be robust with a wide temperature range and long life, (b) exhibit minimal degradation under numerous recharge cycles, and (c) be cost effective for energy storage per kW-h with existing battery technology. The proposed research will study self-assembled CNF membranes and their interaction with electrode active materials in a shape flexible ESD. Previous work on CNF-based lithium ion batteries (LIB) demonstrated very promising results, suggesting that CNF-supported ESDs have low cost, high flexibility, high overall energy efficiency, and scalability. However, fundamentals of using CNF-based technology for achieving high energy density in ESDs are still missing in the literature. Therefore, the objective of this research is to test the hypothesis that self-assembled CNF membranes with well-tuned multi-dimensional electron and ion pathways can be combined with high-performance electrode active materials to yield an ESD with high energy densities. It is expected that the CNF-supported ESD technology could have a significant impact on long-term sustainability for agriculture and food industries by offering more efficient energy solutions. The work could potentially lead to a patented technology and major research grant applications through NSF and USDA.

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: 134A-17

RANK: 23

TITLE: The Effect of Yes-Associated Protein YAP During the Development of Cancer Cachexia

INSTITUTION: University of Louisiana at Lafayette

PRINCIPAL INVESTIGATOR: Shuichi Sato, Ph.D.

COMMENTS: Cancer is the second leading cause of death and more than half a million people die from this disease annually in the United States. Cancer cachexia, an unintentional body weight and skeletal muscle loss over a 6-month period with cancer, accounts for 20-40% of cancer-related deaths. Yes-associated protein (YAP) is a molecule which is involved in the Hippo signaling pathway that regulates skeletal muscle fiber size and gene expressions in response to exercise. However, the role of YAP during the development of cancer cachexia is not known. The proposed research seeks to determine if (1) YAP is involved in the progression of cancer cachexia; and (2) whether resistance exercise alters YAP activation which leads to attenuation of the muscle wasting. Two different animal models for cancer cachexia will be used: Lewis Lung Carcinoma (LLC) mice and Apc^{Min/+} mice. Both mice have shown to be good models for cancer cachexia, which sheds muscle mass significantly in a relatively short term. Using these mice, the gene expression and activation of YAP and other molecules in Hippo signaling in skeletal muscle with or without exercise intervention during the development of cancer cachexia will be examined. The results of the study may provide a potential target to treat muscle wasting during cancer cachexia.

It is recommended that the proposed budget be reduced to provide one-month summer salary including fringe benefits for the PI, rather than 1.5 months requested, undergraduate student support of \$1,000, equipment charges of \$18,303 and the associated 25% institutional match moved to year one in lieu of year two, for a year one budget of \$50,334. Budgets of \$29,256 and \$28,300 that provide limited travel support of \$1,500 and printing charges deleted are recommended for year two and year three, respectively.

Year 1: \$50,334

Year 2: \$29,256

Year 3: \$28,300

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

Appendix E (continued):

PROPOSAL: 149A-17

RANK: 24

TITLE: *The Analysis of Gene Regulatory Evolution Using Transcriptomic Time Courses of Early Embryos of Drosophila Species*

INSTITUTION: *University of New Orleans*

PRINCIPAL INVESTIGATOR: *Joel Atallah, Ph.D.*

COMMENTS: In recent years, changes in gene regulation, at both the transcriptional and post transcriptional levels, have been proposed to be responsible for a significant proportion of interspecific variation. However, while the genetic code for amino-acid-coding regions of the genome was deciphered in the twentieth century, there is no known comparable code for regulatory regions. While individual cases of gene regulatory changes have recently been identified, a global understanding of the role of gene-regulatory evolution in generating diversity is still unknown. The PI proposes a three-year research study that will use high-throughput RNA-sequencing to interrogate the transcriptomes of early *Drosophila* embryos from multiple, highly diverged species, at comparable stages of development. Evolutionary changes in transcript levels at each stage will be correlated with changes in regulatory DNA from enhancer regions (to identify changes in transcription factor binding sites) and untranslated regions (to study the evolution of micro-RNA target sites), in an effort to understand the broad patterns of regulatory sequence evolution. The knowledge gained from the research will provide valuable insights into the mechanistic origin of interspecific variation, and the process of diversification at the genomic level.

The PI has (1) pending proposal:

- NSF – entitled “CAREER: Large-Scale Analysis of Regulatory Motif Evolution Through Broad Sampling of Transcriptomes from Multiple Monophyletic Diptera Clades” the amount of \$893,254 for the period 3/2017 – 2/2022.

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

It is recommended that the proposed budget be reduced to provide one-month summer salary including fringe benefits for the PI, rather than 2-months requested, and limited travel support of \$1,500, for a year one budget of \$43,986. Budgets of \$40,736 and \$37,236 are recommended for year two and year three, respectively.

Year 1: \$43,986

Year 2: \$40,736

Year 3: \$37,236

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

Appendix E (continued):

PROPOSAL: 139A-17

RANK: 25

TITLE: Controlled Polymer Synthesis Towards the Precision of Biomacromolecules

INSTITUTION: University of Louisiana at Lafayette

PRINCIPAL INVESTIGATOR: Yu Wang, Ph.D.

COMMENTS: Controlled polymerization methods enable the synthesis of block copolymers via chain extension from macroinitiators and dramatic advances in the last couple of decades allow synthesis of progressively more complicated macromolecular structures. The novel polymers with well-defined molecular structures show entirely new properties compared to conventional polymers and significantly extend the potential applications of polymeric materials. However, a critical look reveals the products of controlled polymerization, compared to biomacromolecules, are far from perfect. There are two issues in controlled polymerization which limit the perfection of the synthesis. First, the active functional groups cannot be 100% preserved during polymerization and second, the chain lengths of polymers prepared via controlled polymerization are not exactly the same. In this project, recently developed understanding of how to improve the “livingness” of controlled radical polymerization is leveraged to practice and examine high-precision synthesis of complex blocked polymer brushes and mono-disperse block/star copolymers. The PI will pursue how far one can push the precise design of polymeric architecture. High-precision design of polymeric architecture and application of polymeric materials with well-defined structures in organic electronics, nano diagnostics and therapeutics will be studied.

It is recommended that the proposed budget be reduced to provide undergraduate student support of \$1,000, limited travel support of \$1,500, limited supplies charges of \$10,000, and other expense charges of \$5,000 that eliminate \$2,000 in publication charges, for a year one budget of \$48,500. Similar budgets of \$48,500 are recommended for year two and year three.

Year 1: \$48,500

Year 2: \$48,500

Year 3: \$48,500

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

Appendix E (continued):

PROPOSAL: 108A-17

RANK: 26

TITLE: Towards Optimal Timing in Cyber Defense: A Game Theoretic and Learning Approach

INSTITUTION: Tulane University

PRINCIPAL INVESTIGATOR: Zizhan Zheng, Ph.D.

COMMENTS: Malicious attacks are evolving constantly to inflict even more damage on the nation's infrastructure systems, corporate IT systems, and our digital lives. One example is Advanced Persistent Threats (APT), an emerging class of continuous and stealthy hacking processes launched by incentive-driven entities. Due to the persistence of APT, it is crucial for the defender to update its security measures periodically to strike a balance between the risk of being compromised and the cost of security upgrades. The primary challenge is that the defender typically has very limited prior knowledge about the attacker. Moreover, defense decisions often must be made with limited and delayed feedback because of the covert nature of advanced attacks. The goal of this research is to develop a unified approach to achieve optimal security updates in the face of advanced attacks. The PI proposes to (1) develop game models and online learning algorithms that can help a defender with very limited prior knowledge *learn* its optimal timing strategy from the imperfect feedback obtained during the game; (2) develop adversarial learning algorithms against highly adaptive attacks and coordinated attacks on interdependent systems; and (3) develop new metrics to compare learning-based cyber defense solutions with simulations and experiments to validate the game models and learning algorithms developed.

It is recommended that the proposed budget be reduced to provide limited travel support of \$1,500 and supplies of \$2,000, not to include the purchase of a laptop computer, for a year one budget of \$49,333. A budget of \$48,233 is recommended for year two.

Year 1: \$49,333

Year 2: \$48,233

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

Appendix E (continued):

PROPOSAL: 101A-17

RANK: 27

TITLE: Imaging Placental Transport of Folate

INSTITUTION: Tulane University

PRINCIPAL INVESTIGATOR: Carolyn Bayer, Ph.D.

COMMENTS: Valproate, a drug critical for the prevention of epileptic seizures, is known to increase risk of congenital defects when taken during pregnancy. The precise mechanisms of Valproate which lead to birth defects remain unclear, but evidence implicates alterations in folate transport and metabolism. Folate for the developing fetus must be obtained from the mother's diet—the influence of the placenta on the transport of folate could be the critical teratogenic mechanism. Studies have shown that cultured BeWo cells reduce expression of folate receptors after exposure to Valproate; however, this mechanism has yet to be demonstrated *in vivo*. The PI is developing contrast-enhanced ultrasound-guided photoacoustic imaging of placental folate transport to determine the role of the placenta in Valproate teratogenicity. In this proposal, specific aim (1) will verify that cultured BeWo cells reduce transport of folate, and the folate-conjugated near infrared dye OTL38, after Valproate treatment, and analyze the photoacoustic imaging sensitivity using OTL38 as a contrast agent; specific aim (2) will demonstrate *in vivo* photoacoustic imaging of placental folate transport using OTL38 to generate photoacoustic contrast; and specific aim (3) will apply these methods to a folate receptor knockout mouse model, to analyze the hypothesis that photoacoustic imaging of OTL38 can be used to quantify and compare placental folate transport. The proposal will provide critical preliminary data needed to support a nationally competitive proposal to extend this work to a clinically relevant model of Valproate teratogenicity, and long term towards studying the impact of the drug on placental transport and function.

The PI has (1) pending proposal:

- Department of Defense (Discovery Award, Peer Reviewed Medical Research Program) – entitled “Imaging the Biophysical Mechanisms of Preeclampsia” in the amount of \$278,276 for the period of 1/2017 – 12/2019.

Should the PI receive funding for the pending proposal, it is the panel's position that the PI will have received stimulus funding comparable to the RCS, and therefore 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., \$55,943 for year one. Budgets of \$53,443 and \$50,443 are recommended for year two and year three, respectively.

Year 1: \$55,943

Year 2: \$53,443

Year 3: \$50,443

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

Appendix E (continued):

PROPOSAL: 128A-17

RANK: 28

TITLE: Secondhand Cigarette Smoke Promotes Virulence in Upper Airway Bacteria

INSTITUTION: University of Louisiana at Lafayette

PRINCIPAL INVESTIGATOR: Ritwij Kulkarni, Ph.D.

COMMENTS: Human nasopharyngeal mucosa is colonized by respiratory pathogens such as *Staphylococcus aureus* and *Streptococcus pneumoniae*. These bacteria are responsive to bioactive chemicals found in cigarette smoke (CS), which according to growing research evidence promote their virulence. For these experiments, the bacteria are exposed to CS extract (cigarette smoke bubbled into a bacterial culture medium) prior to testing their virulence using *in vivo* mouse models. Two main shortcomings to this method of exposure are its failure to recapitulate a common requirement that nasopharyngeal carriage be a prerequisite for respiratory disease and the absence of mammalian biotransformation of secondhand smoke (SHS) ingredients. The primary goal of the proposed research is to standardize a mouse model of nasopharyngeal pre-colonization followed by exposure to secondhand CS. The model will be used to compare the course of respiratory infection in the presence or absence of SHS exposure; and to perform simultaneous analysis of host-pathogen transcriptomes (dual RNAseq) to identify specific virulence factors and immune effectors affected by SHS exposure. A better understanding of the role of SHS chemicals in shaping host pathogen interactions could improve treatment of respiratory infections in individuals exposed to cigarette smoke.

It is recommended that the project be fund at the level requested, i.e., \$59,217 for year one. Budgets of \$57,586 and \$55,441 are recommended that provide limited travel support of \$1,500 and other expenses (publication cost of \$2,000) deleted for year two and year three, respectively.

Year 1: \$59,217

Year 2: \$57,586

Year 3: \$55,441

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

Appendix E (continued):

PROPOSAL: 093A-17

RANK: 29

TITLE: Organometallic Polyacenes for Organic Opto-Electronic Applications

INSTITUTION: Nicholls State University

PRINCIPAL INVESTIGATOR: Uttam Pokharel, Ph.D.

COMMENTS: Linearly fused polycyclic aromatic hydrocarbons, acenes, are the benchmark materials for organic opto-electronic applications, including organic field-effect transistors (OFET) and organic light emitting diodes (OLED). Application of acenes on the active layer of opto-electronic devices as organic semiconductors has been expected to revolutionize future electronic technology by making the devices more flexible, lighter, smaller, and even cheaper compared to their traditional silicon-based counterparts. The performance of acene molecules for semiconducting applications depends on the energy gap between highest occupied molecular orbital (HOMO) and lowest unoccupied molecular orbital (LUMO), reorganization energies, and their packing in solid states. Although higher acenes exhibit desired semiconducting properties, these molecules are not very stable under ambient conditions. These materials undergo photodegradation in the presence of air and light, especially in solution phase. To enhance their stability and improve their device performance, various research groups are working on modification of acene molecules. Existing at an interface of organic and inorganic semiconducting materials, organometallic semiconducting materials may offer functional molecules that can integrate the electronic properties of “all-organic” molecules to the properties inherent to organometallic complexes. The PI proposes extension of acene chemistry in the organometallic arena by conjugating ferrocene moiety on its aromatic core.

It is recommended that the proposed budget be reduced to provide limited travel support of \$1,500, for a year one budget of \$19,600.

Year 1: \$19,600

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

Appendix E (continued):

PROPOSAL: 050A-17

RANK: 30

TITLE: Computational Methods for Visualizing and Analyzing Big Preference Data: Theory and Applications

INSTITUTION: Louisiana State University and A&M College

PRINCIPAL INVESTIGATOR: Mingxuan Sun, Ph.D.

COMMENTS: Preference data arise from a population of users ranking a collection of items. Over the last decade, there has been a large increase in the volume of preference data occurring in a diversity of application domains. Examples of preference data include medical and psychological surveys, election voting, ranked lists from search engines results, and customer ratings from recommender systems in e-commerce. Aggregated together, enormous preference data in every application domain can lead to revolutionary ways for knowledge discovery. While analyzing preference data has a long history in statistics, construction of a computationally efficient framework for large-scale high-dimensional preference data analysis remains a major challenge, mainly due to rapidly growing data size, increasing computational difficulties associated with discrete algebraic structure, and partial incomplete information in most real-world settings. The PI proposes a probabilistic framework and scalable machine learning algorithm for analysis of preference data including clustering, rule discovery, and rank prediction. The PI also proposes visualization techniques for preference data to support intuitive summarization. Being statistically interpretable and computationally efficient, the proposed framework could support analysis of big preference data in a wide range of disciplines including public health, social sciences, e-commerce, and education.

The PI has (1) pending proposal:

- NSF – entitled “CRII: III: Bootstrapping Large-Scale Recommender Systems” the amount of \$174,936 for the period 4/2017 – 3/2019.

Should the PI receive funding for the NSF pending proposal, it is the panel’s position that the PI will have received stimulus funding comparable to the RCS, and therefore 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., \$56,749 in year one, \$52,749 in year two, and \$51,749 in year three.

Year 1: \$56,749

Year 2: \$52,749

Year 3: \$51,749

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

Appendix E (continued):

PROPOSAL: 125A-17

RANK: 31

TITLE: Developing an Understanding of Nutrient Loading, Metal Contamination, and Sediment Delivery to Lakes in Southwestern Louisiana

INSTITUTION: University of Louisiana at Lafayette

PRINCIPAL INVESTIGATOR: Aubrey Hillman, Ph.D.

COMMENTS: Nutrient loading and metal contamination arising from anthropogenic activities have a profound impact on lakes and wetland ecosystems. In southwestern Louisiana, the in-wash of nutrients and accumulation of heavy metals also have the potential to interact synergistically with hydroclimate extremes such as flooding. However, it is currently difficult to assess these interactions due to the short periods of instrumental/monitoring data that likely do not capture the full range of natural environmental variability. The proposed research will investigate the potential of sediment cores from regional lakes to provide a long-term context of these interactions and to establish natural, pre-anthropogenic conditions of nutrient loading and heavy metal accumulation. The major research objectives are to (1) collect sediment cores from three lakes in southwestern Louisiana; (2) establish preliminary estimates of sedimentation rates; (3) develop an understanding of seasonal limnological cycling; and (4) determine the lake's sensitivity to environmental variables of interest. Preliminary data collected from this project will be used to demonstrate the lake's suitability for future study at multi-century time scales through future NSF proposals.

It is recommended that the project be funded at the level requested, i.e., \$19,050 for year one.

Year 1: \$19,050

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

Appendix E (continued):

PROPOSAL: 001A-17

RANK: 32

TITLE: Mechanisms Underlying Nonalcoholic Fatty Liver Disease

INSTITUTION: Grambling State University

PRINCIPAL INVESTIGATOR: Paul Kim, Ph.D.

COMMENTS: Nonalcoholic fatty liver disease (NAFLD) is the most common chronic liver disease in the US but the underlying mechanisms are not fully understood. Accumulating evidence implicates endoplasmic reticulum (ER) stress in NAFLD pathogenesis. ER stress, often observed in the obese and in NAFLD patients, triggers lipid biosynthesis, insulin resistance, inflammation, and apoptosis, all of which are characteristic of NAFLD. Moreover, murine models of obesity show that increasing the amount of saturated fatty acids in circulation induces ER stress, apoptosis, and liver injury. Together, the data suggest that elevated circulating fatty acids levels, typical of obesity, contribute to NAFLD.

Given that ER stress results from the accumulation of unfolded proteins in the ER lumen, elevated fatty acid levels may induce ER stress by increasing the load of ER client proteins (i.e., protein synthesis) or decreasing the capacity to process that load (i.e., protein folding or degradation), or both. The research aims are to determine the roles of protein folding and protein degradation in saturated fatty acid-induced ER stress. The aims will be carried out in a hepatocyte culture model of obesity and NAFLD. The proposed work could potentially provide new mechanistic insights into NAFLD development and progression. This is important not only because NAFLD is quietly becoming a global epidemic, but also because ER stress is relevant to other metabolic and neurodegenerative diseases. The results of this research could lead to new therapeutic targets and intervention strategies.

It is recommended that the proposed budget be reduced to provide one-month summer salary, rather than two-months requested, plus 25% academic release time including the associated fringe benefits for the PI, and limited travel support of \$2,050, for a year one budget of \$42,306. Budgets of \$40,306 are recommended for year two and year three. The Panel noted that the proposed budget did not include the customary 25% request in overhead. Therefore, the university shall not reduce the recommended research budget to compensate for the oversight.

Year 1: \$42,306

Year 2: \$40,306

Year 3: \$40,306

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

Appendix E (continued):

PROPOSAL: 151A-17

RANK: 33

TITLE: Developing Tools for Efficient Multi-Scale Modeling of Biochemical and Biomaterials Processes

INSTITUTION: University of New Orleans

PRINCIPAL INVESTIGATOR: Dhruva Chakravorty, Ph.D.

COMMENTS: Multi-scale simulations provide critical atomic-level details about the role of structure and dynamics in chemical processes. While numerous studies using molecular dynamics and quantum mechanics (QM) approaches have successfully complemented experimental efforts, there is a need to develop accurate methods to model processes that involve tens to hundreds of millions of atoms. This work involves developing accurate, yet efficient methods for weak interactions as well as methods for rapid screening of data to enable an understanding of the configuration space. The PI proposes to design strategies to (a) develop accurate physics-based force fields for atomistic simulations using QM data; (b) develop coarse-grained approaches using force matching; and (c) develop analysis and visualization tools that efficiently combine simulation data with larger-scale sequence or materials genome data. The method development is necessary to push simulations to larger systems containing millions of atoms with greater accuracy, while being able to analyze the tens of terabytes of data from these simulations. The PI will focus on identifying the key inter-protein and intra-protein interactions that dictate the GTP hydrolysis reaction catalyzed by GTPase enzymes and GTPase interactions and GTPase activation proteins (GAPs) that control the cell-signaling. Understanding the process has profound implications, as disruptions are linked to a wide range of diseases.

It is recommended that the proposed budget be reduced to provide undergraduate student support of \$1,000 and limited travel support of \$1,500, for a year one budget of \$49,314. Similar budgets of \$49,314 are recommended for year two and year three. The PI should note that Support Fund money requested for successive years of a research project should not increase.

Year 1: \$49,314

Year 2: \$49,314

Year 3: \$49,314

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

Appendix E (continued):

PROPOSAL: 053A-17

RANK: 34

TITLE: Mechanisms of Assembly and Water Oxidation in the Active Site of Photosynthetic Oxygen Evolution

INSTITUTION: Louisiana State University and A&M College

PRINCIPAL INVESTIGATOR: David Vinyard, Ph.D.

COMMENTS: Developing fundamental insights in molecular mechanisms of photosynthesis is the ultimate goal of this research. Photosynthesis uses sunlight, water, proteins, pigments, and Earth-abundant metals to meet the biosphere's energy needs. While photosynthesis is a familiar concept, many of the underlying mechanisms remain unsolved. For example, the atmosphere contains 21% O₂, yet the mechanism of assembly of the active site that produces O₂ and of O-O bond formation is not known. Understanding this process at an atomic level is essential for providing food and fuel security for an ever-demanding world. The PI proposes to (1) identify and characterize protein cofactors essential for efficient oxygen-evolving complex (OEC) photo-assembly; (2) trap and characterize chemical intermediates of OEC photo-assembly; and (3) trap and characterize chemical intermediates of OEC O-O bond formation. The research described in this proposal has strong potential for achieving national competitiveness because of the central role photosynthesis plays in food and energy production.

The PI has (1) pending proposal:

- American Chemical Society (ACS) – entitled “Herman Frasch Fund for Chemical Research in Agricultural Chemistry” in the amount of \$250,000 for the period 7/2017 – 6/2022.

Should the PI receive funding for the pending proposal, it is the panel's position that the PI will have received stimulus funding comparable to the RCS, and therefore 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 1.5-months requested, and limited travel support of \$1,500, for a year one budget of \$56,613. Budgets of \$56,403 and \$55,715 are recommended for year two and year three, respectively.

Year 1: \$56,613

Year 2: \$56,403

Year 3: \$55,715

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

APPENDIX F

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

PROPOSAL: 011A-17

TITLE: Platform for a Multisensory Musical Instrument Museum

INSTITUTION: Louisiana State University and A&M College

PRINCIPAL INVESTIGATOR: Edgar Berdahl, Ph.D.

COMMENTS: In musical instrument museums, instrument artifacts are usually protected behind glass walls in a way so that humans cannot interact with them. However, studies show that humans tend to learn more from museum exhibits if they are interactive. The PI proposes to construct and demonstrate the concept for a multisensory musical instrument museum (MMIM). This is to be realized by creating an installation that provides haptic, auditory, and visual feedback from a traditional African lyre called the *endongo*. A physics-based model will be employed to calculate the feedback to the user.

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

Appendix F (continued):

PROPOSAL: 034A-17

TITLE: Reliable 4D Scene Restoration from Partially Scanned Fragments for Virtual Reality Applications

INSTITUTION: Louisiana State University and A&M College

PRINCIPAL INVESTIGATOR: Xin Li, Ph.D.

COMMENTS: In this digital era, large-scale geometry and image datasets are routinely collected into shape repositories or high-dimensional image databases. The rapid technological advances of scanning devices make it possible to digitize objects and scenes from our physical world with greater details. While specialized hardware devices with improved computational power facilitate model acquisition processes, general algorithms that effectively model these datasets remain challenging. During digitization, it is usually impossible to acquire complete real-world objects/scenes. For time-varying deformable objects, it is also impossible to acquire the motion model in one shot, and a camera can only capture fragments that cover different sub-regions of a moving object at different times. As a result, the proposed research tackles the problem of fusion and composition of various partial scan and image fragments in both space and time domains, and to find a reliable technical solution to weave them together in order to reconstruct a complete 4D scene.

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

Appendix F (continued):

PROPOSAL: 046A-17

TITLE: A Multi-Method Assessment of the Diet of Expanding New England Seal Populations

INSTITUTION: Louisiana State University and A&M College

PRINCIPAL INVESTIGATOR: Michael Polito, Ph.D.

COMMENTS: Commercial and recreational fisheries often target the same resources used by marine predators, including pinnipeds (seals and sea lions). In New England waters, gray seal (*Halichoerus grypus*) populations have been steadily increasing, raising concerns at federal and state levels about their potential impact on the recovery of Atlantic Cod (*Gadus morhus*) stocks. However, very little research has been conducted on gray seal diets around New England and the usefulness of these few studies is hampered by methodological uncertainties. The PI proposes to develop and refine methods to address this data gap by integrating information from two techniques: molecular scatology and stable isotope analysis. Molecular scatology allows for the identification of recently consumed prey species based on the amplification of diagnostic DNA fragments. As animals “are what they eat”, the stable isotope analysis of tissues can reveal a predator’s diet composition over longer time scales.

Dr. Polito is a past recipient of RCS grant LEQSF(2015-18)-RD-A-08 for his project entitled “*Investigating the Effects of Historic Harvesting and Recent Climate Change on Antarctic Krill Predators*” for the period 6/1/2015 – 8/15/2015 that resulted in early termination due to the PI becoming nationally competitive. Furthermore, it is the Panel’s position that the proposed research did not demonstrate novel techniques to justify funding for the project. For these reasons, the project was not recommended for RCS funding.

Appendix F (continued):

PROPOSAL: 059A-17

TITLE: Development of a Fully-Coupled End-to-End Marine Ecosystem Model for the Northern Gulf of Mexico

INSTITUTION: Louisiana State University and A&M College

PRINCIPAL INVESTIGATOR: Zuo Xue, Ph.D.

COMMENTS: The goal of the proposed research is to set up and calibrate a physics-to-fish (so-called “end-to-end”) model for the northern Gulf of Mexico (nGOM). The end-to-end model will establish the capability to evaluate the impact of episodic events (e.g., oil spill) and long-term changes (e.g., hypoxia) in environmental conditions on fish population dynamics, which is the mission of several federal agencies. The PI proposes to adapt the end-to-end model that was recently developed for the sardine and anchovy populations in the California Current system to the environment and species of the nGOM. During the project, a 20-year fully coupled end-to-end simulation will be performed, and calibrated and evaluated against existing observations. The end-to-end model could potentially fill a gap in nGOM modeling tools between the single-species population models used in fisheries management and the very complex, but spatially simple, food web models now under construction as part of the Deepwater Horizon response and NOAA’s Integrated Ecosystem Assessment.

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

Appendix F (continued):

PROPOSAL: 067A-17

TITLE: Novel Targeted Kinase Inhibitors Based on Fusarochromanone

INSTITUTION: Louisiana State University in Shreveport

PRINCIPAL INVESTIGATOR: Elahe Mahdavian, Ph.D.

COMMENTS: Fusarochromanone (FC101) is a structurally unique amino flavonoid compound with an interesting range of both hydrophilic and lipophilic functional groups. FC101 is remarkable for its mode of action, potent anti-cancer activity, and inhibition of major oncogenic signaling pathways essential to tumorigenesis. FC101 demonstrates the highest potencies against the most aggressive cancer cell types, including the MAPK-driven melanoma, breast, and renal cell lines. FC101 modulates both the MAPK and mTOR pathways which are vital to cancer cell proliferation, survival, and development of drug resistance in the tumor microenvironment. As a result, new compounds developed from FC101 may confer unique therapeutic advantages by circumventing the normal mechanisms of acquired cancer therapy resistance and increasing survival rates for patients with late-stage disease. Based on the therapeutic potential of FC101, the PI proposes research designed to assess and optimize its clinical relevance. The objectives are (1) the evaluation of the lead compound's molecular mode of action and potential synergy and drug combinations through phenotypic kinome-wide RPPA screens; and (2) the synthesis of six new FC101 analogs using cooperative ligand-based design and phenotypic cell-based screening, complemented with *in-silico* ADMET predictions and kinase inhibition assays to effectively establish quantitative structure activity relationships.

Dr. Mahdavian is a past recipient of RCS grant LEQSF(2005-08)-RD-A-15 for the project entitled "Synthesis of Novel Vitamin E Analogs with Potent Anti-Cancer Activity" for the period 6/1/2005– 6/30/2008. Furthermore, it is the Panel's position that the proposed research did not represent a significant change in research direction. For these reasons, the project was not recommended for RCS funding.

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

Ellen J. Beswick, Ph.D.

Associate Professor
Department of Molecular Genetics and Microbiology
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

Rosemary Knapp, Ph.D.

Associate Professor
Department of Biology
University of Oklahoma

Shahid S. Siddiqui, Ph.D.

Associate Professor
Department of Medicine
University of Chicago

CHEMISTRY

Burtron Davis, Ph.D., Chairman

Professor and Interim Director
Center for Applied Energy Research
University of Kentucky

Mario L. Occelli, Ph.D.

President
MLO Consulting
Atlanta, GA

Appendix G (continued):

COMPUTER & INFORMATION SCIENCES

Sartaj Sahni, Ph.D., Chair

Distinguished Professor

Department of Computer & Information Sciences and Engineering

University of Florida

Oscar H. Ibarra, Ph.D.

Professor

Department of Computer Science

University of California at Santa Barbara

EARTH & ENVIRONMENTAL SCIENCES

Charles J. Wurrey, Ph.D., Chair

Curators' Distinguished Teaching Professor Emeritus

James C. Olson Professor Emeritus of Chemistry

University of Missouri at Kansas City

Charles William Rice, Ph.D.

University Distinguished Professor

Department of Agronomy

Kansas State University

ENGINEERING B

William A. Hyman, Sc.D., Chair

Professor Emeritus of Biomedical Engineering

Department of Biomedical Engineering

Texas A & M University

Raul G. Longoria, Ph.D.

Professor

Department of Mechanical Engineering

University of Texas at Austin

James R. Wilson, Ph.D.

Professor

Department of Industrial and Systems Engineering

North Carolina State University

Daniel A. Gulino, Ph.D.

Associate Professor Emeritus

Department of Chemical & Biomedical Engineering

Ohio University

Appendix G (continued):

HEALTH & MEDICAL SCIENCES

Gerald Sonnenfeld, Ph.D., Chair

Vice President for Research & Economic Development
University of Rhode Island

Terrence Deak, Ph.D.

Associate Director
Center for Developmental and Behavioral Neuroscience
State University of New York at Binghamton (SUNY at Binghamton)

Karen J.L. Burg, Ph.D.

Harbor Lights Endowed Chair & Professor
College of Veterinary Medicine
University of Georgia

APPENDIX H**RESEARCH COMPETITIVENESS SUBPROGRAM
FY 2016-17
SUMMARY OF PROPOSALS****155 TOTAL PROPOSALS**

15	BS I	Biological Sciences I
24	BS II	Biological Sciences II
19	CHEM	Chemistry
19	C/IS	Computer and Information Sciences
12	EAR	Earth and Environmental Sciences
46	ENG B	Engineering B
20	H/M	Health and Medical Sciences

TOTAL FIRST-YEAR FUNDS REQUESTED: \$7,335,489

Proposals Submitted to the Research and Development Program - RCS
for the FY 2016-17 Review Cycle

Proposal #	PI Name	Category	Institution	Duration	Project Title	Amount Requested			
						Year 1	Year 2	Year 3	Total
001A-17	Dr. Paul Kim	Research Competitiveness Subprogram [RCS]	Grambling State University	3 Years	Mechanisms Underlying Nonalcoholic Fatty Liver Disease	\$50,345.00	\$48,345.00	\$48,345.00	\$147,035.00
002A-17	Dr. Naveen Adusumilli	RCS One-Year Research Component	Louisiana State University Agricultural Center	1 Year	Economic Assessment of Damaging Impacts of Major Aquatic Nuisance Plant Species to Louisiana's Local Communities	\$15,000.00	\$0.00	\$0.00	\$15,000.00
003A-17	Dr. Franz Ehrenhauser	RCS One-Year Research Component	Louisiana State University Agricultural Center	1 Year	Novel polycyclic monomer compounds for advanced adsorbents	\$15,644.00	\$0.00	\$0.00	\$15,644.00
004A-17	Dr. Kristen Healy	RCS One-Year Research Component	Louisiana State University Agricultural Center	1 Year	Use of stable isotopes to evaluate temperature dependent metabolic rate and pesticide efficacy in mosquitoes	\$20,000.00	\$0.00	\$0.00	\$20,000.00
005A-17	Prof. CHANGYOON JEONG	Research Competitiveness Subprogram [RCS]	Louisiana State University Agricultural Center	3 Years	Fate and occurrence of harmful cyanobacteria blooms response to nutrient concentration and strategies to reduce the risk of public health by cyanobacterial toxins in agricultural watershed.	\$50,725.00	\$48,725.00	\$48,725.00	\$148,175.00
006A-17	Prof. Qinglin Wu	RCS One-Year Research Component	Louisiana State University Agricultural Center	1 Year	CELLULOSE NANOFIBER-SUPPORTED BATTERIES: ENERGY DENSITY CONTROL	\$20,000.00	\$0.00	\$0.00	\$20,000.00
007A-17	Prof. Wei Xu	Research Competitiveness Subprogram [RCS]	Louisiana State University Agricultural Center	3 Years	Mechanistic Study of Chronic Cutaneous Wound Repair using a Zebrafish Diabetic Model	\$57,750.00	\$65,750.00	\$65,750.00	\$189,250.00
008A-17	Dr. Wenqing Xu	RCS One-Year Research Component	Louisiana State University Agricultural Center	1 Year	Long-term survival and decontamination of Salmonella enterica Serovar Typhimurium on food contact surfaces	\$19,880.00	\$0.00	\$0.00	\$19,880.00
009A-17	Prof. Christopher Arges	Research Competitiveness Subprogram [RCS]	Louisiana State University and A & M College	3 Years	Nanopatterning electrochemical materials via block copolymer lithography	\$57,350.00	\$56,850.00	\$56,475.00	\$170,675.00
010A-17	Prof. Erik Aschehoug	Research Competitiveness Subprogram [RCS]	Louisiana State University and A & M College	3 Years	Indirect interactions and plant community structure in variable environments	\$61,750.00	\$58,750.00	\$59,750.00	\$180,250.00
011A-17	Prof. Edgar Berdahl	RCS One-Year Research Component	Louisiana State University and A & M College	1 Year	Platform for a Multisensory Musical Instrument Museum	\$20,000.00	\$0.00	\$0.00	\$20,000.00
012A-17	Prof. Bhuvnesh Bharti	Research Competitiveness Subprogram [RCS]	Louisiana State University and A & M College	3 Years	Reconfigurable soft-matter: Mimicking neural synapse with colloidal self-assembly	\$68,000.00	\$66,000.00	\$65,000.00	\$199,000.00
013A-17	Dr. Juliet Brophy	Research Competitiveness Subprogram [RCS]	Louisiana State University and A & M College	3 Years	Identifying environmental change and its relation to hominin evolution in southern African Plio-Pleistocene	\$66,400.00	\$63,900.00	\$32,650.00	\$162,950.00
014A-17	Dr. Jennifer Brum	Research Competitiveness Subprogram [RCS]	Louisiana State University and A & M College	3 Years	Investigating the causes and effects of lysogeny with an environmentally-representative culture collection	\$61,750.00	\$60,750.00	\$57,750.00	\$180,250.00
015A-17	Dr. Shengli Chen	Research Competitiveness Subprogram [RCS]	Louisiana State University and A & M College	3 Years	Analytical and Numerical Analyses of Wellbore Stability Problems Using Anisotropic Plasticity Models	\$47,000.00	\$46,500.00	\$46,000.00	\$139,500.00

Proposals Submitted to the Research and Development Program - RCS
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Proposal #	PI Name	Category	Institution	Duration	Project Title	Amount Requested			
						Year 1	Year 2	Year 3	Total
016A-17	Dr. Yuanhang Chen	Research Competitiveness Subprogram [RCS]	Louisiana State University and A & M College	3 Years	Effect of Rheology on Co-Current Non-Newtonian Liquid and Gas Two Phase Flow in Annuli	\$52,500.00	\$49,500.00	\$48,500.00	\$150,500.00
017A-17	Prof. Jin-Woo Choi	RCS One-Year Research Component	Louisiana State University and A & M College	1 Year	A Nanomaterial-Based Photonic Sensor	\$20,000.00	\$0.00	\$0.00	\$20,000.00
018A-17	Dr. HYUNJU CHUNG	Research Competitiveness Subprogram [RCS]	Louisiana State University and A & M College	3 Years	Semivowel errors as Speech Sound Disorders diagnostic marker	\$60,698.00	\$57,748.00	\$57,498.00	\$175,944.00
019A-17	Dr. Arash Dahi Taleghani	Research Competitiveness Subprogram [RCS]	Louisiana State University and A & M College	3 Years	A Novel Continuum Damage Based Model for In-Situ Determination of Rock Properties with Application for Drill Bit Design	\$50,975.00	\$46,735.00	\$45,735.00	\$143,445.00
020A-17	Dr. Joyoni Dey	RCS One-Year Research Component	Louisiana State University and A & M College	1 Year	A Novel Bayesian-Inference Based Reconstruction For Time/Dose Reduction in Cardiac-SPECT	\$20,000.00	\$0.00	\$0.00	\$20,000.00
021A-17	Prof. Kunlun Ding	Research Competitiveness Subprogram [RCS]	Louisiana State University and A & M College	3 Years	Developing high-performance catalytic materials for low-temperature carbon monoxide removal	\$61,349.00	\$58,349.00	\$56,849.00	\$176,547.00
022A-17	Dr. William Doerrler	RCS One-Year Research Component	Louisiana State University and A & M College	1 Year	Role of a conserved membrane protein family in providing bacterial resistance to an antibiotic of last resort	\$20,000.00	\$0.00	\$0.00	\$20,000.00
023A-17	Dr. Ellen Duncan	Research Competitiveness Subprogram [RCS]	Louisiana State University and A & M College	3 Years	Clinical feasibility of transcranial direct current stimulation [tDCS] with standard aphasia therapy	\$73,994.00	\$65,461.00	\$55,506.00	\$194,961.00
024A-17	Dr. Jiming Feng	Research Competitiveness Subprogram [RCS]	Louisiana State University and A & M College	3 Years	The role of golgi protein in experimental autoimmune encephalomyelitis [EAE]	\$90,000.00	\$60,000.00	\$50,000.00	\$200,000.00
025A-17	Dr. Manas Ranjan Gartia	Research Competitiveness Subprogram [RCS]	Louisiana State University and A & M College	3 Years	Dipole-Photonic-Plasmonic Resonance Energy Transfer [DiP-PRET] for injection seeded amplification	\$52,375.00	\$52,095.00	\$51,884.00	\$156,354.00
026A-17	Dr. Ipsita Gupta	Research Competitiveness Subprogram [RCS]	Louisiana State University and A & M College	3 Years	Understanding rock/fluid interactions through numerical simulations - diagenetic controls, impact and applications.	\$51,245.00	\$50,650.00	\$41,450.00	\$143,345.00
027A-17	Prof. Louis Haber	Research Competitiveness Subprogram [RCS]	Louisiana State University and A & M College	3 Years	Ultrafast and Nonlinear Spectroscopy of Colloidal Nanoparticles	\$68,394.00	\$47,928.00	\$46,928.00	\$163,250.00
028A-17	Dr. Daphne Hartzheim	Research Competitiveness Subprogram [RCS]	Louisiana State University and A & M College	3 Years	Effect of Treatment Intensity on Nonverbal Children with Autism Spectrum Disorders	\$66,149.00	\$65,349.00	\$63,474.00	\$194,972.00
029A-17	Prof. Navid Jafari	Research Competitiveness Subprogram [RCS]	Louisiana State University and A & M College	3 Years	Multi-phase Modeling of Elevated Landfill Temperature Events in Municipal Solid Waste Landfills	\$57,850.00	\$53,750.00	\$52,250.00	\$163,850.00
030A-17	Dr. Hyun Woo Jeon	Research Competitiveness Subprogram [RCS]	Louisiana State University and A & M College	3 Years	Measuring Power Demand Risks on Manufacturing Operations	\$58,249.00	\$55,749.00	\$53,249.00	\$167,247.00

Proposals Submitted to the Research and Development Program - RCS
for the FY 2016-17 Review Cycle

Proposal #	PI Name	Category	Institution	Duration	Project Title	Amount Requested			
						Year 1	Year 2	Year 3	Total
031A-17	Prof. Jangwook Jung	Research Competitiveness Subprogram [RCS]	Louisiana State University and A & M College	2 Years	Enhanced recruitment and differentiation of cardiac progenitors via optimized engagement of 3D extracellular matrices	\$78,999.00	\$77,999.00	\$0.00	\$156,998.00
032A-17	Prof. Rendy Kartika	RCS One-Year Research Component	Louisiana State University and A & M College	1 Year	New Synthetic Methodologies towards Biologically Relevant Heterocyclic Compounds	\$20,000.00	\$0.00	\$0.00	\$20,000.00
033A-17	Dr. Yongcheol Lee	Research Competitiveness Subprogram [RCS]	Louisiana State University and A & M College	3 Years	Semantic modules and validation logic for interoperable data exchanges of building information models	\$52,649.00	\$52,149.00	\$51,649.00	\$156,447.00
034A-17	Prof. Xin Li	RCS One-Year Research Component	Louisiana State University and A & M College	1 Year	Reliable 4D Scene Restoration from Partially Scanned Fragments for Virtual Reality Applications	\$20,000.00	\$0.00	\$0.00	\$20,000.00
035A-17	Dr. Junhong Liang	RCS One-Year Research Component	Louisiana State University and A & M College	1 Year	Development of a modeling framework for spilled oil and marine organisms in the turbulent upper ocean	\$20,000.00	\$0.00	\$0.00	\$20,000.00
036A-17	Dr. Chuanlan Liu	RCS One-Year Research Component	Louisiana State University and A & M College	1 Year	Maintaining Healthy Wetland Ecology through Entrepreneurship: An Exploratory Case Study on Identifying Business Opportunities for Promoting Louisiana Produced Slightly Flawed Alligator Skins in the Global Market	\$19,990.00	\$0.00	\$0.00	\$19,990.00
037A-17	Prof. Michael MacLellan	Research Competitiveness Subprogram [RCS]	Louisiana State University and A & M College	3 Years	Neuromuscular Coordination Across the Upper and Lower Limbs following Stroke	\$71,235.00	\$69,235.00	\$56,590.00	\$197,060.00
038A-17	Dr. Elizabeth Martin	Research Competitiveness Subprogram [RCS]	Louisiana State University and A & M College	2 Years	Evaluation of Breast Cancer Sub-type Specific Tumor Matrix through a Tissue Decellularization Model	\$45,789.00	\$42,599.00	\$0.00	\$88,388.00
039A-17	Prof. Kevin McPeak	Research Competitiveness Subprogram [RCS]	Louisiana State University and A & M College	3 Years	Visible-Light-Driven Plasmonic Water Purification	\$65,750.00	\$64,127.00	\$62,904.00	\$192,781.00
040A-17	Prof. Adam Melvin	RCS One-Year Research Component	Louisiana State University and A & M College	1 Year	Microfluidic determination of the effect of fluid shear stress on circulating tumor cells	\$20,000.00	\$0.00	\$0.00	\$20,000.00
041A-17	Prof. Xuelian Meng	Research Competitiveness Subprogram [RCS]	Louisiana State University and A & M College	3 Years	Monitor 3D sediment morphological changes under densely vegetated coastal environment through vegetation crown structures and ground elevation samples	\$66,846.00	\$61,738.00	\$59,957.00	\$188,541.00
042A-17	Dr. Shyam Menon	Research Competitiveness Subprogram [RCS]	Louisiana State University and A & M College	3 Years	Investigation of fuel spray processes for novel combustion engines and fuels using a rapid compression machine	\$52,375.00	\$49,375.00	\$47,375.00	\$149,125.00
043A-17	Prof. Supratik Mukhopadhyay	RCS One-Year Research Component	Louisiana State University and A & M College	1 Year	SpotCheck: An AI-based System for Automatic Online Non-invasive Diagnosis of Manufacturing Machinery	\$20,000.00	\$0.00	\$0.00	\$20,000.00
044A-17	Prof. Lu Peng	RCS One-Year Research Component	Louisiana State University and A & M College	1 Year	Accelerating GPU Hardware Transactional Memory with Snapshot Isolation	\$20,000.00	\$0.00	\$0.00	\$20,000.00
045A-17	Dr. Patricia Persaud	Research Competitiveness Subprogram [RCS]	Louisiana State University and A & M College	2 Years	OASIS: The Ogallala Aquifer Seismic Interferometry Study, a novel method for monitoring aquifer recharge through playa lakes	\$67,416.00	\$64,152.00	\$0.00	\$131,568.00

Proposals Submitted to the Research and Development Program - RCS
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						Year 1	Year 2	Year 3	Total
046A-17	Dr. Michael Polito	RCS One-Year Research Component	Louisiana State University and A & M College	1 Year	A multi-method assessment of the diet of expanding New England seal populations	\$18,000.00	\$0.00	\$0.00	\$18,000.00
047A-17	Dr. Samuel Snow	Research Competitiveness Subprogram [RCS]	Louisiana State University and A & M College	3 Years	Development of Materials for Combined Photocatalysis and Adsorption	\$55,000.00	\$50,000.00	\$45,000.00	\$150,000.00
048A-17	Dr. Brian Snyder	Research Competitiveness Subprogram [RCS]	Louisiana State University and A & M College	3 Years	A Long Term Study of Household Water Quality in the Haynesville Shale	\$76,588.00	\$77,282.00	\$39,936.00	\$193,806.00
049A-17	Dr. Chao Sun	Research Competitiveness Subprogram [RCS]	Louisiana State University and A & M College	3 Years	Integrated Vibration Control and Self-Powered Condition Sensing of Offshore Wind Turbines	\$47,850.00	\$47,700.00	\$46,208.00	\$141,758.00
050A-17	Dr. Mingxuan Sun	Research Competitiveness Subprogram [RCS]	Louisiana State University and A & M College	3 Years	Computational Methods for Visualizing and Analyzing Big Preference Data: Theory and Applications	\$56,749.00	\$52,749.00	\$51,749.00	\$161,247.00
051A-17	Dr. Ryoichi Teruyama	RCS One-Year Research Component	Louisiana State University and A & M College	1 Year	Sexually dimorphic oxytocin receptor expressing neurons in the hypothalamus	\$20,000.00	\$0.00	\$0.00	\$20,000.00
052A-17	Prof. Georgios Veronis	RCS One-Year Research Component	Louisiana State University and A & M College	1 Year	Tunable graphene-based multispectral photodetectors, mode converters, and optical diodes	\$20,000.00	\$0.00	\$0.00	\$20,000.00
053A-17	Dr. David Vinyard	Research Competitiveness Subprogram [RCS]	Louisiana State University and A & M College	3 Years	Mechanisms of assembly and water oxidation in the active site of photosynthetic oxygen evolution	\$66,513.00	\$65,514.00	\$65,059.00	\$197,086.00
054A-17	Dr. Chao Wang	Research Competitiveness Subprogram [RCS]	Louisiana State University and A & M College	3 Years	Dynamic 3D Modeling of Industrial Plant Noise Hazards	\$63,900.00	\$58,900.00	\$40,900.00	\$163,700.00
055A-17	Dr. ZIMENG WANG	Research Competitiveness Subprogram [RCS]	Louisiana State University and A & M College	3 Years	Environmental Redox Chemistry of Soluble Mn(III): Potential Game Changer of Subsurface Biogeochemical Dynamics	\$53,500.00	\$47,500.00	\$47,500.00	\$148,500.00
056A-17	Prof. Hsiao-Chun Wu	RCS One-Year Research Component	Louisiana State University and A & M College	1 Year	Novel Unmanned Aerial Vehicle Aided Simultaneous Localization and Navigation Technology	\$20,000.00	\$0.00	\$0.00	\$20,000.00
057A-17	Dr. Weiwei Xie	Research Competitiveness Subprogram [RCS]	Louisiana State University and A & M College	3 Years	Design and Synthesis of Superconducting Materials via Geometrical and Electronic Links in Solids	\$49,200.00	\$45,600.00	\$43,250.00	\$138,050.00
058A-17	Prof. Jian Xu	Research Competitiveness Subprogram [RCS]	Louisiana State University and A & M College	3 Years	Design Biomimetic Eco-friendly Energy Transducers Using Natural Nanoconductors	\$48,999.00	\$47,499.00	\$46,499.00	\$142,997.00
059A-17	Dr. Zuo Xue	Research Competitiveness Subprogram [RCS]	Louisiana State University and A & M College	3 Years	Development of a Fully- Coupled End- to- End Marine Ecosystem Model for the Northern Gulf of Mexico	\$48,810.00	\$47,100.00	\$44,100.00	\$140,010.00
060A-17	Dr. Seungwon Yang	Research Competitiveness Subprogram [RCS]	Louisiana State University and A & M College	3 Years	Developing an Interactive Digital Archive of Heterogeneous Data for Coastal Erosion (iDACE)	\$53,500.00	\$50,000.00	\$48,500.00	\$152,000.00

Proposals Submitted to the Research and Development Program - RCS
for the FY 2016-17 Review Cycle

Proposal #	PI Name	Category	Institution	Duration	Project Title	Amount Requested			
						Year 1	Year 2	Year 3	Total
061A-17	Dr. Xiuping Zhu	Research Competitiveness Subprogram [RCS]	Louisiana State University and A & M College	3 Years	Development of novel battery systems to harvest salinity gradient energy between seawater and river water	\$54,500.00	\$43,500.00	\$40,500.00	\$138,500.00
062A-17	Dr. Elizabeth Disbrow	RCS One-Year Research Component	Louisiana State University Health Sciences Center Shreveport	1 Year	Race and Cognitive Decline in Parkinson's Disease	\$20,000.00	\$0.00	\$0.00	\$20,000.00
063A-17	Dr. Hung Wen (Kevin) Lin	Research Competitiveness Subprogram [RCS]	Louisiana State University Health Sciences Center Shreveport	3 Years	Fatty acids and brain ischemia	\$50,000.00	\$50,000.00	\$50,000.00	\$150,000.00
064A-17	Dr. Xiao-Hong Lu	Research Competitiveness Subprogram [RCS]	Louisiana State University Health Sciences Center Shreveport	3 Years	Single-Neuron Genetic Interrogation of the Role of human VIPR2 Copy Number Variation on Development and Function of Cognitive Neural Circuits	\$53,750.00	\$53,750.00	\$53,750.00	\$161,250.00
065A-17	Dr. Xingui Shen	Research Competitiveness Subprogram [RCS]	Louisiana State University Health Sciences Center Shreveport	3 Years	Hydrogen sulfide therapy in diabetes type 1	\$61,050.00	\$66,550.00	\$67,650.00	\$195,250.00
066A-17	Dr. Amy Erickson	RCS One-Year Research Component	Louisiana State University in Shreveport	1 Year	Allelopathic effects of common aquatic plants on the invasive water fern <i>Salvinia molesta</i>	\$20,000.00	\$0.00	\$0.00	\$20,000.00
067A-17	Prof. Elahe Mahdavian	Research Competitiveness Subprogram [RCS]	Louisiana State University in Shreveport	3 Years	Novel Targeted Kinase Inhibitors Based on Fusarochromanone	\$68,635.00	\$64,696.00	\$52,898.00	\$186,229.00
068A-17	Dr. Hamzeh Bardaweel	Research Competitiveness Subprogram [RCS]	Louisiana Tech University	3 Years	Design and development of a nonlinear broadband magnetically levitated vibration energy harvester	\$53,995.00	\$52,658.00	\$52,345.00	\$158,998.00
069A-17	Dr. Rakitha Beminiwattha	Research Competitiveness Subprogram [RCS]	Louisiana Tech University	3 Years	Design and Development of Computational Analysis and Modeling Software Frameworks for Nuclear and Particle Physics Experiments	\$52,778.00	\$49,849.00	\$42,943.00	\$145,570.00
070A-17	Prof. Jinyuan Chen	Research Competitiveness Subprogram [RCS]	Louisiana Tech University	3 Years	Information-Theoretic Secrecy for Wireless Networks: From Degrees-of-Freedom to Constant-Gap Capacity Approximations	\$51,725.00	\$51,593.00	\$51,589.00	\$154,907.00
071A-17	Dr. Natalie Clay	RCS One-Year Research Component	Louisiana Tech University	1 Year	Regulation of sodium and protein in common herbivores	\$20,000.00	\$0.00	\$0.00	\$20,000.00
072A-17	Dr. Jennifer Hill	Research Competitiveness Subprogram [RCS]	Louisiana Tech University	3 Years	The impacts of sub-lethal pesticide concentrations on predator-prey interactions in marine and freshwater communities	\$71,975.00	\$59,254.00	\$57,896.00	\$189,125.00
073A-17	Dr. Bryant Hollins	Research Competitiveness Subprogram [RCS]	Louisiana Tech University	3 Years	A robust multiplexed microfluidic device for protein carbonylation assessment	\$52,113.00	\$49,569.00	\$46,536.00	\$148,218.00
074A-17	Dr. Jun-Ing Ker	RCS One-Year Research Component	Louisiana Tech University	1 Year	A Just-in-time Product Centered Approach to Enhance Industrial Engineering Education	\$19,500.00	\$0.00	\$0.00	\$19,500.00
075A-17	Dr. Joan Lynam	Research Competitiveness Subprogram [RCS]	Louisiana Tech University	3 Years	Deep Eutectic Solvents for Deconstruction of Rice Hulls and Sugarcane Bagasse	\$52,560.00	\$52,848.00	\$53,459.00	\$158,867.00

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						Year 1	Year 2	Year 3	Total
076A-17	Dr. Mahboubeh Madadi	Research Competitiveness Subprogram [RCS]	Louisiana Tech University	3 Years	Breast cancer preventive care for women with high breast density	\$52,468.00	\$53,071.00	\$43,699.00	\$149,238.00
077A-17	Prof. Kasra Momeni	Research Competitiveness Subprogram [RCS]	Louisiana Tech University	3 Years	A Multiscale Approach to Modeling 2D Materials: From Nanoscale to Continuum	\$47,046.00	\$44,105.00	\$42,525.00	\$133,676.00
078A-17	Prof. Arden Moore	Research Competitiveness Subprogram [RCS]	Louisiana Tech University	3 Years	Achieving Enhanced Mechanical and Thermal Properties in High Throughput Nanoparticle/Polymer Composite Micro- and Nanofibers via Controlled Promotion of Local Crystallinity	\$43,614.00	\$40,939.00	\$39,276.00	\$123,829.00
079A-17	Dr. Scott Poh	Research Competitiveness Subprogram [RCS]	Louisiana Tech University	3 Years	Suppression of Cartilage Inflammation by Targeted PEGylated Polyamidoamine Dendrimer	\$63,981.00	\$38,614.00	\$40,648.00	\$143,243.00
080A-17	Dr. Donald Shepard	RCS One-Year Research Component	Louisiana Tech University	1 Year	Connectivity of Salamander Populations in Stream Networks	\$20,000.00	\$0.00	\$0.00	\$20,000.00
081A-17	Dr. Tom Stafford	Research Competitiveness Subprogram [RCS]	Louisiana Tech University	3 Years	Neurocognitive Assessment of Motivations for Cybersecurity Behaviors	\$78,511.00	\$24,536.00	\$25,213.00	\$128,260.00
082A-17	Dr. Sanjay Tewari	Research Competitiveness Subprogram [RCS]	Louisiana Tech University	3 Years	Electrokinetic in-situ remediation of high water table soils contaminated with heavy metals	\$56,603.00	\$46,728.00	\$47,876.00	\$151,207.00
083A-17	Dr. Christine Heinecke	Research Competitiveness Subprogram [RCS]	Loyola University New Orleans	3 Years	Development of Novel Antimicrobial Gold Clusters	\$57,777.00	\$38,142.00	\$37,738.00	\$133,657.00
084A-17	Dr. Craig Hood	RCS One-Year Research Component	Loyola University New Orleans	1 Year	Biodiversity and Ecological Resilience of Bat Communities in Natural and Urbanized areas in Greater New Orleans coupled with Citizen Science	\$19,938.00	\$0.00	\$0.00	\$19,938.00
085A-17	Prof. Qian Qin	Research Competitiveness Subprogram [RCS]	Loyola University New Orleans	3 Years	New Organic Superconducting Materials from Sulfur-rich Aromatic Molecules	\$47,483.00	\$37,241.00	\$37,253.00	\$121,977.00
086A-17	Dr. Clifton Stephenson	Research Competitiveness Subprogram [RCS]	Loyola University New Orleans	3 Years	Development of asymmetric xanthene derivatives as chiral sensors	\$52,144.00	\$44,087.00	\$28,685.00	\$124,916.00
087A-17	Dr. Christos Douvris	Research Competitiveness Subprogram [RCS]	McNeese State University	2 Years	Synthesis of New Rhodium and Iridium Complexes, bearing Carborane and Borane Weakly Coordinating Anions, for Use in Bond Activation and Catalytic Functionalization of Simple Alkanes	\$31,040.00	\$26,040.00	\$0.00	\$57,080.00
088A-17	Dr. Kaisar Khan	Research Competitiveness Subprogram [RCS]	McNeese State University	3 Years	Design and Testing of Robust Multiphase Brushless DC Motor for Industrial Pumping Application	\$37,750.00	\$34,000.00	\$34,000.00	\$105,750.00
089A-17	Prof. Ning Zhang	Research Competitiveness Subprogram [RCS]	McNeese State University	2 Years	A Comprehensive Study of the Flow Physics near Flexible Marsh Grasses under Different Wave Conditions for Determinations of Wetland Friction Coefficients	\$39,475.00	\$39,475.00	\$0.00	\$78,950.00
090A-17	Dr. Christopher Bonvillian	RCS One-Year Research Component	Nicholls State University	1 Year	Distribution, population status, and habitat assessment of crayfishes, with emphasis on species of concern, in the eastern Florida parishes of Louisiana	\$19,800.00	\$0.00	\$0.00	\$19,800.00

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091A-17	Dr. Mallory Cortez	RCS One-Year Research Component	Nicholls State University	1 Year	Incorporation of Poly[2-deoxy-2-methacrylamido glucopyranose] to Adenovirus Gene Therapy Vectors as a Stealthy Delivery System	\$20,000.00	\$0.00	\$0.00	\$20,000.00
092A-17	Dr. Sean Graham	Research Competitiveness Subprogram [RCS]	Nicholls State University	3 Years	Multi-decade Scale Effects of Nutrient Enrichment on Soil Carbon Dynamics in Coastal Wetlands	\$65,835.00	\$60,191.00	\$21,452.00	\$147,478.00
093A-17	Dr. Uttam Pokharel	RCS One-Year Research Component	Nicholls State University	1 Year	Organometallic polyacenes for organic opto-electronic applications	\$20,000.00	\$0.00	\$0.00	\$20,000.00
094A-17	Prof. John Apolzan	Research Competitiveness Subprogram [RCS]	Pennington Biomedical Research Center	3 Years	Effects of a liquid low calorie diet on brain function and craving in obese teens	\$58,333.00	\$58,334.00	\$58,333.00	\$175,000.00
095A-17	Prof. Gary Childers	RCS One-Year Research Component	Southeastern Louisiana University	1 Year	Development and Validation of Sampling Methods for Home Water Distribution Systems for use with Next Generation Sequencing	\$18,000.00	\$0.00	\$0.00	\$18,000.00
096A-17	Dr. Wesley Deneke	RCS One-Year Research Component	Southeastern Louisiana University	1 Year	Developing a Prototype for Human Workflow Recognition	\$16,500.00	\$0.00	\$0.00	\$16,500.00
097A-17	Dr. Holly Kihm	Research Competitiveness Subprogram [RCS]	Southeastern Louisiana University	3 Years	Project I-PAL: Assessing and Promoting Physical Fitness and Mindfulness for Young Children using a Real World Ready University Classroom Approach	\$66,167.00	\$62,298.00	\$63,539.00	\$192,004.00
098A-17	Dr. Meghan Savage	Research Competitiveness Subprogram [RCS]	Southeastern Louisiana University	2 Years	Barriers to rehabilitation after stroke: The impact of communication training programs in a healthcare setting	\$65,578.00	\$51,532.00	\$0.00	\$117,110.00
099A-17	Dr. Benjamin Wicker	Research Competitiveness Subprogram [RCS]	Southeastern Louisiana University	3 Years	Synthesis of Novel Cationic Ligands for Use in Catalysis	\$78,890.00	\$63,129.00	\$43,699.00	\$185,718.00
100A-17	Dr. Victor Mbarika	RCS One-Year Research Component	Southern University and A&M College - Baton Rouge	1 Year	Using Social Learning Theory to Investigate Mobile Phone Adoption in the Fight against Female Genital Mutilation in Sub-Saharan Africa	\$19,958.00	\$0.00	\$0.00	\$19,958.00
101A-17	Dr. Carolyn Bayer	Research Competitiveness Subprogram [RCS]	Tulane University	3 Years	Imaging Placental Transport of Folate	\$55,943.00	\$53,820.00	\$51,208.00	\$160,971.00
102A-17	Prof. Emily Farrer	Research Competitiveness Subprogram [RCS]	Tulane University	3 Years	Global change and plant invasions: will microbes enhance invasion in a changing world?	\$60,000.00	\$56,000.00	\$4,000.00	\$120,000.00
103A-17	Dr. Fenglei He	Research Competitiveness Subprogram [RCS]	Tulane University	3 Years	Characterizing the role of PDGFRA in chondrocranium development	\$62,521.00	\$65,183.00	\$69,083.00	\$196,787.00
104A-17	Prof. Hai Huang	Research Competitiveness Subprogram [RCS]	Tulane University	3 Years	Activity-dependent regulation of vesicular glutamate transport	\$65,000.00	\$65,000.00	\$65,000.00	\$195,000.00
105A-17	Dr. Julie Markant	Research Competitiveness Subprogram [RCS]	Tulane University	3 Years	Dopaminergic mechanisms of attentional learning during infant development	\$49,156.00	\$49,839.00	\$47,560.00	\$146,555.00

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106A-17	Dr. Kristin Miller	Research Competitiveness Subprogram [RCS]	Tulane University	3 Years	Delineating the Contribution of Elastin to Evolving Cervical Integrity During Pregnancy	\$61,236.00	\$60,236.00	\$57,736.00	\$179,208.00
107A-17	Prof. Nicholas Sandoval	Research Competitiveness Subprogram [RCS]	Tulane University	3 Years	High-throughput and trackable transcriptional repression and activation for investigation of complex phenotypes in non-model microbes	\$50,050.00	\$49,550.00	\$47,550.00	\$147,150.00
108A-17	Prof. Zizhan Zheng	Research Competitiveness Subprogram [RCS]	Tulane University	2 Years	Towards Optimal Timing in Cyber Defense: A Game Theoretic and Learning Approach	\$54,833.00	\$52,208.00	\$0.00	\$107,041.00
109A-17	Dr. TIONG GIM AW	Research Competitiveness Subprogram [RCS]	Tulane University Health Sciences Center	3 Years	Advancing next generation genomic tools for discovery of the watershed microbiome	\$65,454.00	\$55,920.00	\$46,901.00	\$168,275.00
110A-17	Prof. Stacy Drury	RCS One-Year Research Component	Tulane University Health Sciences Center	1 Year	REACHnet Pediatric Clinical Trials Network	\$20,000.00	\$0.00	\$0.00	\$20,000.00
111A-17	Dr. Eric Dumonteil	Research Competitiveness Subprogram [RCS]	Tulane University Health Sciences Center	3 Years	Next generation sequencing and metabarcoding as a novel approach for the molecular epidemiology of Trypanosoma cruzi transmission	\$86,450.00	\$60,800.00	\$27,750.00	\$175,000.00
112A-17	Dr. Loren Gragert	Research Competitiveness Subprogram [RCS]	Tulane University Health Sciences Center	3 Years	The Role of Immune Gene Variation in Severe Aplastic Anemia among Diverse Populations	\$63,053.00	\$61,524.00	\$59,230.00	\$183,807.00
113A-17	Dr. Jeffrey Han	RCS One-Year Research Component	Tulane University Health Sciences Center	1 Year	The role of L1 retrotransposition in mammalian infertility	\$20,000.00	\$0.00	\$0.00	\$20,000.00
114A-17	Dr. Sean Lee	Research Competitiveness Subprogram [RCS]	Tulane University Health Sciences Center	3 Years	Targeted kinase inhibition as a novel therapy for an incurable childhood cancer	\$70,797.00	\$67,292.00	\$60,474.00	\$198,563.00
115A-17	Dr. Jian Li	Research Competitiveness Subprogram [RCS]	Tulane University Health Sciences Center	2 Years	Integrating liquid biopsy data of multiple types and sources for improving cancer monitoring and diagnosis	\$49,207.00	\$50,684.00	\$0.00	\$99,891.00
116A-17	Dr. Yao-Zhong Liu	Research Competitiveness Subprogram [RCS]	Tulane University Health Sciences Center	3 Years	Sequencing neutrophil transcriptome and blood microbiome for chronic periodontitis	\$50,000.00	\$50,000.00	\$50,000.00	\$150,000.00
117A-17	Dr. LISA MORICI	Research Competitiveness Subprogram [RCS]	Tulane University Health Sciences Center	3 Years	Antimicrobial membrane vesicles as an alternative treatment for multidrug resistant bacterial infection	\$53,091.00	\$46,040.00	\$58,004.00	\$157,135.00
118A-17	Dr. Samendra Sherchan	Research Competitiveness Subprogram [RCS]	Tulane University Health Sciences Center	3 Years	Occurrence, Fate and Treatment of Naegleria fowleri in premise plumbing and water distribution systems	\$51,996.00	\$52,696.00	\$49,030.00	\$153,722.00
119A-17	Dr. Sheng Chen	Research Competitiveness Subprogram [RCS]	University of Louisiana at Lafayette	3 Years	Language and Runtime Supports for Variational Execution	\$58,349.00	\$57,220.00	\$53,914.00	\$169,483.00
120A-17	Dr. Gregory Davis	RCS One-Year Research Component	University of Louisiana at Lafayette	1 Year	Role of Chronic Aerobic Exercise in Fibroblast Growth Factor 21 Regulation and Signaling	\$18,780.00	\$0.00	\$0.00	\$18,780.00

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121A-17	Dr. Dilip Depan	Research Competitiveness Subprogram [RCS]	University of Louisiana at Lafayette	3 Years	Designing of Synthetic Extracellular Matrix (ECM) to Understand the Role of ECM Stiffness Towards Tumor Regrowth	\$59,714.00	\$67,514.00	\$72,569.00	\$199,797.00
122A-17	Prof. Khalid Elgazzar	Research Competitiveness Subprogram [RCS]	University of Louisiana at Lafayette	3 Years	Dynamic Access Control in IoT Deployments	\$71,224.00	\$61,585.00	\$65,394.00	\$198,203.00
123A-17	Prof. Yin Feng	Research Competitiveness Subprogram [RCS]	University of Louisiana at Lafayette	3 Years	Exploration of A Robust and Efficient Algorithm for Fluid Flow in Complex Fracture Network	\$42,774.00	\$35,606.00	\$30,300.00	\$108,680.00
124A-17	Dr. Scott Fuller	RCS One-Year Research Component	University of Louisiana at Lafayette	1 Year	The Effect of a Ketogenic Diet on Substrate Metabolism and Glucose Homeostasis in Exercise-Trained Mice	\$18,731.00	\$0.00	\$0.00	\$18,731.00
125A-17	Dr. Aubrey Hillman	RCS One-Year Research Component	University of Louisiana at Lafayette	1 Year	Developing an Understanding of Nutrient Loading, Metal Contamination, and Sediment Delivery to Lakes in Southwestern Louisiana	\$19,050.00	\$0.00	\$0.00	\$19,050.00
126A-17	Dr. Aminul Islam	Research Competitiveness Subprogram [RCS]	University of Louisiana at Lafayette	3 Years	Finding an Association of a Disease from Data	\$67,544.00	\$63,433.00	\$50,386.00	\$181,363.00
127A-17	Dr. Lulin Jiang	Research Competitiveness Subprogram [RCS]	University of Louisiana at Lafayette	3 Years	Design and Analysis of a Fuel-Flexible Combustion System for Green Power and Propulsion: a Novel Approach to Unleash Widespread Use of Biofuels	\$62,522.00	\$67,281.00	\$67,280.00	\$197,083.00
128A-17	Dr. Ritwij Kulkarni	Research Competitiveness Subprogram [RCS]	University of Louisiana at Lafayette	3 Years	Secondhand Cigarette Smoke Promotes Virulence in Upper Airway Bacteria	\$59,217.00	\$59,493.00	\$59,778.00	\$178,488.00
129A-17	Dr. Arun Kulshreshth	Research Competitiveness Subprogram [RCS]	University of Louisiana at Lafayette	3 Years	Improving Education and Training Through Video Games and Virtual Reality	\$71,336.00	\$69,864.00	\$52,571.00	\$193,771.00
130A-17	Dr. Sun-A Lee	RCS One-Year Research Component	University of Louisiana at Lafayette	1 Year	Cross-Cultural Study of Parental Psychological Control and Adolescents' Mental Health	\$19,960.00	\$0.00	\$0.00	\$19,960.00
131A-17	Dr. Febee Louka	RCS One-Year Research Component	University of Louisiana at Lafayette	1 Year	Investigating the Efficiency of Ecofriendly Adsorbents as Polycyclic Aromatic Hydrocarbons Extractors	\$19,839.00	\$0.00	\$0.00	\$19,839.00
132A-17	Dr. Jonathan Raush	Research Competitiveness Subprogram [RCS]	University of Louisiana at Lafayette	3 Years	Measurement and Prediction of Thermophysical and Thermochemical Properties of Liquid Metal Alloys	\$43,144.00	\$43,084.00	\$44,721.00	\$130,949.00
133A-17	Dr. Emmanuel Revellame	Research Competitiveness Subprogram [RCS]	University of Louisiana at Lafayette	3 Years	Surfactant-based Extraction of Volatile Organic Acids from Anaerobic Digestion of Wastes	\$56,685.00	\$62,536.00	\$63,434.00	\$182,655.00
134A-17	Dr. Shuichi Sato	Research Competitiveness Subprogram [RCS]	University of Louisiana at Lafayette	3 Years	The effect of Yes-associated protein YAP during the development of cancer cachexia	\$39,826.00	\$58,090.00	\$38,264.00	\$136,180.00
135A-17	Prof. Beth Stauffer	Research Competitiveness Subprogram [RCS]	University of Louisiana at Lafayette	3 Years	Connectivity of phytoplankton communities across an estuarine gradient: insights into phytoplankton ecology and implications for management	\$30,410.00	\$36,045.00	\$48,813.00	\$115,268.00

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136A-17	Dr. Ramalingam Subramaniam	Research Competitiveness Subprogram [RCS]	University of Louisiana at Lafayette	3 Years	Microbial polysaccharides synthesis and characterization for pharmaceutical, cosmeceutical and nutraceutical potential	\$59,026.00	\$59,261.00	\$59,496.00	\$177,783.00
137A-17	Dr. Jovan Tatar	Research Competitiveness Subprogram [RCS]	University of Louisiana at Lafayette	3 Years	Nanoengineered Epoxy Adhesives for Use in Environmentally Challenging Infrastructure Applications	\$56,620.00	\$52,985.00	\$53,225.00	\$162,830.00
138A-17	Dr. Xiang-Sheng Wang	Research Competitiveness Subprogram [RCS]	University of Louisiana at Lafayette	3 Years	Optimal control of avian influenza transmission	\$36,563.00	\$35,380.00	\$34,196.00	\$106,139.00
139A-17	Dr. Yu Wang	Research Competitiveness Subprogram [RCS]	University of Louisiana at Lafayette	3 Years	Controlled Polymer Synthesis Towards the Precision of Biomacromolecules	\$66,150.00	\$61,691.00	\$61,884.00	\$189,725.00
140A-17	Dr. Hui Yan	Research Competitiveness Subprogram [RCS]	University of Louisiana at Lafayette	3 Years	Investigating reaction mechanism of water-gas shift reaction on mesoporous ceria-based catalysts	\$48,211.00	\$53,758.00	\$56,369.00	\$158,338.00
141A-17	Dr. Peng Yin	Research Competitiveness Subprogram [RCS]	University of Louisiana at Lafayette	3 Years	Thermal Body Language: An Innovative Approach to Real-time Evaluation of Thermal Comfort for Indoor Environmental Control	\$47,794.00	\$58,282.00	\$57,521.00	\$163,597.00
142A-17	Dr. Pengfei Zhang	Research Competitiveness Subprogram [RCS]	University of Louisiana at Lafayette	3 Years	Self-healing of Composites under Various Fracture Modes and Monitoring of Crack Healing by Lamb Wave based Non-destructive Testing	\$66,635.00	\$66,851.00	\$64,519.00	\$198,005.00
143A-17	Dr. Qian Zhang	Research Competitiveness Subprogram [RCS]	University of Louisiana at Lafayette	3 Years	Mitigating Elevated Temperature Effect on Engineered Cementitious Composites (ECC) Through The Use of High Temperature Resistant Fibers and Nanofibers	\$65,620.00	\$59,626.00	\$57,770.00	\$183,016.00
144A-17	Dr. Georgios Matthaiolampakis	Research Competitiveness Subprogram [RCS]	University of Louisiana at Monroe	3 Years	Role and therapeutic potential of miR-30a in Pancreatic Cancer	\$40,000.00	\$46,875.00	\$35,000.00	\$121,875.00
145A-17	Dr. Siva Murru	Research Competitiveness Subprogram [RCS]	University of Louisiana at Monroe	3 Years	Development of Novel Catalytic Methods for the C-H Functionalization using Base Metal Catalysts	\$44,536.00	\$43,536.00	\$43,536.00	\$131,608.00
146A-17	Dr. Allison Wiedemeier	RCS One-Year Research Component	University of Louisiana at Monroe	1 Year	Host range and biofilm interaction studies of bacteriophages used to identify possible biocontrol agents of Rhizobium radiobacter, Rhizobium vitis and Rhizobium rhizogenes	\$20,000.00	\$0.00	\$0.00	\$20,000.00
147A-17	Dr. Ebrahim Amiri	Research Competitiveness Subprogram [RCS]	University of New Orleans	3 Years	Design, optimization and development of Two-Speed Line Start Permanent Magnet Synchronous Motor for offshore and maritime applications	\$59,325.00	\$61,968.00	\$46,634.00	\$167,927.00
148A-17	Dr. Shaikh Arifuzzaman	Research Competitiveness Subprogram [RCS]	University of New Orleans	3 Years	Scalable Community Detection in Big Social and Information Networks using Hidden Centrality Measures	\$65,836.00	\$66,331.00	\$66,331.00	\$198,498.00
149A-17	Dr. Joel Atallah	Research Competitiveness Subprogram [RCS]	University of New Orleans	3 Years	The analysis of gene regulatory evolution using transcriptomic time courses of early embryos of Drosophila species	\$60,973.00	\$58,991.00	\$55,400.00	\$175,364.00
150A-17	Dr. Sandip Chakrabarti	RCS One-Year Research Component	University of New Orleans	1 Year	Travel mode choice and physical inactivity in Louisiana: Insights from nationwide surveys, and strategies to promote public health	\$20,000.00	\$0.00	\$0.00	\$20,000.00

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151A-17	Prof. Dhruva Chakravorty	Research Competitiveness Subprogram [RCS]	University of New Orleans	3 Years	Developing Tools for Efficient MultiScale Modeling of Biochemical and Biomaterials Processes	\$60,814.00	\$61,019.00	\$61,019.00	\$182,852.00
152A-17	Prof. Viktor Poltavets	Research Competitiveness Subprogram [RCS]	University of New Orleans	2 Years	Ammonia for Renewable Energy Storage: Novel Heterogeneous Catalysts for NH3 Decomposition and N2 Fixation	\$48,806.00	\$49,533.00	\$0.00	\$98,339.00
153A-17	Dr. Damon Smith	Research Competitiveness Subprogram [RCS]	University of New Orleans	3 Years	Nanoparticle Additives for 3D Printing of Multifunctional Composites	\$59,000.00	\$57,578.00	\$49,799.00	\$166,377.00
154A-17	Prof. Xiaochuan(Vincent) Yu	Research Competitiveness Subprogram [RCS]	University of New Orleans	3 Years	Motion Simulation and Hazard Assessment of Dropped Objects in Offshore Operations	\$39,931.00	\$31,016.00	\$18,400.00	\$89,347.00
155A-17	Dr. Minhaz Zibran	Research Competitiveness Subprogram [RCS]	University of New Orleans	3 Years	Clone-Based Software Maintenance and Quality Assurance Research Infrastructure	\$47,255.00	\$48,044.00	\$48,606.00	\$143,905.00

Total Number of Proposals submitted	155
Total Funds Requested for First Year	\$7,335,489.00
Total Funds Requested for Second Year	\$6,158,099.00
Total Funds Requested for Third Year	\$5,245,101.00
Total Funds Requested	\$18,738,689.00