BOARD OF REGENTS SUPPORT FUND
RESEARCH AND DEVELOPMENT PROGRAM

REVIEW OF COMPETITIVE PROPOSALS SUBMITTED FOR
FUNDING CONSIDERATION IN THE
PROOF-OF-CONCEPT/PROTOTYPING INTITIATIVE

FY 2022-23 COMPETITION

March 2023

REPORT OF THE FINAL PANEL
BOARD OF REGENTS SUPPORT FUND RESEARCH & DEVELOPMENT
PROOF-OF-CONCEPT/PROTOTYPING INITIATIVE

FY 2022-23

BACKGROUND INFORMATION

Sixteen (16) proposals requesting a total of $624,821 in first-year funds were submitted for funding consideration in fiscal year (FY) 2022-23 to the Proof-of-Concept/Prototyping (PoC/P) Initiative of the Board of Regents Support Fund (BoRSF). Proposals were submitted in five targeted industry sectors including Advanced Materials and Manufacturing, Coastal and Water Management, Clean Technology and Energy, Digital Media and Enterprise Software, and Life Sciences and Bioengineering, as well as in other disciplines as permitted by the RFP.

THE REVIEW PROCESS

The sixteen (16) proposals submitted were each reviewed by two experts in their corelating fields. The proposals were then ranked according to proposal score and rating, and the available funds were distributed in order of the priority ranking. All proposals recommended for funding received ratings of Very Good or Excellent by both reviewers. Overall, six (6) proposals were recommended for total funding of $229,864.

Table I of this report contains the rank-order list of all proposals highly recommended for funding. Table II lists the contributing consultants across all categories. These are followed by a compilation of written comments submitted by the discipline-based review panels for each of the highly recommended proposals. Appendix A contains a list of all PoC/P proposals submitted, and Appendix B contains the rating form used by all consultants to evaluate proposals.

All proposals not recommended for funding (i.e., any proposal not listed in Table I) will receive debriefing material summarizing reviewer assessments of the project in July 2023, to assist applicants in development of submissions to PoC/P and other grant programs. These materials will be distributed via the PI LOGAN account used to submit the original proposal.

Table I
FY 2022-23 PROOF-OF-CONCEPT/PROTOTYPING INTITIATIVE

Proposals Highly Recommended for Funding

Rank	#	Institution	PI	Category	1st-Year Request	1st-Year Recommendation
1	013D-23	ULL	Mohammad Khattak	Advanced Materials & Manufacturing	$40,000	$40,000
2	007D-23	LSU A&M	Kidong Park	Life Sciences & Bioengineering	$40,000	$40,000
3	014D-23	ULL	Wu Xu	Other: Pharmaceutical Companies	$40,000	$40,000
4	015D-23	ULL	Hui Yan	Clean Technology & Energy	$40,000	$40,000
5	009D-23	LaTech	Yuri Lvov	Advanced Materials & Manufacturing	$40,000	$40,000
6	003D-23	LSU A&M	Sabarethinam Kameshwar	Other: Oil & Gas & Coastal Management	$29,864	$29,864
					$229,864	$229,864

Table II

2022-23 Proof of Concept/Prototyping Initiative Reviewers		
Name	**Institution**	**Discipline**
Life Sciences & Bioengineering		
Kasiviswanathan Muthukumarappan	South Dakota State University	Agricultural Engineering
Asheesh K. Singh	Iowa State University	Agricultural Engineering
Clean Technology & Energy		
Dionysios C. Aliprantis	Purdue University	Electrical Engineering
Jerry Lin	Arizona State University	Chemical Engineering
Shengqian Ma	University of North Texas	Chemistry
Amritanshu Pandey	University of Vermont	Electrical Engineering
Linbing Wang	University of Georgia	Civil Engineering
Advanced Materials & Manufacturing		
Ramana Chintalapalle V	University of Texas-El Paso	Mechanical Engineering
Kuang-Ting Hsiao	University of South Alabama	Mechanical Engineering
Digital Media & Software		
Wes Lloyd	University of Washington-Tacoma	Software Engineering
Stefano Iannucci	Mississippi State University	Computer Engineering
Coastal & Water Management		
Ngoc T. Bui	University of Oklahoma	Environmental/Chem Engineering
ZhiQiang Chen	University of Missouri-Kansas City	Civil Engineering/Risk Assessment
Paolo Gardoni	University of Illinois	Civil Engineering/Risk Assessment
Roger Viadero	University of Western Illinois	Environmental Science
Other		
Alexander V. Kabanov	University North Carolina	Biomedical Engineering
Ian Papautsky	University of Illinois-Chicago	Biotechnology

FY 2022-23 Proof of Concept/Prototyping Initiative
Priority Ranking of Proposals Highly Recommended for Funding

Rank	1
Proposal #	013D-23 (Advanced Materials & Manufacturing)
Institution	University of Louisiana at Lafayette
PI	Mohammad Khattak
Title	Development of Green Construction Material Using Locally Available Rice and Sugarcane Industrial By-products
Requested	$40,000
Recommended	$40,000

This proposal seeks to utilize industrial trash from nearby rice and sugarcane industries to create sustainable building materials expected to reduce the carbon footprint through the replacement of cement. If successful, project work has the potential to contribute to the advancement of the field as well as produce an innovation for commercialization. It is a significant improvement over the existing commercial solutions. The potential scope of intellectual property protection is adequately described. The materials developed may enhance the life-cycle cost of pavement, buildings and other infrastructure and can result in effective cost savings. The preliminary test results are convincing. The developed products from this project may benefit many technologies related to infrastructure engineering.

The research work plan and statement of tasks are well designed to address the challenges and fundamental questions. Research methods are clear and appropriately targeted towards the overall goals and objectives. The methodology includes materials design, development, testing, and evaluation. The proposed scope of work is consistent with the timeline and budget. The presented project milestones and projected outcomes are acceptable and reasonable.

The team's cooperative activities with the Louisiana Department of Transportation and Development and the Louisiana Transportation Research Center in the fields of infrastructure and construction are notable. The PIs have vast experience in research, teaching, and consulting in the areas of advanced pavement design, numerical modeling, and materials characterization. Given their track record, project success is likely. They have all the required infrastructure to execute the project work and deliver the goals and objectives proposed. Commercial partners have indicated interest. Full funding is recommended.

Rank	2
Proposal #	007D-23 (Life Sciences & Bioengineering)
Institution	Louisiana State University and A&M College
PI	Kidong Park
Title	Validation of Hollow Microcarrier Mass-Produced by R2R Process
Requested	$40,000
Recommended	$40,000

This application aims to demonstrate high-throughput production of human stem cells using hollow microcarriers that are produced by an R2R process. Microcarrier culture has been gaining prominence due to applications in vaccine and cell therapy production. The proposed use of hollow PDMS (elastomer) based microcarriers is very innovative.

The proposed concept was reduced to practice and described in literature by the PI in 2018. This is an active area of research and commercial activities, and thus unlikely to be subject to near-term obsolescence. The proposed aims are reasonable. The application states objectives for each aim, although there are no clear milestones identified. The proposed outcomes are reasonable, and the budget is consistent with the timeline.

The approach outlined has the potential to disrupt the current market, but a more detailed analysis is needed. It is not clear how the proposed hollow microcarriers will compete with already commercially available porous microcarriers, which permit cells to seed inside pores and thus offer some protection from high fluidic shear. Nevertheless, there is a compelling commercial need for improved microcarrier technology, and this application attempts to address it. Intellectual property protection appears to be in place with regards to the hollow microcarriers, with a full patent application pending. There is also a need to demonstrate the high throughput capability of the approach (aim 2), which should aid in commercialization efforts and securing industrial support.

This work is of high significance and impact and there is a large market for it. The PI appears to be aware of the current market and the major players. No interest from potential commercial partners has been reported yet, but the PI plans to engage multiple organizations to market the developed technology, starting with national organizations and followed by industry, including existing connections at Johnson & Johnson. Full funding is recommended.

Rank	3
Proposal #	014D-23 (Other: Pharmaceutical Companies)
Institution	University of Louisiana at Lafayette
PI	Wu Xu
Title	Enhancement of the Triangular Spatial Relationship [TSR]-Based Approach for Promoting Successful Patent and Proposal Applications and Developing Collaborations with Industry
Requested	$40,000
Recommended	$40,000

The applicants propose TSR protein structural comparison and analysis research, which is useful, interesting, and somewhat novel. This is a technically sound proposal, with the research methods, work plan, and milestones well put together and clearly described. The PIs address critiques of a prior NSF application review that scored from Fair to Good. This application provides a strong response to the feedback.

If this project is successful, commercialization is possible. There are several clients interested in using the improved TSR tool. According to the proposal, Bayer utilized the TSR-based method in 2019 through a temporary licensing agreement with ULL and wrote a letter to NSF to express their strong interest in the TSR for use in their Computational Molecular Design Group. The method's commercialization potential through licensing is clear and likely will be accomplished if the method can be further improved. The ULL team has already filed a patent application and addressed the U.S. Patent Office's questions. The team is currently waiting for further response.

The AI field is currently "hot", and opportunities are there, though commercial success will depend on the ability to market the invention. The potential for success is high. Full funding is recommended.

Rank	4
Proposal #	015D-23 (Clean Technology & Energy)
Institution	University of Louisiana at Lafayette
PI	Hui Yan
Title	Carbon Dioxide and Methane on HOllow Porous matErials [HOPE]
Requested	$40,000
Recommended	$40,000

The PIs propose studying low-temperature dry reforming of methane for syngas or H2 production. This has long been a popular topic in the chemical industry, but a number of research challenges remain. This proposed approach is very innovative and is anticipated to address some of these long-term challenges. If successful, the work will have significant scientific and economic impacts. The proposed methods and procedures are sustainable. The scope of work is consistent with the timeline, though funds budgeted for student support appear low. While the project milestones and projected outcomes are reasonable, more details will be necessary for the scale-up of catalyst to bench scale or even pilot scale in future applications. One minor criticism is that the proposal title does not reflect the content of the proposal well.

The catalysts to be developed from this proposed research can significantly improve the current technology for DRM in the chemical industry. They will have substantial impact on both the economy and the environment since the greenhouse gases can be reduced while the useful product of H2 can be produced. The potential scope of intellectual property protection is adequately described, and a compelling justification of the need to explore commercial viability is well presented, with clear evidence for viability. The need for further research and development was documented, although a cost analysis for commercialization of the catalysts was not mentioned.

The proposed research has a very high chance of success given the strong expertise and track-record of the PI. A global petrochemical company and the leading producer of polypropylene in the United States has demonstrated interest in being a commercial partner. The size and scope of the potential global market is huge, though much more investment will be needed to scale up the technology to be developed from the proposed research. Full funding is recommended.

Rank	5
Proposal #	009D-23 (Advanced Materials & Manufacturing)
Institution	Louisiana Tech University
PI	Yuri Lvov
Title	Advanced Wood Products Infused with Clay Nanotubes for Strength and Mold / Flame Resistance
Requested	$40,000
Recommended	$40,000

The research team proposes to use clay nanotubes to carry fire retardant and antifungal chemicals to be released inside wood products. This is a very strong proposal. The approach is novel. The proposed tasks, outcomes, and timelines are reasonable.

The cost and potential benefit of this new product could add substantial value to the wood product market, the project's industrial partner, and Louisiana's economy. The team has a sound plan regarding intellectual property protection. This project, if successful, should have very good commercialization potential; however, the competition landscape analysis could be more comprehensive.

The industrial partner, one of the largest forestry and wood products companies in the United States and a Louisiana-based company, is appropriate for this project and has shown strong interest in the research. The team has filed an invention disclosure and will proceed to a patent upon competing this project. The PI has a strong patent record and the knowledge and ability to file the appropriate application.

The team is very qualified. The interest in their research by commercial partners is clearly demonstrated. The scope of the present research is also linked to market opportunities. The institutional capabilities and infrastructure are in place. Full funding is recommended.

Rank	6
Proposal #	003D-23 (Other: Oil & Gas and Coastal Management)
Institution	Louisiana State University and A&M College
PI	Sabarethinam Kameshwar
Title	Preventing Flood Induced Flotation and Sliding Failure of Oil Storage Tanks
Requested	$29,864
Recommended	$29,864

This proposal aims to test out a new design method for anchoring oil storage tanks to resist flood loads. The applicant has conducted sufficient preliminary work, including recognition of the knowledge gap and modeling efforts. The solution appears to be novel.

The work is technically sound, the work plan is well developed, and the timeline and budget are adequate. The proposal makes a clear and sound case for commercial success. There is a clear need for the proposed system, and the team has strong engagement with consulting companies and the Office of Innovation and Technology Commercialization at LSU A&M for practical implementation. A field demonstration will be necessary to make a convincing case for commercial investment.

The project has a good marketing plan, developed in collaboration with a practitioner consulting firm. The proposed solution, if proved feasible, will yield a disruptive product to the market. Full funding is recommended.

APPENDIX A

Proposals Submitted to the Research and Development Program - Proof-of-Concept/Prototyping (PoC/P) Initiative
for the FY 2022-23 Review Cycle

Proposal #	PI Name	Category	Institution	Project Title	Amount Requested
001D-23	Prof. Leslie Butler	Life Sciences and Bioengineering	Louisiana State University and A & M College	Precision in-field agricultural sensor for internal crop analysis	$40,000
002D-23	Dr. Amirhosein Jafari	Digital Media and Enterprise Software	Louisiana State University and A & M College	Developing A WiFi-Based Privacy-Preserving Contact Tracing Mobile Application for Commercial Building Occupants	$39,988
003D-23	Dr. Sabarethinam Kameshwar	Other - Oil and gas and Coastal management	Louisiana State University and A & M College	Preventing flood induced flotation and sliding failure of oil storage tanks	$29,864
004D-23	Dr. Yong-ha Kim	Coastal and Water Management	Louisiana State University and A & M College	Novel Module for Separation of Radionuclides from Aqueous Solution	$40,000
005D-23	Dr. Yong-Cheol Lee	Coastal and Water Management	Louisiana State University and A & M College	A Disaster Risk and Resilience Measurement System for Disaster-Prone Buildings	$40,000
006D-23	Dr. Celalettin Ozdemir	Coastal and Water Management	Louisiana State University and A & M College	Development of a Visual Technology to Monitor Microplastics in Aquatic Environments with a Digital Twin	$38,938
007D-23	Prof. Kidong Park	Life Sciences and Bioengineering	Louisiana State University and A & M College	Validation of Hollow Microcarrier mass-produced by R2R process	$40,000
008D-23	Dr. Hao Wang	Digital Media and Enterprise Software	Louisiana State University and A & M College	Intelligent Resource Manager for Next-Gen Cloud Computing Systems	$39,990
009D-23	Prof. Yuri Lvov	Advanced Materials and Manufacturing	Louisiana Tech University	Advanced Wood Products Infused with Clay Nanotubes for Strength and Mold / Flame Resistance	$40,000
010D-23	Prof. Noshir Pesika	Advanced Materials and Manufacturing	Tulane University	Gecko-inspired high friction grips for sporting equipment	$40,000
011D-23	Dr. Farzad Ferdowsi	Clean Technology and Energy	University of Louisiana at Lafayette	Traffic to Power	$40,000
012D-23	Dr. Farzad Ferdowsi	Clean Technology and Energy	University of Louisiana at Lafayette	Prototyping an Adaptable Low-Cost Volt-VAR Controller for Smart Solar Inverters	$36,055
013D-23	Dr. Mohammad Khattak	Advanced Materials and Manufacturing	University of Louisiana at Lafayette	Development of Green Construction Material Using Locally Available Rice and Sugarcane Industrial By-products	$40,000
014D-23	Prof. Wu Xu	Other - Pharmaceutical Companies	University of Louisiana at Lafayette	Enhancement of the Triangular Spatial Relationship [TSR]-Based Approach for Promoting Successful Patent and Proposal Applications and Developing Collaborations with Industry	$40,000
015D-23	Dr. Hui Yan	Clean Technology and Energy	University of Louisiana at Lafayette	Carbon Dioxide and Methane on HOllow Porous matErials [HOPE]	$40,000
016D-23	Prof. Rui Zhang	Coastal and Water Management	University of Louisiana at Lafayette	Test of Distributed Acoustic Sensing [DAS] for environmental monitoring using the existing fiber optical network on UL Lafayette campus	$39,986

Total Number of Proposals Submitted	16
Total Funds Requested	$624,821

APPENDIX B

A. TECHNICAL MERIT (40 Points) _____
  -Is innovation reduced to practice and not subject to near-term obsolescence?
  -Are the R&D methods, procedures and budget sustainable?
  -Is the scope of work consistent with timeline and budget?
  -Are the project milestones and projected project outcomes reasonable?

COMMENTS:

B. COMMERCIAL OPPORTUNITY (40 Points) _____
  -Does the proposal present a disruptive product or significant improvement over existing commercial solutions?
  -Is the potential scope of intellectual property protection adequately described?
  -Is a compelling justification presented for the need to explore commercial viability?
  -Is evidence presented for commercial viability and the need for further R&D documented?

COMMENTS:

C. POTENTIAL FOR SUCCESS (20 Points) _____
  -Has interest been demonstrated by potential users/commercial partners?
  -What are the size and scope of the potential target market or patent application filed?
  -Is the prior art search completed, with meaningful scope of claims?

COMMENTS:

TOTAL SCORE (Out of 100) _____

OVERALL RATING OF PROPOSAL

Poor	Fair	Good	Very Good	Excellent
____	____	____	_____	_____