



NASA EPSCoR 2019 Research Infrastructure Development (RID) Abstracts

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NASA EPSCoR 2019 Research Infrastructure Development (RID) Abstracts

AK - 18-EPSCoR RID-0016

Director: Dr. Denise Thorsen

University Of Alaska, Fairbanks

Alaska's NASA EPSCoR Program 2019-2021

The Alaska State Committee on Research (SCoR) updated the Alaska Science and Technology Plan, To Build a Fire [see <https://www.alaska.edu/research/research/scor/>] in 2016. In this report, they present a road map for Alaska science and technology development which they organize into seven specific areas to which Alaska's unique characteristics lend themselves" Each of the EPSCoR programs (NASA, NSF, DOE, etc.) currently active in the state look to this document to find the commonality between Alaska's research interests and those of the federal agency. This proposal outlines those commonalities between Alaska's S&T plan and NASA's 2018 Strategic Plan.

Specifically, this NASA EPSCoR RID proposal seeks to build Alaska's research infrastructure and technology capabilities in areas of interest to Alaska by providing seed funding and training that will lead toward long-term, self-sustaining, nationally-competitive capabilities in support of NASA related research and technology priorities.

Goal: Increase Alaska's ability to respond to research and technology development needs of NASA and the State and to partner with Alaska's aerospace industry to expand the space-related capabilities within the State.

Objective 1: Develop research infrastructure by awarding a minimum of three Research Development Seed Grants per year in areas of strategic importance to NASA and Alaska which lead to a minimum of three follow-on proposals submitted per year.

Objective 2: Facilitate new partnerships with NASA researchers by providing Partnership Development Travel Grants to attend NASA EPSCoR annual Technical Interchange Meetings and/or other NASA related workshops that will lead to a minimum of one new collaborative proposal per year.

Objective 3: Promote commercialization and collaboration with industry by supporting faculty and student participation in relevant workshops such as NASA's Small Business Technology Infusion Road Tour and Lean Launch startup workshops which leads to one significant university/industry collaboration.



NASA EPSCoR 2019 Research Infrastructure Development (RID) Abstracts

AL - 18-EPSCoR RID-0022

Director: Dr. Lawrence Thomas

University Of Alabama, Huntsville

Alabama NASA EPSCoR Research Infrastructure Development FY19

The purpose of the Alabama NASA EPSCoR RID program is to build core capabilities at Alabama's universities and other collaborative institutions. We shall build competitive research and technology development capabilities in areas of interest to both NASA and the State of Alabama. The interests of NASA are defined in the CAN (pages 6,7 and 8), in the 2014 NASA Strategic Plan, and by the 3 strategic goals of the Office of Education's ARCD. The interests of the State of Alabama in this regard are defined by the Alabama State EPSCoR Committee (SEC), which oversees all EPSCoR programs within the state. The PI of this proposal is Dr. L. Dale Thomas, the Alabama NASA EPSCoR Director, the Alabama Space Grant Consortium Director, and a professor at the University of Alabama in Huntsville. Alabama proposes a RID program based on the following elements:

- Seed research grants to researchers in early stages of their careers
- Faculty research support
- Development of cooperative ties with NASA Centers



NASA EPSCoR 2019 Research Infrastructure Development (RID) Abstracts

AR - 18-EPSCoR RID-0019

Director: Dr. Mitchell Hudson

University of Arkansas, Little Rock

Arkansas NASA EPSCoR RID 2019

Proposal Summary Arkansas NASA EPSCoR plans to:

- Continue to fund the NASA EPSCoR program office to ensure continued momentum and good progress in NASA relevant aerospace research in Arkansas
- Continue our Planning and Preparatory (P&P) Grant program to enable Arkansas researchers to obtain NASA EPSCoR Research Award funding
- Continue our Planning and Preparatory (P&P) Travel Grant program to enable Arkansas researchers to obtain funding for teams of researchers to visit NASA Centers, Mission Directorates or the Office of Chief Technologist.
- Conduct a statewide annual workshop to disseminate information and know-how to potential Research Award competitors
- Conduct a statewide one day long NASA EPSCoR Conference, in conjunction with the annual Arkansas EPSCoR Conference if possible, to bring NASA and other agency sponsored individuals together



NASA EPSCoR 2019 Research Infrastructure Development (RID) Abstracts

DE - 18-EPSCoR RID-0015

Director: Prof. William Matthaeus

University Of Delaware

Developing Nationally Competitive NASA Research in Delaware

The aim of NASA's EPSCoR RID program is to stimulate and support new collaborations within a state in order to develop research infrastructure in that state. The major goals of the program include both academic and industrial components: (i) develop new collaborative activities among researchers in academia and researchers at NASA Centers so that the academic researchers may become better equipped and /or better prepared to submit successful research applications to competitive programs announced by NASA and other agencies; (ii) develop links with industry to identify research areas that align with the state's economic priorities. In the present proposal, we describe how NASA's goals for EPSCoR RID may be implemented in the State of Delaware.



NASA EPSCoR 2019 Research Infrastructure Development (RID) Abstracts

GU - 18-EPSCoR RID-0010

Director: Dr. John Peterson

University of Guam

NASA EPSCoR Research Infrastructure Development Program FY2019

Project Summary

The NASA Guam EPSCoR program supports the NASA Earth and Ocean Science Mission by developing capacity at the University of Guam to utilize remote sensing data from NASA satellite imagery, to provide real-world localities to test geospatial data and methodologies including NASA Synthetic Aperture Radar and the newly developed MIDAR technology. UOG partners with NASA scientists at JPL/CALTECH and Ames Research Centers to address critical challenges in water security, coral reef conservation, terrestrial land change, and biodiversity in the Pacific Islands. The RID will fund three initiatives that will support faculty and advanced students at UOG: In Initiative 1 NASA satellite imagery will be used to support analyses of earth and ocean science activities. Activity 1 GEOCORE: UOG faculty will be collecting and analyzing datasets pertaining to sea surface temperatures, ocean currents, and sediment transport and loads in order to evaluate coral reef health and create a predictive model for fish spawning aggregation sites. Using Synthetic Aperture Radar data downloaded at the NASA Alaska Satellite Facility including ESA Sentinel-1 and in the near future with the NASA NISAR satellite platform NASA Guam EPSCoR proposes to expand the use of Guam and other islands in the western Pacific as calibration and evaluation sites for SAR investigations, and to apply the resulting observations to earth and ocean science investigations of resilience and sustainability of regional resources. Activity 2 ACTUAS: UOG will be partnering with UH-Manoa through ACTUAS to test their self-autonomous UAVs to detect submarine freshwater plumes. Understanding how these submarine plumes respond to changes in precipitation, ENSO, and drought can provide insights into Guam's primary source of freshwater. Furthermore, the karst landscape bears a striking resemblance to one of Saturn's moons. UOG will be partnering with JPL to explore Guam as potential testing and calibration site for remote sensing technology that characterizes karst landscapes. In Initiative 2, RID funding will be used to support faculty and administrative contributions toward developing a science education, workforce training, and fiber cable hub, and research station at the location of the former Apollo 11 Manned Space Flight Center (MSFC) Tracking Station in Dandan, Majoljol, Guam. In Initiative 3 UOG's NASA EPSCoR program will partner with Ames Research Center's laboratory for Advanced Sensing (LAS) to use fluid lensing and MIDAR toward high resolution coral reef mapping efforts and rapid coral bleaching assessments on Guam and in Micronesia. These collaborations with NASA geospatial science programs will contribute toward satellite-based monitoring for sustainable ecosystem services in small island nations. The islands are at risk from rising sea level, increasingly arid weather patterns, extreme storm events, and increasing sea surface temperatures. Working with NASA earth and ocean science programs and researchers the University of Guam's NASA EPSCoR program is building capacity for GIS and management of robust datasets that will contribute to sustainable management of these threatened resources. Further, through the administrative focus of the NASA EPSCoR and the NSF EPSCoR programs and the supportive Technical Advisory Committee and Science and Technology Board at UOG there is synergy toward developing a science education, workforce training, and Challenger Education Center at the site of the Apollo 11 Manned Space Flight program tracking station in the Dandan area of southern Guam. The



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Apollo MSFC facility has the potential to house these programs as well as the EPSCoR activities for the NASA and the NSF EPSCoR programs at UOG and to make a major impact on science development, STEM education, and public engagement with NASA earth and ocean science programs as well as possibly rocketry and UAV activities as the program expands in coming years.



NASA EPSCoR 2019 Research Infrastructure Development (RID) Abstracts

HI - 18-EPSCoR RID-0024

Director: Dr. Luke Flynn

University of Hawaii, Honolulu

The Hawaii NASA EPSCoR Research Infrastructure Development Program

The objectives of Hawaii NASA EPSCoR Research Infrastructure Development (RID) proposal are three-fold: (1) We will assist and lead the development of a new aerospace economy in Hawaii that is centered on small satellites and UAVs. (1a) Dedicated Small Launch“ We will support new DoD and commercial launch requests from the Pacific Missile Range Facility rail launcher on Kauai. We will co-manage the development of the Pacific Spaceport Complex “ Hawaii (PSCH) - a new small launch site on the Big Island of Hawaii. (1b) Hawaii Space Flight Laboratory (HSFL) was established in 2007 to facilitate the design, building, testing, launching, and operating small satellites from the Hawaiian Islands. HSFL continues to develop and support UH Faculty small satellite and UAV instrument, software, and hardware projects. (1c) Managing/Facilitating State Aerospace Infrastructure Development “ In addition to the development of PSCH, management of other aerospace-related projects include planning the \$12M (State funded) Innovation and Manufacturing Center (IMC) for Hilo, augmenting the infrastructure of UH-Hilo and Hawaii Community College to support local aerospace workforce development, and upgrading the Kauai CC ground station with software defined radios. (2) We will encourage new NASA infrastructure development in Hawaii by providing seed grants and travel grants to investigators willing to work with NASA Centers or Mission Directorates. (3) We will continue to partner with Guam on NASA research projects in order to increase collaborative efforts.



NASA EPSCoR 2019 Research Infrastructure Development (RID) Abstracts

ID - 18-EPSCoR RID-0026

Director: Dr. Joseph Law

University Of Idaho, Moscow

Idaho NASA EPSCoR Research Infrastructure Development 2019 - 2021

Central objectives of the proposal:

Idaho NASA EPSCoR is dedicated to increasing Idaho's competitive research capabilities in areas aligned with NASA's missions and activities. Idaho NASA EPSCoR is guided by the following Vision, Mission, and Strategic Goals that align with NASA's priorities while serving the unique needs of Idaho.

Vision: A nationally-competitive aerospace research capability in Idaho

Mission: To provide opportunities, foster collaboration, stimulate research, and develop innovation in Idaho

Strategic Goals:

Goal 1: Promote the development of research expertise and infrastructure that will allow Idaho researchers to compete nationally in areas of strategic interest to NASA and help to retain qualified early career scientists and engineers in Idaho.

Goal 2: Develop partnerships with NASA and industry that enable Idaho's researchers and students to contribute to NASA's missions through innovative research opportunities.

Goal 3: Support research in areas that will enhance economic development in Idaho.

Methods/techniques proposed to accomplish the proposal objectives:

Through the proposed work, the Idaho NASA EPSCoR will execute a portfolio of competitive and merit-based projects to enhance Idaho's research capabilities in areas of interest to NASA. The majority of funds will support competitive research initiation grants and collaboration grants. In addition to the competitive grants, Idaho NASA EPSCoR will identify promising Idaho researchers to attend the Technical Interchange Meetings organized by NASA EPSCoR to help initiate further collaboration between NASA and Idaho researchers. All of the proposed activities align with Idaho NASA EPSCoR's Vision, Mission, Strategic Goals, Objectives and Priorities.

Perceived significance of proposed work:

Idaho NASA EPSCoR's programs are designed to increase development and use of aerospace and STEM workforce and infrastructure through competitive opportunities and partnerships with Idaho institutions of higher education, state and federal agencies, and other STEM-focused organizations.

Data Management Plan: The administration of this research infrastructure development project will not directly generate scientific data; however, the sub-awards that will be made from it may generate data. As a condition of funding, Idaho NASA EPSCoR will require that researchers are aware of NASA's Plan for increasing access to the results of federally-funded research - and that any articles in peer-reviewed



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journals or papers from conferences are uploaded to NASA's PubSpace at:
<http://www.nihms.nih.gov/db/sub.cgi>



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KS - 18-EPSCoR RID-0020

Director: Dr. Leonard Miller

Wichita State University

The Kansas NASA EPSCoR Research Infrastructure Development (RID) Program

The Kansas NASA EPSCoR RID Program



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KY - 18-EPSCoR RID-0007

Director: Dr. Suzanne Smith

University Of Kentucky, Lexington

NASA Kentucky EPSCoR Research Infrastructure Development (RID) 2019-2021

The Kentucky Statewide EPSCoR Program's mission is to enhance the research and intellectual capacity of the state's universities and colleges by building and coordinating strategic investments in human capital necessary for Kentucky to excel in federal R&D funding competitiveness. This mission aligns with Kentucky's economic development strategy, which stresses the transition to advanced manufacturing, leveraging growth areas like aerospace, and the development of an innovation economy driven by the strengths of its educational system: cutting-edge R&D and a highly educated workforce.

Supporting this statewide mission, NASA Kentucky EPSCoR's goals are to enhance capacity through strategic investments in NASA-priority research areas and to increase researcher competitiveness for non-EPSCoR NASA funding. A key factor in achieving the latter goal is initiation of relationships between Kentucky's and NASA's researchers that can develop into partnerships. Every aspect of the current RID portfolio emphasizes this process of relationship-building, including pursuing collaborations that enable commercial space partnerships.

To reach these goals, four specific objectives of the NASA Kentucky EPSCoR program align with those of the NASA EPSCoR program: 1) to develop human research infrastructure in areas strategically important to NASA, 2) to gain support from non-EPSCoR sources, 3) to develop NASA Partnerships, 4) to develop science, technology and economic capacity.

The centerpiece of the NASA KY EPSCoR RID Program is the Research Infrastructure Development Grant (RIDG) competitively awarded to faculty for one year. RIDG proposals to NASA KY stress collaborative relationship building with NASA. Faculty principle investigators (PIs) must include a letter of collaboration from a NASA collaborator based on prior interactions, describe a schedule for regular contact with the NASA collaborator and plans for a visit to the NASA site and, if funded, are expected to result in submission of a jointly authored paper to a conference or journal.

To assist researchers in establishing initial connections with NASA and developing interdisciplinary research teams, faculty are encouraged to submit proposals for Workshop/Conference/Seminar awards (WCS). Workshop funding builds Kentucky and NASA partnerships to develop interdisciplinary teams interested in pursuing the three-year EPSCoR Research Area (RA) or other nationally competitive solicitations. Conference funding provides partial support for a local, regional, national or international meeting hosted in Kentucky focused on NASA related research. Seminar funding supports a series of seminars or webinars on an aerospace topic.

Faculty Travel (FT) awards are also awarded to assist faculty in developing new relationships with NASA. Individual travel awards are awarded to researchers after review of the application, which must include a NASA invitation to visit and discuss potential collaboration. Analysis of the EPSCoR RAs awarded to KY shows that, to be competitive nationally, it is necessary for a proposed project to have multiple NASA connections. Helping new-to-NASA PIs make an all-important initial contact will enable successful submissions for RIDG awards; allowing RIDG PIs to develop relationships and expand their network will



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prepare them for RA submissions and national non-EPSCoR competitive solicitations in subsequent years.

In addition to managing the proposal submission competitions, NASA KY management also tracks and communicates the impact of NASA Kentucky EPSCoR Programs.



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LA - 18-EPSCoR RID-0018

Director: Prof. T. Gregory Guzik

Louisiana Board Of Regents

New Development for Louisiana Aerospace Research

Louisiana's commitment to Aerospace Science & Technology development has been well established over the decades. We have a diverse cadre of researchers working on active NASA & NASA-related projects across institutions and facilities in the state, and there is an increasing understanding that a highly skilled technical workforce is necessary for our long-term goals. The NASA EPSCoR program is a crucial contributor to the continued growth of Aerospace Science & Technology development. Louisiana participates in all of the agency EPSCoR programs through the Office of Sponsored Programs at the Louisiana Board of Regents (BoR), which provides state matching funds and, consequently, acts as the fiscal agent for the EPSCoR programs. Program management & technical oversight is conducted primarily out of the Louisiana Space Grant/NASA EPSCoR office housed at LSU. The two offices work in-tandem to fulfill the mission-driven requirements of NASA while buoying the infrastructure development needs of the state.

Louisiana's strategy for EPSCoR success involves Engagement, Collaboration and Partnership. We engage faculty, post-docs, and students in performing research projects; we develop Collaborations/Mentorships between NASA scientists/engineers and the Louisiana research community, and we establish Partnerships between educational institutions (minority and majority) and with external facilities and other agencies. We are currently working with most of the designated research universities in the State, many of the smaller less research-intensive institutions, with the Michoud Facility in New Orleans, and with Stennis Space Center through both EPSCoR and the Louisiana Space Grant (LaSPACE). The NASA EPSCoR RID Award provides financial support and a framework to improve the research infrastructure in Louisiana while supporting the mission goals at NASA.

During our previous 3-year cycle alone we supported 13 different faculty researchers, representing 7 different Louisiana Universities (LaTech, LSU, Southern-BR, Southern-NO, ULL, UNO, and Xavier) to conduct research projects in collaboration with 11 NASA researchers from 5 NASA Centers (Ames, Glenn, Johnson, Marshall, and Stennis). In June 2018 Louisiana NASA EPSCoR RID funding will bring a dozen researchers from 7 campuses to Goddard Space Flight Center in Maryland for a NASA Technical Interchange Meeting. These meetings allow interested Louisiana researchers an opportunity to discuss current projects and support needs with active NASA scientists and engineers, which could lead to future collaborations. Our goal for the next three years is to build upon our previous successful TAP, SAR, & RAP subprograms to expand and improve New Development for Louisiana Aerospace Research.



NASA EPSCoR 2019 Research Infrastructure Development (RID) Abstracts

ME - 18-EPSCoR RID-0006

Director: Dr. Terry Shehata

Maine Space Grant Consortium

Maine NASA EPSCoR Program 2019-2021 RID Proposal

During the previous 2015-2018 RID Program period of performance, we invested in three Visioneering Workshops. In the absence of a state vision for economic growth, of the three, the brainstorming around the Maine SpacePort Complex provided THE vision that could galvanize the public and all sectors of Maine's economy to generate excitement and investments in research and education infrastructure for a new space economy. The investments in education and research infrastructure for the Maine SpacePort Complex could be the rising tide that lifted all boats. In other words, the investments for the complex would also enable education, training, and research and commercialization in other industry areas. The Maine SpacePort Complex is not the vision of the Maine NASA EPSCoR Program but a shared vision of the stakeholders, including the Maine NASA EPSCoR Program, who took part in the Visioneering workshop and were inspired to use a new space economy to generate economic growth in Maine. Although early in the statewide public acceptance phase, from our perspective, this is a unifying vision, a potential outcome of the Visioneering workshop strategy, which integrates several of the research themes in a manner that connects to Maine's base of industry and supports the growth of Maine Technology Institute's technology clusters. It is a vision that informs the Maine NASA EPSCoR's role and guide our investments. Of the many components of the Complex, it seems fitting that the role of the Maine NASA EPSCoR Program is to use RID funds to seed research and technology development activities that lay the foundation for realizing the potential of the Maine SpacePort Complex. This strategy aligns with the purpose of RID which is to build the core strength needed to increase competitive research and technology development methods and activities for the solution of scientific and technical problems of importance to NASA and to Maine. Therefore, our goal is to contribute to the development of a new space economy in Maine as envisioned by the Maine SpacePort Complex. Our strategy is to leverage the investments made by Maine NASA EPSCoR in the research themes over the last decade to build the core strengths needed to increase competitive research and technology development methods and activities for the solution of scientific and technical problems of importance to the new Space Value Chain. Our objective for the next three years is to annually seed up to three potential ground-breaking research and technology development projects around opportunities in the new Space Value Chain.



NASA EPSCoR 2019 Research Infrastructure Development (RID) Abstracts

MS - 18-EPSCoR RID-0011

Director: Dr. Nathan Murray

University Of Mississippi

Mississippi NASA EPSCoR Research Infrastructure Development (RID) Program

The Mississippi NASA EPSCoR Director proposes a competitive seed grant program to strengthen Mississippi's research competitiveness. Individual seed grants will (a) build on the current strengths of individual members of the Consortium, (b) focus these strengths on issues of particular relevance to

NASA, and (c) increase the applicability of Mississippi's research to areas of interest within NASA. MSSGC uses the RID program to fill a unique role by infusing NASA investment into human research asset development. The goal is to provide initiation funds to set in motion the maturation of innovative research and technology ventures that are relevant to NASA and NASA related Mississippi industry. The competitive seed grant opportunities are focused on developing and/or maturing research activities that explore promising research avenues, establish or strengthen collaboration between researchers in the Jurisdiction, and enhance MS research relevance to NASA through communication/collaboration with NASA scientists.



NASA EPSCoR 2019 Research Infrastructure Development (RID) Abstracts

MT - 18-EPSCoR RID-0014

Director: Dr. Angela Des Jardins
Montana State University, Bozeman

Montana NASA EPSCoR Research Infrastructure (RID) Program 2019-2021

Since the beginning of the NASA EPSCoR program in Montana in 1994, great strides have been made in developing and coordinating Montana research activities aimed at solving current technical and scientific problems facing NASA and the aerospace community. These accomplishments and their resulting infrastructure have given many Montana researchers opportunities to work with NASA that were not present prior to the implementation of NASA EPSCoR program. Due to the success achieved thus far, the goals for the Montana NASA EPSCoR RID program will remain consistent with those of the earlier program.

GOALS

RID-Specific Goal: Help boost the research programs of Montana higher education faculty research in areas that match scientific and technical problems of importance to NASA to a new level of national prominence, enabling them to compete successfully for regular NASA research funding.

General Montana NASA EPSCoR Goals:

Goal 1. Bring the capabilities of Montana's nationally competitive researchers to the attention of NASA.

Goal 2. Build infrastructure to enhance Montana's capabilities and expertise in areas of importance to NASA, focusing on institutions of higher learning.

Goal 3. Use EPSCoR sponsored research to strengthen partnerships with Montana's high-tech companies and drive the growth of Montana's aerospace-related economy.

Goal 4. Focus on building nationally prominent, competitive research groups at Montana's major universities while also providing collaborative opportunities to faculty members at smaller institutions.

SMART OBJECTIVES

RID Project Element A: Research Initiation Grants

Research Initiation Grant Objectives

A1. Continue to evaluate Research Initiation Grant proposals based on the following criteria:

- 1) Scientific/Engineering impact,
- 2) NASA connection,
- 3) Technical feasibility,
- 4) Broader impacts (such as state research infrastructure and economic development),
- 5) Suitability of the proposed research team, and
- 6) Probability of the work resulting in further NASA funding.



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A2. Continue to require letters of support from NASA personnel in Research Initiation Grant proposals.

Tasks associated with Research Initiation Grant Objectives

Ai. Hold regularly scheduled, well-advertised annual opportunities for faculty from all institutions of higher education to propose for Research Initiation Grants; evaluate submitted proposals via a well-rounded review panel consisting of at least four people within three months of submission.

Aii. Maintain active information about all currently funded Research Initiation Grants on the Montana NASA EPSCoR website (<http://nasaepscor.montana.edu>) including pictures, biographical sketches, stories, and project information; retain information about past Research Initiation Grants on the website.

RID Project Element B: Travel Grants

Travel Grant Objectives

B1. Continue to evaluate Travel Grant proposals based on the following criteria:

- 1) Scientific/Engineering impact,
- 2) NASA connection, and
- 3) Broader impacts, such as state research infrastructure and economic development.

B2. Continue to recommend that faculty make a presentation during their visit to the NASA site.

B3. Continue to coordinate travel opportunities with MT NSF EPSCoR, MT NIH INBRE, and other state and federal agencies.

Tasks associated with Travel Grant Objectives

Bi. Regularly advertise the Travel Grant opportunity to all Montana higher education campuses.

Bii. Maintain updated Travel Grant opportunity information on the Montana NASA EPSCoR website (<http://nasaepscor.montana.edu>).



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ND - 18-EPSCoR RID-0023

Director: Dr. James Casler

University Of North Dakota, Grand Forks

North Dakota NASA EPSCoR: Proposal to Expand Research Infrastructure and Capabilities in North Dakota

The overall goal of North Dakota NASA EPSCoR (Established Program to Stimulate Competitive Research) is to increase the competitiveness of North Dakota for merit-based grants and contracts in support of science and technology research from federal funding agencies. This mission statement is the guiding principle for all ND NASA EPSCoR program activities. ND NASA EPSCoR has established the following goals, objectives, and priorities, to train the North Dakota workforce in STEM (science, technology, engineering, and mathematics) disciplines of relevance to NASA.

ND NASA EPSCoR goals include: 1) Establish long-term, self-sustaining, nationally-competitive research capabilities in aerospace and STEM disciplines at North Dakota colleges and universities; 2) Promote research in North Dakota of strategic importance to the NASA mission; 3) Promote programming that demonstrates a lasting and positive impact on the overall research infrastructure, STEM capabilities, economic development, and citizens of North Dakota.

To accomplish each of these goals, ND NASA EPSCoR has established the following methods/techniques (objectives). 1) Build core competitive research strength in NASA-relevant STEM fields through seed grants awarded to faculty at North Dakota colleges and universities; 2) Promote collaboration and research partnerships through travel grants awarded to North Dakota faculty, staff, and students participating in NASA-relevant research; 3) Support synergistic activities that provide opportunities for North Dakota researchers to participate in meetings, workshops, professional development, and travel to enhance NASA-relevant research initiatives.

ND NASA EPSCoR also focuses on three priorities: 1) diversity, 2) collaboration, and 3) student support. The significance of the seed grants, travel grants, and synergistic activities to NASA can be seen through the five Research Focus Areas (RFAs): RFA A "Astronomy and Planetary Sciences, RFA B "Human Space Exploration, RFA C "Earth Science, RFA D "Materials Science, and RFA E "Small Satellites. These RFAs align with NASA strategic goals 1, 2, and 3. All project elements also align with the NASA Science Technology Mission Directorate (STMD), NASA's Science Mission Directorate (SMD), and NASA's Technology Area (TA) Roadmaps. Through this alignment, ND NASA EPSCoR aims to meet NASA's research and technology development priorities.



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NE - 18-EPSCoR RID-0008
Director: Dr. Scott Tarry
University Of Nebraska, Omaha

NASA Nebraska EPSCoR Research Infrastructure Development (RID) Program FY 2019-2021

NASA Nebraska EPSCoR has established an outstanding record of success and has demonstrated its commitment to developing research capabilities that are long-term, self-sustaining, and nationally competitive. The proposed research infrastructure development (RID) program for FY2019 to FY2021 will continue to support and sustain unique research activities that address the priorities of both NASA and Nebraska. NASA Nebraska EPSCoR's philosophy of using strategic investments in seed projects to develop competitive proposals for the national NASA EPSCoR competitions has been incredibly successful in developing Nebraska's aerospace infrastructure. Industry partnerships have been, and will continue to be, vital to the program's success. The proposed RID program will build on these historically productive relationships and will actively involve industry in all facets of the program's implementation—from RID to technology transfer.



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NH - 18-EPSCoR RID-0017

Director: Dr. Antoinette Galvin

University of New Hampshire, Durham

New Hampshire NASA EPSCoR Research Infrastructure Development Program 2019-2022

The strategic goal of the NASA Established Program to Stimulate Competitive Research, Research Infrastructure Development (EPSCoR RID) project in New Hampshire is to support promising academic research enterprises within the State that are directed toward generating or enhancing long-term, self-sustaining, nationally-competitive capabilities in areas of strategic importance to the NASA mission and of mutual benefit to the research infrastructure in New Hampshire. The program elements included in this RID proposal provide 1) support for program management and meetings, 2) funding for research and technology infrastructure seed grants (including research travel grants for jurisdiction researchers for the purpose of establishing or enhancing partnerships), and 3) further development of a CubeSat Swarm mission concept called ARCS. The administration of the RID is based at the NH NASA EPSCoR Directorship office at the University of New Hampshire. The research leads for this proposal are from the University of New Hampshire and Dartmouth College. This proposal requests three years of funding for implementation of the RID objectives. The proposed cost includes a 1:1 matching funds requirement.

NASA Alignment. NASA's Science Mission Directorate (SMD) has four areas of research: Earth Science, Heliophysics, Planetary Science, and Astrophysics. The Research and Technology Infrastructure Seed Grants (and associated travel awards) of this RID proposal will be selected to promote the infrastructure for future competitive (non-EPSCoR) proposals in one or more of these SMD research areas. The ARCS swarm mission concept element aligns with the SMD's Heliophysics area, particularly ionospheric studies. NASA has also listed "autonomous swarm operations" as a technology enabler in NASA's Game Changing Technology program.

DMP. This is a development effort that will not generate any data for release, so a Data Management Plan is not applicable.



NASA EPSCoR 2019 Research Infrastructure Development (RID) Abstracts

NV - 18-EPSCoR RID-0009

Director: Dr. Lynn Fenstermaker

Nevada System of Higher Education

Nevada NASA EPSCoR Research Infrastructure Development Program

This proposal identifies opportunities to enhance Nevada's research infrastructure that will result in sustainable research programs relevant to both NASA and the State's interests.

The overall goals of the Nevada NASA EPSCoR program are:

- Contribute to the overall research infrastructure, science and technology capabilities, higher education, and/or economic development of Nevada;
- Improve the capabilities of Nevada faculty/researchers to gain support from sources outside the NASA EPSCoR program that are most relevant to NASA research and missions;
- Develop partnerships among researchers at NSHE, NASA Centers, and industry; and
- Work in coordination with the NASA Space Grant program to improve the environment for science, mathematics, engineering, and technology education in Nevada.

Specific objectives that have been targeted to meet Nevada NASA EPSCoR RID program goals include:

- Objective 1: Enhance research infrastructure by competitively awarding at least two significant RID seed grants each year. Grants will be relevant to both NASA and Nevada strategic science plans, as well as the NASA Center and Mission Directorate science priorities provided by the national NASA EPSCoR Project Manager. A requirement of the seed grant solicitation is the submission of at least one competitive proposal.
- Objective 2: Promote the planning and implementation of training and proposal development workshops that will foster collaboration and the development of skills and knowledge to improve Nevada research infrastructure. Funding for at least one workshop per year is budgeted. An expected outcome from the workshops is the submission of a competitive research proposal.
- Objective 3: Facilitate new research collaborations among NASA Centers and NSHE faculty by awarding travel grants. As many travel sub-awards as possible with remaining RID funds will be made available each year. An expected outcome is the submission of a competitive and collaborative research proposal among NSHE faculty and NASA Center scientists.

The science priorities for this proposal are responsive to the NASA Center and Mission Directorate priorities provided by the national NASA EPSCoR Project Manager, the 2018 NASA Strategic Plan, the 2015 NSHE Science and Technology Plan and the Governor's Office of Economic Development plan entitled "2012-2014 Moving Nevada Forward: A Plan for Excellence in Economic Development". In preparation for this proposal, the NV RID TAC collaboratively developed a subset of science priorities as a focal point for future Nevada NASA EPSCoR endeavors based on the above documents, NSHE current and emerging research areas and business member perceptions of current focus areas for NASA. The TAC identified subset of science priorities is listed below by NSHE, State, and Business focus areas.

NSHE Research Focal Areas that are NASA Relevant:



NASA EPSCoR 2019 Research Infrastructure Development (RID) Abstracts

Space exploration materials; Space Psychology; Materials and Advanced Manufacturing; Robotics (emergency services; human services, construction and mining technologies); UAS (materials, hardware, software, command/control and applications); Big Data; Radiation protection; Renewable Energy and Photovoltaics; Software engineering; Cybersecurity; Electronics; 3D Printing; CubeSat; Mars geochemistry; Astrobiology/Exobiology; Astrophysics and Planetary Sciences (James Webb telescope launching in 2020); Sample Science; Cell and Developmental Biology; Plant biology and Ecosystems; Microbial biofilms will shed light on how biofilms form and identify materials and ways to control biofilm formation. Water Resources; Hydrometeorology and Climate Modeling; Dry Land Agriculture; Earth Science; and Aerosols and Atmospheric pollutants and properties

State of Nevada Focal Areas for NSHE:

More STEM-Related Research and Development; UAS and Autonomous Ground Vehicles; Aerospace; and Crypto/Cyber Security



NASA EPSCoR 2019 Research Infrastructure Development (RID) Abstracts

OK - 18-EPSCoR RID-0025
Director: Dr. Andrew Arena
Oklahoma State University

NASA Oklahoma EPSCoR Research Infrastructure Development

Specific RID activities will target four objectives: 1) Initiate contacts and forge direct partnerships with scientists and researchers at the Mission Directorates, the Office of the Chief Technologies, and/or one or more of the ten NASA Centers; 2) Promote collaborative research programs with the NASA Centers, Mission Directorates and Industry; 3) Initiate research activities in areas of strategic importance to the Agency; and 4) Support undergraduate and graduate research experiences. The majority of the proposed funding will be used for Travel Grants and Research Initiation grants awarded to Oklahoma faculty researchers that align with Goals 1-3 of The 2014 NASA Strategic Plan. All of the objectives of this proposal also are in alignment with priorities of the Oklahoma jurisdiction, in particular the Aerospace Industry Engineer Workforce Bill of 2008, House Bills 680 and 681 in conjunction with Senate Bill 720 that ensure that research impacts the State's economy through the technology transfer pipeline, opening doors to universities to license technology and faculty members to own businesses that market technology and invention, and the Council of Science and Technology.

The primary activities and majority of the funding support up to six Travel Grants, which provide opportunities for researchers to forge a direct partnership with a NASA Center, Mission Directorate, or Office of Technology Development for possible collaborations. Once Travel Grant awardees have successfully established links, they may apply for one of three Research Initiation Grants (RIGs), to further develop research collaborations.



NASA EPSCoR 2019 Research Infrastructure Development (RID) Abstracts

PR - 18-EPSCoR RID-0021

Director: Dr. Gerardo Morell

University Of Puerto Rico, San Juan

PR NASA EPSCoR Research Infrastructure Development

Established in 1994 by the Resource Center for Science and Engineering (RCSE) of the University of Puerto Rico (UPR) in conjunction with the National Aeronautics and Space Administration (NASA), the Puerto Rico NASA Established Program to Stimulate Competitive Research (PR NASA EPSCoR) implements strategic tasks and projects directed at enhancing Puerto Rico's research competitiveness and infrastructure, science and technology capabilities, and higher education, while building the core strength required to engage in technology development methods and activities for the solution of scientific and technical problems of importance to NASA in alignment with NASA's Mission.

The goal of the PR NASA EPSCoR Research Infrastructure Development (RID) program is to build in Puerto Rico the core strength needed to increase competitive research and technology development methods and activities for the solution of scientific and technical problems of importance to NASA in coordination and collaboration with NASA Centers and Mission Directorates and other research centers around the Nation that seek to advance U.S. scientific, security, and economic interests through a robust space exploration program.

PR NASA EPSCoR RID supports the initiation of new research projects in collaboration with NASA Centers and Mission Directorates that expand Puerto Rico's capabilities in NASA mission-related sciences and technology-development projects. To encourage and nurture activities that advance NASA's research priorities, the RID projects are competitively selected based on their connection, interaction, and relevance to NASA centers. The evaluation criteria include: intrinsic scientific and/or technical merit; alignment with NASA technology needs; relevance to, partnerships with, and interactions with the jurisdiction; credentials and track record of the investigators.

The emphasis is placed on developing a core expertise capable of successfully competing for funds from NASA and non-NASA sources outside of the EPSCoR program. With the guidance and support of the Technical Advisory Committee, the RID researchers receive technical assistance to transition their projects progressively toward gaining support from sources outside the NASA EPSCoR program by aggressively pursuing additional funding opportunities offered by industry and other sources.



NASA EPSCoR 2019 Research Infrastructure Development (RID) Abstracts

RI - 18-EPSCoR RID-0027

Director: Prof. Peter Schultz

Brown University

Rhode Island NASA EPSCoR Research Infrastructure and Development Grant

The proposed effort is designed to enhance NASA research infrastructure and stimulate new partnerships between RI institutions of higher learning and NASA's Mission Directorates. This will be accomplished through: competed research seed grants (directly related to NASA's goals and missions) each of the three years; workshops within the state in order to broaden participation in NASA opportunities; updated website presence; and participation in national NASA EPSCoR meetings. From such efforts, we seek to increase competitiveness in both EPSCoR Research competitions and future NASA grants and involvement.



NASA EPSCoR 2019 Research Infrastructure Development (RID) Abstracts

SC - 18-EPSCoR RID-0001

Director: Dr. Cassandra Runyon

College of Charleston

SC NASA EPSCoR Research Infrastructure Development 2019-2021

The South Carolina Space Grant Consortium (SCSGC) requests \$125,000 for its 2018 NASA EPSCoR Research Infrastructure Development (RID) program to further research and improve the quality of South Carolina's future workforce. This RID program will provide support for research and subsequent proposal preparation for scientists, engineers and students working to fulfill NASA's mission requirements in support of NASA's Vision to reach for new heights and reveal the unknown. In South Carolina, the NASA EPSCoR program's goal is to foster academic research that enables faculty to meet NASA mission objectives and to develop a self-sustaining, nationally competitive research program that can successfully compete for non-EPSCoR funds. A partnership between the SC NASA EPSCoR / SC Space Grant Consortium (SCSGC) Office and the SC EPSCoR/IDeA program helps SC researchers to establish contacts with and access resources from NASA. The SC NASA EPSCoR opportunity provides seed grant support for competitively selected projects of benefit to both NASA and the South Carolina jurisdiction. Each proposals receives a high quality external peer review as a part of the competitive process. Those proposals selected for funding include strong research components, and successfully demonstrate: 1) strong NASA ties; 2) the significance of their research to SC's vision for competitiveness in science, technology, engineering and mathematics (STEM); and 3) make evident their potential for growth and sustainability.



NASA EPSCoR 2019 Research Infrastructure Development (RID) Abstracts

SD - 18-EPSCoR RID-0003

Director: Dr. Edward Duke

South Dakota School Of Mines & Technology

South Dakota NASA EPSCoR Research Infrastructure Development Program

The goal of the South Dakota Research Infrastructure Development (RID) program is to promote competitive research and technology development in the state with an emphasis on areas of strategic importance to NASA. Attaining that goal requires close coordination among the state's research institutions, government, industry, NASA Headquarters, and NASA research and development centers. In recent years NASA EPSCoR activities in South Dakota have become increasingly integrated with efforts of other EPSCoR and EPSCoR-like programs resulting in better overall alignment with the broader mission of nurturing and diversifying the nation's scientific and engineering research enterprise.

The implementation strategy to achieve the four major objectives of the NASA EPSCoR Program focuses on the major STEM Ph.D.-granting institutions in the state, but also seeks to develop collaborations between those institutions and additional institutions of higher education in the state, including tribal universities. Because RID resources are limited, the allocation of these investments in the state is guided by the following criteria: (1) alignment with NASA R&D priorities, (2) development of NASA research contacts, (3) support for state R&D priorities, (4) formation of multi-institution collaborations, (5) meaningful involvement of Minority-Serving Institutions in research, and (6) potential for economic development and industry partnerships.

SD NASA EPSCoR offers travel grants and seed grants (Research Initiation Grants) to promote development of new contacts and cooperative research ties with NASA Centers and/or Mission Directorates. Because South Dakota has limited university-based and industry-based aerospace R&D, a major focus of SD NASA EPSCoR is redirection of non-aerospace research assets to efforts that address research and technology development needs of NASA. In the solicitations for Research Initiation Grants and NASA EPSCoR major research grants, explicit emphasis is given to development of new or continuing partnerships among colleges and universities in the jurisdiction that will enhance the jurisdiction's abilities to respond to the research and technology development needs of NASA.

This NASA EPSCoR RID program proposal outlines South Dakota's plan to continue to support improvement of the research environment in South Dakota and to further promote technology developments that align with NASA's strategic goals. SD NASA EPSCoR is well positioned to identify and cultivate new research collaborations within the state and with NASA that will increase the state's capacity in STEM research and education and effectively address the critical research and development and economic development priorities of the state and NASA.



NASA EPSCoR 2019 Research Infrastructure Development (RID) Abstracts

VI - 18-EPSCoR RID-0028

Director: Dr. David Morris

University of The Virgin Islands

NASA EPSCoR in the Virgin Islands

The United States Virgin Islands (USVI) has entered a new era in its partnership with NASA to promote STEM research, education, and outreach in the territory. Over the past 6 years, the University of the Virgin Islands (UVI) has led a focused effort to leverage existing facilities and faculty expertise to raise the level of awareness of, participation in, and support for NASA-related science activities in the USVI. Seven years ago, UVI had \$0 in NASA federal awards, only 1 full-time physics faculty, and no scientists in the territory were submitting competitive proposals to NASA's Cooperative Agreement Notices (CAN). Over the past 7 years, UVI has raised its level of CAN responses to 5 per year (academic 2017-18), its level of NASA-sponsored research and education support to more than \$1,000,000 per year (academic 2017-18), and now employs 7 full-time physics faculty and researchers.

This dramatic growth in NASA-related research activities at UVI was initiated through a 2013 NASA-EPSCoR Research Award that supported revitalization of research instrumentation at UVI's Etelman Observatory, provided student funding for authentic research experiences at the Observatory and at our NASA partner, Goddard Space Flight Center, and provided funding to hire the first-ever full-time astrophysics resident observer-researcher at UVI (stationed at Etelman Observatory). The success of this project coincided with an unprecedented growth in interest and enrollment in physics and astronomy courses at UVI from 2009-2014(see Figure 1, below) as well as a dramatic increase in scientific production in physics and astronomy.

This dramatic increase in physics and astronomy activity at UVI led to our successful submission of a NASA-MIRO proposal, in 2015, to support the first-ever 4-year degree in physics at UVI, designed to capitalize on the success of our ongoing NASA EPSCoR-funded project and to better meet the increased demand for physics offerings at UVI. Through the new UVI physics program, UVI has hired 3 new full-time physics faculty who now support this increasing demand for physics and astronomy offerings at UVI with research projects and additional courses in physics and astronomy. We have also dramatically increased the number of students doing research at UVI and with our research partners.

This unprecedented growth in faculty and student research activity in the USVI together with rapidly growing ranks of faculty and researchers with NASA-related research interests and highly-trained students in physics and astronomy, has provided an unparalleled opportunity to embed NASA research activities as a cornerstone of the STEM educational experience in the USVI. Through NASA-EPSCoR RID funding in 2016-2018 we have:

*Established the first-ever NASA-seed-grant program at UVI

*Funded several UVI students to do research at UVI both through direct funding and through seed grants

*Supported travel for several UVI students to national meetings

*Supported 2 USVI high school students to do research at UVI during the summer.



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*Supported the hiring of a dedicated NASA grants administrator at UVI to assist in all grant-related activities and reporting in the USVI



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VT - 18-EPSCoR RID-0012

Director: Prof. Darren Hitt

University Of Vermont, Burlington

VT NASA EPSCoR Research Infrastructure Development (RID) - Phase VI

This document details the proposed activities, along with corresponding priorities, targets, and metrics, for the Phase VI installment of the NASA EPSCoR Research Infrastructure Development (RID) project for Vermont. The Vermont NASA EPSCoR Program operates at the intersection of both NASA priorities and the State's vision for technology and economic development. According, all activities are part of a coordinated strategy to develop research infrastructure in areas of importance to NASA's mission while creating ties between Vermont's academic researchers, its technology-based companies, and NASA centers.

A multi-faceted approach will be taken to foster NASA-relevant research among faculty, graduate students, and the industrial sector while also strengthening collaborative ties with NASA personnel. The main project elements proposed for Vermont's Research Infrastructure Development Project include: Faculty Research Pilot Grants for initiating new projects; Faculty Research Small-Scale Grants for more mature projects; and NASA Center Travel Grants for exploring new, or strengthening existing, research collaborations. In addition, the Industrial Partners Initiative (IPI), based on an SBIR Phase '0' concept, will foster links between Vermont's knowledge/technology-based private sector companies, academia, and NASA.

Finally, significant efforts will be made in all activities to encourage the participation of underrepresented minorities and female students. While the non-diverse population of the State of Vermont will continue to pose challenges in this regard, we are confident that we will meet or exceed our target metrics.



NASA EPSCoR 2019 Research Infrastructure Development (RID) Abstracts

WV - 18-EPSCoR RID-0002

Director: Dr. Majid Jaridi

West Virginia University

Research Infrastructure Development (RID) in West Virginia: A Proposal to NASA Established Program to Stimulate Competitive Research

The NASA West Virginia Established Program to Stimulate Competitive Research (EPSCoR) requests \$375,000 for the fiscal years 2019-2022 for implementation of the WV Research Infrastructure Development (WV RID) Project. NASA EPSCoR is an integral part of the mosaic of research infrastructure building programs conducted by the WV EPSCoR Committee as an umbrella organization for all EPSCoR programs in the state. The WV State Science and Research Council is the body that oversees all of the state EPSCoR programs and other science initiatives of the state.

NASA WV EPSCoR programs are designed in conjunction with the menu of programs offered by the West Virginia Space Grant Consortium. However, in order to preserve the independence and separation of Space Grant and EPSCoR programs, we have avoided any duplication of the offerings of Space Grant in this three-year proposal. Our mosaic of programs covers all aspects of Science, Technology, Engineering, and Mathematics (STEM) education pipeline and research in West Virginia. Our partners in academia, high tech industry, and government are hard at work to ensure that we have a highly cost-efficient and seamless transition between our programs and those of our partners. In summary, we have included new offerings to foster and enhance connections and collaborations between our faculty and NASA Centers and Mission Directorate, as well as help our relatively new faculty to conduct research of interest to NASA and train graduate students in STEM disciplines.



NASA EPSCoR 2019 Research Infrastructure Development (RID) Abstracts

WY - 18-EPSCoR RID-0013

Director: Dr. Shawna McBride
University Of Wyoming

Wyoming NASA EPSCoR RID Proposal: FY 2019 - 2021

Wyoming remains the state with the smallest population (~500,000) and its economy is largely driven by extractive industries, agriculture, and tourism. The University of Wyoming (UW) is the only Ph.D. granting research institution in the state and therefore scientific activities that address key areas of state concern are concentrated at UW. In recent UW Academic Plans, areas for development in critical areas of science and technology have been identified, one being materials science research. Additionally, there is a continued focus on materials science and engineering research through the UW Tier-1 Engineering and Science Initiatives. Both of which are involved in developing and identifying high-priority areas for research and economic focus for WY and the University. The WY Governor's UW Top-Tier Science Programs & Facilities Task Force also identified material science as an area for future development, so there is considerable interest in this area within our jurisdiction.

With support from previous WY NASA EPSCoR RID awards, the Materials Science and Engineering program (MSE) at UW has become a recognized and cohesive research group on campus. The MSE program brings together students and faculty with research interests and expertise in materials science and engineering from physics, chemistry, chemical engineering, electrical engineering, environmental engineering, geology, and mechanical engineering. Materials science is a multidisciplinary field involving collaborations across many academic programs and the MSE program provides a rich, collaborative research environment for researchers to interact. Current strengths at UW include new materials synthesis, including 2D materials and composite materials, advanced laser materials processing and analytics, as well as computational methods for materials design, which fall into four areas of emphasis: catalytic materials, biomaterials, nanomaterials, and optoelectronic materials. Core MSE members also collaborate with established centers of excellence on campus, including the School of Energy Resources, which is engaged in a new Carbon Engineering Initiative and has a well-developed Center for Photoconversion and Catalysis. MSE faculty also participate in the newly formed Artificial Intelligence Materials Development Center at UW. In addition, MSE members are supported by NIH INBRE programs, which sponsors biomaterials-related research projects. The development of the MSE program has allowed for greater networking, collaboration, equipment sharing, and student opportunities in the area of materials science at UW.

While the MSE program has become a recognized program on campus, there is still a considerable need for growth to establish the MSE program as a core center of expertise and excellence on campus. The goal of this RID project, therefore, is to further develop NASA-related materials science research at the University of Wyoming and to continue to expand the MSE program. The long-term vision and implementation strategy for the MSE program is to develop a Center for Materials Science and Engineering at UW aligned with NASA research objectives and that actively engages with NASA Centers conducting materials science research. This long-term vision will be achieved in multiple steps, which include: 1) establishing a multidisciplinary PhD program in Materials Science and Engineering, 2) participating in national NASA EPSCoR meetings to develop NASA contacts, 3) supporting faculty, especially early career faculty, in successfully obtaining extramural funding for materials science



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research (\$2-3M federal grants), 4) building grant funding, research, and collaborative successes to allow for the application of larger center-related grant proposals (\$10-20M grants), and 5) integrating NASA Technology Readiness Level (TRL) training into courses and in developing collaborative research projects aimed at not only basic research, but also producing products.



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