Utah NASA Space Grant Consortium

Proposal Guidelines for the Faculty Research Infrastructure Award Program

2013-2014 Grant Year

Introduction

Junior Faculty at University of Utah invited to submit proposals to the Faculty Research Infrastructure Award Program. As an affiliate of the Utah NASA Space Grant (UNSG) consortium, the University of Utah has $15,000 to be awarded during 2014 for development of research infrastructure. The intent of the University of Utah NASA Space Grant Research Infrastructure Award is to develop interdisciplinary seed funding to build a sustainable capability at the University of Utah which supports NASA's mission. UNSG will assist researchers in focusing their research toward NASA priorities while building ties with NASA Centers and aerospace contractors. The selected faculty research project will provide significant hands-on, authentic research opportunities for one or more students. Projects that emphasize active participation from NASA center researchers and women and underrepresented minorities are particularly encouraged.

Period of Performance

Each award will begin on June 1, 2014 and conclude on December 31, 2014. Budgets should reflect anticipated expenditures within this time period.

Funds Available

Total funds available for new research infrastructure projects are $15,000.

Eligibility

Faculty employed by the University of Utah is eligible to apply.

Proposal Guidelines

- All UNSGC funds must be matched one-to-one from non-federal sources. Be sure to clearly identify the sources and amounts of matching funds. Examples of qualifying cost share sources include: institutional faculty or student salary match, direct institutional support, waiver of institutional F&A expenses, outside support for student salaries
- All faculty and students receiving direct support must be U.S. citizens
- No equipment purchases are allowed under this program
- Expenditures for foreign travel are prohibited

Specific Proposal Requirements and Format

Proposals should be single-spaced on standard 8 ½ x 11 paper, no smaller than 12 point font and with no less than one-inch margins throughout. The proposal package should include the following elements:

- Cover page – should state the proposal title, principal investigator(s), department and institution, project duration, total amount requested and signatures of the principal investigator
- Table of Contents

- Project Abstract – 250 words or less
- Project Narrative – to include an Introduction, Project Objectives, Key Personnel, Student Participants, Implementation Strategy, Relevance to NASA Research and Technology Development Priorities and Relevance to UNSGC Mission, Potential for Follow-on Funding
- Budget – clear, concise budget including matching support documentation, the budget must reflect a clear alignment with the content and text of the proposal
- Curriculum Vitae – attach a curriculum vitae for each principal investigator

Entire proposal and budget cannot exceed 4 pages in length, excluding curriculum vitae. The concise length of the proposals with allow for expediting of the review and award process.

Evaluation and Selection Process

Each proposal submitted will be evaluated using the following criteria:

1. Scientific and technical merit of the proposed project as given by the project goals, timeline and specified project outcomes, realizing interdisciplinary research projects are highly encouraged. (30%)
2. Degree to which the proposed work contributes to the NASA Research and Technology Development Priorities as described in the Strategic Framework for NASA. See Appendix A. Proposals will also focus on projects that can contribute to building future research and innovative activities in Utah. (30%)
3. Degree to which the project contributes to the UNSGC strategic goal of increasing diversity in the STEM workforce and contributes to the UNSGC network. (10%)
4. Appropriateness of budget to carry out the project, including level of institutional match funding. (10%)
5. Probability for the investigator(s) to carry out the research plan and achieve the stated goals and the potential for follow-on funding. (10%)
6. Degree of significant student involvement, measured in terms of value (greater than $5,000) or participation (greater than 160 hours) or impact on student's academic achievement and/or employment. (10%)

Timeline

March 2014	Release of Call for Proposals document
May 1, 2014	Proposals due
May 15, 2014	Award Notification
June 1, 2014	Funding Begins
Jan 31, 2015	Awards completed/results submitted

Reporting Requirements

A final project report is due January 31, 2015. Report shall describe progress toward meeting project objectives and complete the research infrastructure award reporting form for the project which is required to be submitted to the NASA Office of Education Performance Measurement System.

Additionally, faculty researchers agree to cite UNSGC as a source of funding in all publications resulting from the funded research. References to UNSGC funding should utilize the phrase "…supported in part through the Utah NASA Space Grant Consortium, Grant NNX10AJ77H."

Students participating in a faculty research project must complete a Student Data Award Form. Student demographic data is required to be submitted to the NASA Office of Education Performance Measurement System.

Students funded under this program will be expected to submit a report to the proceedings of the UNSCG student symposium and present their findings to the annual meeting of the consortium held in Utah during May of 2015.

Submission Procedures

Submit an electronic file of the complete package with signatures (Microsoft Word or pdf) via electronic mail to:

Joseph Orr PhD, Director, Utah NASA Space Grant Consortium
Joe.Orr@hsc.utah.edu

Appendix A. Strategic Framework for NASA

I. NASA Mission Directorates

NASA's Mission *to pioneer the future in space exploration, scientific discovery, and aeronautics research,* draws support from four Mission Directorates, each with a specific responsibility.

• The Aeronautics Research Mission Directorate (ARMD) conducts vital research to make air travel more efficient, safe, green, and to uncover leading-edge solutions for the Next Generation Air Transportation System (NextGen) in the United States. ARMD's fundamental research in traditional aeronautical disciplines and emerging disciplines helps address substantial noise, emissions, efficiency, performance and safety challenges that must be met in order to design vehicles that can operate in the NextGen. (http://www.aeronautics.nasa.gov)

• The Exploration Systems Mission Directorate (ESMD) Agency role is to develop a sustained human presence on the moon; to promote exploration, commerce, and U.S. preeminence in space; and to serve as a stepping-stone for the future exploration of Mars and other destinations. ESMD establishes the NASA exploration research and technology development agenda. Specifically, ESMD develops capabilities and supporting research and technology that will enable sustained and affordable human and robotic exploration. It also works to ensure the health and performance of crews during long-duration space exploration. In the near-term, ESMD does this by developing robotic precursor missions, human transportation elements, and life-support systems. (http://www.exploration.nasa.gov)

• The Science Mission Directorate (SMD) leads the Agency in four areas of research: Earth Science, Heliophysics, Planetary Science, and Astrophysics. SMD works closely with the broader scientific community, considers national initiatives, and uses the results of National Research Council studies to define a set of ―Big Questions‖ in each of these four research areas. These questions, in turn, fuel mission priorities and the SMD research agenda. The SMD also sponsors research that both enables, and is enabled by, NASA's exploration activities. SMD has a portfolio of Education and Public Outreach projects that are connected to its research efforts. (http://nasascience.nasa.gov)

• The Space Operations Mission Directorate (SOMD) provides the Agency with leadership and management of NASA space operations related to human exploration in and beyond low-Earth orbit. SOMD enables current space exploration in low earth orbit through its Space Shuttle and International Space Station Programs. SOMD is also responsible for Agency leadership and management of NASA space operations related to Launch Services, Space Transportation, and Space Communications in support of both human and robotic exploration programs. (http://www.spaceoperations.nasa.gov)

II. NASA Research Areas of Interest

NASA EPSCoR research priorities are defined by the Mission Directorates—Aeronautics Research, Exploration Systems, Science, and Space Operations. Each Mission Directorate covers a major area of the Agency's research and technology development efforts. Information about current NASA research solicitations can be found on NSPIRES at http://nspires.nasaprs.com (select ―Solicitations‖ and then ―Open Solicitations‖).

Research priorities for each of the Mission Directorates can be found at the following locations:

Aeronautics Research Mission Directorate (ARMD)

Researchers responding to the ARMD should propose research that is aligned with one or more of the ARMD programs. Proposers are directed to the following:

- ARMD Programs: http://www.aeronautics.nasa.gov/programs.htm
- Research Opportunities in Aeronautics (ROA) http://nspires.nasaprs.com (select ―Solicitations‖ and then ―Open Solicitations‖)

Exploration Systems Mission Directorate (ESMD)

General priorities of ESMD can be found at http://www.nasa.gov/directorates/esmd

Science Research Interests:

- Research and Technology Development to Support Crew Health and Performance in Space Exploration Missions, NASA Human Research Program and The National Space Biomedical Research Institute http://nspires.nasaprs.com/external/viewrepositorydocument/cmdocumentid=154870/NNJ08ZSA002N.pdf
- Ground-Based Studies in Space Radiobiology, NASA Space Radiation Program Element http://nspires.nasaprs.com/external/viewrepositorydocument/cmdocumentid=179575/NNJ09ZSA001N.pdf

Engineering Research Interests:

- Spacecraft: Guidance, navigation and control; thermal; electrical; structures; software; avionics; displays; high speed re-entry; modeling; power systems; interoperability/commonality; advanced spacecraft materials; crew/vehicle health monitoring; life support.
- Propulsion: Propulsion methods that will utilize materials found on the moon or Mars, ―green‖ propellants, on-orbit propellant storage, motors, testing, fuels, manufacturing, soft landing, throttle-able propellants, high performance, and descent.
- Lunar and Planetary Surface Systems: Precision landing hardware, software, in-situ resource utilization (ISRU), navigation systems, extended surface operations, robotics, (specifically environmental scouting prior to human arrival, outpost maintenance with and without humans present, and assist astronaut with geologic exploration) environmental analysis, radiation protection, spacesuits, life support, power systems. ESMD also has an extensive program to develop and test models of lunar surface systems in realistic analog environments on Earth. Information on the Analog Tests is available on the Web by visiting: http://www.nasa.gov/exploration/home/analogs.html
- Ground Operations: Pre-launch, launch, mission operations, command and control software systems, communications, landing and recovery.

Science Mission Directorate (SMD)

Detailed information on SMD research priorities is available at the following URLs:

- NASA Science Plan 2007: http://science.hq.nasa.gov/strategy/ and http://nasascience.nasa.gov/about-us/science-strategy/Science_Plan_07.pdf
- Research Opportunities in Space and Earth Science (ROSES): http://nspires.nasaprs.com/external/ Select ―Solicitations‖, ―Open Solicitations‖, and then ―Research Opportunities in Space and Earth Sciences (ROSES) – 2009.

Space Operations Mission Directorate (SOMD)

The primary research and technology development areas in SOMD support launch vehicles, space communications, and the International Space Station. Examples of research and technology development areas (and the associated lead NASA Center) with great potential include:

- Space Communications and Navigation
  - Coding, Modulation, and Compression (Goddard Spaceflight Center (GSFC))
  - Precision Spacecraft and Lunar/Planetary Surface Navigation and Tracking (GSFC)
  - Communication for Space-Based Range (GSFC)
  - Antenna Technology (Glenn Research Center (GRC))
  - Reconfigurable/Reprogrammable Communication Systems (GRC)
  - Miniaturized Digital EVA Radio (Johnson Space Center (JSC))
  - Transformational Communications Technology (GRC)
  - Long Range Optical Telecommunications (Jet Propulsion Laboratory (JPL))
  - Long Range Space RF Telecommunications (JPL)
  - Surface Networks and Orbit Access Links (GRC)
  - Software for Space Communications Infrastructure Operations (JPL)
  - TDRS transponders for launch vehicle applications that support space communication and launch services (GRC)
- Space Transportation
  - Optical Tracking and Image Analysis (Kennedy Space Center (KSC))
  - Space Transportation Propulsion System and Test Facility Requirements and Instrumentation (Stennis Space Center (SSC))
  - Automated Collection and Transfer of Launch Range Surveillance/Intrusion Data (KSC)
  - Technology tools to assess secondary payload capability with launch vehicles (KSC)
  - Spacecraft Charging/Plasma Interactions (Environment definition & arcing mitigation) ((Marshall Space Flight Center (MSFC))
- Processing and Operations
  - Crew Health and Safety Including Medical Operations (JSC)
  - In-helmet Speech Audio Systems and Technologies (GRC)
  - Vehicle Integration and Ground Processing (KSC)
  - Mission Operations (Ames Research Center (ARC))
  - Portable Life Support Systems (JSC)
  - Pressure Garments and Gloves (JSC)
  - Air Revitalization Technologies (ARC)
  - In-Space Waste Processing Technologies (JSC)
  - Cryogenic Fluids Management Systems (GRC)

Reference: National Aeronautics and Space Administration, Office of Education, FY 2010 NASA Training Grant announcement,