

EPO Supplemental Grants from the ROSES 13 & 14 Cycles

Title

PI

Lead Institution

Abstract

Student engagement in Mars Data Analysis: additional hands-on Research Experience for Undergraduates (REU) opportunities

Dr. Devon Burr

SETI Institute

Carl Sagan Center for the Study of Life in the Universe

Abstract: This proposal provides ten weeks of research experience for three undergraduate students (one each summer) at the Carl Sagan Center for the Study of Life in the Universe (CSC) at the SETI Institute. The experience will involve each student in research directly contributory to the parent award, and culminate in conference presentation by the student and her/his co-authorship on (a) peer-reviewed publication(s). The students will join SETI's REU program in astrobiology, and participate in the weekly seminars, various fieldtrips, and other educational experiences along with the other REU participants. The results will be three undergraduate students taken beyond inspiration and engagement in NASA science to employment in hands-on NASA research and education about the NASA pipeline.

Bringing the SETI Institute's Voyages Through Time Astrobiology Curriculum to the Space Science Teacher's Summit

Dr. Tom McCollom

University of Colorado, Boulder

Abstract: Laboratory for Atmospheric and Space Physics

Astrobiology is a critical integrative paradigm for space sciences. The exploration of the early solar system, planet formation and the early Earth engage students and teachers to explore important ideas in chemistry, geology, biology and astronomy. The Colorado Space Science Teachers Summit, a new statewide professional development program, is a weeklong workshop for middle and high school teachers. Here, we propose to incorporate a 2-day high school-focused astrobiology unit to the Summit, using the SETI Institute's "Planetary Evolution" module from Voyages Through Time. The proposal supports the development of the unit (with SETI E/PO staff), as well as travel support, food and lodging, and graduate credit for 20 Colorado Science teachers in each of the three years of the project.

Women's Science Forum: An Outreach Event for Middle and High School Girls

Dr. Mark Giuliano

Space Telescope Science Institute

Abstract: Females are under-represented in STEM (science, technology, engineering, and mathematics) careers. While the under-representation is not as evident in middle school, it is during this time that girls formulate their ideas about their future careers. The Women's Science Forum (WSF), a 16 year-old Space Telescope Science Institute program, understands this under-representation. The program is designed to correct this imbalance. The WSF consists of STEM events for middle and high school female students. Throughout the program, the participants interact with undergraduate women science majors and women scientists who serve as successful role models for the female students.

Geomagnetism for the MESA Classroom-An Essential Science for Modern Society
Dr. Heinrich Maus
University of Colorado, Boulder
CIRES

Abstract: We request funds to develop a project in partnership with the MESA program, an after-school program designed to support under-represented students in the pursuit of degrees and careers in STEM disciplines. Activities include development of after-school geomagnetism curriculum at the high school level, preparation for Dr. Maus to engage in the after-school classroom, professional development for MESA advisors, improvements to a popular geomagnetism website, and dissemination of the materials to a wider audience. Curricular materials include career elements, a tour of the Space Weather Prediction Center and Planet Theatre, a student field experience using magnetic compasses and maps, and hands-on explorations of fundamental geomagnetism physics.

Bringing Solar System Curriculum to the Space Science Teacher's Summit
Dr. Peter Delamere
University of Colorado, Boulder
LASP

Abstract: Solar system studies provide an exciting topic for students to explore a variety of physical processes. The Colorado Space Science Teachers Summit, a new statewide professional development program, is a week-long workshop for middle and high school teachers. Here, we propose to incorporate a 2-day focus on solar system science using LASP and NASA curriculum focusing specifically on solar system exploration. Topics include comparative planetology, the history of the solar system, planetary atmospheres, and highlights current exciting NASA missions including Cassini and New Horizons. The proposal supports the development of the unit, as well as travel support, food and lodging, and graduate credit for 30 Colorado Science teachers in each of the three years of the project.

Why explore Mars?: A Native American Perspective
Dr. Timothy J. McCoy
Smithsonian Institution
Department of Mineral Sciences, National Museum of Natural History

Abstract: We will continue our efforts in planetary science outreach to indigenous communities. This effort brings together scientists, engineers, educators, linguists and cultural preservationists to introduce planetary sciences to the Miami Tribe of Oklahoma and the Menominee Nation through culturally-relevant materials. In this proposal (part of a multi-PI effort), the primary focus is the Miami tribal 2008 Culture and Language Camp with a focus on myaamionki: asiihkiwi neehi kiisikwi (The Place of the Miami: Earth and Sky). This camp will incorporate place-based geoscience and astronomical exploration of landscapes to understand the complex inter-relationships between earth, sky, water and life and compare these to other planets, using indigenous methods of learning and the myaamia language.

Microbes@NASA: A New Curriculum in Astrobiology Highlighting the Importance of Microbial Ecology to Space Exploration
Dr. Brad Bebout
NASA/Ames Research Center
Exobiology Branch, MS 239-4

Abstract: Astrobiologists recognize the importance of microbes to sustaining our own planetary ecology, as well as its importance to exploration, and to the search for life elsewhere. In collaboration with the Thermal Biology Institute, we will enhance the materials already available at the Microbes@NASA website to teach the importance of microbes and microbial ecology to NASA missions and to the search for life elsewhere. The end product of the work proposed here is a new one week middle school curriculum in which the importance of microbial ecology to NASA's goals is highlighted and placed into an astrobiological context. We will include information about a number environments important to NASA, including: hot springs, the deep subsurface, and deep sea vents.

Why explore Mars?: A Native American Perspective
Dr. Aileen Yingst
University of Wisconsin, Green Bay
Department of Natural and Applied Sciences

Abstract: We propose to adapt and integrate the standards-based module "Exploring Mars" into the core curriculum Science Methods course for pre-service teachers at the College of Menominee Nation, focusing on relevance and delivery to Native Americans. This proposal is part of a multi-PI effort, with a partner proposal being submitted by Dr. Timothy McCoy at the Smithsonian Institution. The primary focus of this effort is education outreach to the Menominee Tribe of Wisconsin. We intend a significant expansion of our work with the "Exploring Mars" module, using our experience incorporating native concepts and values of science and observation, and use of native language, to tackle the far more fundamental and complex task of integration into a core curriculum course.

Rocket Scientists
Prof. Charles C. Kankelborg
Montana State University

Department of Physics

Abstract: America is slipping behind other countries in terms of the percentage of students becoming scientists. Many students assume that a scientific career is beyond their reach before they have even explored their own talents. We propose to produce and distribute a film to high schools across Montana showing how students can become scientists by filming examples of real people from 6th grade up through post doc along the path of a science career. We will include Montana's Native American students in both the film and in its distribution. The film will use the MOSES rocket program, designed and built by students at Montana State University, as an example of the opportunities college students have to participate in state-of-the-art research.

Understanding the Sun: Interplay between Modeling & Observations

Dr. Robert F. Stein

Michigan State University

Department of Physics and Astronomy

Abstract: An interactive museum exhibit for the Impression 5 Science Center will be developed to guide visitors through an exploration of the process of modeling nature, using the sun as an example. The centerpiece of the exhibit will be an interactive program where visitors will be able explore the use of models, manipulate parameters of the solar model and interpret results in the light of evidence from observations. Images from NASA supported simulations and solar observatories will support instructional panels to guide visitors through content related to the structure of the sun. Explorations and manipulative components will also be used to explore basic concepts of modeling such as how scientists use models as thinking tools and how models differ to reflect the data being interpreted.

One Earth, Many Views: A multicultural program for teaching earth science education using remote sensing data.

Dr Bryan Baum

Space Science and Engineering Center

Abstract: We propose to increase the participation of under-represented students in the geosciences with a two-pronged educational approach: 1) by designing a culturally meaningful course for science teachers in tribal communities that will introduce learning modules specifically aligned to meet learning needs and learning styles of Native students using visually attractive technologies, based on the use of remote sensing data of the atmosphere, earth, and ocean by both passive and active satellite and ground-based sensors, and 2) by offering a visiting scientist program and culminating "One Earth" cultural conference. Data included in the geosciences course are rarely presented as part of a general science course.

Accessing the Moon: Earth-Moon Comparison Institutes for Classroom Educators

Dr. Walter Kiefer

Lunar and Planetary Institute

Abstract: The Moon is prominent in content taught in K-8 classrooms - and in NASA's exploration plan! Our Moon offers a compelling platform from which educators and students can be immersed in inquiry based science and can build understanding of Earth and Moon structure, formation, evolution, and dynamic relationship. The proposed effort, a partnership between the Lunar and Planetary Institute (LPI) and JSC's Astromaterials Research and Exploration Science (ARES), involves development and implementation of five day inquiry-based Lunar Educator Institutes to immerse 60 fifth through eighth grade teachers in NASA lunar science and prepare them to engage and educate students, and follow-up with continued support for participants.