

**ATLANTA METROPOLITAN COLLEGE  
ATLANTA, GA**

Principal Investigator: Dr. Bryan Mitchell  
Co-PI's: Dr. Margaret Lowder, Ms. Mechelle Alston-Brown  
Website URL: <http://www.atlm.edu/>

**Project Abstract:** Undergraduate Curriculum (CIPAIR) Project entitled "Creating Research Excellence in Science, Technology, Mathematics & Engineering (NASA CREST-ME): Innovations for Pipeline Success" will modify the Biology, Physics and Chemistry courses to include NASA-related content and primary research. The student population is about 95% African-American, 85% of which depend on some form of financial assistance for payment of tuition and fees. Currently, approximately 2,700 students are enrolled of which about 10% are enrolled in STEM disciplines. 95% of these students are minorities and 55% are females.

**Intellectual Merit:** The proposal, Creating Research Excellence in Science, Technology, Mathematics & Engineering (NASA CREST-ME): Innovations for Pipeline Success, is written in an excellent style and appears to be clear, accurate and complete. The institution has established a partnership with the NASA Kennedy Space Center, Advanced Life Support Group to assist in reaching its goals. A significant strength and challenge for AMC is that 95% of the student population is African-American of which 85% depend on some form of financial assistance. AMC is the only minority serving public institution in the state of Georgia. Because it was founded in 1974, it is not considered a historically black college. The current enrollment is 2,781 with 12% (331) enrolled in STEM disciplines. STEM major are typically 12-15% (173 degrees conferred in 2008) of the graduating class each year. The proposal has clear goals and objectives, timelines and evaluation processes. The four goals are presented with several objectives for each goal. Each objective has activities (what will be done), resources (who is responsible for the activity), and performance indicators (how activities will be accomplished). The timeline is presented year-by-year and by activities for fall, spring, and summer. It is evident that the investigators have an idea about the science courses that require revamping but only some knowledge about NASA-related content. This proposal has the capability of impacting a large number of students at AMC and in the Atlanta area, which also include high school students. This is a strong part of the proposal, especially the mentoring.

## NYC COLLEGE OF TECH, & HOSTOS COMMUNITY COLLEGE

Principal Investigator: Gaffar Bailani

Co-PI's: Sidi Berri, Reggie Blake (New York)

Nieves Angulo (Hostos)

Website URLs: <http://www.cuny.edu/index.html> or <http://www.hostos.cuny.edu/>

**Project Abstract:** Both institutions are part of the City University of New York and are minority serving institutions. We are proposing improving the curriculum by adding research components to four existing core courses in physics, chemistry, engineering and engineering technology and introducing two new courses: “Introduction to Research Management”, and “Special Topics in Remote Sensing.” Four revised courses will be taught at City Tech and 2 revised courses at HCC. We will also build strong partnership with NASA centers (Marshall and Goddard) to enhance the faculty research and give minority undergraduate research scholars and the faculty the opportunity to obtain internships. Furthermore, we will extend our collaboration efforts and partner with organizations that work to achieve partially or fully the goals of NASA such as the Louis Stokes Alliance for Minority Participation (LSAMP) and New York City Research Initiative (NYCRI). These measures are expected to increase the transfer rate in STEM the graduation rate from 20% to 50% and the retention rate from 44% to 65%.

**Intellectual Merit:** This is a very strong well thought out proposal which covers all of the merit elements outlined in CIPAIR. It has a systemic plan for addressing the problems of retention and graduation of underrepresented STEM students. There is also mention of using the resources available in other programs (LSAMP etc) to leverage student participation in the program. The curriculum adjustments are to engineering and engineering technology courses which can indeed be focused on the NASA mission without affecting general science education in mathematics, Physics or Chemistry. The PI's all have degrees from first rate institutions and seem dedicated to STEM teaching. The proposed budget is reasonable and realistic and the partnership between the two institutions seems genuine.

## SAN MATEO/ CALIFORNIA STATE UNIV., SAN FRANCISCO

Principal Investigator: Amelito Enriquez

Co-PI's: Cheng Chen, Hamid Mahmoodi, Hamid Shahnasser, Hao Jiang, Wenshen Pong (CSU)

Website URLs: <http://www.smccd.edu/accounts/smccd/> or <http://www.ucsf.edu/>

**Project Abstract:** The objectives of the COMETS project are: (1) to improve student engagement and success in foundational math courses and core engineering courses; (2) to provide ten participants each summer with research experiences in NASA Ames, which they would not otherwise have in their usual academic environment; (3) to provide current community college students a year-long engineering design experience early in their academic career by participating in capstone design courses for graduating seniors; (4) to strengthen existing faculty relationship with NASA Ames, and establish new collaborative relationships among two-year and four-year engineering faculty, and NASA Ames Research Center; (5) to increase the number of academically prepared community college students transferring to four-year institutions as engineering majors; (6) to improve academic success of engineering students from underrepresented groups by providing academic support and mentoring; and (7) to increase the number of minority students pursuing advanced degrees in STEM fields. Improvements in math and engineering curricula will be accomplished through collaboration with faculty researchers and NASA Ames personnel. Additionally, existing capstone senior design courses will be restructured to implement the NASA systems engineering process, and prepare students to work for NASA and space industry partners.

**Intellectual Merit:** The PI and Co-PIs are well qualified and have shown success in getting grants from other sources for creating opportunities for minorities in engineering, technology, and science. The proposal has clear goals and objectives, appropriate partnerships and customer focus. The SFSU Creating Opportunities for Minorities in Engineering, Technology, and Science (COMETS) program already has several projects such as the Academic Excellence Workshops in place to assist their students. This proposal will increase and strengthen programs currently in place at the participating academic institutions. Detailed information is presented about the 10-week summer internship program including how it will be evaluated. The summer internship program will provide hands-on research, mentoring, and training to full-time and part-time students from both the two- and four-year institutions. The proposal reveals that investigators are continually seeking additional training and information from NASA such as one of the investigators who will train to help implement a senior engineering design course that has a strong focus on the NASA systems engineering process and prepares students to work for NASA and space industry partners. The proposed approach includes hands-on activities in math courses and design projects in engineering courses. The interaction between Canada College (CC) and the San Francisco State University (SFSU) in terms of the transfer of engineering and science students shows the need for partnership between these institutions to produce successful outcomes. In fact, the PI from CC and the Co-PI from SFSU are currently working together on a US Education Department \$900k grant for the Minority Science and Engineering Improvement Program (MSEIP). The PI also has currently \$600k National Science Foundation (NSF) S-STEM grant

## SANTA MONICA CC & UNIV. OF CALIFORNIA-LA

Principal Investigator: Jinan Darwiche

Co-PI: Vicki Drake (Santa Monica)

Website URL: <http://www.smc.edu/homex.asp?q=homepage> or <http://www.calstate.edu/>

**Project Abstract:** Santa Monica College (SMC), a comprehensive, transfer-oriented Hispanic-Serving community college addressing the educational needs of west Los Angeles County in southern California, is seeking CIPAIR funding to develop the Curriculum Alignment and Research Advancement (CARA) Project: Bridging Community College STEM Education with the NASA Mission. Through this initiative, SMC will strengthen its STEM curricula through a two-pronged interdisciplinary approach designed to raise faculty and student awareness of NASA's strategic goals and career opportunities. The CARA Project will utilize grant funds to support curriculum revisions in four courses including the Physical Sciences, Computer Sciences, Earth Sciences, and Environmental Sciences, thus ensuring that students from multiple disciplines have access to program resources. Recognizing that student research opportunities may be limited at JPL, SMC faculty will also engage faculty from the University of California, Los Angeles, to further integrate research into the community college curriculum.

**Intellectual Merit:** This is a well written proposal that addresses the intrinsic merit elements outlined in the CIPAIR NRA. The overriding goal is clearly defined: to increase student access and success. The four objectives align with the following goals: 1) Faculty Development (Four faculty fellowships are proposed at JPL on an annual basis.); 2) Course Improvement (Four new courses will be developed: Introduction to MathLab, Scientific Computing/Interactive Data Language, Beginning Electronics, and Introduction to Lab View.) Participation of faculty from several STEM disciplines will allow for cross-curricular integration of NASA content into existing courses; 3) Student Success; 4) Student Access (Two SURF scholarships will be funded yearly). Students will have involvement in the SIRI and AR programs. Students will have the opportunity to participate in research activities at JPL. All of this will enable students and faculty to have input in curriculum improvement that will integrate NASA concepts and skills, thus preparing students for NASA/STEM careers. The plan for implementation is clearly outlined. The project is student and faculty driven. Through the partnership and collaboration with UCLA, students will be able to make a seamless transition to the four year institution. Further, the opportunities available for both students and faculty at JPL will provide a foundation for future curriculum change. This is a continuum of already established partnerships, and integrates NASA related content and research opportunities into courses. Faculty and students will complete internships at JPL; and students have an additional role in the project through providing feedback on curriculum improvement and development. The plan is well organized and has clear lines of communication with NASA. The project has a high probability of success; and there is commitment among the partners to sustain the project. The evaluation plan provides a good opportunity for dynamic strategic planning based on project results.

## SPELMAN COLLEGE & GASDEN COMMUNITY COLLEGE

Principal Investigator: Peter Chen

Co-PI: Brian Geislinger

Website URL: <http://www.spelman.edu/> or <http://www.gadsdenstate.edu/>

**Project Abstract:** The purpose of this proposal is to infuse research-based experiments involving lasers, spectroscopy, and other atmospheric measurement techniques into the chemistry and physics curriculum so that students at two HBCUs (Spelman College and Gadsden State Community College) will develop the skills, knowledge, and hands-on experience that will make them competitive when applying for employment with NASA, academia, or the aerospace industries. The proposed experiments will focus on technology and measurements that are related to NASA's missions, with a focus on studies in atmospheric science. The proposed projects include building and using a new undergraduate Lidar system, initiating a new atmospheric balloon program, and incorporating advanced spectroscopy experiments of atmospheric molecules into the undergraduate curriculum.

**Intellectual Merit:** This is a very well thought out and organized proposal. The PI clearly knows Spectroscopy and uses LIDAR to couple basic knowledge of spectroscopy to a NASA objective of studying the atmosphere. He has formed a partnership with Gadsden Community College to introduce students to research early in their academic careers. The PI's have the experience to develop the LIDAR system, and course modules to introduce the science of spectroscopy in introductory Physics and Chemistry courses. The PI's have also added the necessary evaluation infrastructure by utilizing on campus resources; the Spelman College Office of Internal Evaluation Services (IES) will conduct ongoing evaluation of the program performance for the proposed project. This type of robust assessment can be used to determine what does and does not work as for insertion of this material into undergraduate coursework. The PI requested appropriate resources and has leveraged them efficiently with other resources available on campus. Undergraduate students will be engaged in the building of LIDAR system motivational. The PI and Co-PIs are well qualified and have shown success in getting grants from other sources for creating opportunities for minorities in engineering, technology, and science.

## UNITED TRIBES TECHNICAL COLLEGE

Principal Investigator: Mandy Guinn

Co-PI: Rebekah Olson (United Tribes)

Roderick Hipskind (NASA Ames)

Website URL: <http://www.uttc.edu/main.asp> or  
<http://www.nasa.gov/centers/ames/home/index.html>

**Project Abstract:** United Tribes Technical College (UTTC) is a minority serving institution with students from more than 75 federally recognized Native American tribes in the nation. This project, BOOTCAMPS (Bringing Opportunities Onboard To Create Academic and Methodological Preparation in (STEM)), proposes to develop and strengthen curriculum in the Tribal Environmental Science (TES) program to increase and retain the number of underrepresented students in STEM fields. The main objectives of the project are to develop new courses in research and remote sensing while enhancing three existing courses. Two new courses will be developed: Introduction to Remote Sensing and Introduction to Scientific Research. Three existing courses will be enhanced: Research II: Scientific Reading and Writing, and Biology I and II. The Introduction to Global Climate Change will be disseminated online

**Intellectual Merit:** The BOOTCAMPS proposal addresses the intrinsic merit elements outlined in the CIPAIR NRA. The main goal is to enrich STEM courses to recruit and retain Native American students who will graduate with an understanding of NASA research. Two new courses will be developed: Introduction to Remote Sensing and Introduction to Scientific Research. Three existing courses will be enhanced: Research II: Scientific Reading and Writing, and Biology I and II. The Introduction to Global Climate Change will be disseminated online. Hands-on research has and will continue to be an element of the STEM curricula. Native American culture and beliefs have been taken into account in the development and enhancement of curriculum courses and programs such as the Tribal Environmental Science program. A three-day workshop will be held annually to provide professional development to faculty and students, facilitate access to research mentorship and technical support, data and computational resources. The workshops will be opened to the surrounding North Dakota, Minnesota and Montana Schools. The workshops also will provide NASA scientists opportunities to engage with and learn from TTCU faculty and students. In addition, the project focuses on introducing students to skills in research through a new course, and providing incentives for advanced students to do well in higher level research courses, by offering research opportunities at NASA Ames Research Center as a prize for students' winning project proposals. Very importantly, the proposed project also seeks to establish a research culture at UTTC that emulates NASA culture. The evaluation and assessment plan is well developed and an appropriate external evaluator has been identified and engaged. There is a high probability for successful Implementation.

## **VIRGINIA STATE UNIV. & LOUISBURG COM. COLLEGE**

Principal Investigator: Singli Garcia-Otera

Co-PI's: Ehsan Sheybani (Virginia State)

Jennith Thomas (Louisburg)

Website URL: <http://www.vsu.edu/pages/1.asp> or <http://www.louisburg.edu/>

**Project Abstract:** This proposed Undergraduate Interdisciplinary Curriculum Incorporating NASA related Research is a joint program between Virginia State University (VSU, a 4-year Historically Black University), Louisburg College (LC, a 2-year Minority Institution), and NASA Goddard Space Flight Center (GSFC). The proposed effort includes (1) an educational component for developing and establishing an undergraduate interdisciplinary curriculum in engineering and physical science courses such as a new "Introduction to Engineering and Computer Gaming" course and other hands-on projects which will train students in geospatial science, sensor technology, data pre-processing, analysis, and visualization techniques, and (2) a research component for connecting the two academic institutions (VSU and LC) to on-going research at NASA Goddard Space Flight Center. The research is aimed at increasing the understanding of data sensed and collected remotely by satellites, communication devices, wireless sensor networks, and other data acquisition equipment.

**Intellectual Merit:** The proposed project modifies existing courses and develops new courses that are elegantly integrated into a sequential series. This series, intertwined on a reasonable time-line with research experiences, is highly likely to both inspire and academically prepare students for research at NASA centers and advancement in STEM careers and graduate programs. The proposed program also provides professional development, mentoring and peer interaction to equip and motivate students to go on in STEM fields, which is very important to student success. Particularly noteworthy is the proposed structured program to enable students to conduct and prepare research for presentation to increasingly broad audiences, starting at local research conferences and eventually at national conferences. In general, the step-by-step progression of activities described in the proposal is meritorious and reflects a keen understanding of how best to interest students in STEM fields and careers and prepare them for graduate training and NASA careers. Assisting graduating students with job seeking is a positive addition. The partnership seems appropriate. Both LC and VSU students will benefit from the collaboration. The idea of a 2+2 MOU to provide an incentive to the LC students to enroll in the program is a particularly good one. Project evaluation is built in and specified in the time-line.