



Title of Investigation:

Science, Technology, Engineering Pipeline for Underserved Populations (STEP UP)

Principal Investigator:

Brenda Dingwall (Code 120)

Other In-house Members of Team (include Code):

Kent Stover (Code 228), Tom Wilson (Code 228), Thomas Pittman (Code 840), Les McGonigal (Code 803), Donna Smith (Code 589), Susan Semancik (Code 589), Gary Hancock (Code 229), and Linda McNeil (Code 228)

Other External Collaborators:

Worcester County Economic Development (Maryland); Maryland Jobs Coalition; Worcester County Public Schools (Maryland); Maryland Institute for Space & Technology; Salisbury University, and University of Maryland-Eastern Shore

Initiation Year:

FY 2005

Aggregate Amount of Funding Authorized in FY 2004 and Earlier Years:

\$0

Funding Authorized for FY 2005:

\$15,000; The Worcester County Economic Development Authority and the Maryland Jobs Coalition both matched NASA's contribution for a total program value \$45,000.

Actual or Expected Expenditure of FY 2005 Funding:

\$11,941.47: credit card purchases, \$1,017.18; purchase order (Worcester County), \$10,924.29

Status of Investigation at End of FY 2005:

To be continued in FY 2006, with funds remaining from FY 2005 and earlier years and the Equal Opportunity program.

Expected Completion Date:

Ongoing

Purpose of Investigation:

The goal of the Science, Technology, Engineering Pipeline for Underserved Populations (STEP UP) program is to cooperate with local educational and community organizations to create a seamless, integrated educational and outreach program that encourages students from underserved populations to pursue careers in science, technology, engineering, and mathematics (STEM).

Accomplishments to Date:

- The project is co-funded by NASA, Worcester County Economic Development, Maryland Jobs Coalition & Administrative and Payroll services provided by Maryland Institute for Space and Technology.
- Nine high school students from Worcester County participated in 8-week summer internships at NASA Wallops Flight Facility (WFF).
- Program enjoys broad support across the Center; students participated in projects sponsored by Codes 120, 228, 589, 801, 803, and 840.
- Students participated in a team project with summer interns from the University of Maryland-Eastern Shore (UMES).
- At least one technical area is interested in supporting interns throughout the year.
- Program was expanded to include two paid internships for Salisbury University (SU) students. The anticipated start date is Feb. 5.
- Next summer's efforts will include increased technical support from UMES and Salisbury University.

Planned Future Work:

STEP UP's success can be summed up in the words of one of our 2005 STEP UP interns: *"Before this internship, I never knew these kind of job opportunities even existed."* STEP UP opens doors for students. It gives them the experience and connections they need to succeed. It helps them to reach for the stars.

STEP UP is creating a highly skilled, diverse workforce who will have the skills and creativity to take us to the Moon, Mars, and beyond. To be effective, we must continue to forge collaborative partnerships with schools, communities, and institutes of higher education. None of us can do it alone, but together we can create excellence.

In year one, we created an effective and repeatable model for creating a seamless pipeline to encourage students to pursue STEM careers. Our next step is to refine this model while expanding it to other communities.

We are seeking expanded opportunities to collaborate with institutes of higher education. We have recently added Salisbury University's Geographical Information Systems (GIS) department to the STEP UP team. We plan to create two part-time internships with the GIS program. These

students will continue and expand upon the work that our high school and university interns did last summer. In addition, they will serve as mentors to our younger interns during the summer. This will expose younger interns to opportunities as they continue their relationships with NASA throughout their academic careers.

We are continuing to develop a better and more supportive network for high school students. The network will provide them with valuable job skills and experience. This year we plan to collaborate with UMES to offer a training/job opportunity to two of our high school interns. The students will attend a 4-week paid camp that is focused on GIS. They will learn to use GIS software and become familiar with the potential applications of GIS technology. Following the camp experience, they will come to WFF for an 8-week paid internship. Because they will have been trained in GIS, the students will be able to begin tasks immediately. At the end of the 8-week internship, these students should have workplace skills that will make them immediately valuable. In addition, they will be made aware of opportunities to continue their education and their relationship with NASA. In the future, our goal is to have paid pre-employment training experiences for all high school interns to give them the work skills they need to be immediately valuable in the workplace.

Perhaps our most important future work is with communities. We continue to forge partnerships with local communities and other economic development organizations. By forming cohesive networks with the communities, we can create the support network needed by students who do not traditionally pursue STEM careers. This network will help to provide them with the resources, encouragement, and opportunities necessary for them to succeed. Our collective success means a more capable NASA workforce and stronger communities that surround our gates.

Key Points Summary:

Increasing the number and diversity of students pursuing careers in science, technology, engineering, and mathematics (STEM) is a task that NASA cannot achieve on its own. It requires the active support and involvement of school systems, local communities, institutes of higher education, as well as potential employers to create an environment that welcomes the best and the brightest students, regardless of gender, ethnicity, religion, or disability.

STEP UP takes the innovative step of creating actively collaborative communities. By joining forces with local schools, communities, and institutes of higher education, we can develop and maintain an effective and seamless pipeline through which students who wish to pursue careers in STEM fields can travel. We can become the support network for students who do not traditionally pursue these careers. In short, we are combining forces to collectively inspire the next generation. By pooling our resources, we minimize the individual investment needed to maximize our collective success.

STEP UP provides NASA with a seamless pipeline of well-trained professionals at very little cost. Because STEP UP internships are co-funded by Worcester County Economic Development, Maryland Jobs Coalition, and NASA, the cost to NASA for an 8-week student internship is less than \$1,300. Because communities and schools have made an investment in their students' internships, they are more willing to provide support and resource to help them succeed.

By working collaboratively, students get real world experience, insight into careers that they may have never considered, and, most importantly, support and affirmation by their local communities.

STEP UP assures little duplication of effort by allowing each team member to do what he or she does best. The Worcester County School System has a clearly defined process for selecting internship candidates. NASA, Worcester County Development, and the Maryland Jobs Coalition jointly seek to develop the highly skilled workforce of the future. We co-fund the internships and select the students from the candidates nominated by the school system. Universities wish to attract the best and brightest candidates and provide them with superior academic training and the opportunity for work experience. By involving universities through an internship program, universities can expose well-qualified students to opportunities on their respective campuses.

The Success Criteria for this project are as follows:

- Select interns from a diverse group of high-achieving students. This year’s interns included three non-minority males (one with a disability); three non-minority females; two minority females (AA); and one minority male (AA).
- Provide real world work experience for students. All nine high school interns were given opportunities to work side-by-side with NASA engineers and scientists. All reported gaining significant insights into their intended career. Interns were required to complete a team project, which provided valuable teamwork skills.
- Provide opportunities to develop a long-term relationship with NASA. Each intern was given information about future opportunities with NASA, as well as information about scholarship opportunities at NASA-sponsored internship programs. Students were given the opportunity to see how NASA can fit into their future career plans. One STEP UP intern visited the NASA/University of Maryland nanotechnology lab. This visit sealed her desire to work for NASA. All STEP UP interns had the opportunity to visit the Goddard Space Flight Center and tour the facilities. All STEP UP interns made formal presentations to WFF senior staff, Worcester County Commissioners, and UMES senior staff. Each student was given the opportunity to talk with these people about future employment and scholarship opportunities.

NASA’s Education Enterprise Strategy states: “The NASA Mission—to understand, explore, and inspire — depends upon people with the ingenuity to invent new tools, the passion to solve problems, and the courage to ask difficult questions. To inspire the next generation of scientists, technologists, engineers, and educators, we cannot rely on the past. We must engage the education community and invite them to participate in our ongoing work and process of discovery.”

Student customers are NASA’s most important customers. If we fail to interest and inspire them, we lose the ability to satisfy NASA’s mission and vision in the future. It will never be feasible, practical, or cost efficient to meet the agency’s education goals by providing all of the services alone. We will achieve our goals by working cooperatively with educational institutions and community organizations. Together, we can create the workforce we need for tomorrow—“as only NASA can.”