

1986 STEP
1987 CSTEP
1996 LSAMP
1999 AGEP
2006 S-STEM I
2006 LSAMP BD
2007 GeoPREP
2007 NY Space Grant
2009 TechPREP
2009 NY STEM
2009 S-STEM II

Promoting Inclusivity and Excellence in Science Technology Engineering Mathematics



A Message from Professor David Ferguson, Director of STEM Smart Programs



"The sheer intellectual excitement of doing STEM is increasingly intertwined with unprecedented urgency to use scientific and technological advancements for human good and the betterment of life in all its forms." Dear Colleagues,

For over twenty years, the Department of Technology and Society in the College of Engineering and Applied Sciences has been a leader in New York State and our nation in enhancing the participation of underrepresented groups in science, technology, engineering and mathematics (STEM). At the pre-college, undergraduate and graduate levels, we have helped students develop their potential and achieve their academic goals. Many of these students have either become accomplished professionals in business, industry and medicine, or emerged as outstanding faculty members at colleges and universities across our country. Indeed, the Department of Technology and Society, in collaboration with its many partners in business and industry, government, and colleges and universities, has helped Stony Brook University lead the way in the national priority of strengthening human resource development in STEM.

This is an exciting time for science and engineering. Around the world, there is a growing awareness of the critical importance of scientific and technological advancements in enhancing economic growth and quality of life. At the same time, there is a rapidly expanding perspective that critical issues of our time, including energy and environmental issues and global health and prosperity, demand interdisciplinary thinking and wise leadership in charting socio-technological policies. The sheer intellectual excitement of doing STEM is increasingly intertwined with unprecedented urgency to use scientific and technological advancements for human good and the betterment of life in all its forms.

As an umbrella organization of a wide array of STEM education programs, STEM Smart is designed to enhance the participation of groups that are underrepresented in STEM education and careers. Supporters of these successful programs include Stony Brook University, the New York State Education Department, the National Science Foundation, business and industry, and private foundations. It is this highly collaborative environment that allows us to meet the diverse needs of students from groups that have not been fully engaged in the scientific enterprise.

Although much work is ahead of us, we have come a long way in developing a diverse community of science scholars. We appreciate the many contributions that so many have made over the years. With such commitment in mind, I am joined by STEM Smart staff members, and our many faculty, staff, students and external collaborators in bringing this view of our activities to you.

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David L. Ferguson Distinguished Service Professor, Technology and Society, and Applied Mathematics Chair, Department of Technology and Society Director, STEM Smart



Confege Applied Sciences

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1986 Science and Technology Entry Program CSTEP 1987 Collegiate Science

and Technology

Entry Program

LSAMP 1996

Louis Stokes Alliance for Minority Participation AGEP 1999 ance for Gradu

Alliance for Graduate Education and the Sc Professoriate

S-STEM I 2006 Scholarships in Science, Technology, Engineering and Mathematics

BD 2006 Bridge to the Doctorate

Overview

STEM Smart is the umbrella outreach program of the Department of Technology and Society at Stony Brook University which enhances the participation of underrepresented or economically disadvantaged students pursuing degrees in the social and physical sciences, technology, engineering, or mathematics. The programs draw from both Stony Brook, state and national resources to coach, mentor, and financially support pre-college, undergraduate and graduate students.

All STEM Smart students have special mentoring relationships with Stony Brook faculty, including internship and research opportunities. Students receive career preparation workshops, tutoring services and financial support depending on need and GPA. Special efforts are made to engage African American, Hispanic, Native American, Pacific Island and economically disadvantaged students interested in STEM-related fields. Also, several programs collaborate with efforts to enhance the participation of females and persons with disabilities in STEM.

Mission

The array of programs and activities collectively referred to as STEM Smart all support the following four-part mission:

- 1 To increase the number of underrepresented students at every level who are prepared for and succeed in courses, science competitions, and degree programs in STEM.
- To prepare students to succeed in STEM-related jobs, including high-technology industries, education (teachers and professors), and research in private industry or government labs.
- З To engage in scholarship in STEM education, especially as it relates to the successful participation of underrepresented groups in STEM.
- To provide national leadership in collecting and disseminating information regarding effective practices in scholarship and program implementation in diversity education in the STEM-related disciplines.



GeoPREP 2007 **Opportunities** for Enhancing Diversity in the Geosciences

New York Space Grant TechPREP 2007

2009

NY STEM at Stony Brook University 2009

S-STEM II 2009 Scholarships in Science, Technology, Engineering and Mathematics

Accomplishments

STEM Smart programs have transformed the lives of many students. Here are some highlights.

Overall Impact

- Annually, the STEP and CSTEP programs serve over 500 secondary and undergraduate students.
- In the last ten years, there has been a 119% increase in undergraduate UREP STEM enrollment.
- In the last ten years, 960 underrepresented minority (UREP) students received bachelors degrees in STEM disciplines, 108 UREP STEM students received masters degrees and 54 UREP STEM students received doctoral degrees.
- To date, 241 students received NSF undergraduate scholarships through S-STEM and related programs.
- To date, 37 LSAMP students received NSF Bridge to the Doctorate Fellowships in 16 STEM disciplines. Students were recruited from 17 undergraduate institutions.
- Since AGEP's inception in 1999, there has been a 106% increase in UREP STEM doctoral enrollment.
- The AGEP Program is engaged with 92% of the STEM graduate programs in coordinating recruitment and retention efforts.
- 35% of AGEP graduates are pursuing a career in academia, and another 29% are currently in post-doctoral positions.

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986

Science and

Technology Entry

Program

CSTEP

987

Collegiate Science

and Technology

Entry Program

Individual Student Progress

- In 2007/08, 76% of the STEP students took AP or other advanced science and math courses.
- Students in the outreach programs have retention and completion rates substantially higher than the institution as a whole. For example, a recent study shows that 80% of Level 1 Stony Brook LSAMP students admitted in 2003 received their bachelor's degrees within four years.
- Undergraduate STEM Smart students have received many prestigious awards and scholarships. Some examples are: Minority Access to Research Careers Fellowship, NASA Space Grant Fellowship, Northrup Grumman Scholarship, Citigroup Scholars award, National Society of Black Engineers Scholarship, Japan Center Essay Competition, and the Merck Fellowship.
- Graduate students have received the Fullbright Scholarship, the W. Burghardt Turner Fellowship, HIN Ruth L. Kirschstein National Research Service Award, NSF Graduate Research Fellowship, Harriet G. Jenkins Pre-Doctoral Fellowship, Ford Foundation Fellowship, and the Distinguished Doctoral Student Award.
- 50% of the undergraduate participants of the AGEP Summer Research Institute are either in or applying to graduate school, and 36% have already received either masters or doctoral degrees.

S-STEM I

2006

Scholarships in

Science, Technology,

Engineering and

Mathematics

AGEP

1999

Alliance for Graduate

Education and the

Professoriate

LSAMP

BD

2006

Bridge to the

Doctorate



LSAMP

1996

Louis Stokes

Alliance for Minority

Participation

Student Testimonials

"AMP/CSTEP has equipped and empowered me to become a leading professional at NIH. As a contracting officer at the NIH, I reflect on the academic training, professional development, and personal mentoring of the AMP/CSTEP staff. The impact of the AMP/CSTEP program on my life and others whom I've touched is priceless. It is with humility and honor that I am a supporter of the SBU AMP/CSTEP programmatic efforts."

- Latosha Frink

"I graduated from Stony Brook University in May 2006 with a bachelor in Electrical Engineering. I participated in the LSAMP and CSTEP programs throughout my academic years in Stony Brook. These programs helped shape my education and career path; the programs encouraged me to seek more education and advance studies. As a scholarship recipient, they provided me with funds for my education to fulfill my dream. Presently I am finishing my Masters in Systems Engineering and plan to further my education in intellectual property law. These programs helped me be successful in life and taught me to be the best at everything that I do." "I participated in the CSTEP program the summer before my freshman year at SUNY Stony Brook (SBU) and participated in LSAMP my entire undergraduate career. Without the two programs, I may not have made it through my first year, let alone graduate from SBU. The CSTEP program not only 'gave me a taste' of what I would experience my first year at SBU through the intense coursework and unfamiliar college life, but it also enabled me to be a part of a network of students and faculty members that utilized each other as resources, mentors, and friends. LSAMP provided me the financial, academic, emotional, and social support I needed throughout my undergraduate career. The LSAMP and CSTEP mentors' and advisors' care for the students goes far beyond the classroom. The students that fully understand this are the individuals who excel beyond academics."

- Sabrina Thompson

Marc-Anthony Armand

GeoPREP 2007 Opportunities for Enhancing Diversity in the Geosciences New York 7 Space Grant 2007

TechPREP
2009NY STEM
at Stony Brook
University
2009

S-STEM II 2009 Scholarships in Science, Technology, Engineering and Mathematics



The Journey Begins... Pre-College



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Science and Technology Entry Program (STEP)

STEP (Science and Technology Entry Program) is a New York State Education Department effort which began in 1986 to encourage and prepare more historically underrepresented and economically disadvantaged middle and high school students for entry into scientific, technical, health, and health related professions, including many areas where licensure is required. The program at Stony Brook offers enrichment experiences through the exposure to the University's rich academic resources.

Through STEP, middle and high school students are offered academic enrichment, tutoring, supportive counseling, laboratory experiences, and opportunities to explore scientific research. Highlights of the program include a network of STEP clubs and advisors at participating schools and a residential summer program at the Stony Brook University campus. In addition, in the fall and spring, STEP offers a SAT preparation course, courses for college credit, and internship opportunities.

STEP is sponsored by the New York State Education Department





STEP 1986 Science and Technology Entry Program

Programs

New York Science, Technology, Engineering, and Mathematics (NY STEM)

Stony Brook University's NY STEM, funded by the Title I program of the New York State Department of Education, works with middle school students and teachers from high-needs school districts. The program has the primary goal of enhancing students' learning of STEM. It meets its goal by providing a residential STEM summer program for students on the Stony Brook University campus and academic year enrichment experiences. Activities are planned to motivate students, letting them experience the fun and excitement that accompany discovery, team-based projects and presentations, and effective communications—in a supportive environment. Students become part of a community that includes teachers in the schools, university faculty and staff, along with undergraduate and graduate students as mentors and program counselors.

Students learn that knowledge of STEM is essential for virtually every field, and they learn to design their own projects. Also, they become aware of several areas of research: rapid prototyping for "three dimensional printing" of objects designed with or visualized by computer programs, the study of the effects of pressure by the use of high-pressure apparatuses designed to simulate conditions deep within the earth, and the use of accelerators for research in nuclear physics.





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NY STEM is sponsored by the New York State Education Department



NY STEM 2009 Science, Technology, Engineering, and Mathematics



The Journey Begins... Pre-College



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TechPREP is sponsored by the Motorola Foundation



TechPREP

TechPREP is supported by a generous grant from the Motorola Foundation and is administered by the Department of Technology and Society and the Women in Science and Engineering (WISE) program. It represents a collaborative effort between WISE, the New York State funded Liberty Partnerships Program and the Science and Technology Entry Program.

Through a three-part progressive series of educational modules, TechPREP introduces young women from high needs school districts to science, technology, engineering and mathematics (STEM). The specific modules are: Computer Science and IT, Physics and Mathematics, and Engineering applications. The rationales for focusing on these three areas are:

- (1) Women are underrepresented in all three areas
- (2) An early introduction to subjects that are perceived as complicated will often serve to overcome a student's fear of the subject
- (3) An early introduction will also serve to aid in the mastery of a subject.

TechPREP presents the modules over the course of seven Saturdays during the spring semester and follows up with a two-week summer day camp. This project aims to show young women at an early age that science and engineering are approachable subjects and that an early introduction to these subjects coupled with female role models will build confidence and lead to success. The role models are Sisters in Science, Technology, Engineering, and Research (SISTER) undergraduate mentors from the WISE program.

The primary goal of TechPREP is to eventually impact the number of women from disadvantaged and underserved communities who graduate from a college or university with a degree in a STEM field. This goal is achieved through activities that (1) increase the basic technology skills of young women, (2) increase the comfort level of young women with the subjects of mathematics and physics, (3) increase girls' perceptions of technological and scientific based activities as a viable career option and are gender-normative for girls, and (4) increase parents'/guardians' perceptions of technological and scientific based education/careers as suitable/desirable for girls/women.



TechPREP 2009

Programs

GeoPREP

In May of 2007, Stony Brook University's STEP, CSTEP and LSAMP programs partnered with the Department of Geosciences in a National Science Foundation initiative called Opportunities for Enhancing Diversity in the Geosciences (OEDG). Initial funding for two years was followed up by an additional five years of funding in the summer of 2009. The Stony Brook program, called GeoPREP, collaborates with Brookhaven National Laboratory, the University's Center for Science and Mathematics Education, and Stony Brook's Department of Geosciences and Technology and Society and the School of Marine and Atmospheric Sciences.

GeoPREP is a multi-track program that serves underrepresented minority students from high school through graduate school. The primary audiences for this project are high school students from high needs school districts on Long Island, underrepresented minority undergraduates, and in-service and pre-service science teachers. The program addresses the lack of scholastic follow-up opportunities for students in New York State whose interest in the geosciences has been whetted by 8th or 9th grade Earth Science. Program elements include an intensive summer residential geoscience research program for high school students, a series of in-service teacher training workshops to develop new interdisciplinary geoscience curricula, and through partnering with Brookhaven National Laboratory, webcasts from the National Synchrotron Light Source and further development of the Open Space Stewardship Program. New components include the introduction of an academic-year university laboratory visitation program that provides for expanded hands-on geoscience learning activities, scholarship support for undergraduates in the Louis Stokes Alliance for Minority Participation, and a longitudinal study of attitudes and possible biases towards the geosciences by underrepresented minority students.





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GeoPREP is sponsored by the National Science Foundation Directorate for Geosciences

GeoPREP 2007 Opportunities for Enhancing Diversity in the Geosciences



and Continues... Post-Secondary Pro



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CSTEP is sponsored by the New York State Education Department



Collegiate Science and Technology Entry Program (CSTEP)

Like its high school counterpart (STEP), the goal of the Collegiate Science and Technology Entry Program (CSTEP) is to promote academic excellence and to provide support services for its participants. This New York State Education Department effort encourages and prepares more historically underrepresented and economically disadvantaged Stony Brook University students for entry into scientific, technical, health, and health related professions, including many areas where licensure is required.

In addition to study groups, the program offers preparation for professional school exams, academic/career advisement, a pre-freshman summer residential program for credit and academic enrichment, as well as pre-professional internship placements on the University campus. The philosophy of CSTEP is to promote student involvement in designing the focus of the program and, through collaboration with CSTEP faculty and staff, help students achieve their full academic potential.



CSTEP 1987 Collegiate Science and Technology Entry Program

grams

Louis Stokes Alliance for Minority Participation (LSAMP)

The Louis Stokes Alliance for Minority Participation (LSAMP) program at Stony Brook is part of SUNY LSAMP, a statewide alliance of the four university centers and smaller colleges within the geographical area of each university center. The SUNY LSAMP program was funded in 1996 and has been funded for three successive five-year cycles. The program is designed to increase the numbers of traditionally underrepresented minority students who pursue degrees in STEM majors and now has a further goal of encouraging LSAMP students to pursue graduate degrees. LSAMP does not support students who are intent on pursuing professional degrees such as an MD.

The core of the LSAMP program at Stony Brook is a four-year curriculum that is also an integral part of the CSTEP program. It offers a semester by semester program of courses and seminars to enhance students' academic, research and life skills.

The SUNY LSAMP headquarters is located on the Stony Brook campus, and in 2006 SUNY LSAMP received NSF funding to undertake an alliance-wide research project designed to identify "best practices" and provide a national model for similarly designed programs. Areas of particular interest for the research project are gauging the effectiveness of tutoring and workshops, academic success courses, advising and mentoring, and the decision making process through which students decide to pursue graduate degrees.





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LSAMP is sponsored by the National Science Foundation Directorate for Education and Human Resources

LSAMP 1996 Louis Stokes Alliance for Minority Participation



and Continues... Post-Secondary Pro



New York Space Grant Staff

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New York Space Grant is sponsored by The National Aeronautics and Space Administration



New York Space Grant

NASA initiated the National Space Grant College and Fellowship Program, also known as Space Grant, in 1989. Space Grant is a national network of colleges and universities. These institutions are working to expand opportunities for Americans to understand and participate in NASA's aeronautics and space projects by supporting and enhancing science and engineering education, research and public outreach efforts. The Space Grant national network includes over 850 affiliates from universities, colleges, industry, museums, science centers, and state and local agencies. These affiliates belong to one of 52 consortia in all 50 states, the District of Columbia and the Commonwealth of Puerto Rico. The

52 consortia fund fellowships and scholarships for students pursuing careers in science, mathematics, engineering and technology (STEM) as well as curriculum enhancement and faculty development. Member colleges and universities also administer pre-college and public service education projects in their states.

The Louis Stokes Alliance for Minority Participation (LSAMP) program at Stony Brook University became a member of the New York Space Grant (NYSG) family in 2007. Through NYSG funding, upper division LSAMP students are supported in space related research with NASA supported researchers in Stony Brook University's Departments of Physics and Astronomy, Biomedical Engineering and Mechanical Engineering, the School of Marine and Atmospheric Sciences, and Brookhaven National Laboratory's Department of Medicine. To date, seven LSAMP students have engaged in a variety of projects that have ranged from inquiries in space medicine, the discovery of exo-planets, aerosols in the upper atmosphere, and using CO2 in the Martian atmosphere as a feedstock for fuel for the return trip to earth. One space grant researcher is completing an MS in physiology at Drexel University, and two have been accepted into PhD programs, one at the University of Arizona and the other at Stony Brook University. The remaining four space grant students are completing undergraduate degrees in Computer Engineering, Biomedical Engineering and Chemical Engineering, and all intend to pursue graduate degrees.



New York Space Grant 2007

grams

Scholarships in Science, Technology, Engineering and Mathematics (S-STEM)

The Scholarships for Science, Technology, Engineering, and Mathematics (S-STEM) program is sponsored by the National Science Foundation. The objective of the S-STEM program is to support students who are majoring in disciplines that are critical to the Nation's competitiveness in computer science, engineering, mathematics, and natural and physical sciences. The goals of the program are to support students with demonstrated economic need, to increase the number of students who receive degrees in STEM disciplines, and to help students become members of Long Island's high technology and research workforce.

Currently there are two S-STEM programs at Stony Brook University, referred to as S-STEM I and S-STEM II. The focus of S-STEM I is to support students in the College of Engineering and Applied Sciences. The focus of S-STEM II is to support students in the College of Arts and Sciences and the School of Marine and Atmospheric Sciences.

Both S-STEM I and II provide graduated levels of support for students majoring in STEM disciplines and who have significant economic need. S-STEM I is funded through 2011 and S-STEM II is funded though 2014. Each program is funded to support 56 undergraduates. Each S-STEM program has a principal investigator and co-principal investigators who are well versed in the disciplines appropriate to each program. Both of the principal investigators are awardees of the Presidential Award for Excellence in Science, Mathematics, and Engineering Mentoring.





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S-STEM is sponsored by the National Science Foundation Directorate for Education and Human Resources

S-STEM 2006 Scholarships in Science, Technology, Engineering and Mathematics



... for Graduate Programs and Beyond



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SUNY LSAMP Bridge to the Doctorate is sponsored by the National Science Foundation Directorate for Education and Human Resources

LSAMP Bridge to the Doctorate (BD)

LSAMP BD 2006 Bridge to the Doctorate

The National Science Foundation has funded the Louis Stokes Alliance for Minority Participation Bridge to the Doctorate (LSAMP BD) in order to increase the number of underrepresented minority (UREP) students who enter and complete science, technology, engineering or mathematics (STEM) doctoral degrees by adding LSAMP students to the graduate pool. Each BD project identifies a cohort of twelve students, who have graduated from NSF LSAMP programs across the country. These students get admitted into a STEM department at Stony Brook. Each BD student receives funding for their first two years of graduate study as either masters or doctoral students and will then complete doctoral programs.

The program provides students with a full NSF fellowship, health insurance, tuition and fees. The program offers a series of activities in partnership with SUNY AGEP and STEM graduate departments that help build a strong BD community and provide academic, professional and social support. BD also works with departments to make changes in culture and practice that will help not only BD students but all graduate students. To date, there have been three cohorts of BD students at Stony Brook. Each year, SUNY LSAMP will have the opportunity to apply for funding for a new cohort of BD students at one of the SUNY LSAMP doctoral institutions.







Alliance for Graduate Education and the Professoriate (AGEP)

The Alliance for Graduate Education and the Professoriate (AGEP) is a National Science Foundation initiative created by Congress to diversify the Professoriate. AGEP joins together universities and colleges in the shared mission of increasing the number of underrepresented minority students (African American, Hispanic, American Indian, Alaska Native, Native Hawaiian or other Pacific Islander) earning PhDs and positioning them to become leaders in science, technology, engineering and mathematics (STEM) fields. AGEP is vital to the development of new scientists and researchers. It serves as a gateway into STEM development through the production of more scholars in STEM disciplines.

The four State University of New York (SUNY) Centers – the University at Albany, Binghamton University, the University at Buffalo, and Stony Brook University (the lead institution) – make up the SUNY AGEP Program. Currently, there are 120 PhD granting institutions in the national AGEP network. Between 2002-2006, these AGEP institutions accounted for 56% of the STEM PhDs awarded to underrepresented minorities in the United States. Each AGEP program employs creative administrative strategies, develops infrastructure, and engages in substantive partnerships to enhance recruitment, retention, and advancement and change policies and practices where needed. AGEP Staff Contact Information:



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AGEP is sponsored by the National Science Foundation Directorate for Education and Human Resources



AGEP 1999 Alliance for Graduate Education and the Professoriate

Collaborative Partners

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Department of Technology and Society WISE (Women in Science and Engineering)

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Government

Brookhaven National Laboratory Eastern Suffolk BOCES Nassau County Community College National Science Foundation New York State Education Department Suffolk County Community College U.S. Department of Energy

School Districts

Brentwood Union Free School District Central Islip Union Free School District Hempstead Union Free School District Longwood Central School District Riverhead Central School District Wyandanch Union Free School District Yonkers Public Schools

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