Promoting Diversity in
Science, Mathematics, and Engineering

http://opt-ed.ncsu.edu

OPT-ED is funded by the
National Science Foundation
Directorate of Education & Human Resources
Division of Human Resource Development.

North Carolina Alliance to Create Opportunity through Education

The North Carolina Alliance to Create Opportunity through Education

The North Carolina Alliance to Create Opportunity Through Education (OPT-ED) is a partnership among NSF-sponsored diversity programs at Bennett College, North Carolina Agricultural and Technical State University, North Carolina State University, Saint Augustine's College, the University of North Carolina at Chapel Hill, and the North Carolina Mathematics and Science Education Network.

The programs that constitute OPT-ED (NC-MSEN, HBCU-UP, LSAMP, CREST, AGEP) operate both individually and cooperatively to diversify the science, technology, engineering and mathematics (STEM) workforce and academe by encouraging underrepresented minority students, from middle school through graduate school, to obtain the Ph.D. in one of the STEM disciplines. Serving as a catalyst for greater synergy among these NSF-sponsored partners, OPT-ED strengthens their collaboration and cooperation for excellence in STEM education & research, promoting activities that magnify their efforts to achieve common goals. Additionally, OPT-ED provides a central office for communicating and disseminating information about partner activities and for exploring alliances and connections with neighboring NSF-sponsored, diversity-focused programs with similar goals.

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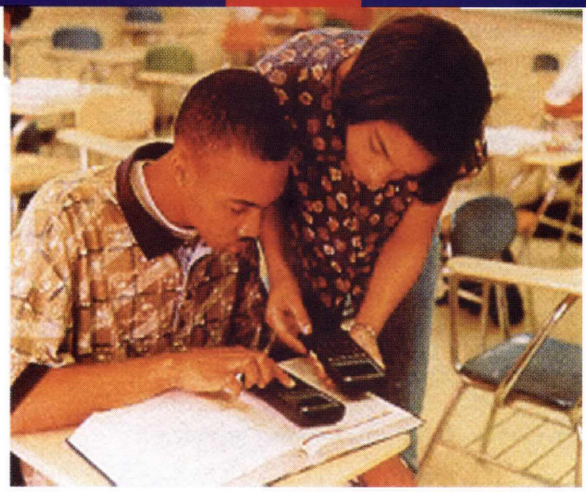

North Carolina Louis Stokes Alliance for Minority Participation (NC-LSAMP)

The North Carolina Louis Stokes Alliance for Minority Participation (NC-LSAMP) is a comprehensive, interdisciplinary, regional partnership comprised of eight institutions within the University of North Carolina system. The chief aim of the Alliance is to significantly increase the quantity and quality of underrepresented minority students earning B.S. degrees in science, technology, engineering, and mathematics (STEM) disciplines, and subsequently pursuing M.S. and Ph.D. degrees in these fields. By systematically enhancing recruitment, retention, access, and opportunities to education, internships, and research in these fields, the Alliance is achieving this primary goal.

Since the inception of NC-LSAMP in 1992, combined efforts of partner institutions have resulted in a variety of programs and activities geared toward enhancing overall student success. Major initiatives include STEM curriculum reform, supplemental instruction, bridge programs, undergraduate research, and summer internships. In addition, an annual research conference sponsored by the Alliance showcases faculty-mentored research projects completed by students.

Partner NC-LSAMP institutions include North Carolina A&T State University (lead campus), North Carolina Central University, the University of North Carolina at Chapel Hill, the University of North Carolina at Pembroke, Fayetteville State University, North Carolina State University, the University of North Carolina at Charlotte, and Winston-Salem State University.

Selection Criteria:
Programs, activities, and services provided by the Alliance are open to underrepresented students seeking a B.S. degree in a STEM discipline. All participants must be a United States Citizen or Permanent Resident. Students directly supported by the Alliance are classified as **Level I participants**. Eligibility criteria pertaining to academic performance and other related factors are available through the NC-LSAMP Office at each partner institution.

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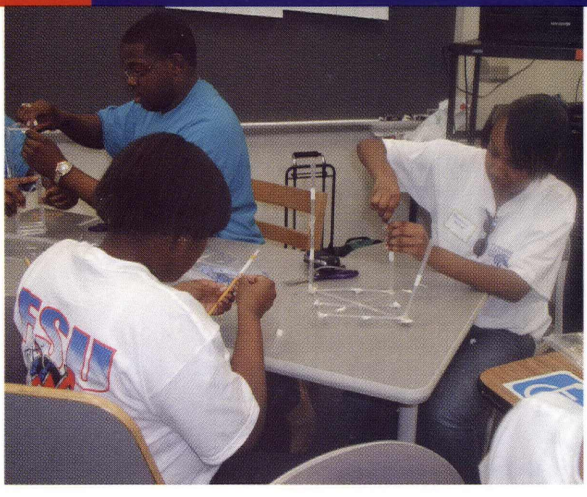
NC-LSAMP is funded by the National Science Foundation.



North Carolina Mathematics & Science Education Network (NC-MSEN)

Pre-College Program

Since 1986, the North Carolina Mathematics and Science Education Network (NC-MSEN) Pre-College Program has been preparing middle and high school students to achieve high standards in mathematics and science. NSF funds the Pre-College Research Experiences in Science, Mathematics, and Technology Program (PREP), which is one of several components of the Pre-College Program. PREP is a research experience program for high-ability/high-potential secondary teachers and students. Through the implementation of the PREP Project, NC-MSEN has become a participating member of OPT-ED.

The Pre-College Program is designed to increase the number of traditionally underserved students graduating from high school with sufficient interest and preparation to pursue mathematics and science fields at the university level and to move into careers in science, mathematics, technology, engineering, and teaching. The program offers academic enrichment classes and activities to students in grades 6-12. Over 97% of Pre-College seniors go on to college and 73% of Pre-College graduates major in mathematics, science, engineering, or related fields.

The NC-MSEN also offers the Pre-College Program and professional development for K-12 teachers. It consists of a central coordinating office located at the UNC Center for School Leadership Development in Chapel Hill, ten Mathematics and Science Education Centers, and six Pre-College sites at The University of North Carolina System campuses across the state. Each Center works to fulfill the mission to improve the quality of mathematics and science teaching and learning in the public schools of North Carolina. The North Carolina Mathematics and Science Education Network is committed to providing high quality professional development programs in mathematics and science education that enhance teacher learning, and support state and national educational guidelines. The Network offers nearly 300 activities annually, reaching almost 6,000 teachers per year.

Pre-College Program Student Selection Criteria

- Interest and aptitude for rigorous mathematics and science courses
- Academic improvement in mathematics and science courses
- Lack of preparation to pursue high level mathematics- or science-based courses
- Grades (C average or higher)
- Conduct and behavior at Pre-College Program
- Socio-economically disadvantaged backgrounds
- Evidence of leadership abilities
- Single-parent households
- First generation college families
- Substantial family and/or financial responsibilities
- Economically disadvantage
- Schools with high drop-out rates

Pre-College Research Experience Program (PREP) Student Selection Criteria

- Minimum GPA of 3.0
- Successful completion of Algebra I and advanced mathematics and science courses
- Exceptional problem-solving skills as determined by their teachers
- Interest in pursuing a research career in mathematics or science
- 15.5 years of age
- Enrolled in tenth, eleventh, or twelfth grade during the upcoming academic year

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Dr. Verna L. Holoman, PREP Principal Investigator

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http://www.unc.edu/depts/msen/

Current Pre-College Funding Sources
North Carolina General Assembly
National Aeronautics and Space Administration (NASA)
National Science Foundation (NSF)
Software Critical Systems, Inc. (S3, INC.)
William Randolph Hearst Foundation
North Carolina Schools and School Districts (Pre-College Program Partnership)
North Carolina Department of Health and Human Services (Pre-College Nutrition Program)
The University of North Carolina Member Institutions
US Department of Education
MSEN Pre-College Parent Clubs
Katheleen and Joseph Bryan Foundation

Integrating Technology in Science & Math Instruction at Bennett College

Bennett College, a private liberal arts college for women, is committed to enabling every student to determine and achieve her highest goals. The college is concerned about the under- representation of minority women currently contributing nationally to the sciences, mathematics, and technology, and the effect this lessening of the talent pool has on solving national and world problems. Consequently, the NSF HBCU-UP project at Bennett seeks to assist students in these disciplines, through a variety of means, to be highly successful as undergraduates and subsequently as graduate students.

We envision the continued development of a nurturing and intellectually stimulating climate for students at Bennett College with challenging and innovative instruction, individual guidance and support, acquisition and use of state-of-the art laboratory equipment and computers, and summer and semester-long research experiences.

The project includes four major components:

- The Summer Academy
- First Year Program
- Student Research
- Other Activities

Selection Criteria:
For the NSF Summer Academy: 2.5 grade point average and 900 SAT score, meeting all Bennett admissions standards, interest in majoring in a STEM discipline as evidenced by a letter from a high-school teacher, and a personal statement explaining interest in attending the Summer Academy.
For the research component: C or better in the required courses in biology, chemistry, mathematics, physics, or computer science in each student's discipline, and letter of recommendation from an advisor or instructor.

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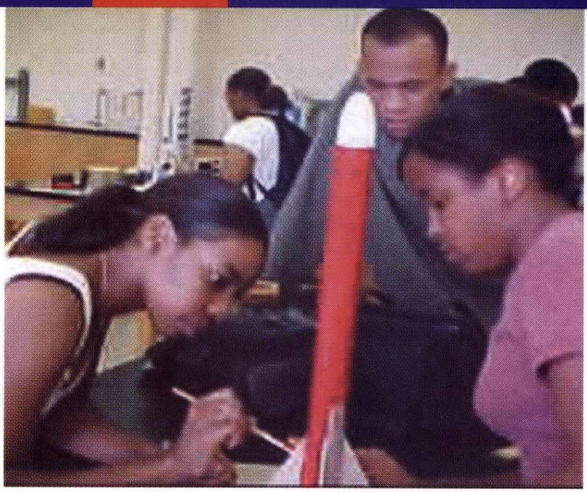
The Integrating Technology in Science and Math Instruction Program is funded by the National Science Foundation.



Talent-21 Program at North Carolina Agricultural &Technical State University

The TALENT-21 " Gateway for Advancing Science and Mathematics Talent " Program is a framework to increase the number of students in STEM disciplines, enhance the career competitiveness of STEM graduates, and encourage more graduates to pursue the Ph.D. in science and engineering. The framework also includes strategies that encompass curriculum development and reform, integration of technology in teaching, infrastructure improvement, faculty development, student learning and research development, and competitive student recruitment and transition through summer institutes.

Goals:

- Improve learning in the STEM "gate keeper" courses: calculus, chemistry, and physics.
- Significantly increase the number of minority students graduating from mathematics, chemistry, biology, and physics.
- Increase the number of minority students with research training and experiences who earn baccalaureate degrees and pursue graduate studies in STEM disciplines or enter STEM careers.
- Support the systematic development of student research and technology skills.
- Develop collaborative programs among North Carolina A&T State University colleges and schools, other institutions of higher education, industry, and governmental laboratories that strengthen the STEM academic infrastructure for undergraduate education.

Objectives:

- Moving the learning process from passive lectures to active engagement lectures in a cutting edge, learning centered environment.
- Encouraging a shift in students' attitude from relying on the professor as the only source of knowledge to becoming discoverers of knowledge themselves.
- Providing students with interdisciplinary and cross-disciplinary curricula and research training.
- Providing professional training and retraining of faculty in fundamental, as well as in emerging techniques of teaching.

Selection Criteria:

- Underrepresented U.S. Citizens, Nationals
- Entering Freshmen with minimum 3.2 high school GPA and minimum SAT 1000
- Freshmen/Sophomores with 3.2 GPA in Major and minimum 3.2 Cumulative
- Juniors/Seniors with 3.3 GPA in major and 3.2 Cumulative

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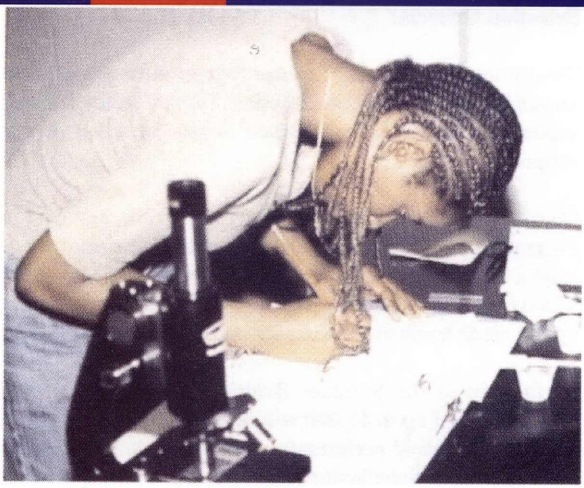
The TALENT-21 Program is funded by the National Science Foundation

Partnerships:
Department of Education, Alfred P. Sloan Foundation, NASA, Western Geophysical, and Pyramid Environmental, Inc.



Living & Learning Science Retention Program at Saint Augustine's College

The Living & Learning Science Retention Program at Saint Augustine's College provides support services and experiences primarily for freshman and sophomore students in the sciences, mathematics, and computer science (SMC). The major goal of the Living & Learning Science Retention Program is to attract, advise, and better prepare undergraduate minority students so that they may eventually pursue graduate and professional degrees in their chosen areas.

The program embodies a living and learning model in which SMC students will not only work together cooperatively in the classroom and laboratory, but also in their respective male and female dormitories. It is the belief of the administrative team that such socialization and networking are beneficial to the target students as they pursue their academic and personal goals.

Selection Criteria:

The Living and Learning Science Retention Program offers enrichment and academic support for all freshman and sophomore SMC majors. Special tutors are apart of this support system.

The Program also offers a Pre-College Summer Bridge Program for a maximum of 30 high school seniors with at least a 2.8/4.0 GPA and intend to major in the SMC areas. The six-weeks residential program allows participants to earn up to 6 credit hours in mathematics and communication skills.

At the end of the Summer Bridge Program, ten annual scholarships of up to $5,000 will be awarded to participants based on academic performance, recommendations, and on financial need. Scholarships are renewable for up to four years. Scholarship recipients must carry a minimum of 12 hours each semester and maintain a minimum GPA of 3.2 in order to qualify for continued scholarship support.

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Dr. Gloria Payne, Co-Principal Investigator

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The Living & Learning Science Retention Program is funded by the National Science Foundation.

CREST

Center for Advanced Materials and Smart Structures at North Carolina Agricultural & Technical State University

The Center for Advanced Materials and Smart Structures (CAMSS) addresses selected critical scientific issues to overcome the limitations in the fundamental body of knowledge regarding ceramic materials and their composites that inhibit the fulfillment of their potential for widespread application in structural and electronic/optical devices.

Components of the CAMSS Mission are to:

- Achieve excellence in basic & applied research
- Enhance undergraduate and graduate curricula
- Provide hands-on research experiences for students
- Support the career development of faculty and the professional community at large
- Offer reliable research services to industry
- Serve as a model of collaboration between academe, industry and the government
- Integrate into NSF Diversity-Focused Programs to address the STEM continuum

Selection Criteria:
All students having met admission requirements for any of the listed disciplines, Mechanical Engineering, Electrical Engineering, Chemical Engineering and Physics are eligible to apply for research in the CAMSS program.

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CAMSS is funded by the National Science Foundation.

Student Transition and Retention Program at North Carolina Agricultural &Technical State University

The Student Transition and Retention Program (STAR) at North Carolina A&T State University is a graduate transition program for first-year master's and doctoral students. STAR provides research experience for new graduate students by offering mentored six-week research internships. STAR also offers a series of "Transition Survival Skills" workshops designed to improve students' writing, problem-solving, and test-taking skills.

A comprehensive, action-oriented, responsive program, it will become a model for successful transition to graduate study, especially in engineering. Primary STAR activities will include:

- **Research Internships:** STAR includes six-week research internships for first-year graduate students.
- **Transition Survival Skills Workshops:** STAR sponsors a series of workshops that focus on developing proficiencies essential for negotiating the graduate process.
- **Information on Jobs and Careers:** STAR will collaborate with North Carolina A&T State University's Career Services program to provide graduate students information on a wide variety of jobs and careers.

Selection Criteria:
The selection of STAR Fellows and Interns requires the following:

- Fulltime graduate student in a science, technology, engineering, or mathematics program
- US citizen or permanent resident
- An earned undergraduate Grade Point Average (GPA) of at least 3.00 out of 4.00 or a graduate GPA of 3.00 or better
- Career goals to include academic teaching or research

The selection among students who meet the above requirements is made based upon GPA and the student's statement of career goals presented with the application.

Dr. Kenneth Murray, Project Director

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STAR is funded by the National Science Foundation.

Minority Graduate Education Program at North Carolina State University

The NC State Minority Graduate Education (MGE) program is an initiative designed to create opportunities in science, engineering and mathematics (SEM) careers for students from underrepresented populations.

With a focus on inspiring participants to pursue academic career paths, the MGE program concentrates on training and mentoring strategies by offering active research and teaching experiences, and professional development seminars to students, as well as special mentoring workshops for faculty. Both undergraduate and graduate students are eligible to participate.

The long-term goals of the Minority Graduate Education Program are to increase the number of doctorally trained minority scientists, mathematicians and engineers and to diversify the faculty in science, engineering and mathematics (SEM). Specific goals are to:

- Cultivate student interest/ability for SEM academic and research careers;
- Provide guidance and support at transitions or difficult points in a student's graduate education;
- Enhance faculty skills in mentoring students from diverse populations; and
- Change university culture positively by reaching out to the entire community of scholars.

Program components designed to accomplish goals:

- Intensive Research and Training Program
- Summer Research Program
- Mentored Teaching Experience for Graduate Students
- Professional Development Workshops and Seminars
- Mentoring Workshops for Faculty

Selection Criteria:

- Be enrolled full-time in a bachelor's degree program in the sciences, mathematics, or engineering
- Be a U.S. citizen or national, or a permanent resident of the United States
- Be considering a faculty and/or research career
- Have an outstanding undergraduate grade point average

Dr. Robert Sowell, Principal Investigator

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http://www.fis.ncsu.edu/grad_fellows/MGE/MGE_HOME.htm

MGE is funded by the National Science Foundation.

The Research Education Support Program at The University of North Carolina at Chapel Hill

The Research Education Support (RES) Program at the University of North Carolina at Chapel Hill seeks to assist the University in supporting increased numbers of students from underrepresented minority groups to gain meaningful research experiences and to enroll in Ph.D. programs. The cornerstone of RES is mentoring and consists of multiple components involving undergraduate, graduate, as well as medical and dental students.

The RES Program builds on the strengths of the University's strong research activities and its efforts to enhance and promote diversity among its student body. The main goal of the program is to increase the number of underrepresented minorities acquiring the skills, knowledge and background preparing them for research careers and enhancing their completion of the Ph.D. An additional goal is to encourage participating medical and dental to pursue academic careers.

RES provides support for undergraduate students on campus during the academic year and those from other campuses during the summer. During the summer, undergraduate students from schools across the country can participate in research through the Summer Pre-Graduate Research Experience (SPGRE). Almost every scholarly and research interest can be addressed through SPGRE, ranging from the biomedical sciences to the humanities and the physical sciences to the social sciences. For UNC-CH undergraduate students, RES provides opportunities for academic-year research in an expansive range of science and social science areas.

Selection Criteria:
For UNC-CH undergraduate students, students should be at least at the sophomore level. Preference will be given to students with GPAs of 3.0 or better but any student sincerely interested in research should apply.

For SPGRE participants, students should have strong academic records and not have graduated before or during the program. Preference will be given to students who have completed their junior year at the time of the program.

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The RES Program is funded by the National Science Foundation and the National Institute of General Medical Sciences (NIGMS) of the National Institutes of Health (NIH).