

2011

Impact Report

NC-LSAMP
North Carolina Louis Stokes Alliance
for Minority Participation



North Carolina Agricultural and Technical
State University

Contents	1	Executive Summary
	2	History of NCLSAMP
	4	NCLSAMP Strategies for Success
	5	Impact on STEM Undergraduate and Graduate Degrees
	5	Impact of the Bridge to the Doctorate Graduate Program
	6	Impact of Research on North Carolina's Economy
	7	Undergraduate Research
	8	NCLSAMP Institutional Impact on North Carolina's Economy
	10	NCLSAMP Industry Partners
	12	Institutional Highlights
		NC A&T
		FSU
	NCCU	
	NCSU	
	UNC	
	UNCC	
	UNCP	
	WSSU	
22	NCLSAMP Alliance Staff	



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Executive Summary

The overall goals of the NC-LSAMP are to: **1)** increase the pool of competent underrepresented STEM graduates with bachelor's degrees; **2)** identify significant factors that promote baccalaureate degree attainment, retention in academic programs, and entry into graduate school in STEM areas; and **3)** increase the number of students who matriculate into STEM graduate schools. Strategies to attain these goals include Summer Bridge programs at Alliance institutions, the sharing of 'best practices' in mentoring and retention, linkages to k-12 institutions and community colleges, campus-level and national laboratory undergraduate research experiences, and academic support activities such as tutoring and mentoring.

NC-LSAMP institutions have made a significant impact on the education, retention and graduation rates of underrepresented minority STEM students. Currently, faculty-mentored undergraduate research projects are conducted on each of the Alliance campuses either during the academic year or summer. Participants have also gained experience in research at sites external to their respective campuses at the Environment Protection Agency, Duke University, Davidson College, University of Arizona, the Center for Remote Sensing of Ice Sheets (CReSIS) at Penn State University, and Ohio State University. Further, existing relationships with other National Science Foundation (NSF) projects such as the Historically Black Colleges and Universities Undergraduate Program (HBCU-UP), National Institutes of Health (NIH) projects, the US Department of Defense and the US Department of Education have afforded NCLSAMP institutions the opportunity to expand undergraduate and graduate research opportunities. Since 2002 eight (8) NCLSAMP faculty and student (FaST) teams have participated in summer research at National research laboratories including Argonne, Brookhaven, and Lawrence L. Livermore.

Major systemic changes accomplished by the Alliance are reflected through the incorporation of cooperative learning activities into STEM course instruction; and early involvement of undergraduate students in faculty-mentored research. Activities include, but are not limited to: **1)** computer-based group study and problem solving; **2)** concept verification in science, technology and engineering through laboratory activities; **3)** team problem solving in calculus, chemistry, physics, computer science and engineering; and **4)** joint research projects. Other systemic changes include the role of the Office of Undergraduate Research at Alliance institutions offices in facilitating the institutionalization of undergraduate research at their respective campuses, and expanding opportunities for underrepresented students.

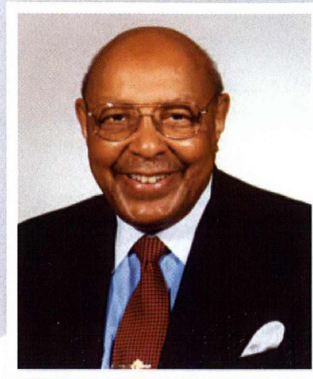
History of the North Carolina Louis Stokes Alliance for Minority Participation (NCLSAMP) Program

One of the oldest alliances in the country, the Alliance for Minority Participation (AMP) was initially funded in 1992 by the National Science Foundation (NSF). The original alliance named NCAMP, consisted of institutions throughout the country, and included North Carolina A&T State University (NCA&T) as the only in-state partner. Others included Prairie View A&M, Stanford University, the University of Washington, and University of Texas-Austin. In honor of Congressman Louis Stokes, a strong advocate for underrepresented populations, AMP was renamed as the Louis Stokes Alliance for Minority Participation.

In 1998, the North Carolina Alliance model was modified to include only University of North Carolina System institutions. During this reconfiguration of the Alliance, University of North Carolina-Greensboro withdrew from the Alliance, and Winston Salem State University (WSSU) joined. Currently, the NCLSAMP is comprised of eight constituent institutions of the University of North Carolina System. North Carolina A&T State University, an 1890 land-grant historically black institution, is also a highly productive research focused institution and a national leader in the production of degrees awarded in engineering to African-Americans. Two flagship institutions within the UNC System, the University of North Carolina at Chapel Hill (UNC-CH) and North Carolina State University (NCSU) are also members of the Alliance, as well as the University of North Carolina at Charlotte that awards doctorate degrees in eighteen STEM areas. Fayetteville State University (FSU), North Carolina Central University (NCCU), and Winston-Salem State University (WSSU) are also HBCUs that contribute to the STEM pipeline

through the production of students (primarily African American) in the biomedical and physical sciences, computer information sciences, and mathematics. Finally, the University of North Carolina at Pembroke (UNCP) is a primary contributor of Native American and African American graduates in various STEM disciplines. The uniqueness of this alliance lies in its diversity of participating universities and research focus areas, as well as program autonomy allowed for each participating campus. As a testament to the productivity of this Alliance, several of its institutions are routinely listed in Diverse Issues in Higher Education's Top 100 Degree Producers in STEM areas at the baccalaureate, Master of Science, and doctorate levels.

The NCLSAMP program has been funded for four consecutive five-year cycles (previously called phases). Each funding cycle focused on building upon "promised practices" learned and utilized, and institutionalized in the previous funding cycle. The initial funding cycle (1992-1997) focused on introducing undergraduate



Louis Stokes

students to STEM-related fields and careers through the use of high school to bridge activities at alliance institutions, peer-led mentoring and tutoring, and introduction to faculty-mentored research, and visits to graduate schools. Students were also provided financial assistance through scholarship and stipend awards. For the second funding cycle (1997-2002), program activities were designed to strengthen the STEM pipeline established during the first funding cycle, and place a stronger emphasis on faculty development and undergraduate research experiences. The undergraduate research experience for NCLSAMP participants has been instrumental in student socialization into the unique culture experienced in most STEM departments. In addition to undergraduate research experiences, students engaged in study groups and supplemental instruction sessions with their peers.

In the third funding cycle (2002-2007) the program focus began to shift to building the graduate STEM pipeline while maintaining the

existing undergraduate programs. Successful activities that had been successfully institutionalized (i.e. peer mentoring, tutoring, bridge activities) were augmented by expanded participation and presentations in State, Regional and National STEM-related conferences by faculty and students. Research experiences also extended to National research laboratories such as Argonne National Laboratories, Brookhaven National Laboratories, and Lawrence Livermore National Laboratories where faculty and student teams conducted summer research with national renowned scientists for ten-week periods.

Currently, in the fourth funding cycle (2007-2012), the NCLSAMP program has developed and implemented collaborations with community colleges, provided post baccalaureate support to former LSAMP students through the Bridge to the Doctorate Fellowship program, and supported international study abroad in Africa, and Costa Rica.

NCLSAMP Strategies for Success

The NCLSAMP Alliance utilizes several strategies to increase the productivity of graduate and undergraduate STEM degrees that mirror those espoused in Tinto and others (Pacarella and Terrinzini, 1991):

Diversity of Alliance Member Institutions:

The North Carolina Alliance is one of few in the country where the lead institution is minority serving (HBCU) for the LSAMP and the Alliances for Graduate Education and the Professoriate (AGEP) programs. This along with flexibility in program design for each Alliance institution has positively impacted degree production.

Socialization activities designed to integrate students and faculty into the university culture: Considered one of the most important aspects of the program, NCLSAMP activities are designed to promote the retention of women and other underrepresented students who major in STEM disciplines. Through activities such as monthly meetings, faculty-mentored research experiences, and outreach activities, students gain a sense of belonging on Alliance campuses, which increases the likelihood of completing their academic studies.

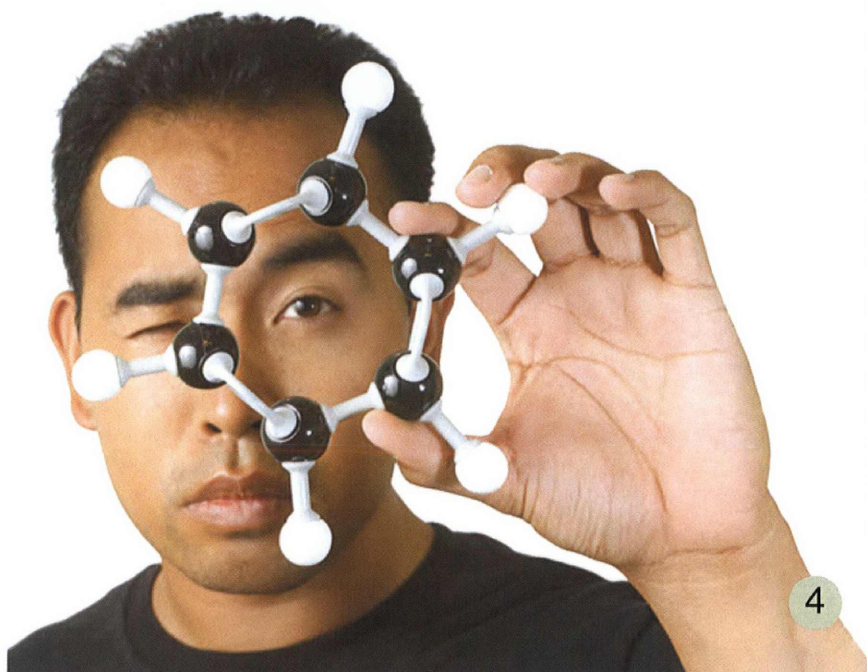
From 2002 through 2007, a longitudinal study was conducted for NCLSAMP participants at North Carolina A&T State University. The purpose of the study was to identify factors that significantly impact on the retention and graduation of students, and their subsequent entry into graduate STEM programs. The study concluded that NCLSAMP participants performed at a higher rate in their academic studies and were retained at a higher rate than a control group of their peers. This study yielded five published papers.

Professional development and networking opportunities for students:

NCLSAMP participants have attended over 200 professional development workshops, seminars and conferences throughout the country. Workshops have included a plethora of topics that include research ethics, choosing graduate schools that support their research interests, and funding sources for graduate school support. Graduate students have participated in “cross-talks” held quarterly on alliance campuses where they are provided a forum to develop a support network as they matriculate through their respective graduate programs.

Networking and professional development activities for faculty and staff:

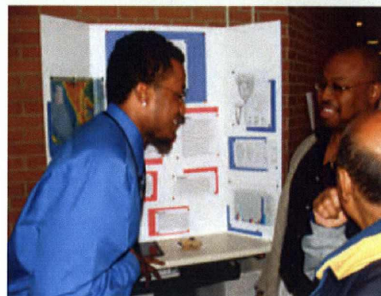
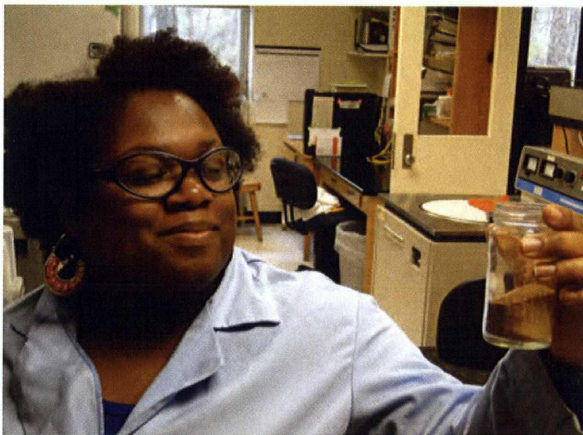
NCLSAMP faculty and staff have been supported to attend and present papers in over 200 conferences and symposia throughout the country. This support has positively impacted faculty productivity, which in turn has positively impacted student productivity. Faculty and staff also represent their respective institutions on national boards, councils, and advisory committees such as The National Society of Black Engineers (NSBE), The Institute for Broadening Participation (IBP), and the Council on Undergraduate Research (CUR).



Impact on STEM Undergraduate and Graduate Degrees

The impact of the NCLSAMP program on increasing the number of underrepresented minorities enrolled, retained and graduated in STEM fields has been far-reaching. Over the past 20 years, NCLSAMP Alliance institutions have enrolled 334,921 STEM majors, of those 31% were underrepresented minorities. Alliance institutions have awarded 372,180 degrees and 104,951 (28%) were to STEM majors.

Impact of the Bridge to the Doctorate Graduate Program



In addition to the undergraduate programs established, the National Science Foundation implemented the NSF Bridge to the Doctorate program specifically for qualified LSAMP students interested in pursuing a doctorate degree in a STEM field. In 2005, the North Carolina Louis Stokes Alliance for Minority Participation (NCLSAMP) program was one of sixteen original alliances funded to support an original cohort of 10 master's level students at North Carolina A&T State University. Subsequently, three additional cohorts were funded to support students at the University of North Carolina at Charlotte (2006-2008), North Carolina Central University (2006-2009), and North Carolina State University (2009-2011). The NSF Bridge to the Doctorate Program has been instrumental in increasing the production of Alliance graduates with advanced degrees in STEM disciplines and has offset the cost of education for graduate student in the amount of \$3,371,000.

Impact of Research on North Carolina's Economy

As of 2008, the University of North Carolina System institutions were awarded \$1.1 billion in from federal agencies, state and local governments, industries and other agencies to support research and sponsored programs of which \$72.3 million consisted of funding for graduate research and sponsored programs. This effort yielded a total economic impact of \$840.6 million, including 8,380 new jobs, \$290.5 additional wages and salaries, and \$90.4 million in additional local and state tax revenues. With adjustments, the UNC system directly introduced \$639.6 million to the state economy due to competitive research programs. The \$840.6 million generated by UNC sponsored research has yielded impacted all sectors of the state economy: wholesale retail – \$395 million (47%), business – \$66 million (8%), and the finance, insurance, real estate and personal services – 7%. As of 2010, three Alliance institutions were the top producers of sponsored research in the University of North Carolina system: University of North Carolina at Chapel Hill (\$672,273,593) North Carolina State University (\$231,557,433), and **North Carolina A&T State University (\$54,594,028).**



Undergraduate research opportunities (URO) have been a primary activity provided to NCLSAMP participants. The design and length of the URO is determined by the institution and may include summer research experience on campuses, or research experiences that occur during the academic year. Undergraduate research experiences provided to NCLSAMP participants afford them opportunity to work with renowned scientist and engineers on their respective campuses, other host campuses and National research laboratories. Since 1992, 1,390 NCLSAMP participants have participated in faculty-mentored undergraduate research. The full impact of NCLSAMP students' research is immeasurable. Cutting edge research has been presented by NCLSAMP participants at conferences and symposia throughout the nation. In addition, several participants have been co-authors on peer-reviewed publications. NCLSAMP faculty and staff have also made significant contributions through refereed publications and presentations at local, regional, state and national conferences including the State of NC Undergraduate Research and Creativity Symposium where over 360 students from 45 NC institutions presented their original research and creative ideas, and the NCLAMP/NC OPT-ED Alliance Day where as many as 700 STEM faculty, staff, and students have participated in workshops, and presented their research.



Undergraduate Research

NCLSAMP Institutional Impact on

The economic impact of the NCLSAMP extends beyond its eight institutional partners. Alliance institutions have provided services to the citizens within the 100 distinct counties of North Carolina. Cooperative Extension and Industrial Extension services in counties where Alliance institutions are based have resulted in an economic of over \$3.4 billion. Data from 2008 below provides a brief sketch of the economic impact of Alliance institutions by county.

Cumberland County: Fayetteville State University

- 6,780 undergraduate students enrolled at UNC institutions
- ECU, FSU, and UNCP Schools of Education Partnership with Cumberland County and Cumberland City Schools
- \$12,484,562 in sponsored research performed by FSU
- NCSU and NCA&T Cooperative Extension: economic impact of \$1,800,000 in 2009
- NCSU Industrial Extension Service: 13 businesses served and 25 jobs created or saved.
Economic impact: \$47,193
- UNCCH School of Government: 486 contacts with Cumberland County citizens and officials through courses, publications, teaching sessions and the Civic Education Consortium

Durham County: North Carolina Central University

- 5,276 undergraduate students enrolled at UNC institutions
- NCCU and UNCCH Schools of Education Partnership with Durham County Schools
- \$23,924,120 in sponsored research performed by NCCU
- NCSU and NCA&T Cooperative Extension: Volunteers contributed 14,04 hours of service valued at \$274,018
- NCSU Industrial Extension Service: 31 businesses served with the economic impact of \$40,459,310
- SBTDC: 200 businesses served generating \$222,537,509 in sales

Forsyth County: Winston-Salem State University

- 6,955 undergraduate students enrolled at UNC institutions
- UNCG and WSSU Schools of Education Partnership
- \$12,060,947 in sponsored research performed at WSSU in 2009
- NCSU and NCA&T Cooperative Extension: economic impact of \$2,000,000
- NCSU Industrial Extension Service: 55 businesses served and 16 jobs created or saved with an economic impact of \$11,127,785
- SBTC: 166 business served through consultation with an economic impact of \$69,883,108

North Carolina's Economy



Guilford County: North Carolina A&T State University

- 11,891 undergraduate students enrolled at UNC institutions
- \$57,704,040 in sponsored research performed at NCA&T
- NCSU and NCA&T Cooperative Extension Service: economic impact of \$11,800,000
- NCSU Industrial Extension Service: 79 businesses served and 145 businesses created and saved with an economic impact of \$35,368,698
- SBTDC: 204 businesses served through consultation with an economic impact of \$346,250,004

Mecklenburg County: University of North Carolina at Charlotte

- 17,081 undergraduate students enrolled at UNC institutions
- \$36,581,079 in sponsored research performed by UNCC
- NCSU Industrial Extension Service: 101 businesses served and 43 jobs created or saved with an economic impact of \$14,208,641
- SBTDC: 443 businesses served through consultation with an economic impact of \$801,913,964
- UNCCH School of Government: 1,561 contacts with Mecklenburg County citizens

Orange County: University of North Carolina at Chapel Hill

- 3,745 undergraduate students enrolled in UNC institutions
- \$716,242,666 in sponsored research performed by UNCCH
- NCSU and NCA&T Cooperative Extension: 106,842 contacts made by Extension staff
- NCSU Industrial Extension Service: 1 business served with an economic impact of \$260,000
- SBTDC: 170 businesses served through consultation generating \$99,538,604 in sales

Robeson County: University of North Carolina at Pembroke

- 2,747 undergraduate students enrolled in UNC institutions
- 4,406,670 in sponsored research performed by UNCP
- NCSU Industrial Extension Service: 14 businesses served with an economic impact of \$520,000
- SBTDC: 111 businesses served through consultation with an economic impact of \$28,478,901

Wake County: North Carolina State University

- 20,807 undergraduate students enrolled in UNC institutions
- NCSU and NCCU Schools of Education Partnership with Wake County Schools
\$206,143,934 in sponsored research performed by NCSU
- NCSU Industrial Extension: 65 businesses served with an economic impact of \$10,610,280
- SBTDC: 533 businesses served through consultation with an economic impact of \$746,887,140

NCLSAMP Industry Partners

Since the beginning of the NCSLAMP grant, close partnerships with corporations and organizations that have interests in supporting project activities, providing internships, and hiring our students have been maintained. We have very close partnership with corporations and organizations that have interests in supporting project activities and hiring our students. Annually, 30 industry representatives make presentations or conduct mock interviews at North Carolina State University in the E144/E145 courses (5), host STP attendees at their company site for orientation and information sessions (7), or attend the annual National Minority Engineering Programs Advisory Board meeting (19). Several of these companies also provide approximately \$40,000 each year to help support the numerous programs and activities in support of the minority engineering student population. In addition, student chapters of NSBE, AISES and SHPE at NCSU each receive \$2500 annually to help support travel to their annual convention or the annual student awards banquet.

All UNC institutions embarked upon a yearlong innovation initiative with IBM in 2010. Campuses focused on identifying areas of research strength and commercial potential, on systems and programs to support entrepreneurial individuals, and on novel, efficient technology development processes. Five campuses serve as pilots, taking on comprehensive change. These campuses were highlighted at the 11th meeting of the University-Industry Demonstration Partnership (UIDP) that drew an audience of over 120 academic and business leaders to UNC Charlotte in October 2010. Moreover in 2010, UNC General Administration began working with UNC Chapel Hill, NC State University, and the Renaissance Computing Institute (RENCI) to develop a searchable portal of faculty expertise.



Intel/Semiconductor Research



Milliken Company



Exxon

NCLSAMP partners





Institutional Highlights

As the lead institution for NC Louis Stokes Alliance, North Carolina Agricultural and Technical State University (NCA&T), is a historically black, 1890 land-grant institution, doctoral granting research university (high research activity), as classified by the Carnegie Foundation for the Advancement of Teaching. NCA&T offers 117 undergraduate degree programs, more than 58 master's degree programs, and 9 Ph.D. programs. NCA&T is a national leader in the production of African-American doctorate degrees awarded in engineering, and is ranked third in the sixteen institution UNC system for research funding. Since 1992, over 9,069 STEM degrees (6799 bachelor's, 2087 masters, and 183 doctorates) have been conferred to students at NCA&T. Since 2003, 128 undergraduate students at NCA&T have participated in faculty-mentored research, and have presented at conferences throughout the United States, including Florida, Georgia, New Mexico, New York, and Puerto Rico. 73 % have applied to or entered STEM graduate programs.

NCLSAMP program activities at NCA&T program activities included peer mentoring, supplemental instruction, tutoring in STEM gatekeeper course, and undergraduate research experiences, and a STEM Living Learning Community launched in fall 2011. Outreach activities for the 2010-2011 academic year included STEM Clubs and robotics workshops for elementary, middle, and high school students.



Student Highlight

Husniyah Abdus-Salaam began her participation in the NCLSAMP program in 2003 as an undergraduate research scholar in Electrical Engineering under the mentorship of Dr. Clinton B. Lee. Her research investigated "Pulse Laser Deposition of Yttrium Barium Copper Oxide (YBCO) in Nanoparticles. In 2004, Husniyah completed her bachelor's degree in Electrical Engineering at NCA&T and was awarded a NCLSAMP Bridge to the Doctorate Fellowship at the University of North Carolina at Charlotte where she completed her master's degree. In 2006, she returned to her Alma mater and completed a doctoral degree in Industrial Engineering 2010, and was honored for the best graduate dissertation by the Graduate School at NCA&T for her dissertation entitled, "Examining the Influence of Dependent Demand Arrivals on Patient Scheduling".

STEM Club

Fall 2010 marked the launch of two STEM clubs for 9-12 graders at Ragsdale High School and NCA&T Middle College. The goals and objectives of the STEM Club are to 1) encourage and inform teenage students of educational and career opportunities in STEM (science, technology, education and mathematics) related professions; 2) create optimism about the values, rewards, and accessibility of STEM careers; and 3) increase awareness about the need for underrepresented minorities in the STEM professions. The STEM Clubs met on a monthly basis as an after-school program. Workshops conducted were designed to increase students' awareness of STEM careers and awareness of research activities. Fall semester workshops were conducted by the following STEM programs at NCA&T: School of Technology Motor Sports Program, NOAA/ISET Atmospheric Science and Meteorology Program, Computer Science-Hip/Hop Computation, Electrical Engineering-Lego Robotics, and College of Arts and Science Chemistry Department. Workshops were facilitated by faculty as well as undergraduate and graduate students. Workshops were interactive and students were engaged in learning broad and specific information about various STEM disciplines. Nearly 100 students participated and were introduced to various STEM disciplines.

Robotics

Through the use of Lego Robotic Kits, students participate in workshops designed to create fun and engaging activities to excite youth about STEM education. These activities promote critical thinking and provide opportunities for exploration, discovery, creativity, and problem-solving. NCLSAMP students co-facilitated robotics workshops and served as mentors to middle and high school students.

Faculty Highlight

Dr. Stephanie Luster-Teasley, Associate Professor in the College of Engineering and NCLSAMP faculty mentor, had her research project chosen as the research project for the 4-H National Science Day. Consequently, she published both student manuals and student workbooks for the project termed "4H2O: Understanding the Link between Water Quality and Climate Change."





FSU

FAYETTEVILLE STATE UNIVERSITY

Fayetteville State University (FSU) is a constituent institution of the University of North Carolina and the second-oldest public institution of higher education in the state. Founded in 1867 as the Howard School for the education of African Americans, today FSU serves a growing student body of over 6,300 and ranks among the nation's most diverse campus communities. New undergraduate degree programs have been established, including undergraduate degrees in biotechnology, communications, forensic science, management information systems, and generic nursing. In addition, there are new graduate programs that offer the master's of arts in teaching and the master's of science in criminal justice. Altogether FSU boasts 43 undergraduate programs, 23 master's degree programs, and one doctoral program in educational leadership.

Between spring semester 2007 and spring 2011, 60 NCLSAMP students participated in research mentoring and 128 students in STEM Career Workshops. On the average, LSAMP supports 47 students per year, which is approximately 9% of all STEM majors per year. In addition, 40% of all LSAMP participants are currently pursuing masters or doctoral degrees.

The NCLSAMP program at Fayetteville State University has collaborated with the following National laboratories and business entities: Argonne National Laboratories where five students and one faculty member conducted summer research; Oak Ridge National Laboratory where 2 students and 1 faculty Laboratory; 2 students and 1 faculty completed summer research internship at Oak Ridge National Laboratory; 1 student completed summer research internship in the Directorate for Undergraduate Education at the National Science Foundation; and 1 student served as an intern at RLM Communications in Fayetteville, North Carolina.



Student Highlight

LSAMP scholar, Kristy Mitchell won the "Chancellor for a Day" at Fayetteville State University through a competitive selection. This Chancellor's initiative allows students to shadow the Chancellor for a day.

Located in Durham, NC, North Carolina Central University (NCCU) is an accredited Historically Black Institution (HBCU) chartered in 1909 as the nation's first publically-funded liberal arts institution founded for African Americans. Since its inception, NCCU has provided a strong and challenging educational environment that prepares students to become productive contributors in a global society. Classified as a Comprehensive Level 1 Institution, NCCU offers baccalaureate, Master of Science, and selected first professional degrees. NCCU is listed regularly in Diversity Magazine's Top 100 Degree Producers of African American baccalaureates and Master of Science degrees in the Biomedical



Sciences. More recently, NCCU has also made this list as a top producer of Master of Science degrees in the Physical Sciences for minority students. The institution is committed to maintaining its role as a top producer of under-represented minority (African-American U.S. citizens) baccalaureate recipients that obtain terminal degrees in STEM disciplines while expanding its role in the health, and behavioral sciences through expansion of research.



During Phase III (2002-2006) NCCU supported 50 undergraduate STEM majors through the NC Alliance. Of these 92% received the baccalaureate degree in a STEM discipline. Of those that graduated, 48% matriculated into a STEM-based M.S. or Ph.D. Program. Fifty-six (56) % of these participants gave professional presentations, while

16% published their research results in partnership with the University Undergraduate Research Program. Forty-four (44%) percent of Phase III participants are (or have been) employed in a STEM-based discipline or field.

Cohort III of the LSAMP-BD was funded at NCCU during Phase III. This funding had a major impact on the generation of graduate degrees in the Physical Sciences and expanded NCCU's reputation as a top producer of under-represented minority MS degree recipients in the Physical Sciences (while continuing in the Biomedical and Behavioral Sciences).

NORTH CAROLINA CENTRAL UNIVERSITY



NCCU

Student Highlight

Jerry Battle, an active participant in the NCLSAMP program and the Environmental Risk and Impact in Communities of Color research project, co-authored 5 conference presentation abstracts. He received a \$400 scholarship from Southeast Collegiate Environmental Science and Health Symposium/CDC and Prevention

Faculty Highlight

Dr. Sandra F. DeLauder, Campus PI, and Dr. Yolanda Banks Anderson participated in a SENCER Capitol Hill Poster Session (Washington, DC) where the outcomes of the Environmental Risk and Impact in Communities of Color Grant Project were presented. All participants were scheduled to meet with our congressional representatives. Drs. Anderson and DeLauder met with a representative from Congressman David Price's Office to discuss STEM priorities for NCCU.



NCSU

NORTH CAROLINA STATE UNIVERSITY

With more than 34,000 students and nearly 8,000 faculty and staff, North Carolina State University is a comprehensive university known for its leadership in education and research, and globally recognized for its science, technology, engineering and mathematics leadership. NC State students, faculty and staff are focused. As one of the leading land-grant institutions in the nation, NC State is committed to playing an active and vital role in improving the quality of life for the citizens of North Carolina, the nation and the world.

Each year, an average of 141 new minority engineering freshmen have entered NCSU and participated in one of several programs and activities fully or partially funded by the NCLSAMP grant. This number of 141 represents 22.5% of all undergraduate minority engineering students, and 11.8% on all new engineering freshmen. Over the life of NCSLAMP, the number of new minority engineering freshmen entering the program at NC State University has ranged from a low of 111 (2001) to a high of 176 (1996).

The numbers that follow in parentheses represent average number of participants and include upper division minority engineering students and high school seniors who attend our annual spring recruiting event. Annual involvement was as Summer Transition Program (STP) participants (46), STP counselors, faculty or staff (23), NCSLAMP Scholars (9), Student Advancement and Retention Teams (START) mentors (19), START mentees (116), students enrolled in E144-Professional Development I (112), or E145-Professional Development II (49), and participants (37), student hosts (35), guests, faculty or staff (81) for our Minority Student Recruiting Weekend (MRW). Since the beginning of NCSLAMP, a total of 2257 new underrepresented engineering freshmen have entered the program. Annually, an average of 90 minority engineering students received undergraduate engineering degrees. This represents on average 8.7% of all undergraduate degrees awarded annually (1034). Over the past several years, according to Diverse Issues in Higher Education, NC State University has remained in the top five nationally in awarding undergraduate engineering degrees to African Americans. This success is due in large part to scholarships, mentoring and other support programs partially funded by the NSLAMP grant. A total of 1347 underrepresented minority students have earned undergraduate engineering degrees from NC State University.



Student Highlight

Calvin Phelps, and NCLSAMP participant who earned a B.S. degree in Aerospace Engineering in May 2009, was elected NSBE National Chair at the annual NSBE Convention held in Toronto, Canada March 31– April 4, 2010, and was elected to a second term at the March 2011 annual convention in St. Louis.

Faculty Highlight

The NC State University Programs for Women and Minorities, represented by Dr. Sarah Rajala, Associate Dean and Professor of ECE, Dr. Tony L. Mitchell, Director of Minority Engineering Programs and Associate Professor of ECE, and Dr. Laura Bottomley, Director of Women in Engineering and Lecture in ECE, received the 2000 Organizational PAESMEM Award.

The University of North Carolina at Chapel Hill, the nation's first public university, serves North Carolina, the United States and the world through teaching, research and public service. We embrace an unwavering commitment to excellence as one of the world's great research universities. Our mission is to serve as a center for research, scholarship and creativity and to teach a diverse community of undergraduate, graduate and professional students to become the next generation of leaders. Through the efforts of our exceptional faculty and staff, and with generous support from North Carolina's citizens, we invest our knowledge and resources to enhance access to learning and to foster the success and prosperity of each rising generation. In fall 2010, Carolina enrolled 3,960 first-year students drawn from a record 23,271 applications – a 24 percent increase over the past five years. More than 78 percent graduated in the top 10 percent of their high school class.

The Summer Bridge program at UNC-Chapel Hill is designed to encourage minority STEM students to conduct intense, but highly personal, research with a faculty mentor during one or two consecutive summers. These SMART students are rising sophomores with at least a 3.0 GPA in "gatekeeper" science classes who are selected to spend the summer in Chapel Hill and participate in a mentored research project. In July 2010, 14 SMART students completed the summer program with a symposium presentation for the students, faculty and graduate mentors, and the students' families.

Student Highlight

Testimonial from Lamorris Loftin:

I was interested in research as an undergraduate, and attending the NC-LSAMP conference had a profound and memorable effect. As an African American, I was concerned about pursuing a research career. My concern stemmed from the fact that there were so few minorities involved in research and even fewer successful scientists from underrepresented backgrounds. However, interacting with other students in Montana (at the national conference of the Louis Stokes Alliance for Minority Participation) showed me there was a vibrant community of students from different backgrounds that were also interested in a scientific career. At the conference I also met a former researcher from a prominent HIV lab. She described her research experience and outlined the successes she had. This conversation gave me confidence that I could also be successful if I chose this career path.

At UNC, I performed undergraduate research in two labs. As a junior, I worked for Dr. Barry Goz. In his lab, I studied the effects of cancer drugs on the function of the Ku protein, a DNA binding protein that protects telomeres from degrading. My senior year, I worked with Dr. Kenneth Bastow. I studied the effects of all trans retinoic acid on cell growth and viability. I graduated with Honors from UNC-CH in Biology, with a minor in Chemistry.

At the University of Pennsylvania I was a graduate student in the Microbiology graduate group, which is a part of the Cell and Molecular Biology graduate program. During graduate school, my research focused on the cellular and viral factors that determine the CCR5 use by R5X4 HIV-1. I graduated from Penn in 6 years.

Faculty Highlight

Program Director Patricia Pukkila was named a Fellow of the American Association for the Advancement of Science in 2005 for "work in regulation of meiosis and for leadership in promoting undergraduate education and research." She received the Bruce Alberts Award for distinguished contributions to science education from the American Society for Cell Biology in 2007. She has served as a Councilor in the Council for Undergraduate Research since 2002.

UNIVERSITY OF NORTH CAROLINA
AT CHAPEL HILL



UNC

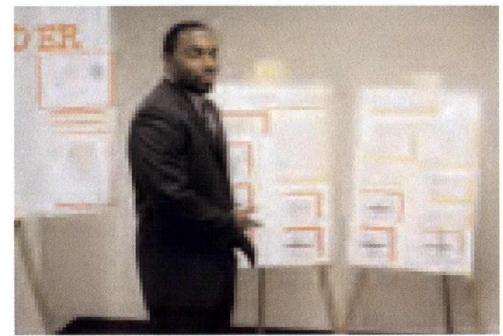
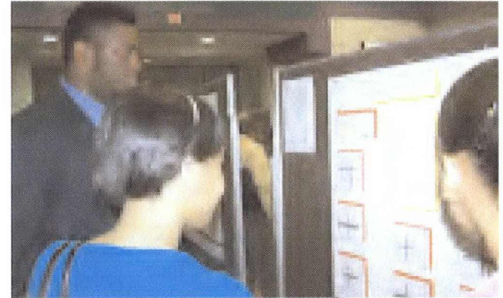


UNCC

UNIVERSITY OF NORTH CAROLINA-CHARLOTTE

UNC Charlotte is North Carolina's urban research university. It leverages its location in the state's largest city to offer internationally competitive programs of research and creative activity, exemplary undergraduate, graduate, and professional programs, and a focused set of community engagement initiatives. UNC Charlotte maintains a particular commitment to addressing the cultural, economic, educational, environmental, health, and social needs of the greater Charlotte region.

UNC Charlotte joined NCLSAMP at the beginning of Phase II. Phases II-IV funds were and continue to be administered under the auspices of the College of Liberal Arts and Sciences and is housed in Multicultural Academic Services (formerly Minority Academic Services) through the Producing Readiness of Diverse University Cohorts through Education (PRODUCE). Minority Academic Services is an office the Department of Academic Services. The primary focus of the PRODUCE Program under Phase II and III was to increase the recruitment, retention, and graduation underrepresented students in the science, technology, engineering and math (STEM) disciplines. The program expanded its focus under Phase IV to increase the number of underrepresented students applying to and being accepted into graduate STEM programs.



Since 1997, an average of 271 STEM students have participated in tutoring, mentoring, professional development activities, academic workshops, and volunteer activities each year. Approximately 32% of the program participants are freshmen and at least half of those participated in UTOP, a summer bridge program. The number of program participants on academic probation or suspended was less than 12% ten out of thirteen years. In addition, more than 62% of program participants in biology; 74% in math; 64% in chemistry and 53% in physics gateway courses earned a C or better in their classes. These percentages were higher than the rates of underrepresented students not participating in the program and comparable to Caucasian students taking the same courses. The four and six-year graduation rates of student participants were also 7-10% higher than their peers. According to information reported on the UNC Charlotte Career Center and Senior Exit Surveys, 75% of our graduates are working in jobs directly or somewhat directly related to their STEM degree. Thus we estimate 63% of our annual underrepresented graduates of entered STEM graduate programs or careers.

Student Highlight
Harry Gilliard, an African American male candidate for the BS degree in Meteorology was selected to serve as a page to American Meteorological Society Meeting in Seattle, WA.

The August 2010 edition of *The Education Trust*, cites UNC-Charlotte in an article "Small Gaps for African American Students" for having comparable graduation rates for African American, Hispanic American and Caucasian students. The programs in the Multicultural Academic Services Office were specifically mentioned. This success is due in large part to scholarships, mentoring and other support programs partially funded by the NSLAMP grant.

The University of North Carolina at Pembroke (UNCP) is a master's level degree granting university within the University of North Carolina system. With a total enrollment of 6,944, the university offers 41 bachelor's and 17 master's degrees. UNCP has distinguished itself as a school where students excel because of the tremendous care faculty take to ensure their success and growth. With a 16:1 student-faculty ratio an average class size of 21, UNCP students are able to receive individualized service, which affords them the success to continue into vibrant and successful careers. Since 2002, NCLSMP has supported 100 summer bridge participants, and 6 transfer fellows. Seventy-four (74) have completed their bachelor's degrees and 2 are enrolled in Ph.D. programs through the Colorado Bridge to the Doctorate program.

NCLSAMP faculty, students and staff at UNCP have participated in STEM outreach activities at local, regional and national levels. Table 1 below indicates the impact of UNCP/NCLSAMP activities over the past 15 years.



UNIVERSITY OF NORTH CAROLINA AT PEMBROKE



UNCP

Table 1: UNCP/LSAMP Activities

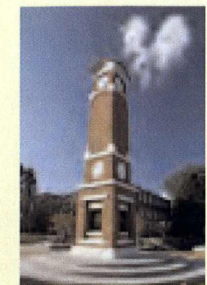
YEAR	ACTIVITY	LOCATION	PARTICIPANTS
2010-2011	Workshop – endothermic and exothermic reactions	Red Springs High	70
	Graduate Presentations	AISES National	26
2009-2010	Workshop prep for Science Fair	IEA	8
	Graduate Presentations	AISES National	23
	Science Fun Day- making slime	UNC Pembroke Family Day	150
2008-2009	Workshop – design, execution, and presentation of Science Fair Projects	IEA	4
	Workshop- Baggie ICE CREAM – Showing Endothermic and exothermic reactions	UNCP Family Life	20
	Workshop- Microscopy of cells and Heredity by DNA	UNCP Family Life Residential Summer	18
	Graduate Presentations	AISES National	19
2007-2008	Workshop prep for Science Fair	IEA	8
	Graduate Presentations	AISES National	18
	Workshop- Crystal Formation	Scotland County Teachers – middle school	24
	Workshop – Kaleidoscope Snowmen using pH	Scotland County Teachers – middle	22
	Workshop- Goo and Gluu Polymers	Scotland County Teachers – middle	24
	Workshop- DNA fingerprinting	Purnell Swett High – 3 classes	60
2006-2007	Workshop prep for Science Fair	IEA	
	Graduate Presentations	AISES National	16
	Workshop – Forensic Science	Scotland County Teachers – middle	24
	Workshop – Cells Large and Small	Pembroke Elementary School	56
2005-2006	Workshop Prep for Science Fair	IEA	9
	Teacher Link mentor	Robeson County Elementary Teachers in Teacher Link	25

Faculty Highlight

Dr. Velinda Worlax, Campus PI, was awarded the American Society for Cell Biology Linkage Fellow Award by the Minority Affairs Committee. The award is presented annually to 7-9 minority faculty across the nation for promotion of Cell Biology and related topics.

Student Highlight

Upon his return from Costa Rica, Daniel Locklear was awarded a travel scholarship to the Society for the Advancement of Chicanos and Native Americans in Science (SACNAS) National Conference in Anaheim, CA on Sept. 27-30. There, he presented findings based on his research and served as a spokesman at OTS NAPIRE booth.



WSSU

WINSTON SALEM STATE UNIVERSITY

Winston-Salem State University, a constituent institution of the University of North Carolina, is a historically black university that today is a recognized regional institution offering baccalaureate and graduate programs to a diverse student population. *U.S. News and World Report* has ranked the university among Top Public Comprehensive Colleges in the South - Bachelor's Category for the last nine years (2001-2009). Founded in 1892, WSSU is a master's level coeducational institution with an enrollment of 6,442, and offers more than 40 undergraduate programs and 10 graduate programs. Students are engaged in active and experiential learning and have access to education through flexible delivery modes. The University is dedicated to the development of students through excellence in teaching, scholarship and service. As a comprehensive, historically Black constituent institution of the University of North Carolina, Winston-Salem State University contributes to the social, cultural, intellectual and economic growth of the region, North Carolina and beyond. NCLSAMP has provided support to 100 participants at WSSU. Of those, 88 have entered STEM careers. Participants have gained experience in undergraduate research, tutoring and mentoring activities.

Winston-Salem State University STEM disciplines served by the NCLSAMP Alliance includes: Chemistry, Computer Science, Information Technology, Life Sciences, and Mathematics. Forty students, with representation from each of these majors, participated in the WSSU NCLSAMP program at either Level-1 or Level-2 during the 2010-2011 academic year. Activities included the following:

- Stem pipeline to graduate study (Bridge to the Doctorate)
- Faculty/Staff Training and Development Activities
- Outreach Activities
- Conferences and/or workshops and symposiums attended by faculty and students
- International Study Abroad activities for NCLSAMP students
- Community College Bridge Activities
- Post Baccalaureate Support
- Summer or Academic Year Bridge Activities

Outreach activities included visits to Kimberly Park Elementary School, Quality Education Institute Middle School and the Emmanuel After-school Academy for STEM activities and demonstrations to market STEM study. We continue our partnership with Atkins Technology High School—a technology based high school located in historically African American East Winston, is composed of three small high schools located in one building: Computer Technology High School, Bio-technology High School and Pre-Engineering High School. These students are invited to STEM presentations on campus.



Student Highlight

Dr. Pamela Jones shares results of work with NCLSAMP student Ashley Pierce. I am very pleased to announce that my manuscript, "Escherichia coli Cold Shock Protein CsdA Effects an Increase in Septation and the Resultant Formation of Coccobacilli at Low Temperature", was peer-reviewed and accepted for publication as an original paper in the journal *Archives of Microbiology*. I am proud to inform you that the only additional authors on the manuscript are 2010 Department of Life Science graduates Ashley Pierce and Devyn Gillette. This manuscript is a follow-up to my previous publication, "Mutational Analysis of the Escherichia coli DEAD Box Protein CsdA."

Faculty Highlight

Dr. Elva Jones, Campus PI, was the fifth award recipient at the Information Technology Senior Management Forum (ITSMF) 5th Annual Awards Ceremony, held in Irving, TX.

NCLSAMP

NCLSAMP Alliance Staff

North Carolina A&T State University (lead campus)

Chancellor:

Dr. Harold L. Martin, Chancellor

Principal Investigator and Governing Board Chair:

Dr. Winser E. Alexander

Co-Principal Investigator and Project Director:

Dr. Marcia F. Williams

Program Assistant:

Ms. Kristie Johnson

External Evaluator:

Dr. Rita O'Sullivan (UNC Chapel Hill)

Fayetteville State University

Campus Principal Investigator

Dr. Daniel Okunbor

North Carolina Central University

Campus Principal Investigator

Dr. Saundra DeLauder

North Carolina State University

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Program Assistant

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Dr. Patricia Pukkila

Campus Coordinator

Dr. Nalin Parikh

University of North Carolina at Charlotte

Campus Principal Investigator

Dr. Billy Hill

Campus Coordinator

Ms. Jodi Turner

University of North Carolina at Pembroke

Campus Principal Investigator

Dr. Velinda Worlax

Campus Coordinator

Ms. Valarie Deese

Winston-Salem State University

Campus Principal Investigator

Dr. Elva Jones

2011

Impact Report

NC-LSAMP
North Carolina Louis Stokes Alliance
for Minority Participation



North Carolina Agricultural and Technical
State University