

***North Carolina Louis Stokes Alliance for
Minority Participation***

Program Effectiveness Review

NC-LSAMP



Building a stronger partnership for success

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NC-LSAMP Partners

- North Carolina A&T State University
- Fayetteville State University
- North Carolina Central University
- North Carolina State University
- University of North Carolina at Pembroke
- University of North Carolina at Chapel Hill
- University of North Carolina at Charlotte
- Winston-Salem State University

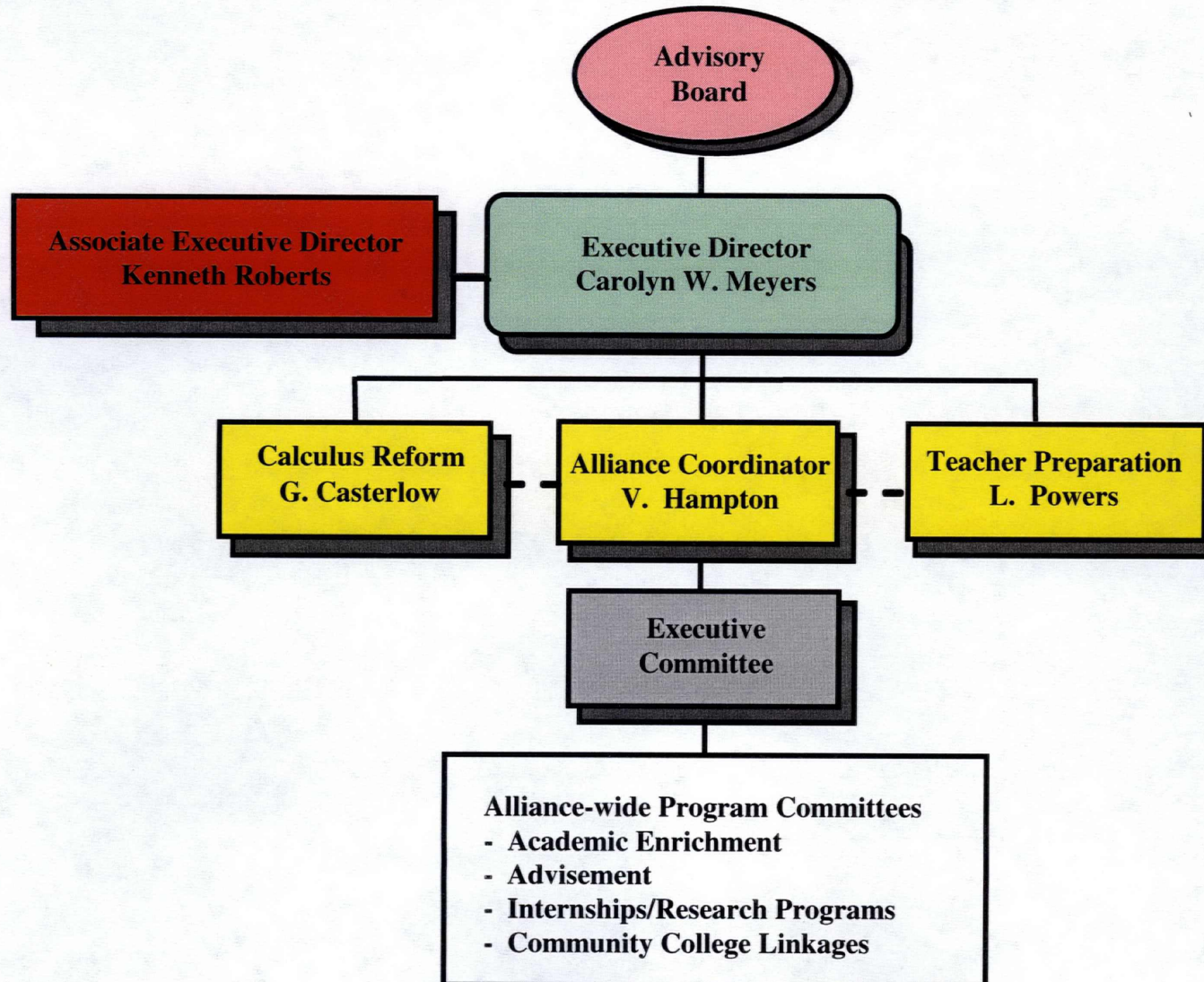


NC-LSAMP Goals

- To improve the quality of the learning environment for minority science and engineering students at all schools.
- To substantially increase the numbers of minority students graduating with degrees in science, mathematics, engineering, and technology.
- To develop and implement effective methods of attracting talented minority students who would otherwise not choose science, mathematics, engineering, or technology as a career.



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Alliance-wide SMET Degree Data

Degrees	Baseline Spring '95	1996	1997	1998	1999	2000	2001
African American	877	658	753	773	726	810	707
Hispanic American	345	36	42	53	48	60	46
Native American	23	40	37	53	51	49	36
Pacific Islanders	4	230	218	239	222	245	245
Total Minority	1,249	964	1,050	1,118	1,047	1,164	1,034
Non-Minority	4,641	2,975	2,883	2,706	2,546	2,559	2,645
Total All	5,890	3,939	3,933	3,824	3,593	3,723	3,679

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Retention Data

	SMET			NON-SMET		
	Total in Cohort	1-Year Return	% Total	Total in Cohort	1-Year Return	% Total
1994	781	549	70.34%	3,360	2,551	75.92%
1995	850	594	69.88%	3,246	2,492	76.77%
1996	847	604	71.31%	3,551	2,712	76.37%
1997	859	608	70.78%	3,643	2,829	77.66%
1998	938	600	63.97%	3,598	2,730	75.88%
1999	882	574	65.08%	3,821	2,780	72.76%



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“Best Practices” Shared and Institutionalized

- SMET Study Groups
- Faculty Mentoring
- Early Research Experiences
- Organized Tutorial Sessions
- Internships
- Career Advisement
- Saturday SMET Workshops
- Hands-on Instructional Activities
- Supplemental Instruction
- Collaborative Learning
- Peer Mentoring
- Computer Application Assistance
- Distance Education



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Effectiveness of “Best Practices”

- Study groups promoted among first year students have yielded positive results in student performance in introductory SMET courses.
- "Hands-on" collaborative learning activities significantly improved course performance for SMET students at all classification levels (i.e., freshmen through senior levels).
- SMET student participants in combined study groups, peer advising, and supplemental instruction demonstrated improvement in their final course grades when compared to similar groups of non-participants.
- Concurrent Saturday workshops in gatekeeper courses (biology, chemistry, mathematics, and physics) enhanced course performance. Workshops were structured to focus on small group learning activities and intensive SMET faculty-student interaction with one faculty member, one peer tutor, and 10 students.



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Effectiveness of “Best Practices” (continued)

- Integral components of gatekeeper workshops include faculty mentoring, peer mentoring, student development, and career advisement throughout undergraduate training and into graduate school.
- Fieldtrips to major industries in the Research Triangle Park promote students’ development of insight into the practical application of SMET research, and facilitate exposure to career options in SMET fields.
- Monthly meetings and seminars for Level I students encourage increased participation in research activities, thereby minimizing reluctance of students to engage in faculty-mentored research.



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Effectiveness of “Best Practices” (continued)

- SMET students demonstrated higher levels of enthusiasm to engage in faculty-mentored research after listening to their peers share research-related experiences, and observing poster and oral presentations.
- Intensive student interaction with faculty outside the classroom setting enabled students to feel less intimidated working closely with faculty in research projects.
- Comparative data for tutorial services in gatekeeper courses suggest that students who participate in tutorials are more likely to pass the course with a grade of C or better than non-participating students.



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Preparation for Faculty Mentoring

- SMET Department Identification of Faculty Mentors
- Workshops Defining Faculty Roles and Expectations in Mentoring
- Staff Development Activities Training Faculty to Use Effective Mentoring Strategies
- Joint Seminars involving Faculty Mentors and Students
- Faculty Mentors Accompany Students to Research Conferences
- Students Attend Professional Meetings with Faculty Mentors



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Infusing Technology and Research-based Methods in Teaching and Learning

- Faculty development through workshops and training ensures application of technology and research-based methodologies in SMET instruction.
 - Emphasis on enhancement of teaching skills has promoted curriculum reform of gatekeeper courses.
 - Incorporation of graphing calculators in gatekeeper course instruction has significantly improved overall student performance.
 - Joint research projects in SMET courses continue to promote inquiry-based, hands-on learning.
 - Team problem solving in SMET courses improves quality of learning and fosters early interest in research experiences.
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Infusing Technology and Research-based Methods in Teaching and Learning (continued)

- SMET courses include Computer Laboratory Components
- Computer software and on-line materials are accessed during SMET classes
- SMET courses apply interactive software
- Teaching Stations - SMART Boards are used in SMET classes



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Institutionalizing and Implementing Successful Strategies Beyond SMET

- Peer Advisement
- Peer Mentoring
- Faculty Mentoring
- Cooperative Learning
- Organized Tutorial Sessions
- Supplemental Instruction
- Distance Education
- Technology-based Instruction
- Career Advisement
- Internships



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Interaction of NC-LSAMP Project with CREST

- CREST facilitates increased integration of SMET education with research.
- SMET undergraduate faculty enhance instruction through substantial research resources provided by CREST.
- Undergraduate students in engineering and science engage in research mentored by graduate students and faculty.
- Collaboration of CREST with academe, private industry, and the government in developing basic and applied research programs provides a major focus on NC-LSAMP student participation and learning.



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Interaction of NC-LSAMP Project with CREST (continued)

- CREST resources afford a major expansion of research experiences to motivate undergraduate students to pursue graduate study.
- Summer research opportunities at collaborating industry and government facilities reinforce relevancy of learning for undergraduate and graduate students.
- Early CREST-related research experiences assist talented students in bridging the gap between engineering theory and practice.
- Rising seniors are exposed to current research issues addressed by CREST through and Undergraduate-Graduate Transition Program.



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Interaction of NC-LSAMP Project with HBCU-UP

- HBCU-UP activities provide resources which further expand ongoing NC-LSAMP efforts to enhance teaching and learning in mathematics, chemistry, and physics.
- Curriculum Development and Reform in Calculus, Chemistry, and Physics.
- Faculty Development for Gatekeeper Courses.
- Integration of Technology in Mathematics and Science Teaching.
- Student Learning and Research Development.



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Interaction of NC-LSAMP Project with HBCU-UP(continued)

- Infrastructure Improvement through Collaborative Activities Involving HBCU Institutions, Industry, and Government Laboratories.
- Expansion of Research Training and Experiences for Minority Students.
- Systematic Development of Research and Technology Skills for Undergraduate Students at all Participating Institutions.
- The Number of Minority Students Earning Baccalaureate Degrees in Mathematics, Chemistry, and Physics will be Significantly Increased.
- An Increased Number of Minority Students will Pursue Graduate Degrees and Related Careers in Mathematics, Chemistry, and Physics.



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Interaction of NC-LSAMP Project with MGE

- Activities and resources provided by MGE augment continuing efforts by NC-LSAMP to increase the number of underrepresented minority students earning Ph.D. degrees in science, mathematics, and engineering (SME), and entering related careers, including the professorate:
- Intensive Recruitment and Support for NC-LSAMP Students Transitioning from Undergraduate to Graduate Study in SMET Disciplines. First-Year Graduate Students Participate in STAR (Student Transition and Retention).
- Seminars to Train Faculty Mentors to Effectively Serve Diverse Student Populations.



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Interaction of NC-LSAMP Project with MGE (continued)

- Intensive Mentored Research Experiences and Training for Undergraduate SME Students During the Academic Year and Summer.
 - Peer-oriented Problem Solving Cluster Groups for Graduate Students in SME Disciplines.
 - Structured Year-long Activity to Prepare Ph.D. Minority Students in SME Fields for Future Careers in the Professoriate.
 - Enhancement of Professional Development, Career Options, and Understanding of Cultural Diversity for Minority Students through a Series of Seminars, Workshops, and Symposia.
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