Fifth Annual Undergraduate Research Conference

Gateways to Graduate Excellence in Science, Mathematics, Engineering, and Technology: A Decade of Louis Stokes AMP Achievement

NORTH CAROLINA LOUIS STOKES ALLIANCE
FOR MINORITY PARTICIPATION
in Science, Mathematics, Engineering, and Technology

North Carolina A&T State University
Greensboro, North Carolina
April 20, 2001

Sponsored by the National Science Foundation and Participating Institutions
Fayetteville State University, North Carolina Central University,
North Carolina State University, University of North Carolina–Chapel Hill,
University of North Carolina–Charlotte, University of North Carolina–Pembroke,
Winston-Salem State University, and North Carolina A&T State University (lead campus)

PROGRAM SYNOPSIS

The North Carolina Louis Stokes Alliance for Minority Participation (NC-LSAMP) is a comprehensive, interdisciplinary, regional coalition comprised of eight institutions within the University of North Carolina system. A primary aim of the Alliance is to significantly increase the quantity and quality of underrepresented minority students earning B.S. degrees in science, mathematics, engineering, and technology (SMET) disciplines, and subsequently pursuing Ph.D. degrees in these fields. Partner institutions include Fayetteville State University, North Carolina Central University, North Carolina State University, University of North Carolina at Chapel Hill, University of North Carolina at Charlotte, University of North Carolina at Pembroke, Winston-Salem State University, and North Carolina A&T State University (lead campus).

Program priorities focus on four central approaches. These entail a systemic, collaborative learning approach emphasizing group study and support; positive and sustained interaction with faculty; intensive interaction with other support persons at the university and the wider community (alumni, parents, mentors from industry and community organizations); and hands-on experience in SMET including undergraduate research opportunities, internships with industry, and interaction with class projects. All partners share a strong commitment to the goal of increasing retention, access, and opportunities for minority students in SMET fields. Accordingly, NC-LSAMP systemically assists students by developing a supportive community, and by offering opportunities for students to grow academically, professionally, and personally. Another major function of NC-LSAMP is to provide student financial aid to support tuition and related university fees.

The impact of the NC-LSAMP project at partner institutions is quite dramatic. There is a cultural change occurring on all campuses reflecting a more strategic and systemic focus on the institutional issues that impede minority student success in SMET programs. Indeed, outcomes of NC-LSAMP up to this point are encouraging, and we fully anticipate reaching higher levels of success as we continue implementation of Phase II through 2002, marking a ten-year period of performance. We will continue to place emphasis on retention, which has proven to be our greatest challenge. Attainment of our chief goal will be largely determined by success not only in recruiting minority students into SMET programs at partner universities, but also in nurturing these students through the SMET pipeline from undergraduate to the graduate level.

Since the inception of the Alliance in 1992, combined efforts of partner institutions have resulted in a variety of programs and activities geared toward enhancing student success. Major initiatives include SMET curriculum reform, supplemental instruction, bridge programs, undergraduate research, and summer internships. The Alliance also sponsors an annual research conference, which serves as a forum to showcase faculty-mentored research projects. During the 1999-2000 academic year, 5,188 underrepresented minority students enrolled in SMET disciplines were supported by NC-LSAMP institutions. Moreover, 919 B.S. degrees were awarded to African American (810), Hispanic Americans (60), and Native American (49) students in SMET fields.

NC-LSAMP operations are supported primarily through funding provided by the National Science Foundation (NSF). The North Carolina University system is indebted to NSF for its generous support of programs and activities to increase minority participation in the SMET enterprise.

NC-LSAMP Linkages with NSF Diversity-Focused Programs Addressing the SMET Continuum

Centers of Research Excellence in Science and Technology (CREST); Alliances for Graduate Education and the Professoriate (AGEP); Historically Black Colleges and Universities-Undergraduate Program (HBCU-UP)

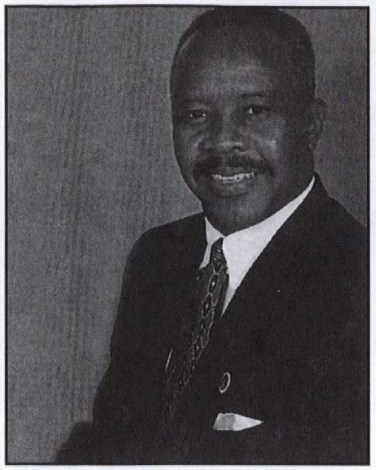
Institutions within the North Carolina Louis Stokes Alliance for Minority Participation (NC-LSAMP) are collaborating with HBCU-UP, AGEP, and CREST Programs to maximize resources and opportunities for students pursuing B.S., M.S., and Ph.D. degrees in science, mathematics, engineering, and technology (SMET) disciplines. When the Alliance was formed in 1992, several programs and activities were developed to facilitate a significant increase in the number of B.S. degrees earned by underrepresented minority students in SMET fields. Major initiatives implemented include: supplemental instruction in gatekeeper courses, calculus reform using graphing calculators, a general engineering freshman core program, bridge programs, SMET study groups, organized tutorial sessions, undergraduate research through faculty mentoring, and internships in industry and at national research laboratories.

The CREST Center was subsequently established in 1997 at North Carolina A&T State University (NCA&TSU), in a ten-year partnership with North Carolina State University (NCSU). Outreach activities supported by the CREST Program at NCA&TSU, "Center for Advanced Materials and Smart Structures" (CAMSS), are geared to build upon and enhance ongoing NC-LSAMP programs and services, particularly in research. CREST is coordinating efforts with NC-LSAMP to expand undergraduate summer research experiences, and to provide research opportunities at collaborating industry and government facilities. An Undergraduate-Graduate Transition Program exposes rising seniors to current research issues being addressed by CREST. Moreover, collaboration between NC-LSAMP and CREST reinforces the relevancy of research and assists students in gaining valuable insights between engineering theory and practice. Additionally, CREST promotes interactions among undergraduate and graduate students, other researchers, and local technical professionals for continuous upgrading of skills. These experiences are inspiring many students to make early decisions to pursue graduate study.

In Spring 2000, NCA&TSU acquired funding for the HBCU-UP Program, which targets undergraduate students in physics, chemistry, biology, and mathematics at participating schools. This program is titled "TALENT-21: Gateway for Advancing Science and Mathematics Talent." Also, the AGEP Program, focusing on SMET Ph.D. production for the professoriate, was funded simultaneously at two partner institutions: the University of North Carolina-Chapel Hill and North Carolina State University. NCA&TSU sponsors the "Student Transition and Retention (STAR) Program" as a partner with the NCSU AGEP Program. The HBCU-UP and AGEP Programs are building on established NC-LSAMP/CREST programs, activities, and services to implement a systemic, seamless approach. This strategy addresses undergraduate and graduate recruitment; best practices in teaching and learning strategies; and mentoring, retention, and graduation of students with B.S., M.S., and Ph.D. degrees in SMET disciplines, including students who will enter the professoriate.

Through pre-college programs offered across the Alliance, students receive early "hands-on" introductions to SMET opportunities and careers. To be sure, many of these students are entering the SMET pipeline in North Carolina, and collaborative efforts between LSAMP, HBCU-UP, AGEP, and CREST are facilitating a persistent and effective progression from the undergraduate to the graduate level for increasing numbers of underrepresented minority students.

CONFERENCE GREETINGS



NATIONAL SCIENCE FOUNDATION

Directorate for Education and Human Resources
Division of Human Resource Development

A Message from the National Program Director of the Louis Stokes Alliances for Minority Participation (LSAMP) Program

Dear NC-LSAMP Research Conference Participants:

Welcome to the Fifth Annual NC-LSAMP Undergraduate Research Conference hosted by North Carolina A&T State University in Greensboro, NC. NC A&T, the lead university partner in the NC-LSAMP Project, and the Alliance leadership have planned another memorable event in your academic career. Student presentations, mentoring sessions led by faculty members, and the keynote address by Dr. Roosevelt Johnson, AGEP Program Director at the National Science Foundation, highlight the inspiring program agenda for the conference. In addition, I invite you to establish new professional interactions with fellow students during the day-long event. You will also have opportunities to learn more about graduate school options and summer research internships. Indeed, your experiences at this important event will further kindle your life-long learning interests expressed in the program theme, "Gateways to Graduate Excellence in Science, Mathematics, Engineering, and Technology: A Decade of Louis Stokes AMP Achievement."

A diverse, globally-oriented workforce of scientists, mathematicians, engineers, and technical workers will continue as a major focal point and need for America, as we venture into the future. Therefore, it is my hope that each of you will continue pursuing a career in these disciplines. The Louis Stokes Alliances for Minority Participation Program and America need your participation in the national science, mathematics, engineering, and technology (SMET) enterprise! Congratulations on your current achievements, and we expect you to move onto and through graduate school in a SMET field upon completing your baccalaureate degree.

Again, it is my delight to welcome you to the 2001 NC-LSAMP Undergraduate Research Conference, and best wishes for a productive future in SMET fields!

A. James Hicks

A. James Hicks, Ph.D.
LSAMP National Program Director

Greetings from Dr. James C. Renick
Chancellor, North Carolina A&T State University
Greensboro, North Carolina

Greetings Conference Participants:

It is with great pleasure that I welcome each of you to the Fifth Annual Undergraduate Research Conference sponsored by the North Carolina Louis Stokes Alliance for Minority Participation (NC-LSAMP) Program. This major conference showcases the faculty-mentored research accomplishments of undergraduate students in science, mathematics, engineering, and technology (SMET) disciplines at all partner institutions. Undergraduate research opportunities are requisite to prepare students adequately for a rigorous graduate experience in a research-oriented field. This year's theme, "Gateways to Graduate Excellence in Science, Mathematics, Engineering and Technology: A Decade of Louis Stokes AMP Achievement," evinces our ongoing commitment to significantly increase the number of underrepresented minority students earning baccalaureate degrees in SMET fields and subsequently pursuing graduate degrees.

I extend a special commendation to each student presenting a research project at this year's conference. Furthermore, faculty mentors from each partner campus warrant praise for their exemplary service as role models in guiding research investigations by undergraduate students. And finally, partner institutions merit special acclamation for the success of the Alliance's efforts.

On behalf of the University family, I express sincere appreciation to Dr. Roosevelt Johnson, AGEP National Director, NSF, as well as to the former LSAMP students (who are now masters and doctoral students) comprising our luncheon panel, for joining us on this occasion. I also wish to thank those who collaborated to make this conference a reality: the NC A&T directors and coordinators of the NSF-funded, diversity-focused programs targeting the SMET fields. Finally, I acknowledge the National Science Foundation's central role in making the LSAMP Program a primary resource for SMET students throughout the United States.

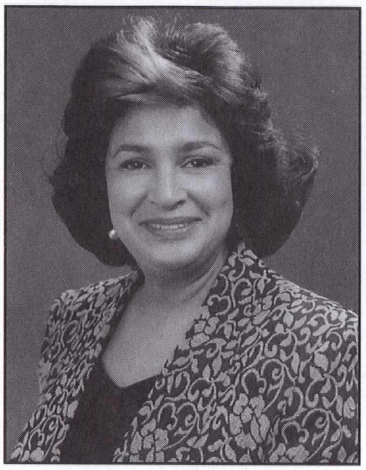
I extend a hearty AGGIE welcome and thank you for your participation!

Sincerely,

James C. Renick

James C. Renick
Chancellor
and NC-LSAMP Advisory Board Chair

Greetings from Dr. Carolyn W. Meyers
Project Director, North Carolina Louis Stokes Alliance for Minority Participation Program



Greetings Conference Participants:

Warm greetings to everyone gathered at North Carolina A&T State University for the Fifth Annual North Carolina Louis Stokes Alliance for Minority Participation (NC-LSAMP) Undergraduate Research Conference. This year's theme is "Gateways to Graduate Excellence in Science, Mathematics, Engineering, and Technology: A Decade of Louis Stokes AMP Achievement." During the past ten years, the national plan of the LSAMP Program has contributed significantly to the attainment of a more diverse workforce of scientists and engineers capable of competing internationally.

As we move into Phase III operation of LSAMP, its second decade, it is vital that we continue the expansion of opportunities to further impact underrepresented minority participation in the SMET enterprise. These efforts must address all segments of the SMET pipeline from pre-college to the Ph.D. level. Indeed, to maximize outcomes for students, collaboration is essential among all diversity-focused programs. Today's conference joins students and faculty, who represent several programs funded by the National Science Foundation to support the SMET continuum. Among these programs are Centers of Research Excellence in Science and Technology (CREST); the Alliances for Graduate Education and the Professoriate (AGEP) Program; and the Historically Black Colleges and Universities-Undergraduate Program (HBCU-UP).

I congratulate all SMET students from partner universities for their research achievements, and commend faculty mentors who work diligently to support these students throughout the year. Undergraduate research experiences are critical for all students, particularly those who aspire to earn Ph.D. degrees in SMET fields. Consequently, the NC-LSAMP Program will maintain its central focus on provisions for early exposure to research for students in university, industrial, and national laboratory settings.

Once again, I welcome everyone to the A&T campus for this year's research conference, and hope that it will be both enjoyable and productive. We look forward to your continued participation in NC-LSAMP activities.

Sincerely,

Carolyn W. Meyers

Carolyn W. Meyers, Ph.D.
Provost/Vice Chancellor for Academic Affairs
and NC-LSAMP Project Director
North Carolina A&T State University

NATIONAL SCIENCE FOUNDATION
Directorate for Education and Human Resources
Division of Human Resource Development

A Message from the National Program Director of the Alliance for Graduate Education and the Professoriate (AGEP) Program

Dear NC-LSAMP Research Conference Participants:

We live in a time where the opportunities for success in science, mathematics, engineering, and technology (SMET) careers are unlimited. Scientific discoveries in the last decade alone have stretched our imaginations... taking us far beyond what many thought was technologically possible. New areas of science and technology have been created, and the boundaries between traditional scientific disciplines are being blurred each day. America has been able to take an international leadership role in SMET by producing a steady source of newly trained scientists, mathematicians, and engineers to meet the challenges of the 20th Century.

In order to sustain that leadership position in the 21st Century and beyond, however, America must more effectively engage segments of the population that have traditionally been underrepresented in SMET careers. The National Science Foundation (NSF) is strongly committed to significantly contributing to that effort through such programs as the Louis Stokes Alliances for Minority Participation (LSAMP) program.

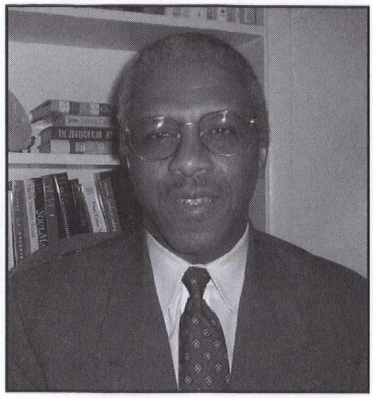
The theme of this year's conference is "Gateways to Graduate Excellence in Science, Mathematics, Engineering, and Technology: A Decade of Louis Stokes AMP Achievement." The participants of this conference provide dramatic testimony to the extraordinary accomplishments of the LSAMP program. I fully expect that this year's conference will be as outstanding as previous conferences, and that participants will take full advantage of the educational activities planned by the program leadership and hosted by the North Carolina A&T State University.

The next step in your journey is the attainment of graduate excellence. It is a challenging step, but one that can yield satisfaction and success beyond your wildest dreams. The NSF is prepared to partner with you on that journey, building on the lessons learned from the LSAMP program in the development and implementation of the Alliances for Graduate Education and the Professoriate (AGEP) program... the graduate analogue of the LSAMP program.

On behalf of all my colleagues at NSF, I welcome you to the 2001 NC-LSAMP Undergraduate Research Conference, and wish you unlimited success in your graduate and career pursuits.

Roosevelt Y. Johnson, Ph.D.
AGEP National Program Director

OPENING SPEAKER



DR. ROOSEVELT Y. JOHNSON
Program Director
Division of Human Resource Department
National Science Foundation

Dr. Johnson received his baccalaureate degree in zoology in 1968 from Howard University (Washington, D.C.), and subsequently earned his doctorate in microbiology from Indiana University (Bloomington, IN) in 1972. As a National Institute of Health (NIH) Fellow, he engaged in postdoctoral research in the area of plant molecular biology at the University of Washington (Seattle, WA; 1972-74).

Dr. Johnson has held full and adjunct faculty positions at Pacific Lutheran University (Tacoma, WA), Howard University College of Medicine, Howard Community College (Columbia, MD), Towson State University (Towson, MD), and Howard University College of Liberal Arts. He also served as an official collaborator at the Los Alamos National Laboratories (Los Alamos, NM; 1986-89), conducting research directed toward elucidating the molecular basis of salt tolerance in plants.

From 1989 to 1995, Dr. Johnson served as a program director with the National Science Foundation (NSF). During his tenure at NSF, Dr. Johnson managed the Minority Research Initiation (MRI) Planning Grant Program, the Research Improvement in Minority Institutions (RIMI) Program, the Research Careers for Minority Scholars (RCMS) Program the Graduate Research Traineeship (GRT) Program and, the NSF-NATO Postdoctoral Fellowship Program in the Directorate for Education and Human Resources. From 1995 to November 1997, Dr. Johnson served as Deputy Director and Acting Executive Director of the National Consortium for Graduate Degrees for Minorities in Engineering and Science (GEM Consortium), where he was responsible for management of the GEM Fellowship program and operations at the GEM Center (South Bend, IN). From November, 1997 to February, 2000, he managed administrative operations in the Division of Undergraduate Education at the National Science Foundation.

Currently, Dr. Johnson is a Program Director in the Division of Human Resource Development within NSF's Directorate for Education and Human Resources, where he manages the Alliances for Graduate Education and the Professoriate (AGEP) Program. Specific objectives of the AGEP program are to increase the number of underrepresented minorities receiving doctoral degrees in science, mathematics and engineering (SME), and to increase the number of underrepresented minorities entering academia at the faculty level.

AGENDA

Fifth Annual North Carolina Louis Stokes Alliance for Minority Participation
Undergraduate Research Conference

North Carolina A&T State University
Greensboro, North Carolina
Friday, April 20, 2001

8:30 AM – 12 Noon

CONFERENCE REGISTRATION
NSF-SPONSORED PROGRAMS INFORMATION
Location: Memorial Union Ballroom Lobby

8:30 – 9:30 AM

STUDENT POSTER SET-UP
Location: Memorial Union - Exhibit Hall
(Posters will remain on display until 3:30 PM.)

8:30 – 9:50 AM

CONTINENTAL BREAKFAST
Location: Memorial Union - Exhibit Hall

NETWORKING with Graduate Recruiters/SMET Students And Faculty
Location: Memorial Union - Exhibit Hall

9:30 –10:00 AM

OPENING WELCOME SESSION

Location: Memorial Union Ballroom
All Conference Participants

Moderator: Dr. Carolyn W. Meyers
Provost/Vice Chancellor for Academic Affairs
North Carolina A&T State University
NC-LSAMP Principal Investigator/Executive Director

SMET DEANS' WELCOME
Dr. Joseph Monroe, College of Engineering
Dr. Phillip Carey, College of Arts and Sciences
Dr. Elazer Barnette, School of Technology
Dr. Alton Thompson, School of Agriculture and Environmental and Allied Sciences

Greetings: Dr. Kenneth Murray, Interim Dean
School of Graduate Studies

10:00 – 10:30 AM

OPENING SESSION
Location: Memorial Union Ballroom
All Conference Participants

Introduction of Keynote Speaker: Dr. Eric Cheek
Associate Dean for Undergraduate Programs, College of Engineering
North Carolina A&T State University

Keynote Speaker: Dr. Roosevelt Y. Johnson
National Director
Alliances for Graduate Education and the Professoriate (AGEP)
National Science Foundation
Arlington, Virginia

CONCURRENT ACTIVITIES

10:30 AM – 12 Noon ***STUDENT POSTER PRESENTATIONS***
Location: Memorial Union – Exhibit Hall

10:50 – 11:50 AM ***RESEARCH LABORATORY TOURS***
Location: Fort Interdisciplinary Research Center
(Tour Packets Available at Registration Desk)

(Laboratory Tours are open to students and faculty. Participants are required to sign-up for tours at the registration desk in the Memorial Union Ballroom Lobby. Transportation will be provided.)

11:00 AM – 12 Noon ***GRADUATE RECRUITMENT / NETWORKING SESSION***
Location: Memorial Union – Exhibit Hall

11:00 AM - 12 Noon ***NSF-Diversity Program Exhibition***
Location: Memorial Union Ballroom Lobby

10:30 AM – 12 Noon **STUDENT POSTER PRESENTATIONS**
Location: Memorial Union – Exhibit Hall

BIOLOGY / LIFE SCIENCE

Alisha Covington, Junior
" Analysis of Antibiotic Resistance in Bacteria Found in Fayetteville State University Water Supply"
Fayetteville State University
Faculty Mentor: Mrs. Minnie B. Ragland

Barry G. Graham, Senior
"Development of an Experimental Model for Therapeutic Stem Cell Transplantation in Genetic Liver Disease"
University of North Carolina at Pembroke
Faculty Mentor: Dr. Velinda Locklear Woriax

Norma L. Houston, Senior
"Assessing the Economic Feasibility of Different Hard Clam Grow-Out Methods"
North Carolina A&T State University
Faculty Mentor: Dr. James Williams

BIOLOGY / LIFE SCIENCE (continued)

Adrienne Jones, Junior
Jamica Wilkerson, Junior
Carmon Choice, Junior
Angela Harris, Senior
"Detection of Phospholipase A_2 Iso-Enzyme mRNAs in Rat Astrocytes Using RT-PCR Technique"
Winston-Salem State University
Faculty Mentor: Dr. Kim H. Tan

Marie-Louise Locklear, Senior
"Protocol and Detection of Isozymes of Chrysoma Pauciflosculosa"
University of North Carolina at Pembroke
Faculty Mentor: Dr. Velinda Locklear Woriax

Chanel Nichols, Sophomore
Rolanda Patrick, Sophomore
"Colocalization of Cytoskeleton Proteins in Cho-K1 Cells"
Winston-Salem State University
Faculty Mentor: Dr. Richard Bennett

Nyasha Skrette, Senior
James Blackwell, Senior
Tomeca McLain, Senior
"Investigating the Impact of Variations in Nitric Oxide (NO) Delivery Among Commonly Used No-Donors"
North Carolina Central University
Faculty Mentor: Dr. Amal Abu-Shakra and Eric T. Saliim

Victoria Romain Williams, Sophomore
"Comparing the Processes of Cell Division, Mitosis and Meiosis"
University of North Carolina at Charlotte
Faculty Mentor: Dr. T. Lawrence Mellichamp

Shanita W. Wooten, Senior
"Differential Expression Levels of CDK/CKI Cell-Cycle Femoral Artery Injury"
North Carolina A&T State University
Faculty Mentor: L. Akyurek, A. L. True, H. San, K. Miyaki, and Dr. E. G. Nabel
National Heart Lung Blood Insititute, (NHLBI), Bethesda, MD

CHEMISTRY / FOOD SCIENCE / PHYSICAL SCIENCE

April D. Brown, Senior
"Prediction of Phase Equilibria Behavior of Aerosol OT in Supercritical Ethane"
North Carolina A&T State University
Faculty Mentor: Dr. Kenneth L. Roberts

Genese Culp, Junior
Vivienne Gray, Senior
Marcus Moye, Senior
"A Spectroscopic Study of Hair Permeability"
North Carolina Central University
Faculty Mentor: Dr. Saundra F. DeLauder

CHEMISTRY / FOOD SCIENCE / PHYSICAL SCIENCE (continued)

Jason Davis, Senior
Francior Massey, Freshman
"Silver Recovery in the Photo Finishing Business"
Fayetteville State University
Faculty Mentor: Dr. I. Daniel Shin

Cassondra L. Gainey, Senior
"Evaluation of the ADE2 Protein as a Potential Target for Ansamycin Antitumor Agents"
North Carolina A&T State University
Faculty Mentor: Dr. Vincent J. Davisson & Dr. S.V. Chittur, Purdue University

Kisha Greene, Senior
Shon McCargo, Junior
"Synthesis of Piperidyl Analogs for Binding to the Dopamine Transporter"
Winston-Salem State University
Faculty Mentor: Dr. Jill Harp

Kashenya M. Gurley, Senior
"Prediction of Phase Equilibria Behavior of Ammonium Carboxylate
Perfluropolyether in Supercritical Carbon Dioxide"
North Carolina A&T State University
Faculty Mentor: Dr. Kenneth L. Roberts

Kibri Hutchison, Sophomore
"Linking Air and Soil Temperatures Using Field Observations for Environmental Applications"
North Carolina State University
Faculty Mentor: Dr. Dev dutta S. Niyogi and Dr. Sethu Raman

Je'Velle B. Leavens, Senior
"Analysis and Evaluation of Porous Mo_2N Nanostructured Catalysts for Hydrocarbon Reduction Reactions"
North Carolina A&T State University
Faculty Mentor: Dr. Kenneth L. Roberts

Karla Allyson Mark, Senior
"Synthesis of Isoindolequinones for Covalent Linking into a Molecular Triad for Artificial Photosynthesis"
North Carolina Central University
Faculty Mentor: Dr. John Myers

Susana Mullikin, Senior
"Fuel Cell-The Clean Energy"
Fayetteville State University
Faculty Mentor: Dr. I. Daniel Shin

Hazel Ogugua, Junior
"PC-12 Cells: Studying Cell Adhesion and Neurotoxicity of Methyl Mercury Chloride"
North Carolina Central University
Faculty Mentor: Dr. Joyce E. Royland, NHEERI, U.S. Environmental Protecion Agency

CHEMISTRY / FOOD SCIENCE / PHYSICAL SCIENCE (continued)

Crystal A. Pass, Junior
"Physical and Sensory Properties of Low-Fat Table Spreads"
North Carolina A&T State University
Faculty Mentor: Dr. Mohamed Ahmedna

Aaron Pratt, Senior
"Variation of Precipitation, Maximum Temperatures, and Minimum Temperatures in North Carolina from 1949-1999"
North Carolina State University
Faculty Mentor: Dr. Sethu Raman

Laillah Rice, Senior
" Solid Supports for Carbon Dioxide Applications"
University of North Carolina at Chapel Hill
Faculty Mentor: Dr. Joseph M. DeSimone

Cynthia Sherman, Senior
Shanna May, Senior
"Conalbumin and Hemoglobin Protein Crystallization"
University of North Carolina at Pembroke
Faculty Mentor: Dr. Len Holmes and Dr. Sivanadane Mandjiny

Dianne Thrower, Senior
"Determination of Synthetic Organic Dyes in Natural Hair Products"
University of North Carolina at Charlotte
Faculty Mentor: Dr. James Hovick

ENGINEERING / MATERIAL SCIENCE

Egbe Eni, Senior
"Energy Analysis of the Yarn Production Process"
North Carolina State University
Faculty Mentor: Dr. Perry Grady

Marcus A. Hunt, Senior
"Diffusion and Solubility of Polymerizable Solvents in Ethylene Propylene Diene Monomer Rubber"
North Carolina State University
Faculty Mentor: Dr. C. Maurice Balik

Derek Solomon, Senior
"Energy Efficient and Re-Commissioning Buildings"
North Carolina A&T State University
Faculty Mentor: Dr. Peter Rojeski

ELECTRICAL ENGINEERING

Errick L. Baldwin, Senior
" An Introduction to Video Over IP"
North Carolina A&T State University
Faculty Mentor: Dr. Derrek B. Dunn

ELECTRICAL ENGINEERING (continued)

Isaac M. Black, Senior
Bert A. Davis, Senior
"The Strengths and Weaknesses of TMDA versus CDMA for the Use as an Access Technology for Third Generation Wireless Communication Systems"
North Carolina A&T State University
Faculty Mentor: Dr. Derrek B. Dunn

Candice Coltrane, Senior
Courtney Amos, Senior
Shedrick Bessent, Senior
"TDMA vs. CDMA: The Strengths and Weaknesses of each for Use as an Access Technology"
North Carolina A&T State University
Faculty Mentor: Dr. Derrek B. Dunn

David Jones, Senior
Louis Tyson, Senior
"Wireless Communications Comparisons Between Bluetooth, Jini, and Salutation Protocols"
North Carolina A&T State University
Faculty Mentor: Dr. Derrek B. Dunn

Bryan Mason, Senior
Chico Foxx, Senior
Hayes Bowling III, Senior
"Optical Routers and Their Improved Performance in Relation to LANs and WANs"
North Carolina A&T State University
Faculty Mentor: Dr. Derrek B. Dunn

Renata McCloud, Senior
Shayne O'Reilly, Junior
"Method for In-Situ Patterning of Metal Films Deposited by Evaporation"
North Carolina A&T State University
Faculty Mentor: Dr. Clinton Lee

Wayne Morrison, Senior
Kennedy Cheruiyot, Senior
"What is NAMPS (Narrowband Advanced Mobile Phone Service)?"
North Carolina A&T State University
Faculty Mentor: Dr. Derrek B. Dunn

Trina Posey, Junior
Terrance Blackmon, Junior
Justin Taylor, Junior
"TDMA vs. CDMA, Which Will be the Access Technology of the Future?"
North Carolina A&T State University
Faculty Mentor: Dr. Derrek B. Dunn

ELECTRICAL ENGINEERING (continued)

Jason Sherrill, Senior
Roderick Bradford, Senior
John Dingle, Senior
"Time Division Multiple Access (TDMA) versus Code Division Multiple Access (CDMA) for Use as an Access Technology
North Carolina A&T State University
Faculty Mentor: Dr. Derrek B. Dunn

Wilson Skipwith, Junior
Terrell Goudy, Junior
"Digital versus Analog"
North Carolina A&T State University
Faculty Mentor: Dr. Derrek B. Dunn

Idris Talib, Junior
"Electrical Properties of Metal-Oxide-Semiconductor Capacitors with Ultra-Thin Gate Silicon Oxides: Current – Voltage Characteristics and Analysis"
North Carolina State University
Faculty Mentor: Dr. Dennis Maher

CHEMICAL ENGINEERING / PHYSICS

Benita Powell, Sophomore
Toriano Franklin, Junior
"Fuel Cell Multimedia Module for Use in a Numerical Methods Course"
North Carolina A&T State University
Faculty Mentor: Dr. Keith Schimmel

Jermell G. Powell, Senior
James Harris, Junior
"Prediction of Human Blood Flow Behavior Using Fundamental Newtonian flow Theory"
North Carolina A&T State University
Faculty Mentor: Dr. Kenneth L. Roberts

Keron Subero, Senior
"Characterization of Gyrotron Window Materials"
North Carolina Central University
Faculty Mentor: Dr J.M. Dutta

Nneka C. Ubaka-Adams, Junior
"Analysis and Prediction of Mass Transfer Phenomena in Surfactant/Supercritical Fluid Cleaning Systems"
North Carolina A&T State University
Faculty Mentor: Dr. Kenneth L. Roberts

Robyn D. Williams, Sophomore
Marsay Winder, Junior
"Supercritical Fluid Multimedia Module for Use in Numerical Methods Courses"
North Carolina A&T State University
Faculty Mentor: Dr Keith Schimmel

COMPUTER SCIENCE / ELECTRONICS & COMPUTER TECHNOLOGY

RaShunna Crockett, Senior
"Analysis of the Different Aspects of Debugging in C and C++
Fayetteville State University
Faculty Mentor: O.C. Holloway

Ronnetta M. Mosby, Junior
"Digital Communication Using Frequency-Shift Keying"
North Carolina A&T State University
Faculty Mentor: Dr. Derrek B. Dunn

Tamarah Walton, Freshman
"Verifying Kirchoff's Current Law (KCL) by Using a DC Ammeter
North Carolina A&T State University
Faculty Mentor: Dr. DeWayne Brown

12 Noon – 2:00 PM **LUNCHEON**
Location: Memorial Union Ballroom

Session Moderator: Dr. Bertha Miller
Dean, College of Arts and Sciences
NC-LSAMP Campus Principal Investigator
Fayetteville State University

Invocation: Ms. Yolanda Sinclair
NC-LSAMP Recruiter/Counselor
University of North Carolina-Pembroke

Introduction of Roundtable Moderator: Dr. Bertha Miller

GRADUATE STUDENT ROUNDTABLE ON SMET DIVERSITY
Moderator: Dr. Roosevelt Y. Johnson
National Program Director
Alliances for Graduate Education and the Professoriate
National Science Foundation

Panelists:
Shree Whitaker, B.S., M.S., Mathematics, Clark Atlanta University (1995); Ph.D., Applied Mathematics, North Carolina State University (2000).

Rashida Shivers, B.S., Biology, Fayetteville State University (2000); Pursuing M.S., Biology, Fayetteville State University.

Stacie Hill, B.S., Mechanical Engineering, North Carolina Agricultural and Technical State University (1996); Pursuing M.S., Industrial Engineering,

Timothy C. Jones, B.S., Mechanical Engineering, North Carolina Agricultural and Technical State University (1999); M.S., Civil Engineering, Duke University (2000).

Jenora Waterman, B.S., Biology, Bennett College (1999); Pursuing M.S., Biology, North Carolina Agricultural and Technical State University.

Michael King, B.S., M.S., Electrical Engineering, North Carolina Agricultural and Technical State University; Ph.D. Candidate, Electrical Engineering, North Carolina Agricultural and Technical State University.

Special Presentation: Dr. Kenneth L. Roberts
NC-LSAMP Co-Principal Investigator
Department of Chemical Engineering
North Carolina A&T State University

GROUP PHOTOGRAPHS WITH DR. ROOSEVELT Y. JOHNSON AND GRADUATE PANELISTS IMMEDIATELY FOLLOWING LUNCHEON (ALL CONFERENCE PARTICIPANTS)

CONCURRENT ACTIVITIES

2:00 – 5:00 PM **STUDENT ORAL PRESENTATIONS**
Concurrent Sessions I-XV
Locations: Memorial Union
Marteena Hall

2:50 – 3:50 PM **RESEARCH LABORATORY TOURS**
Location: Fort IRC Building
(Tour Packets Available at Registration Desk)

(Laboratory Tours are open to students and faculty. Participants are required to sign-up for tours at the registration desk in the Memorial Union Ballroom – Lobby Area. Transportation will be provided.)

3:00 – 4:00 PM **GRADUATE RECRUITMENT / NETWORKING SESSION**

3:00 – 4:00 PM **NSF-DIVERSITY PROGRAM EXHIBITION**
Location: Memorial Union Ballroom Lobby

3:30 PM (*STUDENTS DISMANTLE POSTER DISPLAYS*)

CONCURRENT ACTIVITIES

2:00 - 5:00 PM **STUDENT ORAL PRESENTATIONS**
Locations: Memorial Union
Marteena Hall

SESSION I: BIOLOGY
Location: Room 101 Memorial Union
2:00-3:00 PM

MODERATOR:
Dr. Mary A. Smith
Professor; Biology Department
North Carolina A&T State University

April C. Cameron, Senior
"Effects of Angiotensin-(1-7) in the Hindquarters Vascular Bed of Ovariectimized Rats"
North Carolina A&T State University
Faculty Mentor: Dr. L.A. Neves & Dr. K. B. Brosnihan, Wake Forest University

Laveda Casterlow, Freshman Biology
"The Effects of Environmental Temperature on *Campylobacter Jejuni* Infection and Recovery in Broiler Chickens"
North Carolina A&T State University
Faculty Mentor: Dr. Willie Willis

Robert Corprew, Senior
"Identifying Position-Specific Single Nucleotide Polymorphisms (SNPs) in the Entire Npr3 Gene"
North Carolina Central University
Faculty Mentor: Dr. Pradeep Chatterjee

SESSION II: BIOLOGY
Location: Room 209 Memorial Union
2:00-3:00 PM

MODERATOR:
Dr. James Williams
Professor; Biology Department
North Carolina A&T State University

Selena D. Judon, Senior
"Comparative Study of the Effects of Steep Bacteria and Two Types of Proteases on the Release of Peptides and Starch from Corn Kernels"
North Carolina A&T State University
Faculty Mentor: Dr. Charles Cox, University of Iowa

Kevin T. King II, Junior
"Using Antibiotics to Determine the Role of Viable but Nonculturable *Escherichia Coli* Bacteria in the Recurrence of Urinary Tract Infections"
University of North Carolina at Charlotte
Faculty Mentor: Dr. Todd Steck

SESSION II: BIOLOGY (continued)
Location: Room 209 Memorial Union
2:00-3:00 PM

Lamorris Loftin, Senior
"All-Trans Retinoic Acid Inhibits Vero Cell Growth"
University of North Carolina at Chapel Hill
Faculty Mentor: Dr. Kenneth Bastow

SESSION III: BIOLOGY
Location: Room 213 Memorial Union
2:00-3:00 PM

MODERATOR:
Dr. David Aldridge
Professor, Biology Department
North Carolina A&T State University

Rosemarie Marchan, Junior
"Green Fluorescence Protein (GFP) Gene Fusions to Natriuretic Peptides Clearance Receptor Gene (Npr3): Constructing a Targeting Vector for Homologous Recombination"
North Carolina Central University
Faculty Mentor: Dr. Pradeep Chatterjee

Takiyyah McCaskill, Junior
"Identification of Aquaporin-8 and Aquaporin-9 in Rat Granulose Cells"
University of North Carolina at Charlotte
Faculty Mentor: Dr. Monty Hughes

Sheldon R. Richburg, Sophomore
"Bacterial Components Found in Water
Fayetteville State University
Faculty Mentor: Mrs. Minnie Ragland

SESSION IV: COMPUTER SCIENCE
Location: Room 101 Memorial Union
3:00-4:00 PM

MODERATOR:
Dr. Laura Smith
Associate Professor, Department of Mathematics and Computer Science
North Carolina Central University

Juan Hayes, Junior
"A Hierarchical Internet Whiteboard for Joint Task Planning of Mobile Agents"
North Carolina A&T State University
Faculty Mentor: Dr. Albert Esterline

SESSION IV: COMPUTER SCIENCE (continued)
Location: Room 101 Memorial Union
3:00-4:00 PM

Oliver Hinds, Senior
"Joint Activity Coordination and Planning in Multi-Agent Environments Through Computer Integrated Communication"
North Carolina A&T State University
Faculty Mentor: Dr. Albert Esterline

Edgar Johnson, Senior
"Hierarchical Multi-Agent Motion Planning Using Lee's Algorithm for Groups of Multiple Agents within a Static Environment"
North Carolina A&T State University
Faculty Mentor: Dr. Albert Esterline

SESSION V: CHEMISTRY/ FOOD SCIENCE
Location: Room 209 Memorial Union
3:00-4:00 PM

MODERATOR:
Dr. Saundra DeLauder
Assistant Professor, Department of Chemistry
North Carolina Central University

Deidra Felton, Freshman
Sompharanh Phetsomphou,
"Oxidative Rancidity in Heated Vegetable Oils During Storage"
North Carolina A&T State University
Faculty Mentor: Dr. C. W. Seo and Sarah Williamson

Andrea K. King, Sophomore
"New Methods for Nanoparticles Preparation"
University of North Carolina at Chapel Hill
Faculty Mentor: Dr. Scott Wallen

Ryan Danielle Kinloch, Junior
"Studies of Functionalized Phenpropylamines"
North Carolina A&T State University
Faculty Mentor: Dr. Julius L. Harp

SESSION VI: CHEMISTRY
Location: Room 101 Memorial Union
4:00-5:00 PM

MODERATOR:
Dr. Claude Lamb
Interim Chair & Associate Professor, Chemistry Department
North Carolina A&T State University

SESSION VI: CHEMISTRY (continued)
Location: Room 101 Memorial Union
4:00-5:00 PM

LaFaith Miller, Junior
"Fusarochromanone, A Potent Ant-Angiogenic Agent and Effective Cancer-Treatment Drug"
University of South Carolina
Faculty Mentor: Dr. Roy E. Wuthier

Corrie Stowe, Junior
"Inactivation of *Micrococcus* sp. With Heat and Sodium Chloride"
North Carolina A&T State University
Faculty Mentor: Dr. Ipek Goktepe

Kantrell West, Senior
"Quantitative Analysis of MTBE by Means of NMR"
Fayetteville State University
Faculty Mentor: Dr. I. Daniel Shin

Chavon R. Wilkerson, Senior
"A Bisacylhhdrazine Coupling Optimization Study"
North Carolina A&T State University
Faculty Mentor: Dr. Robert Hormon, Rohm and Haas Company, PA

SESSION VII: COMPUTER SCIENCE
Location: Room 209 Memorial Union
4:00-5:00 PM

MODERATOR:
Dr. Anna Yu
Associate Professor, Computer Science Department
North Carolina A&T State University

Kwadwo Agyeman, Senior
"Multi-User Task Integration"
North Carolina A&T State University
Faculty Mentor: Dr. Albert Esterline

Bennet Barham, Junior
"Data Structures for Implementing an A* Algorithm for Multiple-Robot Path Planning"
North Carolina A&T State University
Faculty Mentor: Dr. Albert Esterline

Michael C. Faulcon, Jr.
"Robot Motion Planning Using the A* Algorithm in the Presence of Multiple Agents"
North Carolina A&T State University
Faculty Mentor: Dr. Albert Esterline

SESSION VIII: BIOLOGY

Location: Room 213 Memorial Union
4:00-5:00 PM

MODERATOR:
Dr. Doretha Foushee
Associate Professor, Biology Department
North Carolina A&T State University

Elliott D. Tatum, Senior
"Analysis of the Effect of BaCl2 on the Fidelity of *InVitro* DNA Synthesis by *Escherichia Coli* DNA Polymerase I"
Fayetteville State University
Faculty Mentor: Dr. Juliette B. Bell

Tiffany Thorn, Senior
"Comparison of Muscle Fiber Types in the Tongue Muscles of Two Species of Frogs, *Litoria Caerulea* and *Bufo Marinus"*
University of North Carolina at Charlotte
Faculty Mentor: Dr. Susan B. Peters

Emmanuel Kwame Torgbe, Senior
"Analyzing Polymorphisms in the Npr3 Gene with In-Frame Green Fluorescent Protein (GFP) Fusions: Building One Arm of Homology for Recombination"
North Carolina Central University
Faculty Mentor: Dr. Pradeep Chatterjee

SESSION IX: COMPUTER SCIENCE

Location: Room 114 Marteena Hall
3:00-4:00 PM

MODERATOR:
Mr. Ray Hawkins
Assistant Professor, Computer Science Department
North Carolina A&T State University

Muntasir Ahmed Khan, Senior
"Operating System Support for High-Speed Communication"
North Carolina A&T State University
Faculty Mentor: Dr. Albert Esterline

Que'Shetta Manning, Junior
"Using Quadtrees to find Channels for Robot Motion Planning"
North Carolina A&T State University
Faculty Mentor: Dr. Albert Esterline

Jenelle Ore, Junior
"Cell Decomposition in Quadtrees for Robot Motion Planning"
North Carolina A&T State University
Faculty Mentor: Dr. Albert Esterline

SESSION X: COMPUTER SCIENCE
Location: Room 120 Marteena Hall
3:00-4:00 PM

MODERATOR:
Dr. Jung Hee Kim
Assistant Professor, Computer Science Department
North Carolina A&T State University

Guadalupe Rojas, Senior
"Hierarchical Motion Planning of Groups with Multiple Agents within Static Environments"
North Carolina A&T State University
Faculty Mentor: Dr. Albert Esterline

Edward T. Saddler, Junior
"Multiple-Robot Motion Planning Using the A* Algorithm with an Enhanced Heuristic Function"
North Carolina A&T State University
Faculty Mentor: Dr. Albert Esterline

Patrick Spears, Junior
"Rules of Engagement for Computer Facilitated Cooperation"
North Carolina A&T State University
Faculty Mentor: Dr. Albert Esterline

SESSION XI: COMPUTER SCIENCE
Location: Room 212 Marteena Hall
3:00-4:00 PM

MODERATOR:
Ms. Sharon Brown
Adjunct Associate Professor, Computer Science Department
North Carolina A&T State University

Renard Spratling, Freshman
"Multi-User Distributed Workspace for Joint Motion Planning"
North Carolina A&T State University
Faculty Mentor: Dr. Albert Esterline

Kimberly Webb, Junior
"Computer Displays of Common Ground to Facilitate Joint Activities"
North Carolina A&T State University
Faculty Mentor: Dr. Albert Esterline

SESSION XII: ENGINEERING

Location: Room 216 Marteena Hall
3:00-4:00 PM

MODERATOR:
Dr. Alade Tokuta
Chair/Associate Professor, Mathematics and Computer Science Department
North Carolina Central University

Troy Green, Senior
"Impact of Tillage and Fertilizer on Cotton Yield and Water Quality"
University of South Carolina
Faculty Mentor: Dr. Kinku Endale, USDA, Agricultural Research Service, GA

Erick G. Pryor, Senior
'Characterization and Analysis of Iron-Based Electrodes in Molten Carbonate Systems"
North Carolina A&T State University
Faculty Mentor: Dr. Kenneth L. Roberts

Rahul Saddy, Senior
"Structural Modeling for a Structural Damage Detection System"
North Carolina A&T State University
Faculty Mentor: Dr. Ji Y. Shen

Asia C. Wells, Senior
"Supercritical Fluid/Surfactant Mixtures for Contaminant Removal from Various Substrates"
North Carolina A&T State University
Faculty Mentor: Dr. Kenneth L. Roberts

SESSION XIII: ELECTRICAL ENGINEERING AND APPLIED MATHEMATICS

Location: Room 114 Marteena Hall
4:00-5:00 PM

MODERATOR:
Dr. Clinton B. Lee
Co-principal Investigator, CREST/CAMSS
Associate Professor, Electrical Engineering Department
North Carolina A&T State University

Franklin E. Leaven, Jr., Senior
"Classification and Evaluation of Parallel Methods for Power Supplies"
North Carolina A&T State University
Faculty Mentor: Dr. Abdollah Homaifar

Patrick Murphy, Senior
"An Experimental Current Sharing Design and Implementation"
North Carolina A&T State University
Faculty Mentor: Dr. Abdollah Homaifar

SESSION XIII: ELECTRICAL ENGINEERING AND APPLIED MATHEMATICS (continued)
Location: Room 114 Marteena Hall
4:00-5:00 PM

Reginald Watson, Sophomore
Raynard Sumpter, Sophomore
"Geometric Proof of a Vector Triple Product Identity"
North Carolina A&T State University
Faculty Mentor: Dr. Mingxiang Chen

SESSION XIV: PHYSICS
Location: Room 120 Marteena Hall
4:00-5:00 PM

MODERATOR:
Dr. Sekazi Mtingwa
Professor, Physics Department
North Carolina A&T State University

Shareed S. Ali, Junior
"Development of a Polarimeter to Analyze Polarized Beam in Few Gev Range
North Carolina Central University
Faculty Mentor: Dr. B. Vlahovic

Shanese Collins, Sophomore
Manu Edwards, Senior
Jamie Ryan, Senior
"Electron Spin Resonance of Paramagnetic Substances"
Fayetteville State University
Faculty Mentor: Dr. A. Y. Abokor

Mariamma Kambon, Senior
"Development of a Polarimeter to Analyze GeV Range Photon Beam-Japan experience
North Carolina Central University
Faculty Mentor: Dr. B. Vlahovic

SESSION XV: PHYSICS
Location: Room 212 Marteena Hall
4:00-5:00 PM

MODERATOR:
Dr. Floyd James
Professor, Physics Department
North Carolina A&T State University

Joseph P. Reynolds, Senior
"Comparison of Recent Nondestructive Testing Techniques of Composite Materials"
North Carolina Central University
Faculty Mentor: Dr. Kinney Kim

SESSION XV: PHYSICS (continued)
Location: Room 212 Marteena Hall
4:00-5:00 PM

Dana Maurice Warren, Junior
"Atomic Force Microscopy to Investigate Surface Morphology of Semiconductors"
North Carolina Central University
Faculty Mentor: Dr. J.M. Dutta

5:00 - 7:00 PM **AWARDS BANQUET**
"Celebrating A Decade of Louis Stokes AMP Achievement"
Location: Memorial Union Ballroom

Moderator: Dr. John C. Kelly
Interim Chair
Department of Electrical Engineering
North Carolina A&T State University

Greetings: Dr. James C. Renick
Chancellor
North Carolina A&T State University

Invocation: Dr. Dennis Felder
NC-LSAMP Coordinator
Winston-Salem State University

PARADE OF LSAMP SENIOR SCHOLARS: Dr. John C. Kelly

Presentation of Awards:
Dr. Mattie E. Moss
Associate Dean
College of Arts and Sciences
North Carolina Central University

Dr. Richard Bennett
Professor of Biochemistry
Department of Life Sciences
Winston-Salem State University

Student Presenters: Poster and Oral Sessions

Outstanding SMET Faculty Mentors

Recognition of Moderators and Judges: Dr. Mattie E. Moss

Closing Remarks: Dr. John C. Kelly

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