

# REPORT DOCUMENTATION PAGE

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13. ABSTRACT (Maximum 200 words) This program, entitled "Nurturing ECSU Research Talent focuses on undergraduate education and undergraduate research experiences. Nurturing these young researchers is our primary concern. Highest priority is given to providing them with the guidance and skills to insure their entrance and success in graduate school. Further, each student in our program learns the fundamentals of scientific research. Program activities include student development activities and infrastructure activities.				
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ANNUAL REPORT

Summer 1994 Program  
Academic Year 1994-95

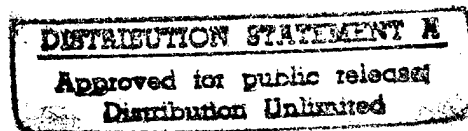
NURTURING ECSU RESEARCH TALENT PROJECT

SUBMITTED TO

THE OFFICE OF NAVAL RESEARCH

BY

ELIZABETH CITY STATE UNIVERSITY



Dr. Linda Hayden, Principal Investigator  
Box 672 ECSU  
Elizabeth City, NC 27909  
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FUNDING INFORMATION:

N00014-94-1-1089 PPandCV-1  
N00014-94-1-0948 N-ASERT-2

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This program, entitled "Nurturing ECSU Research Talent focuses on undergraduate education and undergraduate research experiences. Nurturing these young researchers is our primary concern. Highest priority is given to providing them with the guidance and skills to insure their entrance and success in graduate school. Further, each student in our program learns the fundamentals of scientific research. Program activities are as follows:

I. Student development activities:

- a) Recruitment of 5 high ability minority students each year;
- b) Providing a precollege/summer experience for recruited students;
- c) Providing research experiences;
- d) Providing a mentor, graduate school counseling and GRE preparation;
- e) Providing financial support for students in the form of research scholarships.
- f) Provide funds for student travel

2. Infrastructure activities

- a) Enhancement of current computer graphics and operating systems courses;
- b) Development of a new course in computer visualization.
- c) Acquisition of computer equipment appropriate to support of research.
- d) Establishing a visiting lecture series in computer science.
- e) Hiring a UNIX network manager

## STUDENT DEVELOPMENT ACTIVITIES

### a) Recruitment

Students recruited as entering freshmen were:

Corey Ellis (Mathematics),  
 Curtis Felton (Computer Science)  
 Melvin Anderson (Computer Science).

LaVonna Felton (Mathematics)  
 Tammara Ward (Mathematics)

Current ECSU Students recruited into the program were:

Monk, Clutilda	junior/math	Jones, Clarence	junior/physics
Moore, Dovella	junior/cs	Dall, Eva Marie	junior/cs
Turner, Reginal	junior/cs	Gayle, Chonda	junior/cs
Walker, Matresha	junior/cs	Best, Tonia	senior/cs
Howard, Ervin	senior/math	McCray, Timothy	senior/cs
Trotman, Kevin	senior/cs	Sharon Saunders	senior/cs

Precollege Students

Albert Whitley	senior	Connie Sawyer	junior
Kuchumbi Hayden	senior	Derrek Burrus	senior
Je'aime Powell	soph		

## b) Providing a precollege/summer experience for recruited students;

During the 1994 summer research program students were actively involved in computer science research projects. The subareas of their research investigations were parallel processing and computer graphics. Each was assigned a computer networking problem to investigate.

Undergraduate Computer Science majors were full time ECSU students with a minimum 2.8 overall GPA, 3.0 GPA in their major and were recommended by two of their major professors. The undergraduates worked in the laboratory for 5 hours each day, 5 days each week for 6 weeks.

Precollege students selected had completed a minimum of three credits of mathematics including geometry and algebra II. Grades of B or better in these courses plus recommendation of two science/mathematics teachers was required. The precollege students worked in the laboratory for five weeks, 5 hours each day, 5 days each week. All students, both precollege and undergraduate were citizens of the United States.

The Instructor for each team was a member of the ECSU faculty knowledgeable in the subdiscipline. Instructors worked with the students for approximately 3 hours each day, 4 days each week.

Consultants were available to team members daily via email. Dr. Wong made a visit to the ECSU site.

Assistant Instructors were graduate students pursuing a Masters or Ph.D in Computer Science. Assistant Instructors worked with the students 5 hours each day.

### Activities:

Research at the Library of Congress (Washington, DC July 14-17 tentative date)  
Training at the NC Supercomputing Center (Research Triangle Park, NC 2-3 days)  
SIGGRAPH Conference (Orlando, Fla. July 25-27, 1994 for CV team)  
ADMI Conference & Georgia Tech. Atlanta, GA (July 21-23 for PP team)  
Lectures by visiting consultants( Sharon Ramsey of Alcoa Aluminum)  
Weekly Research Project Reports on Friday  
Final Research Project Reports

### Schedule

Week 1 ECSU students work with Instructors  
Weeks 2-6 High School Students join the teams

## Summer 1994 Research Projects

### Computer Graphics Project Description : 3-D Modeling and Viewing

The computer visualization project, which students funded under AASERT will investigate, shall consist of three stages. In the first stage, the student researchers will be given lectures concerning solid modeling and visualization. For the solid modeling, they will learn how to represent a solid object using an edge-based boundary model. They will also be taught how to obtain a new object from an existing one or from scratch using Euler operators. As to visualization, they will be given the concepts of 3D viewing, shading and texturing.

In the second stage, the students will define data structures for a solid object using the edge-based boundary model and define a subroutine for each Euler operator. Then we will use the Euler operators to build a set of primitives such as cube, sphere, cylinder, cone and torus. We will also use the Euler operators to build high level operators like sweeping (including both translational sweep and rotational sweep), gluing and assembling. After this stage, students have a simplified solid modeling system based on Euler operators.

In the third stage, students will develop the software for the Gouraud shading and Phong shading as well as for the solid texturing. Finally, they will design objects using the solid modeling system build in the second stage and visualize these objects using the software developed in this stage.

#### Visualization/Graphics Team

Instructor:	Dr. Jingyuan Zhang	Precollege 1:	LaVonna Felton
Assistant Instructor:	Stephanie Vaughan	Precollege 2:	Jackie Hall
Consultant:	Dr. Scott Owens	ECSU Student 1:	Sharon Saunders
ECSU Student 2:	Kevin Trotman	ECSU Student 3:	Denisa Edwards

### Parallel Processing Research Project Description

The Sieve of Eratosthenes has long been a standard benchmark program for integer operations on a sequential computer. We will develop a parallel prime number sieve to demonstrate several concepts fundamental to parallel computing. This example also illustrates a process of parallel program development which can be usefully applied to many problems.

After defining the problem and a sequential solution, we begin the development of a parallel algorithm by analyzing the actions to be taken and the order constraints on those actions. This makes it possible to define a maximally parallel, although impractical, algorithm. We will then develop a practical algorithm which can be mapped to a network of message passing processors, a pipeline.

The mapping of the algorithm to the array of processors brings up the issue of load balancing. We will develop an algorithm for static load-balancing, allocating the work so that each processor will have about the same amount to do.

We will investigate the performance of the algorithms by measuring the speedup and efficiency. Amdahl's Law gives theoretical limits on the speedup which can be obtained from parallel computers. This will lead to a final refinement of the algorithm based on using an efficient sequential algorithm within processors while maintaining the pipeline between processors.

The final aspect of algorithm development will be an analysis of communication issues: 1) Buffering between the processors reduces processor idle time spent waiting for communication with a neighboring processor; and 2) The effect of packing the integer messages into larger messages between processors so as to increase overlapping of communication with computation.

#### Parallel Processing Team

Instructor:	Dr. Johnny Houston	Precollege 1:	Connie Sawyer
Assistant Instructor:	Michelle Emmanuel	Precollege 2:	Kuchumbi Hayden
Consultant:	Dr. Wong	Precollege 3:	Derrek Burrus
ECSU Student 1:	Ervin Howard		

**c) Providing research experiences;**

<u>Research Focus</u>	<u>Mentor</u>	<u>Team Members</u>
Fractals/Chaos	Dr. D. Sengupta	Tammara Ward, Fr/Math Cory Ellis, Fr/Math Lavonna Felton, Fr/Math Clutilda Monk, Jr/Math
Virtual Reality/Graphics	Dr. Zhang	Dovella Moore, Jr/CS Ericka Joseph, So/CS Tonia Best, Sr/CS Reginal Turner, Jr/CS Melvin Anderson, Fr/CS
Multimedia Authoring	Dr. Hayden	Albert Whitley, Pre/CS Connie Sawyer, Pre/CS Derrek Burrus, Pre/CS Matresha Walker, Jr/CS Timothy McCray, Sr/CS Chonda Gayle, Jr/CS Je'aime Powell Pre/CS
Unix System Adm.	Dr. Hayden	Bradford Smith, Fr/CS Kuchumbi Hayden, Pre/CS Kevin Trotman, Sr/CS Sharon Saunders, Sr/CS Curtis Felton, Fr/CS Eva Marie Dail, jr/CS
Rutherford Scattering	Dr. Choudhury	Clarence Jones, Jr/Phy

**d) Providing a mentor, graduate school counseling and GRE preparation;**

The Graduate Record Examination was administered on the campus of ECSU on Dec. 10, 1994. Kevin Trotman experienced death in his family and did not take the examination. He will register to take the GRE in the spring. The following students took the GRE in December:

Best, Tonia	Monk, Clutilda
Edwards, Denisa	Turner, Reginald
Anderson, Melvin	Howard, Ervin
Felton, Curtis	Walker, Matresha
McCray, Timothy	Felton, Lavonna
Ward, Tammara	Saunders, Sharon
Ellis, Corey	

## e) Research Scholarships.

### ONR Research Scholarship Committee

Dr. Helen Caldwell, Vice Chancellor/Academic Affairs  
Dr. VanDergriff, Special Assistant to the Chancellor  
Dr. Linda Hayden, PI Nurturing ECSU Research Talent Grant  
Mr. James Swinpson, Financial Aid Director  
Mr. Rodger McLean, Vice Chancellor/Business & Finance  
Dr. James McClean, Director of Funded Projects  
Mr. Tommy Foust, Registrar

Steps taken to select student recipients of the Research Scholarship for 1994-5:

1. The Scholarship committee met to outline the process of selection and to clarify scholarship requirements.
2. A list of applicants for admission to 1994 freshmen class was received from Tommy Foust, Registrar.
3. As recommended by the committee, students were contacted by telephone to establish the mentoring relationships:

### Out-of-state Students

- \*to determine their intended major;
- \*to determine their interest in the ONR Research Scholarships;
- \*to determine their interest and experiences with science research; and
- \*to determine their career ambitions.

### Current ECSU students

ECSU students were selected according to the governing criteria. Preference was given to :

- \*Students from the HU-ISSP program;
- \*Department Interns
- \*ONR-AASERT Summer 1994 Student Researchers

4. A tentative list of scholarship candidates was submitted to the financial aid officer and to the registrar for review. The PI and the financial aid officer made the determination of award amounts.

5. A written offer of scholarship was sent to each selected candidate. Included with the letter was a form which students were asked to complete and return to Dr. Hayden. Copies of the letter and form were submitted to the Financial Aid Office. **Total Amount Awarded \$45,250.00**

## f) Provide funds for student travel

### Graduate School forum conducted by the Journal of Black Issues in Higher Education

Eight seniors attended the graduate school forum on October 17, 1994 at the Raleigh Civic Center. Students talked with representatives from ten graduate schools. They received information on programs of study and financial assistance.

### SOAR Conference

Thirteen students attended the SOAR Undergraduate research conference conducted at Fayetteville State University Nov 9 - 11, 1994. Nine of the students attending the conference made research presentations. SOAR stands for "Seizing Opportunities for Advancing Research Scholars is a consortium project sponsored by the North Carolina Consortium for Undergraduate Research and is supported by a grant from GLAXO, INC. This conference brings together undergraduates to report research results from a wide range of disciplines, including the arts, humanities, social sciences and natural sciences.

### Georgia Tech Graduate School Forum and M.L. King Day Focus

Eight students WERE invited to join in the fourth annual graduate recruiting/awareness program for African American students. Focus'95 is a program specifically designed for prospective African-American Graduate Students. Focus'95 the third annual program and is part of the King Week Celebration held in Atlanta, Georgia on January 13-16, 1995. This program has four objectives:

- Provide students an opportunity to interact with the Georgia Tech Faculty and over 400 currently enrolled African-American Graduate Students.
- Familiarize students with the Georgia Tech graduate programs and financial assistance available.
- Assist students in applying for graduate school and financial resources.
- Give students an opportunity to participate in the Annual National Celebration honoring Dr. Martin Luther King

### NAAAS

Twelve students submitted abstracts to the NAAAS (National Association of African American Studies) Conference to be held at Virginia State University, in Petersburg, VA., February 1995. All of the students received acceptance letters. Students from Elizabeth City State University spoke at a special NAAAS session arranged by the VSU Kappa Mu Epsilon Mathematics Honor Society and the VSU Walter Johnson Mathematics Club. Student researchers from VSU also made presentations

### SIGGRAPH

All students in the summer program attended the 1994 SIGGRAPH Conference in Orlando Florida. SIGGRAPH'94 focused on the future with a special emphasis on computer graphics and interactive techniques applied to 4 leading-edge areas: 1) Personal technology-the merger of computer

communications technologies; HDTV; personal digital applications. 2) digital media-multimedia products, technologies, and applications; advanced communications techniques. 3) scientific computing- scientific visualization, high-performance computing and communications. 4) virtual reality- experiential simulations for research and entertainment. Time was allocated during the trip for students to visit the Disney-EBCOT-MGM park.

### Library of Congress

Thirteen students and faculty travelled to the Library of Congress during the summer1994 program. Students used the resources available at the Library of Congress to acquire hard copies of items on their reference list and to complete their research literature reviews. Time was allocated during the trip for students to tour the Congress, Air and Space Museum, and other sites of the capital.

### North Carolina Supercomputing Center

The course was an introduction to visualization and the Application Visualization System (AVS). As such, no prior experience with either was expected. However, basic experience with UNIX(TM) and X Windows(TM) was necessary. The course included laboratory exercises on the material presented during the lectures, along with an optional extended laboratory each day from 5-7p.m.

The second class was intended for new KSR1 users who have experience with Unix, and FORTRAN or C. Completion of the full day portion of this class is required for account activation. This was a one and a half day class. The first half day was optional and covered basic parallel programming concepts and algorithms. The full day covered the various parallel programming models available for C and FORTRAN programmers on the KSR1 and mechanics of using the KSR1.

### NAFEO High Tech Expo

The National Association for Equal Opportunity Higher Education (NAFEO) met in Washington, DC at the Sheraton Hotel March 1995. Ten ECSU students submitted abstracts to the NAFEO High Tech Expo and were accepted. The main purpose of the trip was to allow the students to present their research at the NAFEO High Tech Expo and to meet with other student researchers. Students also had the opportunity to interact with graduate school representatives.

# INFRASTRUCTURE ACTIVITIES

## a) Enhancement of current computer graphics course;

Multiple site licences for Renderman software have been purchased for use with the student researchers and with the current computer graphics course. This course which was once a 2D graphics course offered on 286 PCs has emerged into a 2D and 3D graphics course. The workstations used to support the graphics course is currently being shared with the student researchers. Funding of the Instrumentation for Educational Use proposal will alleviate this situation.

Sharon Saunders, completed her honors thesis, entitled "Scene Design Using Renderman".

## b) Development of a new course in computer visualization.

The curriculum committee of Elizabeth City State University has approved the addition of one course to our computer science curriculum. The course is CSC 250: Introduction to Computational Science and Computer Visualization Techniques. The course is designed to attract all science majors and has as prerequisites/co-requisites: Calculus I. The course will be offered for the first time during the fall semester 1995. During the spring semester of 1996, CSC 430: Undergraduate Research will focus on advanced computer visualization concepts. Students will complete assignments using the Silicone Graphics workstations on which IRIS Explorer visualization software is available. The book Animation and Scientific Visualization: Tools & Applications edited by R.A. Earnshaw and D. Watson will be used as a textbook. The book was published by Academic Press in 1993 ( ISBN 0-12-227745-7).

ECSU submitted a proposal to the ONR Educational Use Broad Agency Announcement. In that proposal ECSU requested funds to purchase additional Silicone Graphics Workstation to support the new course. This proposal was funded and therefore, we do not have to compromise our successful research activity by reallocating the SGI equipment to support classroom assignments.

## c) Establishing a visiting lecture series in computer science.

During the summer of 1994 visiting lecturers included Sharon Ramsey, computer visualization specialist from Alcoa Aluminum Company of America. Dr. Wong, professor of computer science at Fayetteville State University spent three days at ECSU working with student researchers on parallel programming during the summer program.

During the academic year program: 1) Dr. Andrea Lawrence, professor of computer science at Spelman University, spoke to our group on Feb. 7, 1994. Dr. Lawrence spoke on The Human Interface. 2) Dr. Larry Morell from Hampton University also spoke with our group on Graduate School course work: What to expect. 3) Mr. Stefan Lawrence spoke on Numerical Analysis.

Additionally, training workshops were conducted on MATHEMATICA by Wolfram Inc. Training workshops were also conducted on AutoCAD by R.L. Daniels and Associates.

## d) Hire a UNIX network manager

Two students, Sharon Saunders and Kevin Trotman have been hired to share the job of UNIX system administration. These two senior computer science majors maintain the file system; install

software; establish user accounts; and perform periodic backups. Both students will graduate in May 1995. Kevin will be hired at that time to assume the UNIX network.

The Personnel Office of ECSU is assisting with the process of establishing the network technician I position. All forms have been completed and required signature have been secured. The description of the position as supplied to the State of North Carolina is as follows:

Employee resolves system and network problems on a multi-system UNIX network. Employee coordinates and works with vendors, faculty and student researchers. Employee maintains and supports the network; assisting in the testing and analysis of all elements of the network facilities ( including power, communication machinery, software, lines, modems and workstations). Employee prepares instruction sheet for typical network user tasks and assists with UNIX training sessions for research faculty and students.

### **e) Acquisition of computer equipment appropriate to support of research.**

#### Networking:

- Currently all workstations are networked using TCP/IP (NIS and NSF servers) allowing complete access to the internet.
- Upgrading to ATM Technology Summer '95

#### HARDWARE

- 3 Silicone Graphics Workstations (INDY2 and Iris)
- 10 Additional INDY2 workstations to be added summer '95
- 12 Sun Sparc Workstations running Sun O/S
- 10 486 PC converted to LINUX
- 2 Power Macintosh 8100
- 1 Power Macintosh 7100

#### Peripherals and Printers

- Variety of Laser and Color Printers
- Color and Greyscale Scanners
- VCR/TV
- Color Cameras
- INDYCAM
- Projection Panels

## 1994-95 ENROLLMENT AND GPA REPORT

Data on student enrollment and performance is requested for the overall science and engineering student body, and for students supported under the ONR grant in order to have an internal comparison at your school.

Please see the following table for data. Our Institution does not offer a degree in engineering. No biology majors are involved in this program. **ONR students made up 17.4% of the graduating class and 66.7% of those who went on to graduate school.**

Major Discipline	Number of students enrolled at school (by year)				Number of students enrolled in ONR Program (by year)				Number of students graduated		Number Graduate Professional School	
	FR	SO	JR	SR	FR	SO	JR	SR	total	ONR	total	ONR
	ENGINEERING	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BIOLOGY	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CHEMISTRY	4	3	9	6	0	0	0	0	3	0	2	0
COMPUTER SCIENCE	42	28	21	31	5	1	6	5	22	7	0	4
MATHEMATICS	11	16	25	12	4	0	0	0	8	0	0	0
PHYSICS	0	0	7	0	0	0	2	0	0	0	0	0
<b>TOTALS</b>	<b>57</b>	<b>47</b>	<b>62</b>	<b>49</b>	<b>9</b>	<b>1</b>	<b>8</b>	<b>5</b>	<b>33</b>	<b>7</b>	<b>2</b>	<b>4</b>

Class Year	Mean GPA for all students	Mean GPA for ONR students
Freshman	2.331	3.498
Sophomore	2.502	3.740
Junior	2.709	3.050
Senior	2.956	3.023

### 1994-95 GRE DATA

	total
ONR	1150.71
ALL	1109.22



Dr. Hayden & Multimedia

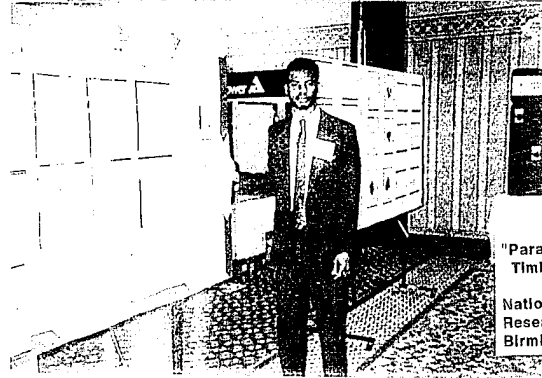


Fractals & Chaos



UNIX System Adm. Team

Sharon "Unix Guru" Saunders



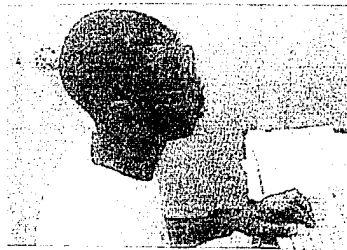
"Parallel Processing Timing Study"  
National Energy 1994 Research Conference  
Birmingham, Alabama



Derrek  
Je'aimie &  
Connie

### Undergraduate Research Conference

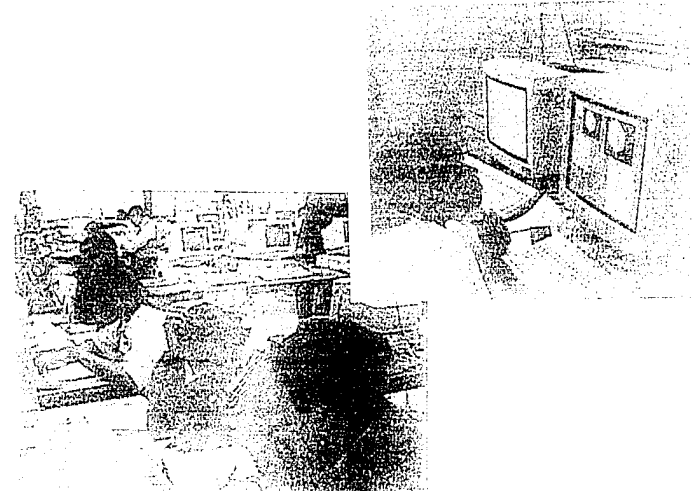
SOAR 1994 was dedicated to the late Dr. James Towns, ECSU Researcher & Administrator



Curtlis Felton, Freshman CS major, Chemistry minor, GPA = 3.82, Recipient of the N.C. Academy of Science Yarbrough Research Award for Chemical Visualization



Honors & Awards Day



*GPA, Grad School & GRE*



*I can do all things through Christ  
which strengtheneth me.  
Philippians 4:13*

*To God Be The Glory*

*The Faculty and Graduating Class  
of  
The Ohio State University  
announce the  
Spring Commencement Exercises  
of  
Cathy Latrice Thomas  
a candidate  
for the degree of  
Master of Science  
in  
Computer Science  
Friday, the ninth of June  
Nineteen hundred ninety-five  
at nine-thirty o'clock in the morning  
Ohio Stadium*

## Students enrolled in the M.S. in Computer Science at Hampton University

**Timothy McCray** maintained a 3.4 GPA during Spring semester 1995 while taking 6 graduate hours credit and working full time at ECSU. He will be a full time graduate student during Fall semester 1995.

**Michelle Brown-Emmanual** maintained a 4.0 GPA during Spring semester 1995 while taking 9 hours graduate credit and working as a Teaching Assistant.

**Stephanie Vaughan** also maintained a 4.0 GPA during Spring semester 1995 while taking 9 hours graduate credit and working as a Teaching Assistant.

**Sharon Saunders** will enroll as a full time graduate student and Teaching Assistant during Fall 1995.

**Stephanie Purvis** will enroll in 6 hours of graduate credits while working full time at ECSU during Fall 1995

**Kevin Trotman** will enroll in 6 hours of graduate credits while working full time at ECSU during Fall 1995

# Career or Graduate School In Your Future?

## Graduate Study & Career Fair

Connecting Minority Students and Jobseekers  
with Graduate School Admissions Officers  
and Corporate/Agency Employment Representatives

**RALEIGH CIVIC CENTER**

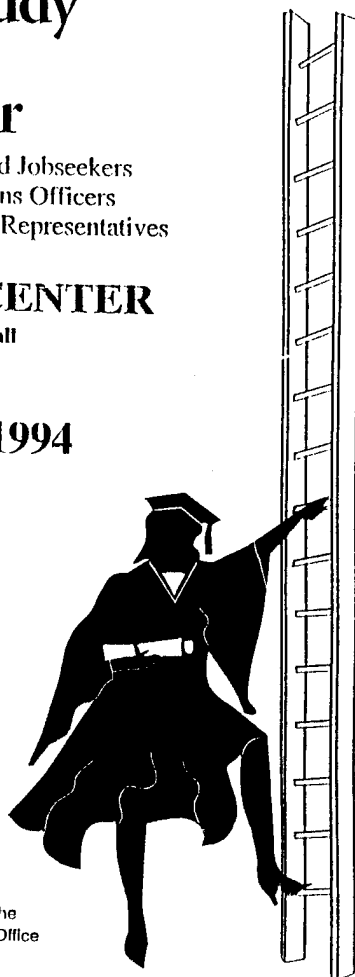
500 Fayetteville Street Mall

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10AM - 8PM

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December 13, 1994

NMGFP Coordinators  
December 13, 1994  
Page Two

Linda Hayden, Professor  
Department of Mathematics & Computer Science  
Elizabeth City State University  
1704 Weesville Road, Box 672  
Elizabeth City, NC 27909

Dear Dr. Hayden:

Chancellor Jenkins has notified me that you have been designated to be your institution's program coordinator for the National Minority Graduate Feeder Program. I am pleased to welcome you to NMGFP, a program jointly sponsored by the National Association of State Universities and Land-Grant Colleges and the American Association of State Colleges and Universities. Together, these associations represent almost 500 institutions, including 36 HBPCUs.

Participation in NMGFP includes an institutional commitment to the following:

1. Installation of the computer equipment, modern, and dedicated phone line as described in my letter of October 31st to your president. It is my understanding that your office includes everything required. If you have questions, please contact me. I have been advised by Mark Jones, the Entura representative for National Computer Systems (NCS), that the software will not function unless the specified equipment is used.

Entura is the software each HBPCU will be using to enter student data into the NMGFP database. It is very user-friendly and easy to install. Therefore, NCS will mail the software to you for installation in mid-January, rather than sending Mark Jones to each campus to install it for you. This decision not only saves time, a major need if we are to meet our mid-January start-up deadline, but has enabled NCS to contribute the first year's data transmission costs between each HBPCU and Morgan State University. NCS personnel will be available via telephone to assist you. Contact information will be mailed with the software.

2. Identification of at least 10 juniors through masters students for inclusion in the database by mid-January. Ph.D.-granting institutions tend to award fellowships for graduate study one year in advance of admission. These institutions have committed financial support for 10 NMGFP students each, but can't wait much longer to complete the admissions process for September 1995. It is therefore, very important that you identify your students prior to mid-January and enter their profile and academic data into the database as soon as you receive the software.

To assist you with the identification process, I've included the name of the Thurgood Marshall Scholars coordinator for your campus. This individual is already working with outstanding students attending your institution. Please contact this individual as soon as possible to ensure that those scholars who have concentrated in mathematics, the sciences, or engineering are included in the NMGFP database. I have forwarded your name to this individual as well.

Mrs. Vivian T. Armstrong, Acting Chairperson  
Division of General Studies  
Elizabeth City State University  
(919) 335-3324  
(919) 335-3731 FAX

Thank you for agreeing to work with the National Minority Graduate Feeder Program, and I will look forward to talking with you throughout the year. If you have questions, please don't hesitate to call me.

Sincerely,

Dorothy J. White, Program Coordinator  
National Minority Graduate Feeder Program

DW/rar

cc: Jimmy R. Jenkins, Chancellor  
Elizabeth City State University

File Help

NCS Entrance - Student Menu

## The National Minority Graduate Feeder Program

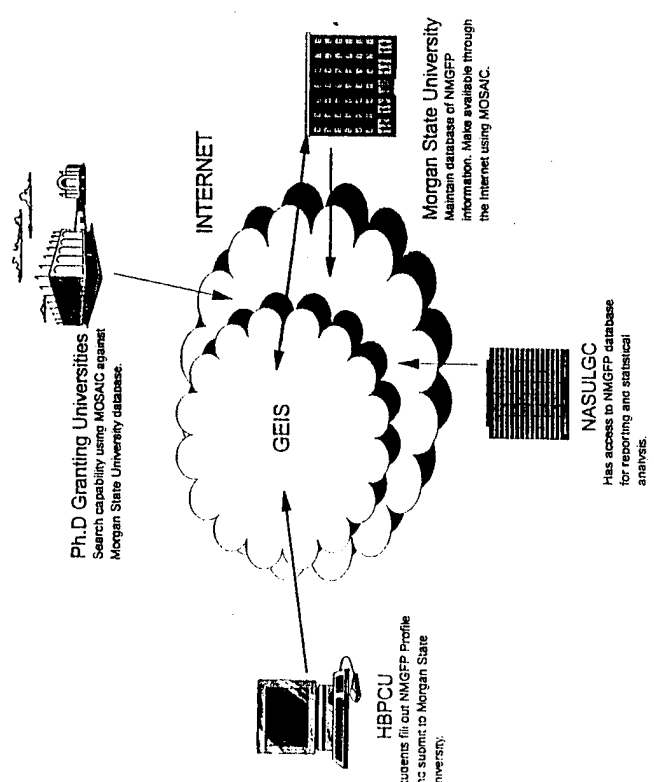
Webboard. The purpose of the Webboard is to provide you with an opportunity to inform participating universities of your wish to pursue full-time graduate study in their Ph.D. in mathematics, the sciences, or engineering. Only faculty and administrators from the participating universities have access to your profile. Access is provided via Internet through use of an individual password. The participating institutions are members of the National Association of State Universities and Land-Grant Colleges and/or the American Association of State Colleges and Universities. The database is not located at Morgan State University.

**THIS IS NOT AN APPLICATION TO GRADUATE SCHOOL.**

The information you provide will be accessed by faculty from participating universities with Ph.D. programs in the targeted fields. They will initiate contact with you based on how closely your academic background and goals match available openings in individual graduate program(s). Whether or not you decide to pursue the application process after you have been contacted is strictly your decision and responsibility.

Choose Next Page button to continue with the program profile.

Cancel Show Completed Initial Page



*Visiting Lectures  
Workshops & Training*

*Mathematics and Computer Science Department  
Elizabeth City State University*

*Invited Guests*

*Dr. Larry Morell, Hampton University Graduate Programs (Apr. 4th)*

*Steve Covington, Representative from SGI Microsystems (Apr. 6th)*

*Student Researchers' Final Reports*

*Graphics Research Team*

*Classical Rutherford Scattering Team*

*Multimedia Authoring Team*

*Unix System Administration*

*Fractals/Chaos Team*

April 4 & 6, 1995 5:00 pm 116 Lester Hall

Refreshments Served

---

Mathematics and Computer Science Department

of

Elizabeth City State University

Presents

**Mr. Stefan Lawrence**

*Invited Lecturer in Differential Equations,  
Mathematics and Computer Scientist Colloquium*

April 11, 1995

2:00 pm 116 Lester Hall

Coffee and Dessert Buffet Served

Mathematics and Computer Science Department  
of  
Elizabeth City State University  
Presents

**Dr. Andrea Lawrence**

*Invited Lecturer,  
Black Mathematicians and Computer Scientist Colloquium*

February 7, 1995  
2:00 pm 116 Lester Hall  
Coffee and Dessert Buffet Served

Mathematics and Computer Science Department  
of  
Elizabeth City State University  
Presents this Certificate of Appreciation to

**Dr. Mary Ellis**

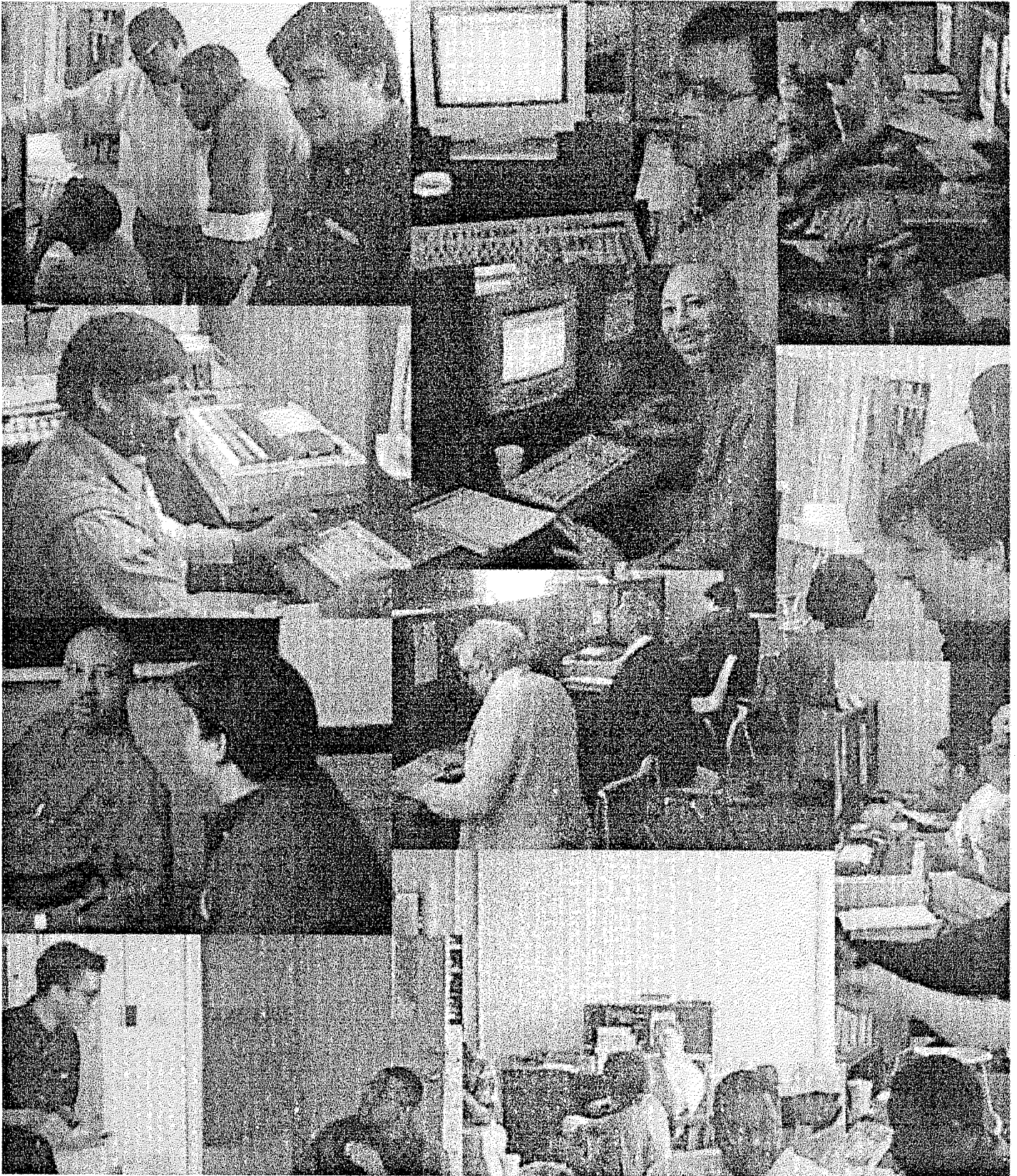
*Invited Lecturer,  
Women in Mathematics and Computer Science  
Colloquium*

March 28, 1995

Dr. Sohinder Sachdev  
Department Chairman

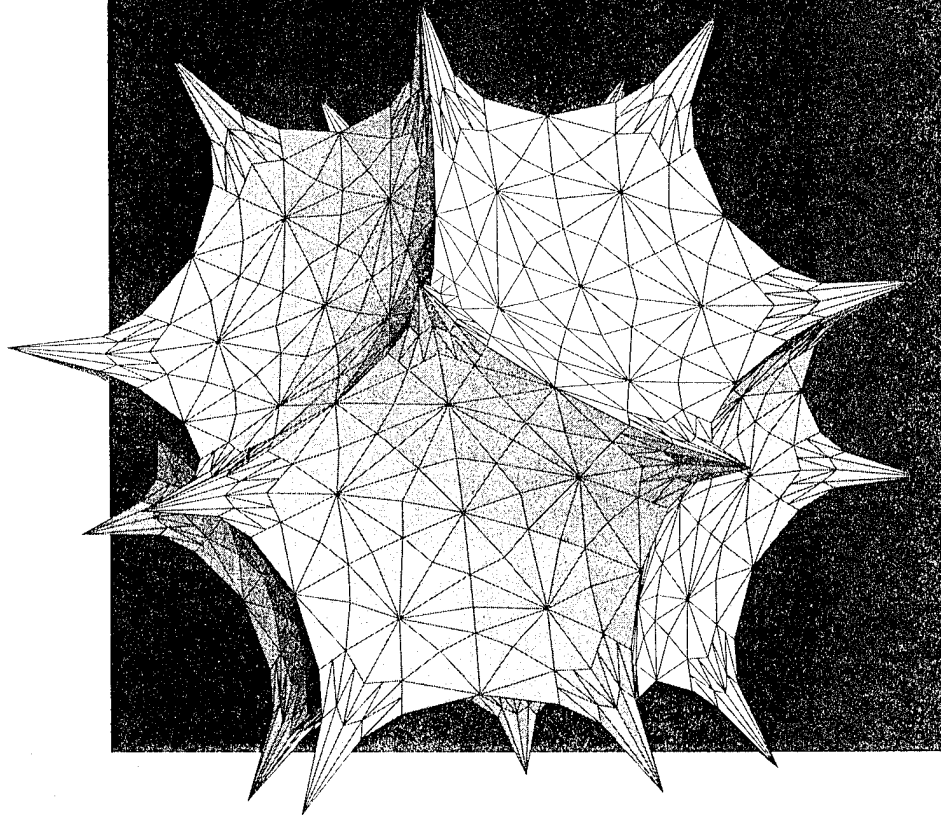
Dr. Linda Hayden  
Colloquium Organizer

*Mathematica*  
*A System for Doing Mathematics by Computer*  
Training by Wolfram, Inc.  
MARCH 11, 1995

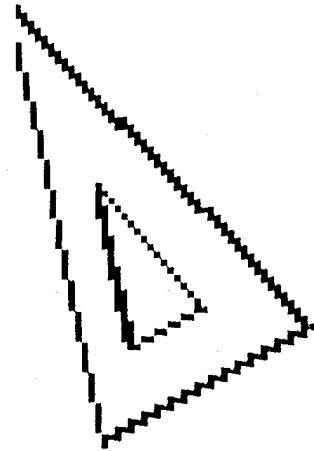


An excerpt from  
*Mathematica: A System for Doing Mathematics by Computer*,  
Second Edition (1991), by Stephen Wolfram, published by  
Addison-Wesley Publishing Company

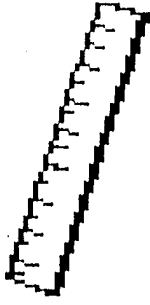
*A Tour of*  
***Mathematica***<sup>®</sup>  
A System for Doing Mathematics by Computer



Wolfram Research



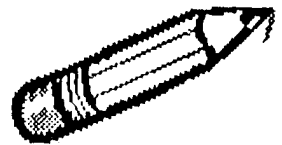
## Free AutoCAD Training Sponsored by Elizabeth City State University



### AutoCAD 101

#### Introduction To AutoCAD

**Objectives:** Upon completion of this course, students will be familiar with the 2-D capabilities of AutoCAD, and should know how to create, modify, and display drawings. For maximum benefit, each student should be provided with non-production practice time during the two weeks following this course. Given 20-40 hours of after-course practice and review time using the materials provided in class, a student should be able to use AutoCAD to create and update basic production drawings.



### Dates and Times

August 1-3, 1994

Each session is from 8:00 am to 5:00 pm with a one-hour lunch break.

### All sessions will be held at:

Elizabeth City State University  
Lester Hall - Room 115  
Elizabeth City, North Carolina 27909

Space is limited to 16 people, so call now to reserve seats.

Call (919)-335-3439 to make reservations.

### Who should attend

Drafting and Technology instructors, Vocational directors and any interested participants from middle schools to university level.

### Credit

Continuing Education Units.

### Program Personnel

Mr. Lee Hayden

Department of Math & Comp. Sci.

Dr. Linda Hayden

Department of Math & Comp. Sci.

Dr. Ellis Lawrence

Department of Technology

### Instructors

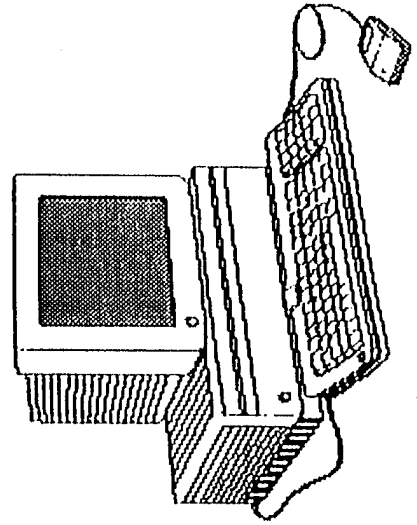
Dr. Ellis Lawrence

Department of Technology

Mr. R.L. Daniels & Associates

Autodesk - Area Education

Representative



*Honors & Awards*

# Honors Fall Semester 1994-95

## Chancellor's List: 3.75 to 4.0 Average

James D. Agar  
Enver Alam  
Cora B. Armstrong  
Elizabeth J. Arndt  
Katina F. Bailey  
Guy W. Bair  
Belinda C. Banks  
Pamela M. Barber  
Lee G. Barnhart  
Tonya A. Bass  
Crystal L. Belfield  
Ron J. Ben-Dov  
Clarence K. Binkley  
Tonya D. Blair  
Robin M. Blalack  
Carmen T. Bolden  
Dawn M. Boncek  
Vicky L. Braddy  
Samantha L. Brown  
Virginia F. Bunch-Patterson  
Jarvis R. Byrum  
Tera D. Caldwell  
Jennifer L. Capps  
Meredith L. Capraro  
Samuel D. Chambers  
John I. Chobot

Iris P. Clark  
Michele B. Coberly  
Susan D. Courington  
Andrea B. Cox  
Claire E. Culbreth  
Stephanie T. Dance  
Debra L. Demolay  
Pearlie J. Dixon  
Patricia B. Dunbar  
Gordon C. Elmer  
Corey M. Ellis  
Kim P. Everett  
Leanne M. Farmer  
Curtis W. Felton  
Judith L. Fields  
Sheri A. Foskey  
Jonathan D. Geddie  
Ruthann H. Gibbons  
Andrea P. Gibbs  
Donna P. Gilbird  
Allie B. Gladden  
Dewitt Gooch  
Ann H. Goodwin  
Linda S. Grandy  
Darlene T. Gray  
Verna L. Gregory

Renita R. Griffin  
Jennifer A. Gurganus  
Susan S. Haas  
James W. Hardy  
Tammy R. Harrell  
Karen M. Hayes  
Susann H. Heidler  
Rachel A. Holmes  
Kendric A. Jackson  
Percival E. Jacobs  
Louise Jefferson  
Christopher K. Johnson  
Dorothy B. Johnson  
Linda A. Johnson  
Warren D. Judge  
April D. Keeter  
Robert H. Kelley  
Trudy K. Kenyon  
Mary K. Kincaid  
Jeanne B. Kitchin  
George F. Koch, III  
Robert O. Kretz  
Karlon L. Lane  
Richard W. Lenau  
Marisha J. Leonard  
Tamara T. Lewis

Karen B. Lowe  
Susan B. Lowry  
Tamara R. Luton  
Jimmy R. McDarles  
Vlora M. McIntyre  
Michael J. McMahon  
Cherrie A. Meredith  
Jeffrey E. Mesowski  
Paula W. Mickey  
Tonya Mizelle  
Vickie S. Morgan  
Rebecca L. Myers  
Sheryl L. Needham  
Linda A. Needham  
Amby H. Parrish  
Jason C. Pearce  
Allison F. Pendleton  
Clinton M. Perl  
Kenneth E. Perry  
Erin V. Pfundt  
Dana C. Phillips  
Stephanie M. Pierce  
Heather G. Price  
Michael C. Price  
Ruby J. Price  
Dondrea M. Purnell

Stephanie A. Purvis  
Phillip E. Puryear  
Rebecca A. Rhodes  
Michelle D. Richeson  
Nakeisha N. Riddick  
Benjamin G. Roberts, Jr.  
Christopher L. Roberts  
Rebecca G. Roberts  
Jenny L. Roffo  
Calvina C. Russell  
Sawyer, Kevin T.  
Cliff R. Schweitzer  
William E. Scott, Jr.  
Shawn T. Sewell  
Harriet H. Shannon  
Beatrice K. Shearn  
Janet R. Shira  
Deirdre N. Smith  
Brian Parker Snow  
Mary L. Stallings  
Bonnie W. Stroud  
John T. Sugimoto  
Karen G. Swain  
Nakeisha S. Sylvester  
Greg J. Tahntien  
Stephen F. Talley

Ruth D. Thomas  
Letitia R. Turner  
Robin T. Turner  
Washella N. Turner  
Lisa L. Vanasch  
Mildred H. Vanterpool  
Kimberly R. Walston  
Reequita B. Walston  
Kyong H. Watson  
Charles E. Whedbee  
Leanora Wynn White  
Roslyn R. White  
Timothy D. White  
Charles L. Whitley  
Fannie W. Wiggins  
Leslie R. Wiggins  
Constance F. Wilson  
Florence D. Wilson  
Anna G. Winslow  
Catina L. Wood-Byrum  
Susan E. Wyrick-Andre

## Vice-Chancellor's List: 3.50 to 3.74 Average

Jamit Adams  
Chinwe G. Ajurnobi  
Travis J. Albrinton  
Valerie A. Alston  
Virginia L. Ambrose  
Jennifer L. Amstutz  
Melvin L. Anderson  
Karen D. Backus  
June R. Banks  
Lisa A. Battle  
Lamont S. Bazemore  
Irma J. Bell  
James M. Bemby  
Donna J. Bennett  
Susanne S. Berry  
Yvonne E. Blount  
Lori A. Brinson  
Katrina J. Brown  
Angela Burus  
Carol J. Butts  
Tara M. Carter

Jason D. Cartwright  
Wilhelmina W. Cartwright  
Marja-Leena Casey  
Irving R. Cohoon  
Tanisha S. Cowell  
Teonaka D. Daye  
Corey T. Drew  
Brenda O. Edwards  
Sharmel D. Edwards  
Michelle M. Ellinwood  
Tracy M. Farabee  
Christopher M. Finney  
Niki M. Fisher  
Raiph S. Flowers  
Abdoulaye Fofana  
Lakisha C. Freeman  
Chonda S. Gayle  
Paula S. Gibbs  
Deborah B. Goodman  
Kathryn C. Goodwin  
Susan M. Goodwin

Chiquie P. Gregory  
Eules M. Hall  
Desha J. Harrell  
Christopher H. Hassell  
Rose M. Hawkins  
Jacqueline R. Head  
Zabrina Y. Hoggard  
Ruby M. Holder  
Helen M. Hollowell  
Berneta M. Jenkins  
Doris Johnson  
Lisa M. Johnson  
William D. Johnson  
Joyce S. Jones  
Olympic N. Jones  
Kristie R. Jordan  
Eugenia A. Kee  
Lena L. Kee  
Mary E. Knight  
Lynn A. Koltzian  
Michelle M. La Hair

Shondrieka N. Lamb  
Fanisha L. Long  
Courtney T. Lynch  
Kenneth E. Mabine  
Tiffany L. Mason  
William C. Mason  
Jackie B. Mays  
Dessalines M. McClure  
Tamara M. McCray  
Fatsy E. Mercer  
Willis D. Moore  
Felicia Y. Mullen  
Loutina R. Murrell  
Ronell D. Nobles  
Wanda V. Parham  
Amy Parks  
Penny U. Pascale  
Lena L. Priest  
Sandra V. Rawls  
Crystal F. Richards  
Keith L. Robinson

Lee T. Robinson  
Allison F. Rollinson  
Lola N. Rountree  
Francis S. Sakaia  
Sharon M. Saunders  
Sandra D. Scriber  
Mekia M. Shoulers  
Paula J. Simpson  
Sylvia H. Snyder  
Eric S. Solesbee  
Tonda E. Spallman  
Roger K. Spivey  
Robin T. Stallings  
Donna L. Stearns  
Teia S. Stephenson  
Sandy D. Strobner  
Rhonda M. Swift  
Thomas A. Taylor  
Kenyatta M. Thomas  
Kevin P. Tiller  
Sheila W. Twine

Donald D. Van De Walker  
Debra L. Wade  
Bryan N. Walke  
Kenya X. Wallace  
Betty T. Waters  
Tracy M. Weathers  
Kathleen C. Weeks  
Susan B. Wescott  
Chengee B. White  
Kimberly A. White  
Julie D. Williams  
Laverne S. Williams  
Melissa G. Williams  
Sherica T. Williams  
Sonya A. Williams  
Tanisa L. Wilson  
Tenela R. Wooten  
Delicia A. Wright  
Vincent L. Wright

## Honor List: 3.00 to 3.49 Average

Pamela G. Adams  
Stephanie F. Alexander  
Amy D. Anderson  
David B. Andre  
Bonnie J. Ange  
Joseph C. Baker  
Katina A. Baker  
Stacey L. Baker  
Shirley W. Ballard  
Annie D. Barco  
Shon F. Barnes  
Gloria M. Bates  
Melanie A. Beasley  
Tiffany R. Belfield  
Darrrell L. Bell  
Donna H. Bembridge  
Raymond D. Bennett, II  
Kirmmi M. Birth  
Kelvin A. Black  
Demitrius R. Blount  
Myra W. Blow  
Branda L. Bond  
Miles T. Bond  
Freda V. Bonner  
Renita A. Boone  
Shondae A. Bostick  
Lisa D. Bottoms  
Felicia A. Bowser  
Loukisha R. Boyd  
Betsey M. Bradley  
Kenneth D. Brandon, Jr.  
Nancy V. Brinkley  
Tonya M. Brinkley  
Jacqueline R. Britt  
Kathleen J. Brooks  
Andrea L. Brown  
Angelina M. Brown  
Gary E. Brown  
Natasha L. Brown  
Kenda D. Bryant  
Niki D. Bryant  
Shelia T. Bryson  
Franklin L. Burgess  
Olinka B. Burley  
Angela D. Burrell  
Camilla Burus  
Jill E. Butcher  
Krisann L. Butcher  
Florence T. Canady  
Cheryl E. Chalk  
Dennis C. Chalk  
Lisa C. Chappell

Paul A. Cherry, Sr.  
Annette E. Cherry  
Kisha L. Clark  
Sharonda Claude  
Thomas H. Clifton  
Vickie B. Colfield  
Shanda N. Collins  
Robert L. Comstock, Jr.  
Connie F. Conwell  
Carla L. Coston  
Nicole F. Crotwell  
Anita L. Creecy  
Ronald M. Dabney, II  
Eva M. Dail  
Karl B. Dail  
Lakeshia C. Darden  
Kenneth L. Davenport  
Olandors Davis, Jr.  
Atiya D. Davis  
Regina Y. Davis  
Selma Davis  
Linda L. Dietzway  
Jeffery M. Dockery  
Jeremy R. Drake  
Tamikia C. Drake  
Brian E. Duhaime  
Keshia D. Dukes  
Anthony S. Dunlow  
Tonya N. Eason  
Jo Ann Eiler  
Carlton C. Eley  
Keywonna S. Everette  
Brandi L. Famer  
Peggy A. Farmer  
Trenance N. Fayton  
Carrie J. Fiedorczyk  
Shawnetta D. Fleming  
Cedric B. Freeman  
Monte T. Freeman  
Rosa B. Freeman  
Makeba Fussell  
Patricia D. Futrell  
Tanisha H. Gabriel  
John C. Gambrell  
Corinna L. Gann  
Bonnie J. Garner  
Charles L. Gattling  
Margaret V. Gibbs  
Shrhonda Gilliam  
Shawn T. Glasper  
Robert C. Golden  
Richard C. Graham

Christopher F. Gray  
Robert N. Gray  
Juanita G. Gregory  
Latonya M. Gregory  
Michelle N. Grier  
Katina Griffin  
Tresha R. Griffin  
Wendy Griffin  
Olivia D. Gurganus  
Camille Y. Heath  
Sonya B. Hargest  
Lisa R. Loucks  
Cheryl C. Hassell  
Tamara L. Hedgebeth  
Ginger N. Helton  
Dianne E. Herring  
Kimberly T. Hines  
Karin L. Hite  
Lashanda D. Hockaday  
Constance A. Hocutt  
Avery J. Hoggard  
Sonya L. Holley  
Andre T. Howell  
David J. Howell  
Gertrude L. Humphrey  
Raneshia K. Hunt  
Catherine A. Iglesias-Flores  
Kristen A. Jackson  
Tasha N. Jackson  
Derrick L. James  
Shemell L. James  
Janet L. Jernigan  
Alfred J. Jeter  
Tony L. Johnson  
Kevin R. Jones  
Kimberly E. Jones  
Maris D. Jones  
Shellee R. Jones  
Sheretta L. Jones  
Mildred J. Jordan  
Adreanne A. Joyner  
Aaron B. Kelly  
Ray V. Keyes  
Crystal Keyes  
Malinda L. Keyes  
Sherry E. Keys  
Tiesha S. Kirland  
Tanya J. Kuno  
Vickie L. Lambert  
Helen G. Lane  
Shaunee Y. Langford  
Andre Liassiter

Antonine C. Lassiter  
Gerik M. Lawrence  
Elaina M. Lawson  
Carol A. Lewis  
Ruth B. Lewis  
Sharard Rufus  
Cynthia D. Lister  
Forrest W. Liverman  
Jamie C. Liverman  
Linda F. Logan  
Sonya B. Longest  
Lisa R. Loucks  
Cheryl C. Hassell  
Tonya F. Lyons  
Judith J. Mann  
Mitchell B. Manuel  
Christi T. Martin  
Allen J. Mason  
Mary L. Matthews  
Richard L. Matthews  
Susan S. McCianahan  
Stacia L. McFadden  
Nanci B. McGarvey  
Shanda McNair  
Deloras A. Meads  
Louis T. Meads  
Eunice I. Meekins  
Eric D. Moore  
Dovella P. Moore  
Marlo O. Moore  
Corina R. Morris  
Phillip S. Morris  
Robert L. Morris  
Amy M. Morse  
William J. Mosley  
Queenia C. Motely  
Eric D. Mountain  
Anjanette D. Murphy  
Terrica D. Nelson  
Syntheia N. Newby  
Tiffany M. Newell  
Anna L. Newton  
Yureacia D. Norman  
Andre C. Norwood  
Thanh V. On  
Susan C. Owens  
Tracie R. Owens  
Kim S. Palmer  
Damon L. Parker  
Virginia G. Parker  
John L. Parks  
Ramona L. Patrick

Mattie S. Paylin  
Trina Y. Payne  
Vanessa C. Pearson  
Casey B. Peele  
Thomas E. Perry  
Krisilla Perry  
Natasha D. Peters  
Tonya R. Peterson  
Earline S. Pickett  
Kenya J. Pleasant  
Tonita F. Polston  
Tymesia D. Pope  
Jason L. Powell  
Keynisha D. Powell  
Talia N. Powell  
Nakia K. Pride  
Tamara D. Rainey  
Johnnie E. Rascoe  
Debra M. Raymond  
Chelsea T. Raynor  
Tredina A. Raynor  
Quintina E. Reed  
Angelina R. Reid  
Connie B. Reid  
Jason M. Riddick  
Latonia S. Riddick  
Patrick L. Riddick  
Tamika D. Riddick  
Jerald D. Robertson  
Courtney E. Robinson  
Nicole M. Robinson  
Mary J. Rodgers  
Unice M. Rodgers  
Peter J. Rodrigues  
Marcenda J. Robers  
May J. Ross  
Charice A. Rosser  
Dionne Sanders  
Sheree B. Saunders  
Brandon E. Scott  
Dexter L. Scott  
Fred S. Sessoms  
Joan V. Sharpe  
Donna E. Shaw  
Bryan K. Shea  
Tandra L. Shepard  
Hurly D. Shields  
Fredrika C. Simons  
Casandra L. Smith  
Consuelo M. Smith  
Samantha G. Smith  
Mable C. Smithson

Angela D. Sneed  
Ronald W. Snyder  
Alfred L. Solomon, Jr.  
Tricia L. Soloner  
Brenda M. Spellman  
Fennessa L. Spruill  
Ceitha A. Spruill  
Leigh-Jo H. St. Pierre  
Wendy R. Stallings  
Kevin W. Staples  
Amanda B. Swain  
Sharon M. Tann  
Cher D. Taylor  
James J. Taylor  
Taneka S. Taylor  
Thomas M. Tharps  
Felicia D. Thigpen  
Karimah A. Thomas  
Monica L. Thomas  
Annette K. Tiller  
Mary L. Trueblood  
Melanie L. Turner  
Bridget R. Twine  
Tyrone A. Tynes, Jr.  
Lolethia F. Underdue  
Porchia L. Unthack  
Shaunda T. Vaughan  
Vanessa B. Vinson  
Nicole J. Walton  
Ahmad T. Ward  
Deborah Ward  
Gwendolyn Y. Ward  
Natalie L. Ward  
Tammara M. Ward  
Joseph E. Webb, Jr.  
Shiree L. Wharton  
Andre J. Whidbee  
Felicia R. White  
Timeka L. Whitehead  
Evelyn S. Whitley  
Debbie N. Wilkins  
Mario L. Wilkins  
Anthony R. Williams  
Janice L. Williams  
Michelle Williams  
Wanda M. Williams  
Deborah A. Willis  
Karen E. Winslow  
Dana L. Wood  
Sharon A. Wright  
Melissa A. Young

# NCAS

NORTH CAROLINA ACADEMY OF SCIENCE, INC.  
*Promoting science in North Carolina since 1902*

## NORTH CAROLINA ACADEMY OF SCIENCE

### CALL FOR PROPOSALS YARBROUGH UNDERGRADUATE RESEARCH GRANTS for the 1995-96 Academic Year

*Yarborough Research Grant Committee*

May 8, 1994

Curtis Felton  
Box 672 ECSU  
Elizabeth City, NC 27909

Dear Curtis,

I am pleased to inform you that the Yarborough Research Grants Committee of the North Carolina Academy of Science has approved funding your undergraduate research for the amount of \$50.00.

Dr. Vincent Bellis, Treasurer of the Academy, will issue a check jointly to you and your faculty sponsor in September.

Please complete the enclosed Statement of Acceptance and return it to me no later than July 15, 1995. Review the conditions of acceptance carefully before you sign the statement.

Please be reminded that funds cannot be disbursed until you are a member of the Collegiate Academy. If you wish to obtain individual membership or check on the status of a science club on your campus, please contact our Co-Executive Director, Dr. Sheila S. Reilly, Department of Biology, Belmont Abbey College, Belmont, NC 28012-2795

Congratulations! Good luck with your research. I shall look forward to hearing your presentation next spring.

Sincerely,

Wid J. Painter, Chair  
Yarborough Research Grant Committee

cc: Dr. Linda Hayden

Enclosure

WP:sc

1. Grants are for research to be carried out during the summer of 1995 and/or the 1995-96 academic year. Maximum amount available to be determined by NCAS Board.
2. Applicants must be freshmen, sophomores, or juniors in good standing at any North Carolina college or university and must plan to be enrolled next year. Each applicant must have a faculty sponsor to guide the research and administer the funds.
3. Before funds are disbursed, recipients must be members of the Collegiate Academy (either individual or member of a Club in good standing). Recipients must present a paper on their research at the 1996 spring meeting and submit a brief financial report to the chairman of the Research Grants Committee upon completion of the research project. Derieux Award winning papers must be submitted to CASCAS, the official journal of the Collegiate Academy, for publication.
4. Applications must include the following:
  - a. From the student: One copy of
    - (1) A proposal cover sheet.
    - (2) A narrative description of the research. This should include an introduction with clear statement of purpose, methods and materials, and listing of pertinent references. It should be no longer than four pages.
    - (3) A one page budget summary. Itemize as specifically as possible; no miscellaneous line item, please! Indicate quantity and source of materials. Supplies and equipment normally available in science departments, books, and routine travel expenses should not be included (see attached example).
  - b. From the faculty sponsor: One copy of a supporting letter.
  - c. From two other professors: One copy each of two general letters of recommendation.
5. All application materials should be sent to Dr. Wid Painter, Chairman, Yarborough Research Grants Committee, Department of Chemistry, High Point University, University Station-Montlieu Ave, High Point, NC 27262-3598.
6. The deadline for receipt of all application materials is April 16, 1995. Awards will be announced by May 15, 1995, and funds will be distributed in September, 1995.

# Mathematics and Computer Science of ECSU 1994 Student Internship Report

## 1994 Intensive Summer Science Program Students

The following students were selected to attend the Summer'94 Intensive Summer Science Program at Hampton University.

<u>name</u>	<u>major</u>	<u>class</u>	<u>ssno</u>	<u>home phone</u>
Clutilda Monk	math ed	sophomore	242-21-4964	(910) 289-2603
Richard Flood	physics	sophomore	260-31-3146	(912) 923-6863
Robert Holley	chemistry	sophomore	237-47-0479	(919) 771-2781
Guana Dixon	chemistry	junior	240-57-7278	(919) 338-2892
Christopher Roberts	physics	sophomore	244-21-1890	(919) 568-4066
Matresha Walker	cs	sophomore	246-37-6133	(919) 438-8379
Reginal Turner	cs	junior	245-43-8072	(919) 338-4106
Tonya Best	cs	junior	238-59-3934	(919) 237-4150
Dovella Moore	cs	sophomore	239-45-2601	(919) 946-6509

## 1994 ONR-Summer Research Students

ONR AASERT Summer Research Program in Parallel Processing and Computer Visualization 1994. Research was conducted on the campus of ECSU in the Mathematics and Computer Science Department.

summer'94	242-94-7067	kevin trotman	senior CS
summer'94	235-37-4090	stephanie vaughan	graduate student CS
summer'94	240-37-6990	michelle brown-emmanaul	graduate student CS
summer'94	237-41-5055	sharon saunders	senior CS
summer'94	244-51-8662	denisa edwards	senior CS
summer'94	114-56-32-54	ervin howard	Senior Math ED.
summer'94	238-25-6441	derrek burrus	precollege- Camden County
summer'94	243-37-0536	jackie hall	precollege- NC school of Math
summer'94	246-33-5956	connie sawyer	precollege - Camden High
summer'94	225-15-7231	lavonna felton	precollege Norcom High
summer'94	579-15-0979	kuchumbi hayden	precollege Norcom High

*Student/Sponsor Travel*

# PLANNED AGENDA FOCUS '95

The National Association of African-American Studies (NAAAS)

February 16, 1995

by Chonda Gayle

At a quarter to 8 am we departed to go to the third annual conference of the National Association of African-American Studies (NAAAS) at Virginia State University in Petersburg, Virginia. This conference marked a special time in my development of communication skills. I was the speaker informing other students of my research and results. I was speaking instead of listening. I have a long term objective of being a role model for others. I feel that by doing this presentation, you inform others that you don't have to wait until you enter graduate school to do research.

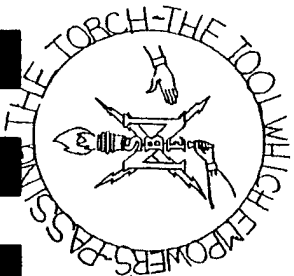
Previous to my presentation, I listened to some of my fellow classmates. I observed and listened. I observed their actions that I thought might hinder and enhance to my presentation. I tried to make sure I did not make the same mistakes but also try to get some involvement from the audience. Their topic was about Neoscience. Programming the computer to learn and make decisions, such as deciphering different people, just like a regular person. They applied this concept of neoscience to calculating statistics and recognizing the player by its statistics.

My presentation at 11:30 went smoothly. I tried to get some audience participation but did not have much luck. That is something that I have to work on for my next presentation. Of course, I was nervous at first, but soon felt comfortable enough to do the rest of the presentation.

In conclusion, going to this conference, I found that I am one of the fortunate students that first of all have a degree in Computer Science. Secondly, have the opportunity to do research on an undergraduate level. Lastly, to be able to develop presentational skill and share my findings with others that are just as interested in the same research topic. This interest brought me closer to the other students in the room. The more interested faces I saw during my presentation, the more I wanted to feed them with information.

KING  
WEEK

February 16, 1995



**SMART/NSBE Conference Report**  
By Kevin Trotman

After two or three weeks of preparation, the Elizabeth City State System Administration Team was given the opportunity to present an Alumni Workshop to the Alumni group at the National Society of Black Engineer's SMART conference in Washington DC. We traveled to the conference with Tammara Ward and Matresha Walker. Tammara and Matresha were given the opportunity to compete in the undergraduate presentation was on Multimedia programming (authoring).

We arrived at the conference on Friday, Feb. 3, 1995 and checked into our hotel and went over our presentations for the last time. The next morning we awoke to find that several inches of snow had fallen during the night and some of the alumni were unable to make it to that morning's workshop's due to the weather. However, at 10am we began to give our presentation to a still-forming group of the NSBE alumni. There were five of us in our group and our presentation took just over a half hour and then we were able to hear from the next speaker who gave an excellent lecture on how to grab student's attention by using the technologies available. He emphasized using hypertext tools for teaching, such as Mosaic, a tool used widely for internet exploration. He made a very good point in noting that students are often more interested in classroom work when they are taught using electronic or technological resources, because of the student's excitement associated with them.

After these workshops, we were able to help set up the presentations for the other members of our group and mingle about the conference room while the competition was taking place. The students in our group were able to mingle with the alumni and pass out many resumes and collect information from various companies. Later that night we attended the Banquet and listened to Dr. Howard Edwar's speech on "Passing the Torch, the Tool Which Empowers". He is a very moving speaker and I enjoyed his remarks. I agreed with his remarks on funding for minority education, and was very surprised by his statistics on the number of blacks obtaining degrees last year. There was only one point in his speech which I did not agree with, and that was his characterization of blacks as "poor folks". Even though I am no black, I recognize why he said this. He was referring to monetary means. However, after working with my friend on the System Administration Team at ECSU and seeing the drive spirit, determination, strength, and intelligence which they possess, I would have to characterize them all as some of the richest folks I know. Before leaving on our trip to Washington, one of the undergraduates in our group remarked that he wanted to room with me because I was a senior and he wanted to pick my brain of what I knew about computer science. We did room together, and he did ask me every question related to computers that he could think of. That is a strength which I could only characterize as a rich spirit.

Melvin Anderson

My tasks were to help set up and attend the presentations of the UNIX and Multi-media groups. The presentations began around 10:30 with the UNIX group. The presentation basically involved the explanation of the UNIX system and the many "clones" which exist. The most discussed "clone" was Linux. Linux was described as the most complete duplication of the UNIX system. The presenters described the many functions of the UNIX system. The most important functions of UNIX involve the creation and deleting of user files within the system.

The next presentation was done by Ms. Smith and Mr. Williams from Wayne State University in Detroit, Michigan. Their presentation was significant, in that Mr. Williams and Ms. Smith play an integral role in bringing technology to inner-city youths. I can relate to this story, because it is people like these who showed Melvin Anderson that there is more to the world than the drugs and violence that he sees everyday in Bowling Park. Mr. Williams is instrumental in maintaining a network which links Wayne State's computing center to area public schools. The system used by the students contains internet and mosaic. Also, Mr. Williams spoke of a 14 year old kid who has taught himself to use a computer and has created his own homepage.

Later in the evening we attended a banquet in the grand ballroom. The guest speaker was Dr. Howard Adams. Dr. Adams speech was very inspirational in that he dared us to dream the impossible. He spoke of how he was told that his dreams and goals were laughed at by members of his rural community. This is very important to me on a personal level because I am only one of three people from my neighborhood to go to college. I am told every time I go home that college is only for whites and that I will soon join them on the corner. Dr. Adams really hit home when he said that African-Americans deserve to experience life at its fullest. I know that I will settle for nothing less than the best.

In all the trip was an enlightening experience. I met many people who have the same goals as myself. I also traveled from home for the first time. I learned a lot about Curtis Felton as a person which is important since we will work as a team for the next three years. I would like to formally thank you for taking me on this trip.

*Region II Spring Conference*  
*February 3-5, 1995*  
*Howard University*

## North Carolina Fall Conference on Undergraduate Research

November 10-11, 1994 at Fayetteville State University

sponsored by the North Carolina Consortium for Undergraduate Research  
and supported by a grant from GLAXO, INC.

Theme

*"Seizing Opportunities for Advancing Research Scholars"*

**DEDICATED TO THE MEMORY OF**

**DR. JAMES TOWNES  
ELIZABETH CITY STATE UNIVERSITY**

This year's conference is in memory of Dr. James Townes of Elizabeth City State University. Dr. Townes was instrumental in establishing the Consortium and made many significant contributions to its growth.

Please excuse the ECSU students for their absences and allow them to make up any work missed. For further information please contact Dr. Linda Hayden, ph. ext. 617.

A copy of the conference program is attached for your convenience.

Erica Joseph  
LaVonna Felton  
Chonda Gayle  
Chaka Ruffin  
Reginald Turner  
Clarence Jones

Cutlida Monk  
Dovella Moore  
Matresha Walker  
Denisa Edwards  
Tamara Ward  
Cory Ellis

The following students attended the SOARS Conference at Fayetteville State University, Fayetteville, N.C., on November 9, 10, and 11, 1994:

From: Dr. Linda Hayden, Research Advisor  


To: Elizabeth City State University Instructors

Four historically black public universities [North Carolina Central University (NCCU), Elizabeth City State University (ECSU), Fayetteville State University (FSU), and Winston-Salem State University (WSSU), a university enrolling a substantial number of Native Americans [Pembroke State University (PSU)], and two premier undergraduate research universities [North Carolina A&T State University (NCA&T) and the University of North Carolina at Asheville (UNCA)] from among the sixteen institutions of higher education that comprise The University of North Carolina have entered into a consortium [North Carolina Consortium for Undergraduate Research (NCCUR)] in order to gain expertise in the development and management of successful, institution-wide undergraduate research programs and to enhance research activities on their campuses. The fourth fall conference on undergraduate research sponsored by the Consortium is being held on the campus of Fayetteville State University on November 10-11, 1994 with the theme "Seizing Opportunities for Advancing Research Scholars (SOARS)". Research presentations will be made by undergraduate students from such widely diversified fields as chemistry, physics, biology, instruction and curriculum, psychology, sociology, physical education, computer science, and mathematics.

The Consortium for Undergraduate Research gratefully acknowledges GLAXO, INC. for a generous grant in support of the North Carolina Fall Conference on Undergraduate Research

# Ninth Annual Black College Expo High Tech Expo 1995

## Benedict College

*Terra Costa Gibbs*  
Abstract: Synthesis and Expression of Human Fetal Lactate Dehydrogenase-B cDNA in Developing Mice

*Adrienne Jenkins*  
Abstract: The Effects of Chronic Dietary PCBs Exposure on Hepatic Enzymes of the Native Rodent *Peromyscus Polionotus*

## Delaware State University

*Craig Alexander*  
Abstract: A Prototype Genetic Animated Mathematics Environment

*Joseph Anthony Cooke, Jr.*  
Abstract: Effect of Sample Size on Acoustic Velocities for  $Al_2O_3$  Polycrystals

*Verandrina Harris*  
Abstract: Mathematical Properties of Magic Square

*Marquesa D. King*  
Abstract: Cellular Toxicity in *Xenopus* Oocytes: Cholinergic Mechanisms

*Laurenz K. Nguzer*  
Abstract: Particle Identification Using Neural Networks

## Talaya N. Perkins

Abstract: Analysis of Vascular Endothelial Motility Following Injury

*Anaili A. Umeji*  
Abstract: Characteristics of Acoustical Sensors Used for Detection of Insect Larvae Feeding in Grain

## Elizabeth City State University

*Denise Edwards*  
*Sharon Saunders*  
Abstract: Scene Design Using Renderman

*Chonida Gayle*  
Abstract: G.E. Computer Services Help Desk Interview & Survey Results

*Dovella Moore*  
*Reginal Turner*  
*Marresha Walker*  
Abstract: Identification & Prediction Using Neural Networks

## Claudia Monk

Abstract: Function Comparison for Lagrange Polynomials

## Wendy Griffor

## Reginald Harris

## Denise Mitchell

## Eric Mountain

## Penny Pascale

## Stephen Talley

Abstract: Application of Total Quality Management (TQM) in Black Owned Business

## Fayetteville State University

*Samuel Q. Campbell*  
Abstract: Nucleation and Chiral Symmetry Breaking Under Controlled Hydrodynamic Flow

## Grambling State University

*Larry C. Clay Jr.*  
Abstract: D-galactosamine Effects at Various Concentrations on Monolayer Rat Hepatocytes

*Mitchell Davenport*  
*Chesven Sausasa Eranin*  
*Elander L. Norffier*  
*Darrin Wayne Moore*

## David Anthony Yekky

Abstract: Perceived Effects of Reproductive Technology on the Family

## Lariza Michelle Phill

Abstract: Using Electronic Mail (Email) to Increase City Government Communication Productivity

## Jason D. White

Abstract: Investigation of Magnetic Properties of Syngas Conversion Cu-Co-Cr Catalyst Composites

## Hampton University

## Devin Walker

Abstract: A Study of Distinct Microsomal RNA from *Neurospora Crassa*

## Jackson State University

## Williams J. Durr

Abstract: Copper (II) Compounds with Heterocyclic Ligands

## Eva McShelle Owens

Abstract: Multimedia Toolbook

## Rhonda Richardson

Abstract: Computational Studies on Molecular Structures and Properties of HPX and HXP (X=O,S,Se) Species

## Kentucky State University

## Elore Shabazz Alauddin

Abstract: Effects of Varying Dietary Copper Concentration & Copper Supplementation on Ceruloplasmin & Superoxide Dismutase Activity in Blood of Weanling Rats

## Larvin Lerner-Wilson

Abstract: Effect of Organometals in Causing Chromosome Changes in Cultured Mammalian Cells

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February 16, 1995

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National Association of African American Studies

National Conference

Virginia State University

Petersburg, VA 23806

February 14-18, 1995

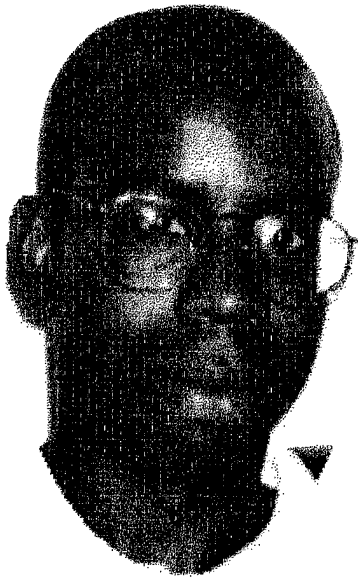


*We're Tempting You With...*

- ✓ One Low, All Inclusive Registration Fee
- ✓ Great Room Rate at the Holiday Inn - Petersburg
- ✓ Comfortable, Friendly and Productive Exhibit Hall
- ✓ Conference Produced Showcases
- ✓ Unbeatable Travel Rates
- ✓ Great Social Gatherings

And through it all, you'll experience the same cordial, informal, intimate atmosphere which has always been the hallmark of NAAAS. Meet and mingle with your colleagues and friends at a conference providing sparkling showcases, provocative professional panels and research presentations, a bustling exhibit hall, and just fun!

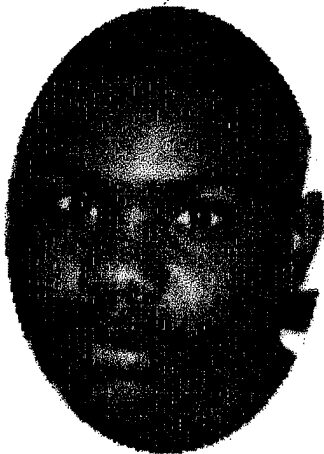
*Research Projects*



**Connie Sawyer**



**Matresha Walker**



**Derrek Burrus**

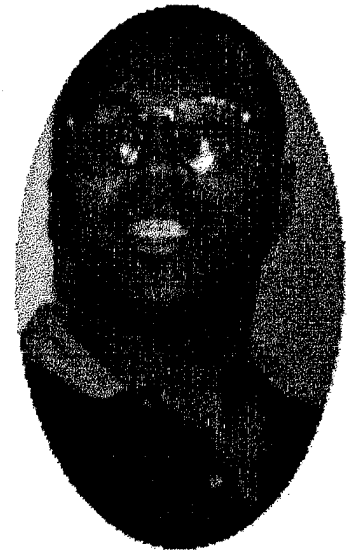
## Multimedia Authoring Team

Student multimedia researchers will use Authorware by Macromedia and Aldus Persuasion to create multimedia documents. Students will focus on information architecture and human-factor issues that help determine the size of and connections between information modules, and related high-level issues of interest to those planning to compose, evaluate or purchase multimedia documents. They will learn to use multimedia authoring tools with their suite of production tools (including word processor, a desktop publishing package, a video edition system, an audio capture program, and a synchronization tool to make all the disparate elements come out of the computer at the same time.) to produce documentation of the Nurturing ECSU Research Talent programs.

Their research, using techniques of sound and video conversion, intergration and compression, will serve to document the work of all research teams. Researchers will explore several models that group information in different ways. Researchers will assume the various project management tasks including audio technicians, writers, graphic designers, and editors.



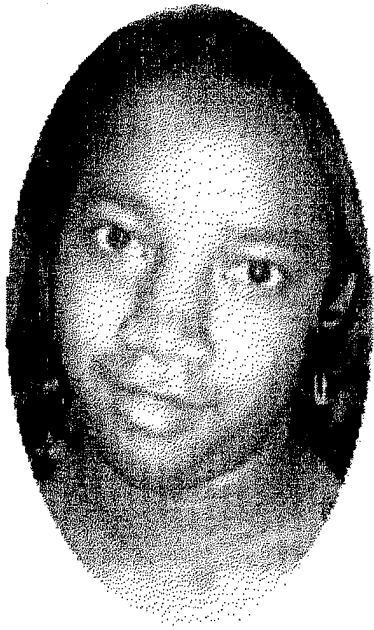
**Je'Aime Powell**



**Tim McCray**



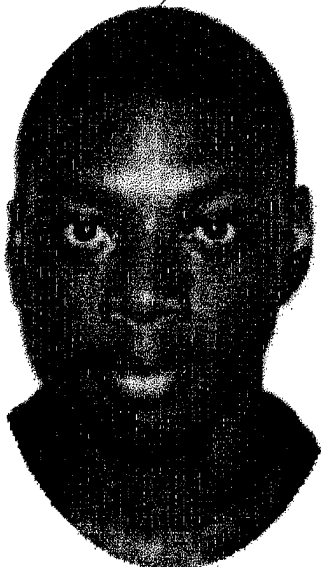
**Chonda Gayle**



**Dovella Moore**



**Tonia Best**



**Reginald Turner**

## Virtual Reality/Graphics Team

The computer animation project, which students will investigate, will consist of three stages. In the first stage, the student researchers will be given lectures concerning modeling and visualization. For the modeling, they will learn how to represent a solid primitive using the boundary representation. They will also be taught how to obtain a new solid object from existing ones. As to visualization, they will be given the concepts of 3D viewing, shading and texturing.

In the second stage, the students will build a solid modeling tool based on RenderMan, which will provide a set of primitives such as cube, sphere, cylinder, cone and torus, and a set of boolean operators like union, intersection, and difference. The tool will also be capable of building a solid object from a 2D object using sweeping (including translational and rotational sweeps).

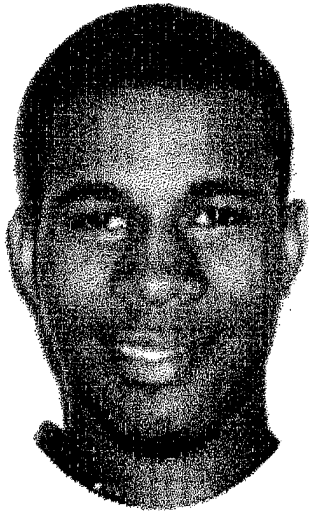
In the third stage, the students will define scenes using the tools they build, and describe the surface details like shading and texturing using RenderMan's Shader Language. They will also put different kinds of light sources into the scenes. Finally, they will develop frames for animation by either moving part of the scene or moving the camera, and putting these frames together for playing.



**Ericka Joseph**



**Melvin Anderson**



**Bradford Smith**



**Kevin Trotman**



**Curtis Felton**

## Unix System Administration Team

ATM stands for asynchronous transfer mode. ATM networking provides both circuit and packet-switching services with the same protocol. Students researchers will investigate the major benefits of ATM networking: scalability, statistical multiplexing and traffic integration.

Scalability is one of the most valuable properties of ATM. The main factor in providing scalability are a switched-based architecture and a common cell structure across all ATM components. Conventional LAN technologies such as ethernet are limited by the delays involved in the attempts to coordinate the sharing of the link bandwidth. Students will investigate how ECSU users access the ATM network in the student CS research laboratory located in Lester Hall with a variety of connections, media types and applications. They will begin by studying the common cell structure which allows data to be transported in the same format over the entire network regardless of the data rates of the intervening subnetworks.

The effect of uniform cell format on traffic integration will be analysed as data from different sources are readily integrated into the ATM network and transmitted concurrently.

Students will investigate how statistical variations in the traffic load can be smoothed out as many sources are multiplexed to result in better utilization of shared resources. A minimum of 18 random sources will be studied to exploit the benefits of statistical multiplexing and to avoid the possibility that there are too few traffic sources.



**Kuchumbi Hayden**



**Sharon Saunders**



**Eva Marie Dail**



**Tammara Ward**

## Fractals/Chaos Team



**Lavonna Felton**

Fractals have captured the attention, enthusiasm and interest of many people around the world. In our Fractal, Dynamic and Chaos research project, we will investigate the underlying mathematical principles and characteristics behind fractals, chaos and dynamics. In addition, we will investigate how fractal, chaos and dynamics relate to each other and to many aspects of mathematics as well as to natural phenomena. The final aspect of the project is to create some fractals using computers.

The goals of the project will be achieved in several stages. In the first stage, students will be given handouts concerning some preliminaries of dynamical systems and their examples. Students will be asked to predict the fate of orbit of some simple (non-linear) quadratic dynamical systems and investigate the period doubling route to chaos. At this stage two computer programs will be developed to see this numerical observation in computer graphics. In the third stage, using several activity sheets, the student researchers will be involved directly in constructing, counting, computing, visualizing and measuring related to deterministic fractal, the Sierpinski triangle and the Pascal triangle. Students will also investigate geometric relationships between Pascal's triangle and the Sierpinski triangle by coloring rule using modular arithmetic. This relationship provides the link to Cellular automata. Students will explore a whole class of cellular automata which are closely related to the evolution of divisibility patterns in Pascal's triangle.

The final stage of the project, using L-systems the researchers will construct Fractals in computer and growth of a plant. L-systems are string rewriting machines which are characterized by the fact that the production rules are applied simultaneously to all symbols of the input string.



**Cory Ellis**



**Clutilda Monk**



**Clarence Jones**

## Rutherford Scattering Team

The structure of the atom was first determined by bombarding heavy atomic targets with alpha particles. The alpha particles are the nuclei of Helium atom. Radioactive substances emit alpha particles. They are found suitable to be used as projectiles. These particles have been found to possess kinetic energy of the order of several MeV's. Such high energetic particles can come very close to the target nuclei such as gold. The alpha particles under the influence of Coulomb interaction are scattered along different directions. The trajectories of the projectiles in the classical picture can be obtained by solving Newton's equation of motion.

The quantity that measures the outcome of the scattering is the differential cross-section. This quantity is a measure of the ratio of the number of projectiles glancing beyond the target along a solid angle to the incoming projectile intensity. A researcher must have a clear picture of this idea. This is the quantity an experimental physicist measures with his instruments.

A counter receives these projectiles and records their number along different angle around the target. We know the initial intensity of the projectiles by carrying out initial counts.

The whole study of classical Rutherford Scattering runs in three phases. In the first phase the researcher learns to set up the mathematical problem. Then the equation of motion for the projectiles moving around the fixed target is written. These equations will later be changed into differential equations. He will learn to solve them to determine the orbits of the projectiles. With the knowledge of the orbits he will compute a closed form of the differential cross-sections.

In the second phase the researcher will write a Mathematica program to plot the differential cross-section as a function of the scattering angle  $\theta$  with this program he will plot graphs for different substances for different projectile energies. In the third phase he will expand the program to graph the cross-sections as a function of two variables, namely the scattering angle and the kinetic energy.

**Student Research Project**  
in  
**Computer Networking**

**ATM Networks**

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This is to certify \_\_\_\_\_ student researcher's name \_\_\_\_\_ has been interviewed and accepted onto the ATM Networking Research Team. Written below are any additional responsibilities assigned to this student

Dr. Linda Hayden, Instructor      date

Dr. Linda Hayden, P I      date

**Student Research Project**  
in  
**Multimedia Authoring**

Student multimedia researchers will learn to use Authorware by Macromedia and Aldus Persuasion to create multimedia documents. Students will focus on information architecture and human-factor issues that help determine the size of and connections between information modules, and related high-level issues of interest to any planning to compose, evaluate or purchase multimedia documents. They will learn to use multimedia authoring tools with their suite of production tools (including word processor, a desktop publishing package, a video edition system, an audio capture program, and some kind of synchronization tool to make all the disparate elements come

out of the computer at the same time.) to produce documentation of the Nurturing ECSU Research Talent program and the Center of Excellence in Undergraduate Research program.

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This is to certify \_\_\_\_\_ student researcher's name \_\_\_\_\_ has been interviewed and accepted onto the Multimedia Authoring Research Team. Written below are any additional responsibilities assigned to this student

Mr. Derrek Wilkens, Instructor      date

Dr. Linda Hayden, P I      date

## Student Research Project

in

## Physics

### Rutherford Scattering

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This is to certify \_\_\_\_\_ student researcher's name

the Mathematics Research Team. Written below are any additional responsibilities

assigned to this student

This is to certify \_\_\_\_\_

student researcher's name

onto the Parallel Processing Research Team. Written below are any additional

responsibilities assigned to this student

List two reference books that the student must read.

- 1.
- 2.

## Student Research Project

in

## Parallel Processing

Reference: Laboratories for Parallel Computing by Christopher H. Nevison, Jones and Bartlett Publishers, 1994. ISBN 0-86720-470-2

The Sieve of Eratosthenes has long been a standard benchmark program for integer operations on a sequential computer. We will develop a parallel prime number sieve to demonstrate several concepts fundamental to parallel computing. This example also illustrates a process of parallel program development which can be usefully applied to many problems.

After defining the problem and a sequential solution, we will begin the development of a parallel algorithm by analyzing the actions which must be taken and the order constraints on those actions. This makes it possible to define a maximally parallel, although impractical, algorithm. We will then develop a practical algorithm which can be mapped to a network of message passing processors, a pipeline.

The mapping of the algorithm to the array of processors brings up the

issue of load balancing. We will develop an algorithm for static load-balancing, allocating the work so that each processor will have about the same amount to do.

We will investigate the performance of the algorithms by measuring the speedup and efficiency. Amdahl's Law gives theoretical limits on the speedup which can be obtained from parallel computers. This will lead to a final refinement of the algorithm based on using an efficient sequential algorithm within processors while maintaining the pipeline between processors.

The final aspect of algorithm development will be an analysis of communication issues:

- 1) Buffering between the processors reduces processor idle time spent waiting for communication with a neighboring processor; and 2) The effect of packing the integer messages into larger messages between processors so as to increase overlapping of communication with computation

Dr. Dipendra Sengupta, Instructor      date

Dr. Linda Hayden, P I      date

Dr. Johnny Houston, Instructor      date

Dr. Linda Hayden, P I      date

## Student Research Project

in

## Mathematics

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Fractals have captured the attention, enthusiasm and interest of many people around the world. In our Fractal, Dynamic and Chaos research project, we will investigate the underlying mathematical principles and characteristics behind fractals, chaos and dynamics. In addition, we will investigate how fractal, chaos and dynamics relate to each other and to many aspects of mathematics as well as to natural phenomena. The final aspect of the project is to create some fractals using computers.

The goals of the project will be achieved in several stages. In the first stage, students will be given handouts concerning some preliminaries of dynamical systems and their examples. Students will be asked to predict the fate of orbit of some simple (non-linear) quadratic dynamical systems and investigate the period doubling route to chaos. At this stage two computer programs will be developed to see this numerical observation in computer graphics

In the third stage, using several activity sheets, the student researchers will be involved directly in constructing, counting, computing, visualizing and measuring related to deterministic fractal, the Sierpinski triangle and the Pascal triangle. Students will also investigate geometric relationships between Pascal's triangle and the Sierpinski triangle by coloring rule using modular arithmetic. This relationship provides the link to Cellular automata. Students will explore a whole class of cellular automata which are closely related to the evolution of divisibility patterns in Pascal's triangle.

The final stage of the project, using L-systems the researchers will construct Fractals in computer and growth of a plant. L-systems are string rewriting machines which are characterized by the fact that the production rules are applied simultaneously to all symbols of the input string.

This is to certify \_\_\_\_\_

student researcher's name

has been interviewed and accepted onto

the Mathematics Research Team. Written below are any additional responsibilities

assigned to this student

List two reference books that the student must read.

- 1.
- 2.

Dr. Dipendra Sengupta, Instructor

Dr. Linda Hayden, P I

date

## Student Research Project

in

## Graphics/Animation

### 3-D Modeling and Viewing

The computer animation project, which students will investigate, will consist of three stages. In the first stage, the student researchers will be given lectures concerning modeling and visualization. For the modeling, they will learn how to represent a solid primitive using the boundary representation. They will also be taught how to obtain a new solid object from existing ones. As to visualization, they will be given the concepts of 3D viewing, shading and texturing.

In the second stage, the students will build a solid modeling tool based on RenderMan, which will provide a set of primitives such as

cube, sphere, cylinder, cone and torus, and a set of boolean operators like union, intersection, and difference. The tool will also be capable of building a solid object from a 2D object using sweeping (including translational and rotational sweeps).

In the third stage, the students will define scenes using the tools they build, and describe the surface details like shading and texturing using RenderMan's Shader Language. They will also put different kinds of light sources into the scenes.

Finally, they will develop frames for animation by either moving part of the scene or moving the camera, and putting these frames together for playing.

This is to certify \_\_\_\_\_

student researcher's name

has been interviewed and accepted onto

the Graphics/Animation Research Team. Written below are any additional responsibilities

assigned to this student

List two reference books that the student must read.

- 1.
- 2.

Dr. Jingyuan Zhang, Instructor

Dr. Linda Hayden, P I

date

*Future Directions*  
*"Center of Excellence in Undergraduate Research"*  
*Proposal Abstract & Exerts*

*Proposal Control # 95019ISS - ARO*

*Elizabeth City State University  
Center of Excellence in Undergraduate Research*

**ABSTRACT**

The proposed effort would establish a Center of Excellence in Undergraduate Research at Elizabeth City State University in the fields of Chemistry, Computer Science, Math and Physics (CCMP). This program will include both an academic year component and a summer component and will involve two departments at ECSU: Math and Computer Science Department and the Department of Physical Science.

The proposed project focuses on undergraduate education and undergraduate research experiences in CCMP. Nurturing these young researchers will be our primary concern. Highest priority will be given to providing them with the guidance and skills to insure their entrance and success in graduate school. Further, each student will learn the fundamentals of scientific research as they conduct investigations in CCMP disciplines.

The proposed project is based on the successful program entitled "Nurturing ECSU Research Talent (NERT)" funded by the Office of Naval Research. NERT focuses on undergraduate computer science majors. ONR proudly considers NERT as part of its Science and Engineering Education Initiative. Further, the NERT program should serve as a model for increasing the quality of science education and increasing the number of minority students trained in CCMP disciplines. Therefore, it is the desire of ECSU, at this time, to replicate the Nurturing program in the Physical Science Department while continuing to challenge majors in the Mathematics and Computer Science Department. Proposed COE activities address both student development and infrastructure.

To accomplish the objectives ECSU has partnered with several other organizations and institutions: Georgia State University, Georgia Technical Institute, Old Dominion University, American University, North Carolina A&T and Hampton University. The COE would formalize the relationships with these PH.D. granting institutions. Partners have agreed to participate in the visiting lecture series, to support ECSU CCMP research activities and facilitate student entrance into graduate programs. ADNET Systems, industrial partner( 8(A) certified), will mentor the Networking research team and insure the integrity of the network connections on which the on-line mentoring will depend. **ECSU is a small school that makes a big effort to nurture its students.**

*Center of Excellence  
in  
Undergraduate Research*

**Physics & Chemistry  
Research Teams**

**Electron Scattering**

Dr. Choudhury, ECSU Mentor  
Dr. Muang, HU Mentor

**Photochemistry**

Dr. Koker, ECSU Mentor  
Dr. Roscher, AU Mentor

**GS/MS**

Dr. Yakubu, ECSU Mentor  
Dr. Kent, NCA&T Mentor

**Mathematics & Computer Science  
Research Teams**

**Graphics and VR**

Dr. Zhang, ECSU Mentor  
Dr. Owen, GSU Mentor

**Parallel Processing**

Dr. Houston, ECSU Mentor  
Dr. Morrell, HU Mentor

**Fractals & Chaos**

Dr. Sengupta, ECSU Mentor  
Dr. Casey, AU Mentor

**Networking**

Dr. Hayden, ECSU Mentor  
ADNET Industrial Mentor  
Dr. Wahab, ODU Mentor

**Multimedia Authoring**

Mr. Wilkens, ECSU Mentor  
Dr. McGuire, GATech Mentor

## **Facilities and Equipment**

It is important that the Center of Excellence provide state-of-the-art equipment to support the research activities of the students and faculty involved. Following is a description of the equipment required for each of the research teams involved in the Center of Excellence at ECSU.

### **Facilities**

ECSU proposes to renovate 113 Lester Hall, 114 LH and 115 LH, to house the Center of Excellence in Undergraduate Research offices. Offices for the Principal Investigator, Network Technician, Clerical Support and Tutors will be available in the 113-115 LH complex. Space will also be available for student research and study activities. The physical science equipment will be located in the J.R. Jenkins Science Complex which is adjacent to Lester Hall. Internet access will be available to student/faculty researchers in both Lester Hall and the Science Complex.

ECSU has recently renovated 116 Lester Hall to accommodate a lecture room and a 12 station computer laboratory which has ATM networking. This facility will also be available to the Center of Excellence in Undergraduate Research. In addition the ECSU Library, which is less than 50 feet from Lester Hall has 2-way teleconferencing and a video conference room. That facility will also be available to the COE.

### **Photochemistry Research Support Equipment**

The Photochemistry Research Team Projects will be conducted on a modular instrument developed by SLM-AMINCO, namely, the SLM-AMINCO model 8100 Spectrofluorometer. The application capabilities of this instrument are remarkable with respect to the Photochemistry research to be conducted. This modular instrument enables the measurement of excitation, emission, and synchronous spectra quantitative analysis; time traces(kinetics); intracellular measurements; 3-D scans; polarization/anisotropy; excitation/emission matrices. With optional accessories or system upgrade, experiments pertinent to stopped flow measurements, quantitative fluorescence imaging and fluorescence lifetime measurements can be made. Cost: \$55,000.00

### **GRAPHICS Research Support Equipment**

The Graphics Research Team Projects will be conducted on a Silicone Graphics ONYX. The ONYX provides the student researchers with a unique combination of CPU computing power, advanced graphics, throughput(I/O), and real-time video performance on a single highly scalable computing platform. In addition, the ONYX will provide Graphics researchers with a wealth of development tools and libraries. Cost \$98,000.00

### NETWORKING Research Support Equipment

The Networking Research Team Projects would center around integration of the ONYX, Pentium PCs, and Indy workstations into the Asynchronous Transfer Mode(ATM)network which is currently being installed in Lester Hall. Although a considerable amount will be required for reference material, and peripherals, there is no additional hardware required for projects which the system administration research team will conduct. Cost \$0.00

### Multimedia Authoring Research Support Equipment

The Multimedia Authoring Research Team Projects will be conducted on two silicone graphics INDY workstations. INDY gives the multimedia researcher the ability to incorporate sound, video, and high quality 3D graphics into their projects. Multimedia Researchers will make considerable use of the Build-in Video and Audio Subsystems, and standard tools such as IndyCam color digital video camera, integrated video MediaMail software and options such as desktop conferencing and IndyVideo. These features will allow the multimedia authoring research team to capture, create and communicate their ideas. Only two INDY workstations are requested since the multimedia authoring research team will also have access to the ONYX. Cost \$10,800.00 per Indy.

### Fractals/Chaos Research Support Equipment

The Fractals/Chaos Research Team Projects will be conducted on a Pentium PC platform which will support the use of MATHEMATICA software. The Fractals/Chaos research team will also have use of the ONYX for visualization purposes and the INDY workstations. Cost \$4500.00 per PC.

### Parallel Processing Research Support Equipment

The Parallel Processing Research Team Projects will be conducted on the CRAY supercomputer and nCube located on the campus of Hampton University. Each student on the Parallel Processing Research Team will be assigned accounts on the CRAY and nCube for use in their research assignments. Students will access the CRAY and nCube using equipment currently on the UMFORT.ECSU.EDU research lab network. No additional equipment is required for the parallel processing research team. Cost \$0.0

### GS/MS Research Support Equipment

The GS/MS Research Team Projects will be conducted using a gas chromatography-mass spectrometer (GS/MS). The GS/MS provides a powerful tool for quantitative and qualitative identification of components of complex mixtures. It will allow students to identify a particular component by comparing its retention time with the retention times of standards. Students will confirm the identity and concentration of the gas chromatographic peak by mass spectrometry. Cost \$62,364.60

### Electron Scattering Research Support Equipment

The Electron Scattering Research Team Projects will be conducted using three PENTIUM PC running MATHEMATICA software. The calculus of electron scattering will initially be a large part of the research of this team. MATHEMATICA will support their initial investigations. Students will also have use of the equipment located in the physics department of Hampton University where researchers will spend summers. Cost \$4500.00 per PC.

## EXPECTED RESULTS

We expect this program to result in several very important outcomes. First, the close working relationships students will experience with their research advisors will give them additional insights into course material. We expect that these students will maintain their qualifying GPA and be retained in the program. **Success will be measured by the number of students retained in the program.**

ECSU has the highest retention rate of any of the 16 campuses in the University of North Carolina system. Our retention rate is 48% as compared with the next highest of 45.8% at UNC-Charlotte, 38.2% at North Carolina State University, 29.5% at North Carolina A&T, and 12.1% at Fayetteville State University. We fully expect to retain each and every one of the student participants in this program. It should be noted that none of the students in our Pilot program withdrew from the University. **Success in retaining these students in the program will be measured by the number who graduate from ECSU .**

We expect, on a larger scale, to nurture the research abilities of our many highly motivated, academically talented CCMP students. Based on the Pilot program we expect our student researchers to have their research papers accepted and presented at two national conferences each year. We will also encourage students to submit their research for publication. We expect that at least one of our researchers will have their papers accepted for publication each year. **Success will be measured by the number of student research papers accepted for presentation and for publication.**

Second, given the emphasis we will place on GRE preparation and given the many opportunities we will give these students to take the GRE, we expect that the final GRE scores for our graduating seniors will be markedly higher than those we now see. **Success will be measured in terms of the percent of increase over average GRE scores of previous graduates.**

Third, undergraduate research experience will give our students the competitive edge they will need in their graduate studies. In addition to the fellowships from partner institutions, participants will be encouraged to start early selecting graduate schools and seeking fellowships to finance their graduate studies. We will require all seniors to apply for graduate school admission. **Success will be measured by the number of COE student researchers who elect to go on to graduate school in a CCMP discipline.**

## Schedule of Major Program Activities

### Summer & Fall 1995

- Make selections of research students
- acquire research equipment
- hold 1 meeting with partners
- conduct 2 research training seminars weekly
- start applications process for summer'98 internships
- hold visiting lecturer seminars
- monitor academic/research/scholarly activities
- students take the December offering of the GRE
- assist seniors with graduate school applications
- hire tutors and network technician

### Spring 1996

- complete application process for internships
- evaluate program progress & make annual report
- conduct 2 research training seminar weekly
- hold 1 meeting with partners
- hold visiting lecturer seminars
- Make selections of research students
- monitor academic/research/scholarly activities

### Summer 1996

- complete annual report
- monitor student internships
- conduct summer program at ECSU and HU

### Fall 1996

- hold 1 meeting with partners
- hold visiting lecturer seminars
- monitor academic/research/scholarly activities
- begin application process for summer'97 internships
- students take the December offering of the GRE
- assist seniors with graduate school applications

### Spring 1997

- complete applications for internships
- evaluate program progress
- make annual report
- hold 1 meeting with partners
- hold visiting lecturer seminars
- monitor academic/research/scholarly activities

### Summer 1997

- complete annual report
- monitor student internships
- conduct summer program at ECSU and HU

### Fall 1997

- hold 1 meeting with partners
- conduct 2 research training seminars weekly
- hold visiting lecturer seminars
- monitor academic/research/scholarly activities
- begin application process for summer'98 internships
- students take the December GRE
- assist seniors with graduate school applicaitons

### Spring 1998

- complete applications for internships
- evaluate program progress
- hold 1 meeting with partners
- conduct 2 research training seminars weekly
- hold visiting lecturer seminar
- monitor academic/research/scholarly activities

### Summer 1998

- complete annual report
- monitor student internships
- conduct summer programat HU and ECSU

**Collaborations:**

*American University, Math and Chemistry Depts*

*Old Dominion University, Computer Science Dept.*

*Hampton University, Computer Science Dept.*

*North Carolina A&T University, Chemistry Dept.*

*Georgia Technical Institute, Multimedia Center*

*Georgia State University, Computer Science Dept.*

*ADNET Systems, Inc.*

**University Partnerships:**

ECSU has worked diligently at building relationships with each of the partner universities. It is our desire to formalize these relationships through visiting lecture programs, fellowship programs and on-line mentoring of ECSU research faculty and students.

**Industrial Partner**

ADNET Systems Inc., is a small disadvantage company based in Washington D.C. metropolitan area. ADNET has received small disadvantaged business certification under the **U.S. Small Business Administration's 8(a) program**. ADNET posses superior technical ability in the area of data communications, computer networking, information management system, system analysis, system engineering and system integration. ADNET will provide mentoring for the Networking Research Team.

ADNET has extensive knowledge in various local as well as wide area network topologies and schemes. ADNET has developed device driver applications for various UNIX-based workstations such as Sun Sparc, Silicon Graphics and others. The company is well versed in design, implementation and management of various LAN architecture such as: 10BaseT, FDDI, ATM, etc. to run DECnet, TCP/IP, XNS, SNA and Appletalk protocols. Most importantly, the company has been has responsibility for installation of the ECSU ATM network.

Partner	Research Area	Partner Provides	Partner Receives
ODU (CS)	Networking	•On-line mentoring •Visiting Lectures	•1 fellowship/dept •Travel money: \$2K/dept •Honorarium: \$3K/dept
AU (Math, Chem)	Fractal/Chaos Photochemistry		
HU (CS, Physics)	Parallel Processing Electron Scattering		
GATech (Comm)	Multimedia Authoring		
NCA&T	GS/MS		
GSU (CS)	Graphics	•On-line mentoring •Visiting Lectures	•Travel money: \$2K •Honorarium: \$3K
ADNET Systems	Networking		