8th Annual Science & Engineering Research Conference

AMP

South Carolina Alliance For Minority Participation

Celebrating Louis Stokes Alliance 10th Anniversary

Our mission

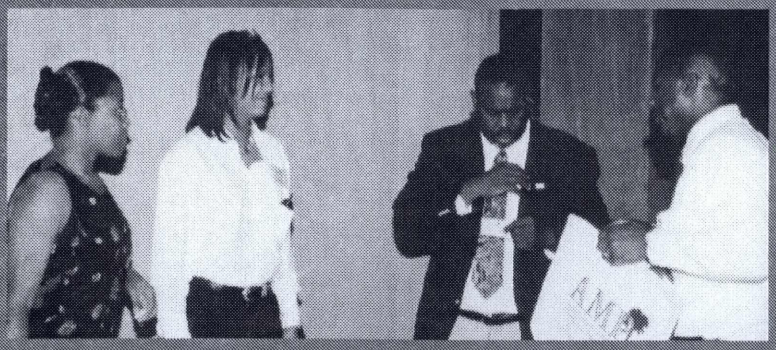
To increase the number of minority graduates in the fields of Science & Mathematics and Engineering

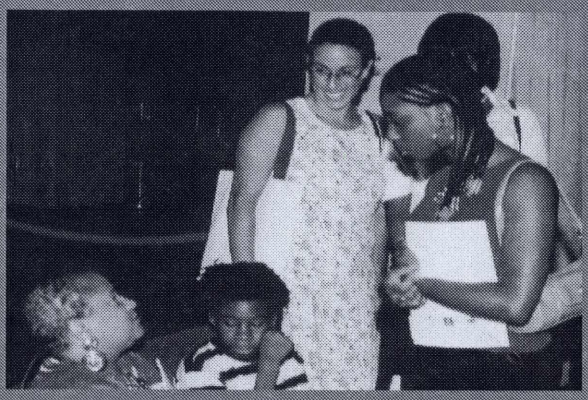
The SCAMP Science & Engineering Research Conference is a major opportunity to highlight the outstanding talents in the National Science Foundation's SCAMP program. The research conference showcased students engaged in outstanding research in academic, industrial, and government laboratories in the states of South Carolina, North Carolina, and Georgia.

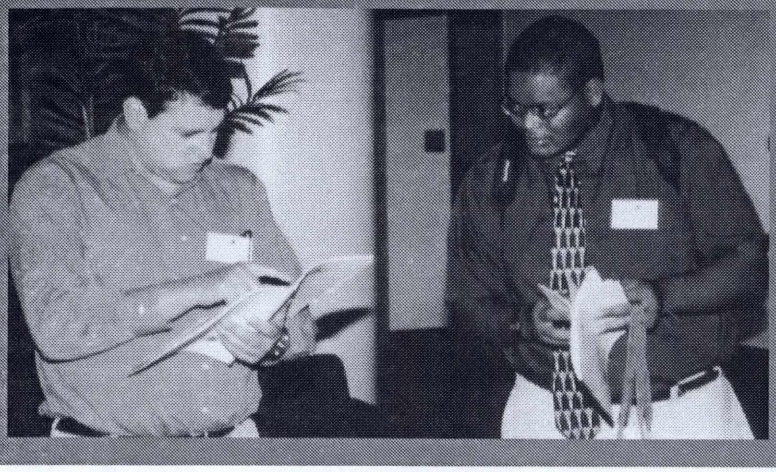
We would like to express our appreciation to the research mentors, judges, sponsors, Dr. Vallen L. Emory, Jr., and the SCAMP Statewide Office for an outstanding research conference as well as our congratulations to the student participants.

Summer Research Conference 2002

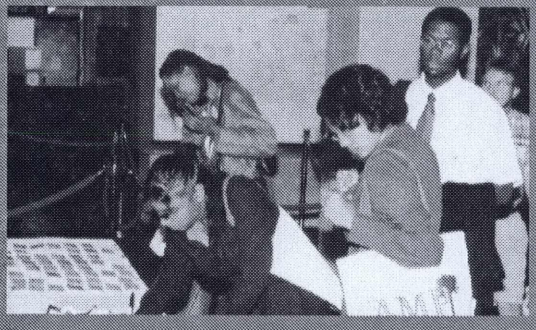
University of South Carolina
Russell House Conference Center

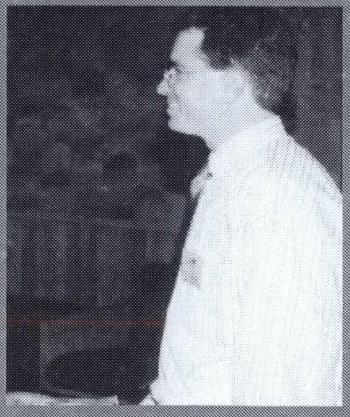


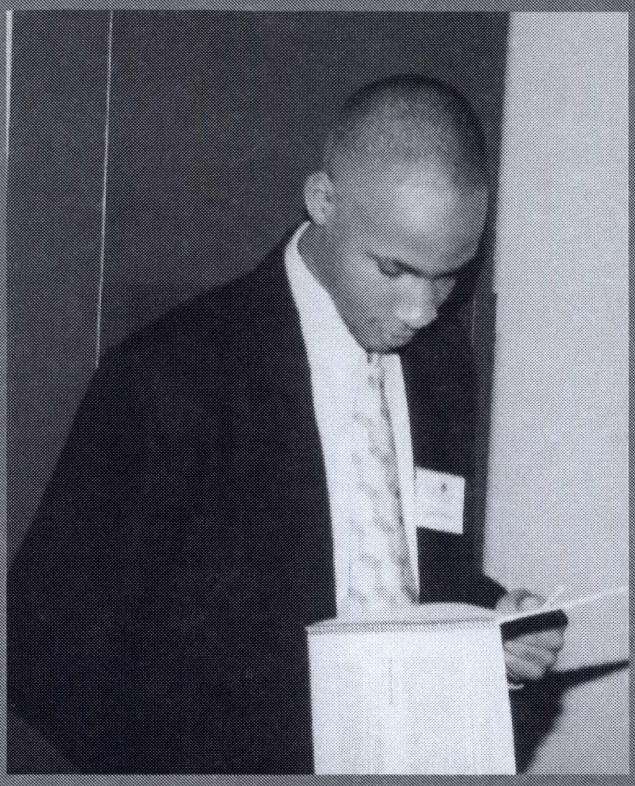




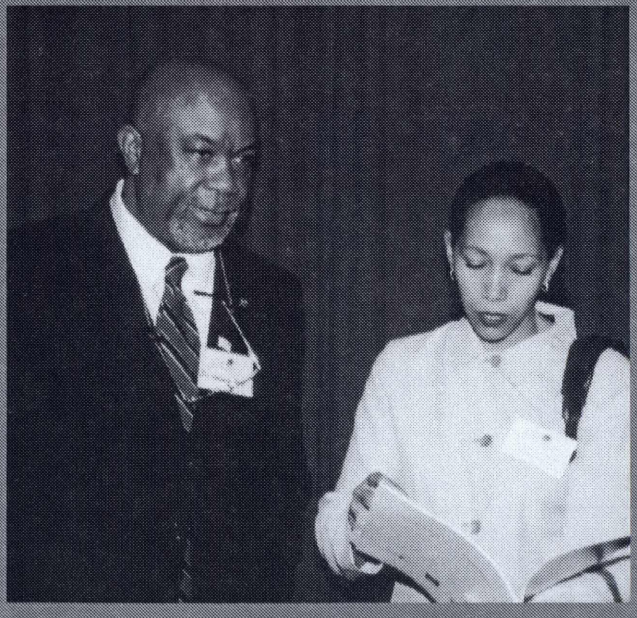
Registration

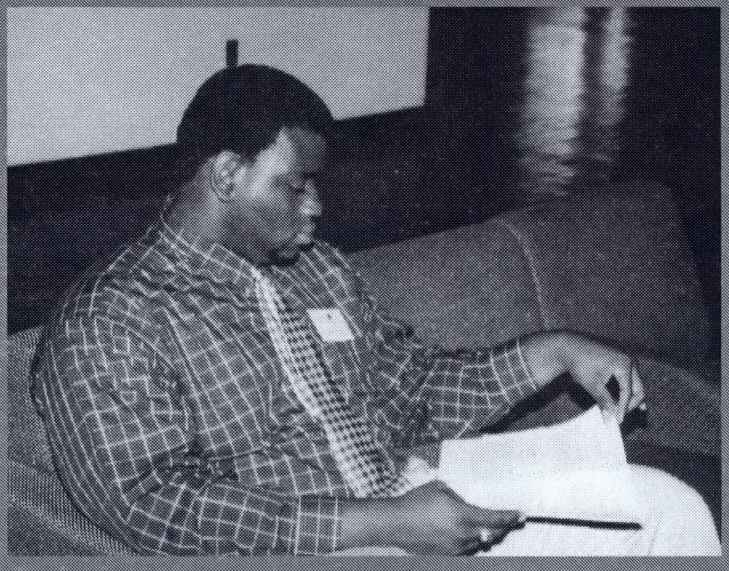


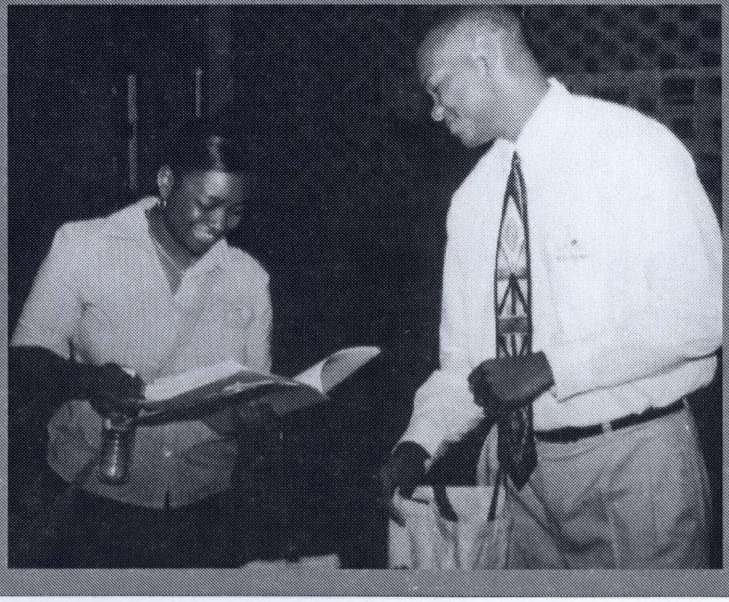


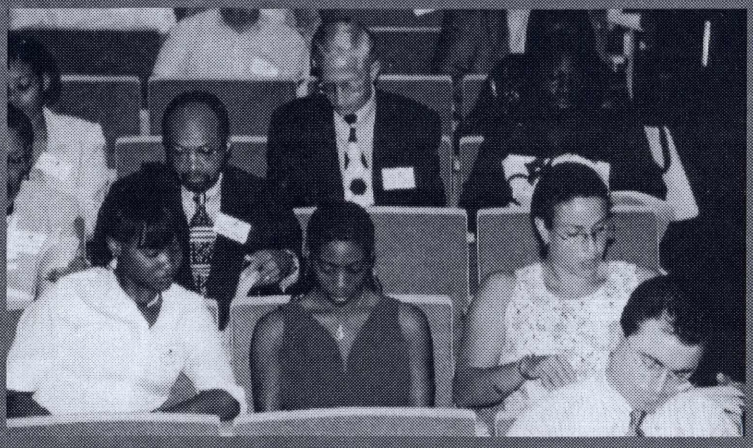


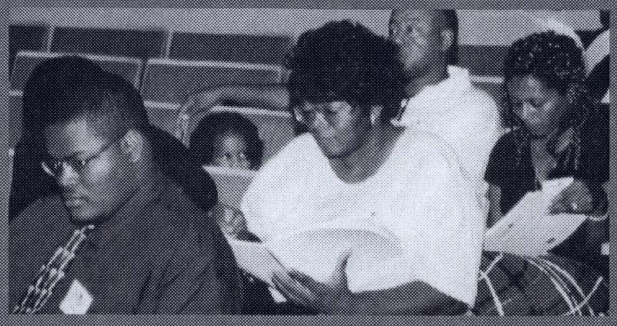

LOOK FOR FREE
MOVIES ON THE

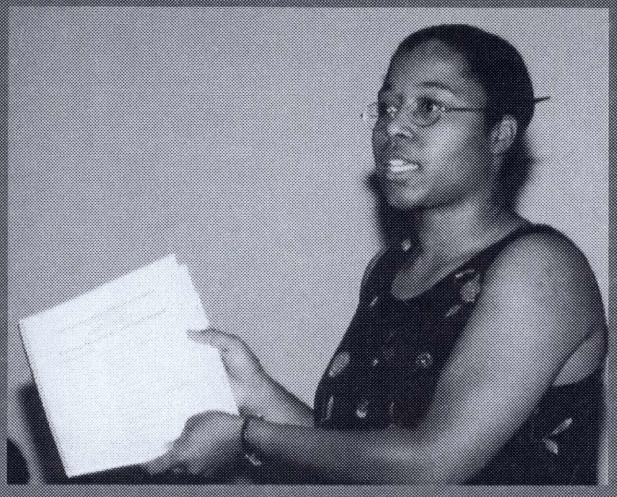




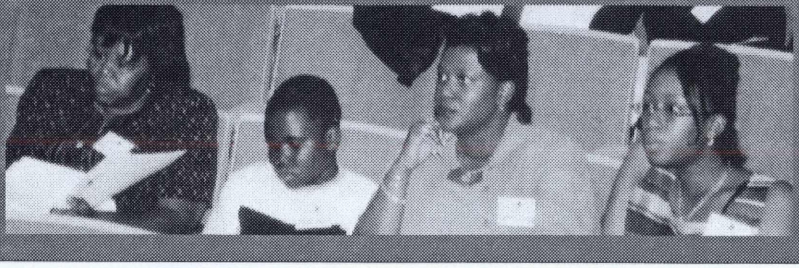






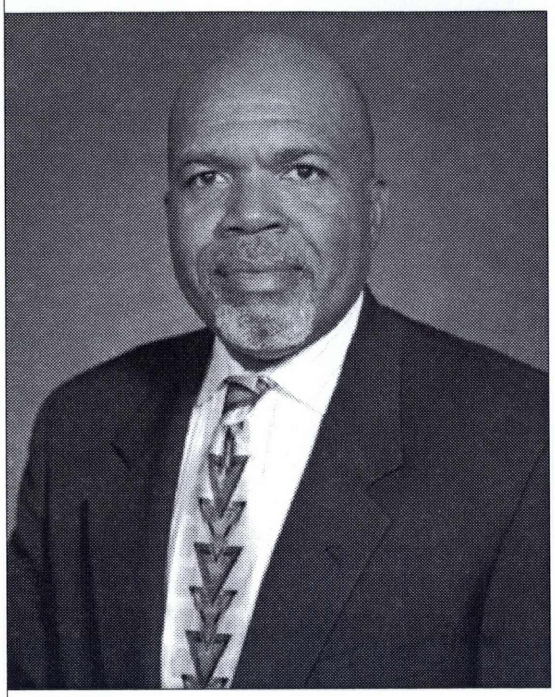


Opening Session



Keynote Speaker

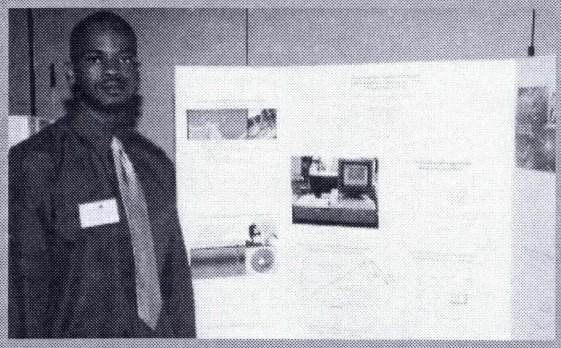
Dr. Vallen L. Emery, Jr.

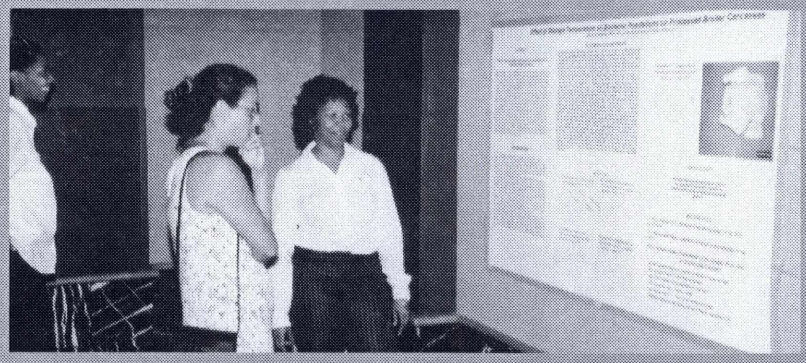


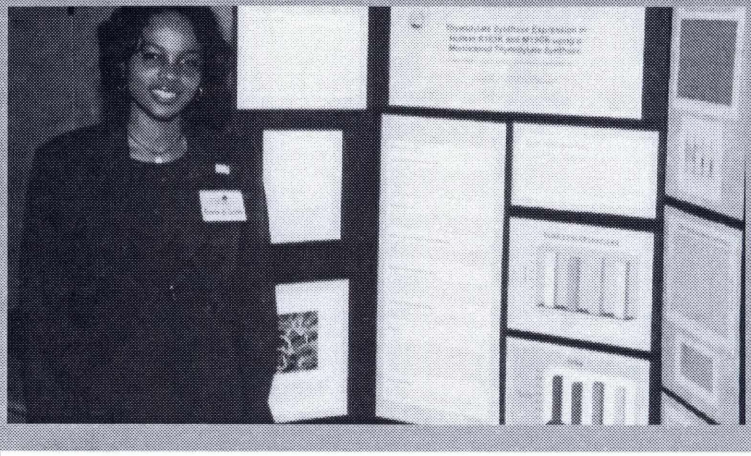
Dr. Vallen L. Emery, Jr., is the Minority Outreach Program Manager of the U.S. Army Research Laboratory. Dr. Emery holds a bachelor's degree in chemistry from Morgan State University, a master's degree in Marine Estuarine and Environmental Science from the University of Maryland Eastern Shore, and a doctorate in Environmental Science from the University of Maryland College Park.

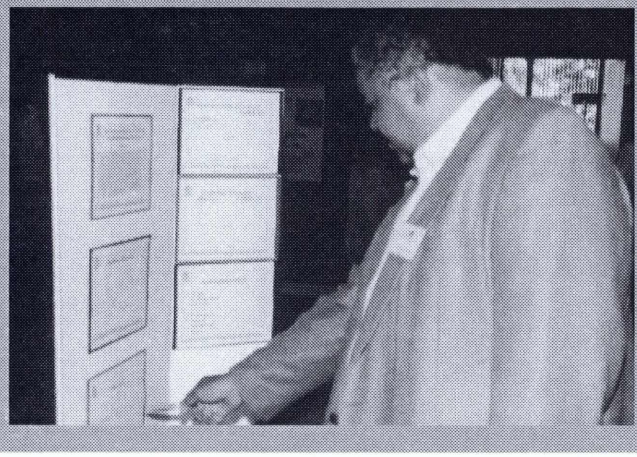
Prior to joining ARL, Dr. Emery served as a Research Biologist for the U.S. Army Corps of Engineers Waterways Experiment Station (WES), Vicksburg, MS. While at WES, Dr. Emery's research focus was aquatic bioassay test development, aquatic toxicity testing of military unique compounds and ecological risk assessment. Prior to his position at WES, Dr. Emery served as the Director of Special Projects and the Director of Marketing at the Johns Hopkins Health Plan in Baltimore.

Dr. Emery is a member of Beta Kappa Chi scientific honor society, the American Society of Testing and Materials (ASTM) and the Society of Environmental Toxicology and Chemistry (SETAC). He has served on the SETAC Fellowship and Awards Committee and as co-chairman of the SETAC Minority and Student awards subcommittee.

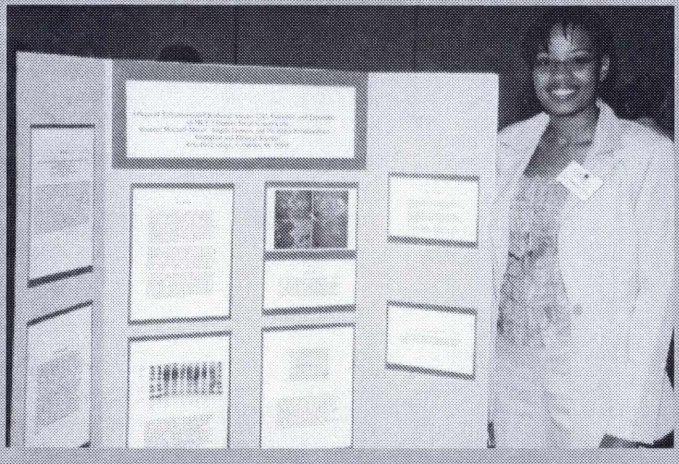


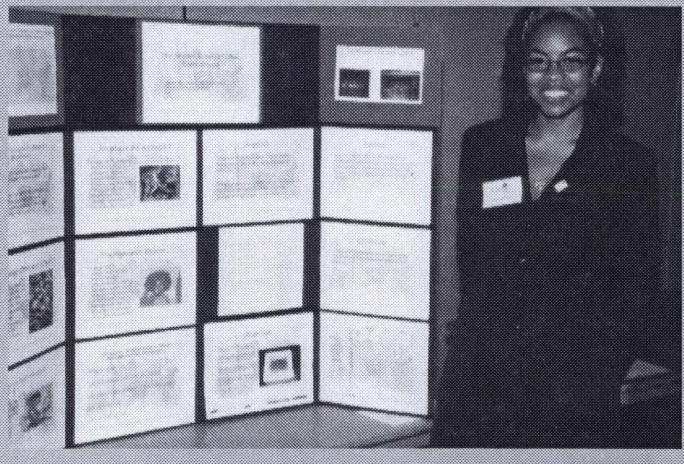


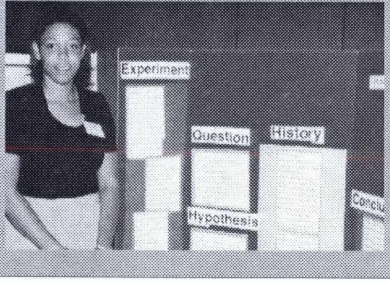


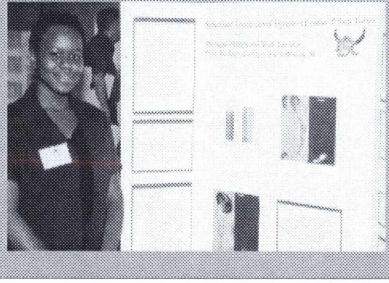


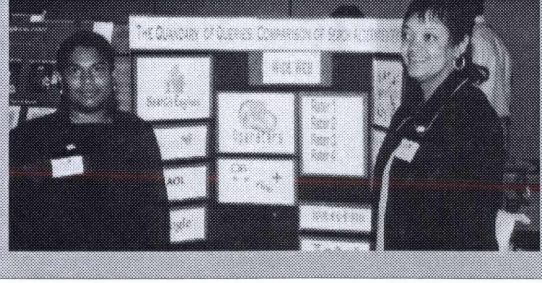
Poster Competition









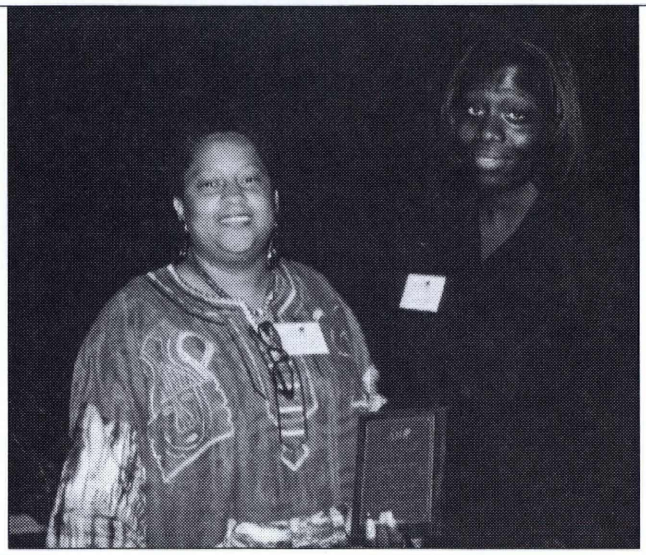


Computer Science and Mathematics

First Place

Annette D. Davis
Benedict College

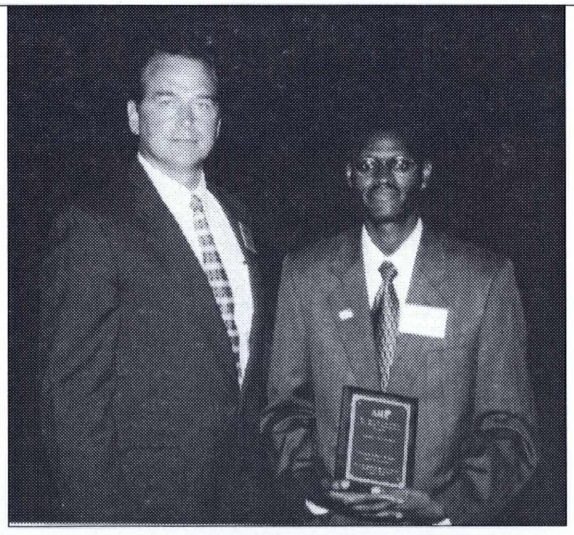
Computer-Speech Technology and Interactions of Intelligent Software Agents



Second Place

Mathew J. Moore
Voorhees College

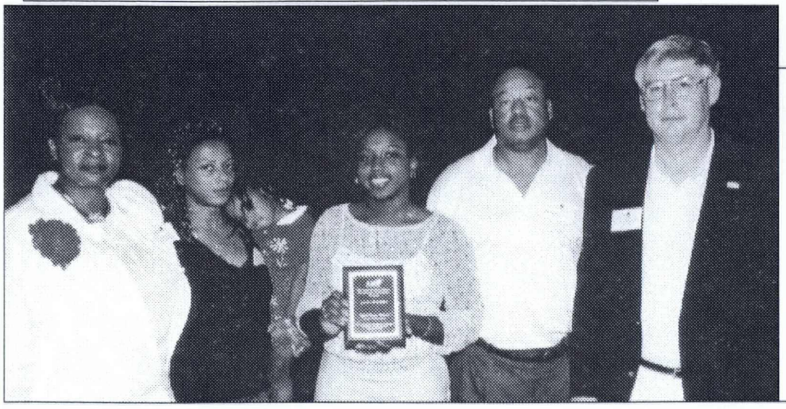
User-friendly Web-based Data Delivery



Second Place

Theotis L. Washington
University of South Carolina

User Interface Support for Learning Bayesian Networks from Data

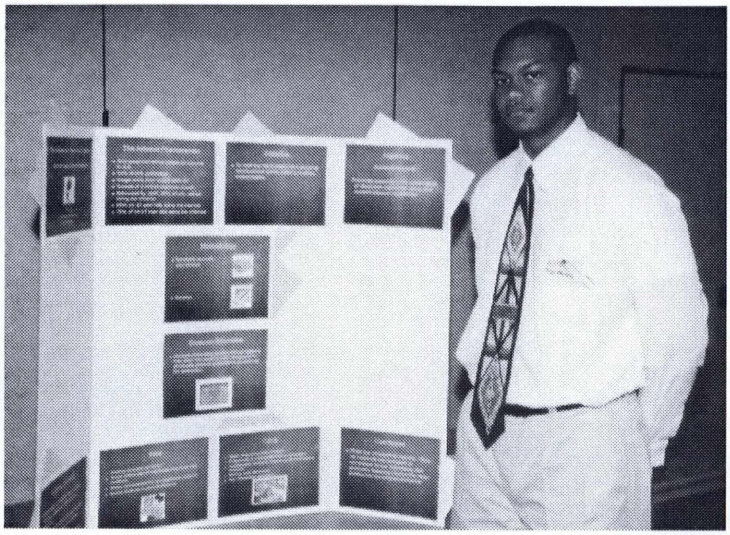


Third Place

Jamika Livingston
South Carolina State University

Automatic Determination of Chemometric Preprocessing for Multiple Year Data

Physics and Engineering



First Place

Troy Nelson
College of Charleston

"A New Era of Learning: Internet-Based Distance Education"

Second Place

Cody Ford
University of South Carolina

Piezoelectric Controlled Electromechanical Devices Electronic Valves
Camless Engine

Third Place

Rashada Ross
College of Charleston

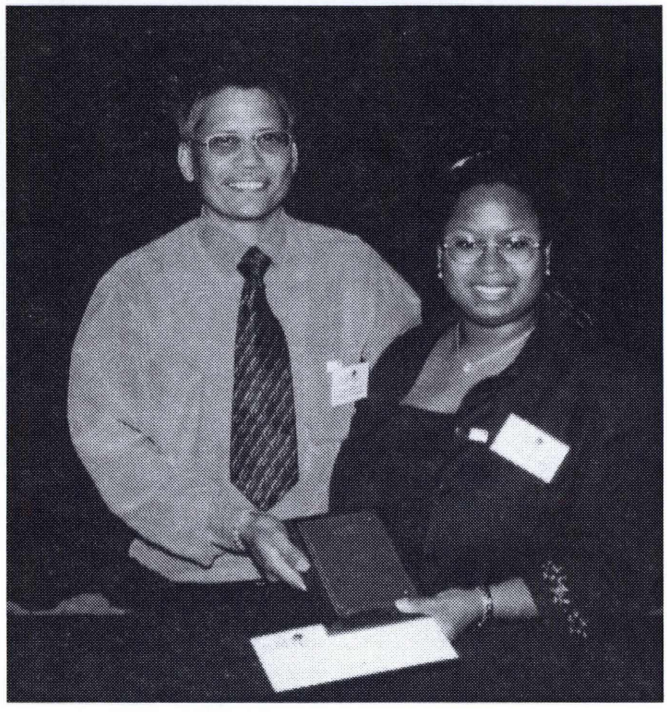
Measuring the Uptake of Merocyanine 540 (MC540) and Chloradinitrobenzene (CDNB) Within A549 Lung Cancer Cells

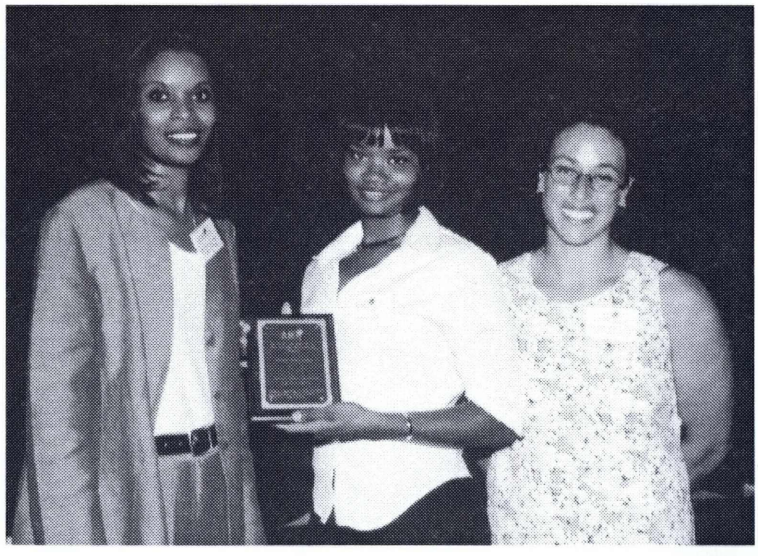
Natural Science

First Place

Yaenette N. Dixon-Mah
College of Charleston

Vascular Endothelial Growth Factor (VEGF) Expression in Chronically and Acutely Adapted Human Cancer Cells Under Acidosis and Hypoxia





Second Place

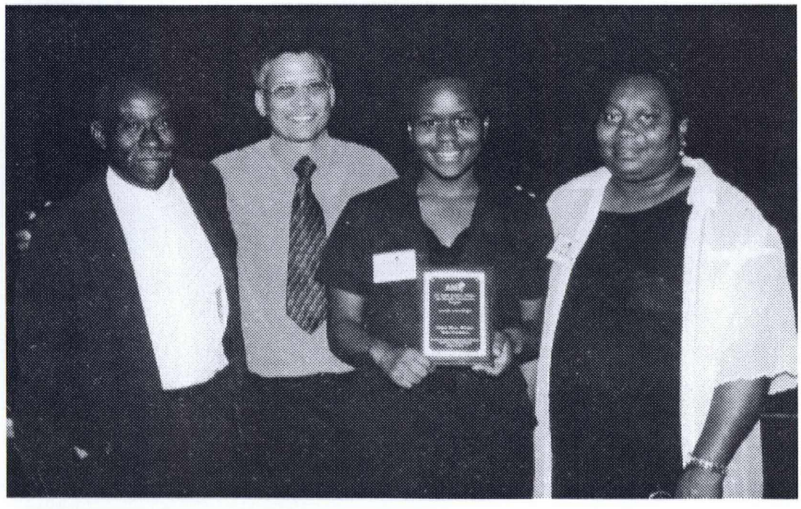
Tiffany Hall
Voorhees College

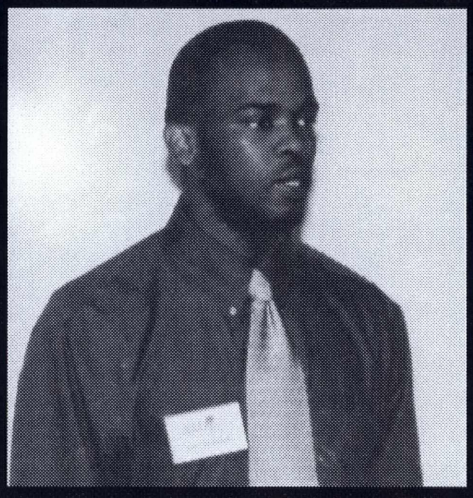
Temporal Patterns in Carbon, Nitrogen, and Phosphorus within Open Ocean Plankton

Third Place

Monique Phillips
College of Charleston

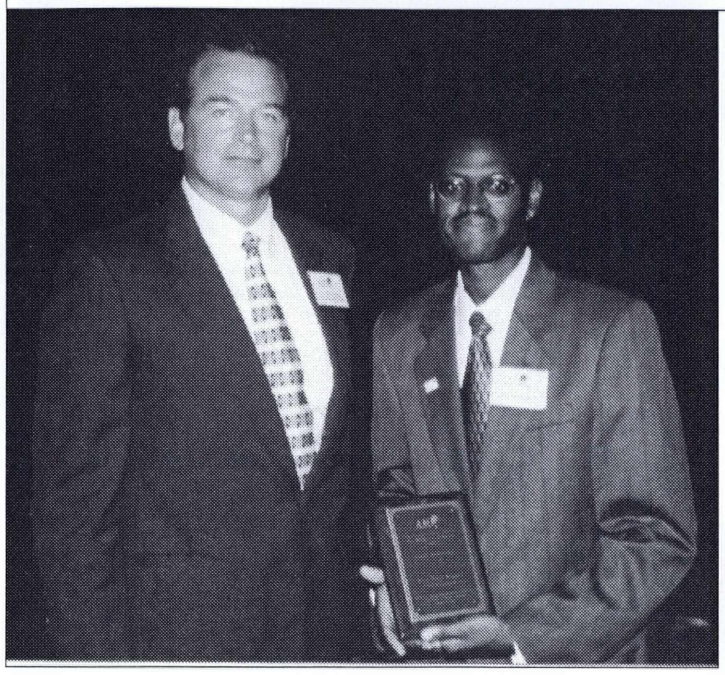
Subcellular localization of dynein in conifer pollen tube





Oral Competition

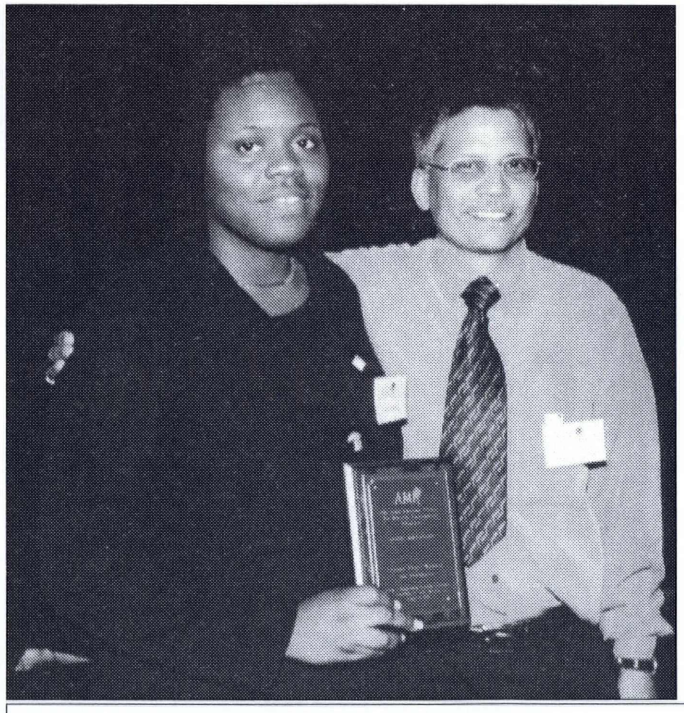
Computer Science and Mathematics



First Place

Theotis L. Washington
University of South Carolina

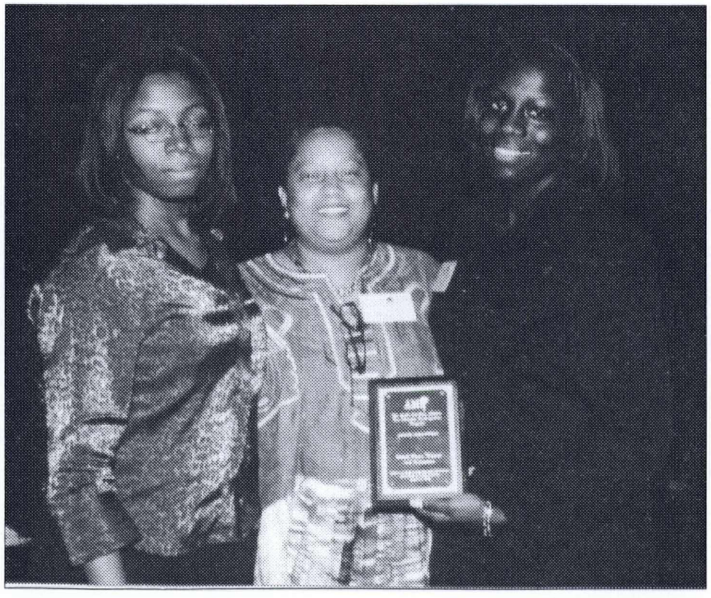
User Interface Support for Learning Bayesian Networks from Data



Second Place

Vashtia Bennett
College of Charleston

A new lite magic cube and enclosing of magic squares



Third Place

Annette D. Davis
Benedict College

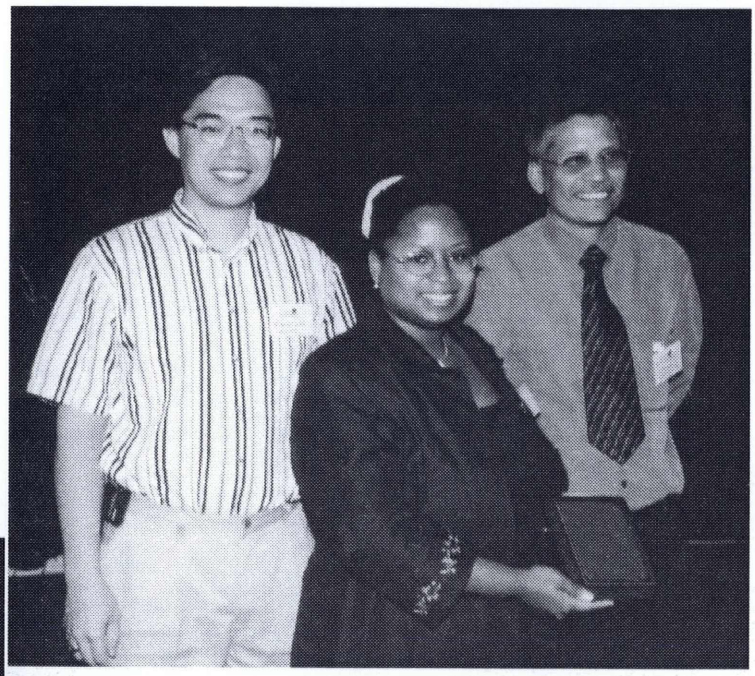
Computer-Speech Technology and Interactions of Intelligent Software Agents

Natural Science I

First Place

Yaenette N. Dixon-Mah
College of Charleston

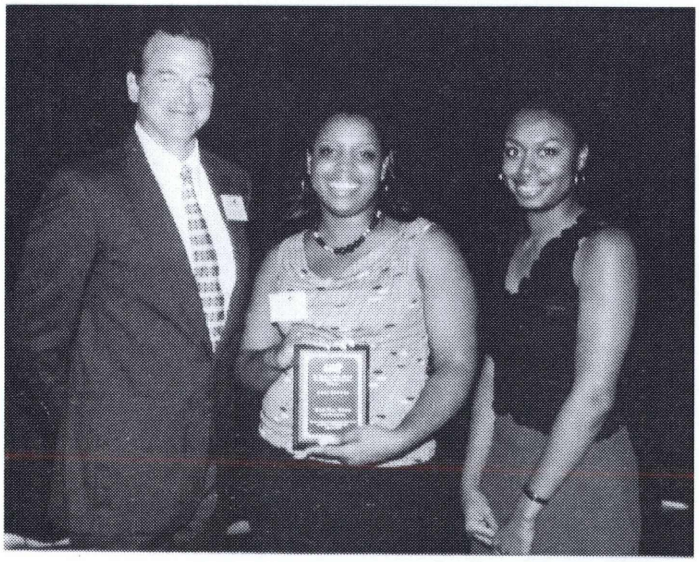
Vascular Endothelial Growth Factor (VEGF) Expression in Chronically and Acutely Adapted Human Cancer Cells Under Acidosis and Hypoxia



Second Place

Olivia Brown
College of Charleston

"What's All the Fuss About?: The Ethics of Stem Cell Research"

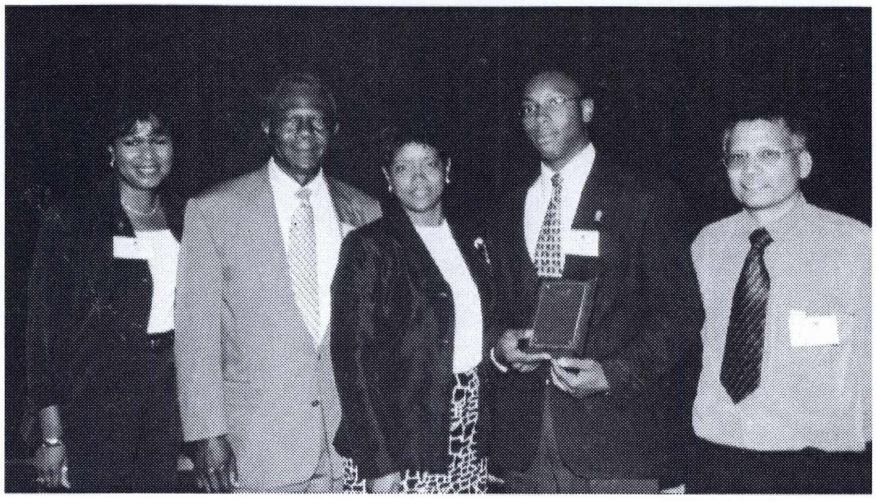


Third Place

Christina White
University of South Carolina

The Reproductive Ecology of the Alien Invasive Love Bug, Plecia nearctica

Natural Science II



First Place

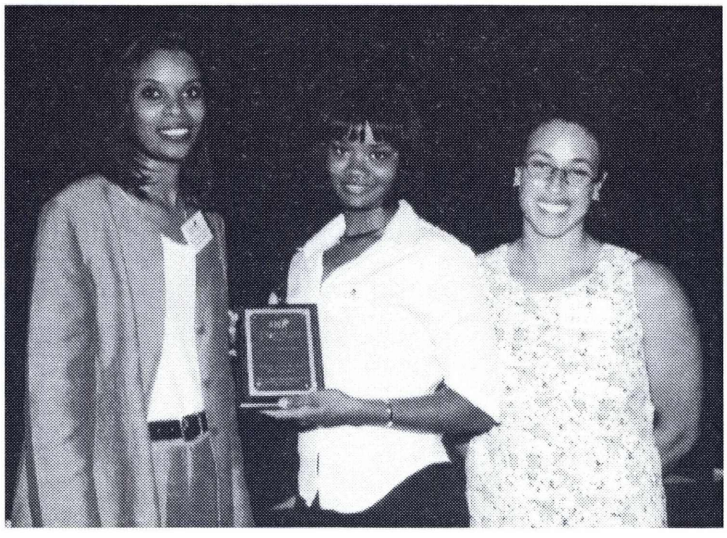
Travis D. Chavis
College of Charleston

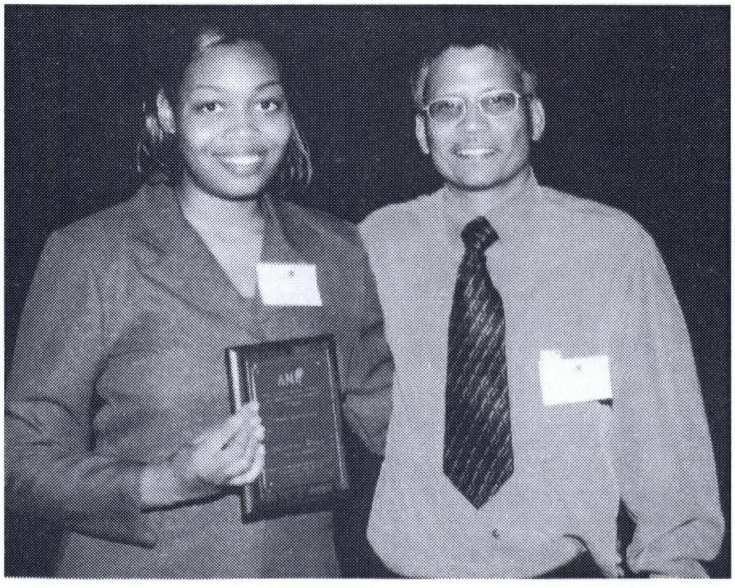
Cerulenin and Ischemia Survival

Second Place

Tiffany Hall
Voorhees College

Temporal Patterns in Carbon, Nitrogen, and Phosphorus within Open Ocean Plankton





Third Place

Terica Simpson
College of Charleston

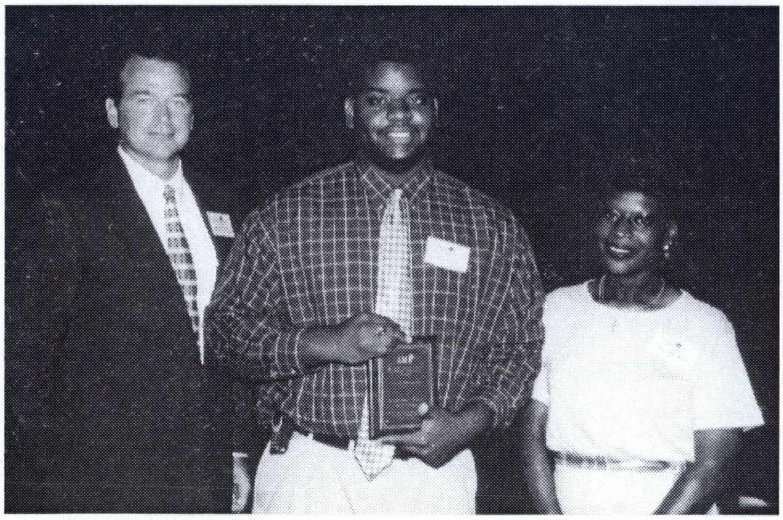
Effect of Insulin-like Growth Factor (IGF)-binding Proteins on Cell Proliferation and Apoptosis in Cervical Cancer

Physics and Engineering

First Place

Rashada Ross
College of Charleston

Measuring the Uptake of Merocyanine 540 (MC540) and Chloradinitrobenzene (CDNB) Within A549 Lung Cancer Cells



Second Place

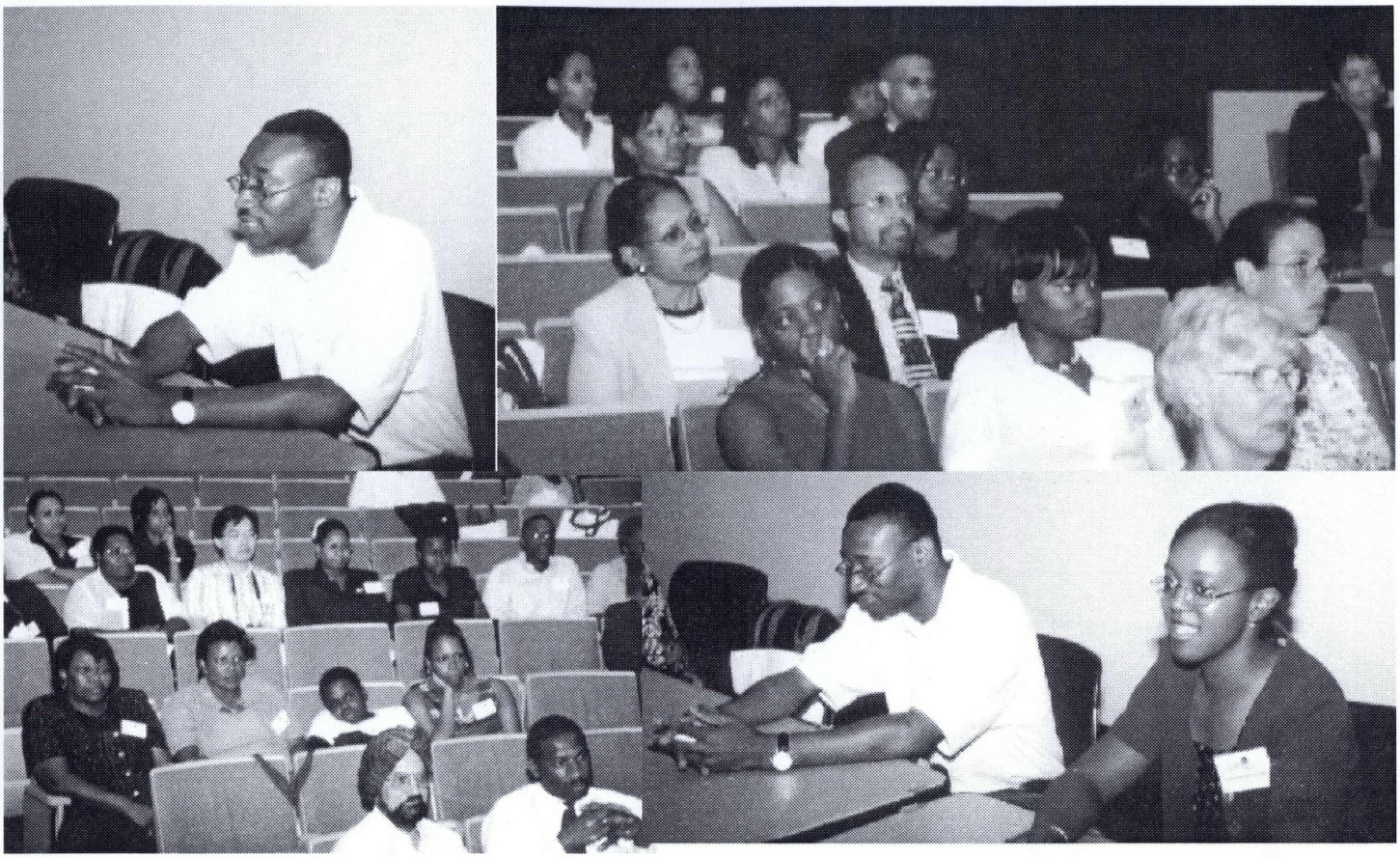
Brendon Wilson
University of South Carolina

Removing Fire Ants from Their Parent Material

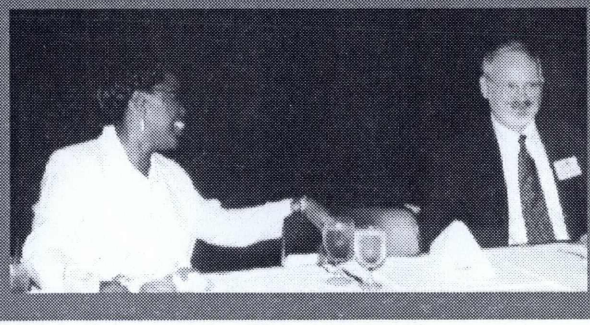
Third Place

Cody Ford
University of South Carolina

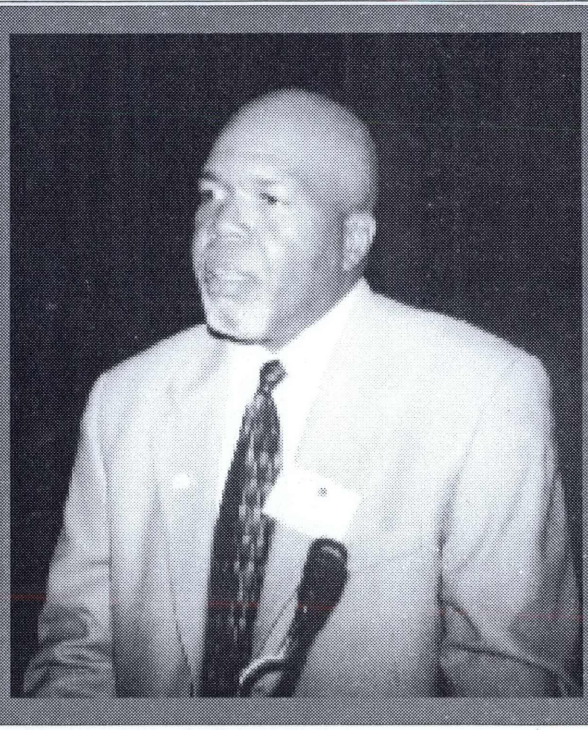
Piezoelectric Controlled Electromechanical Devices Electronic Valves Camless Engine

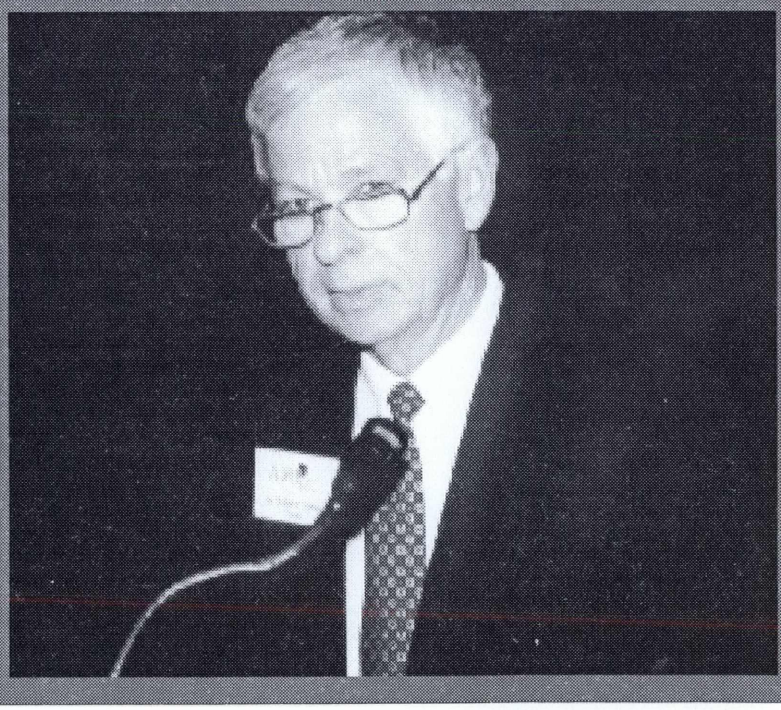


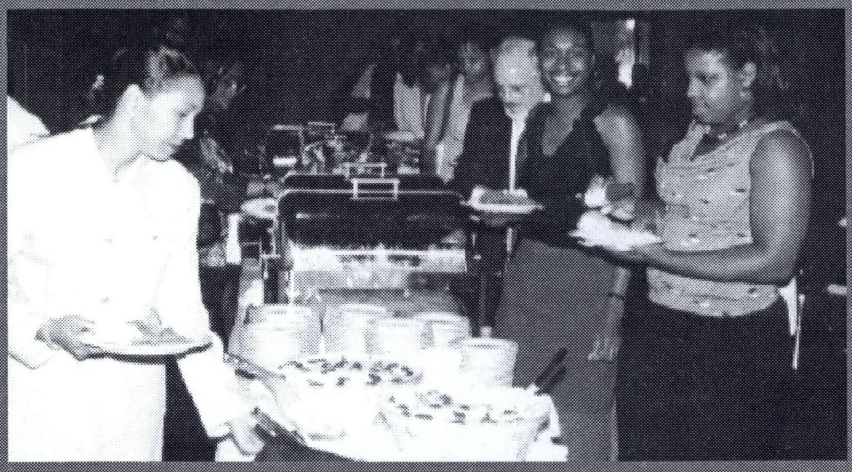
Graduate Student Forum

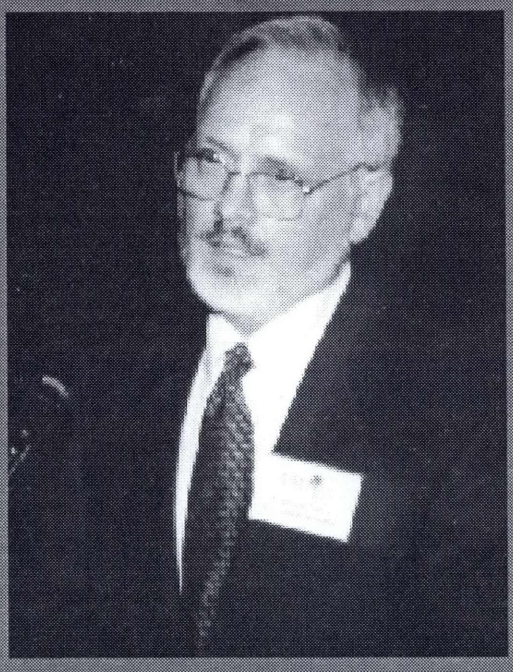


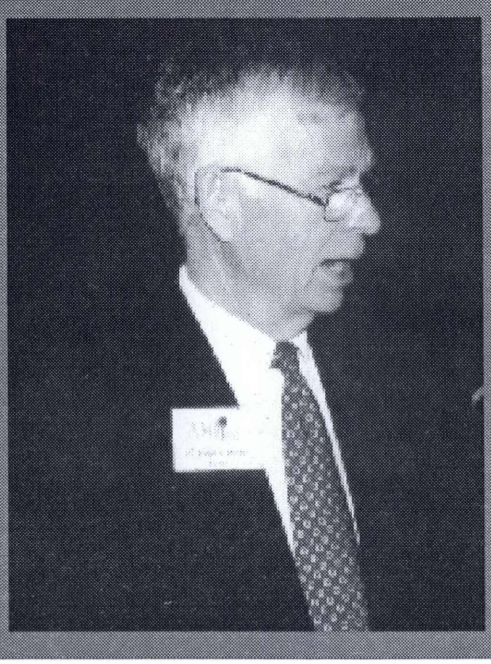
Awards Banquet

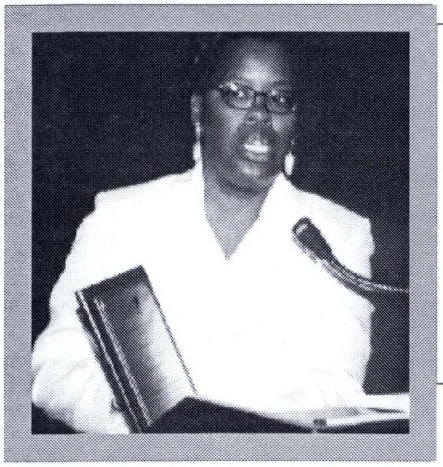










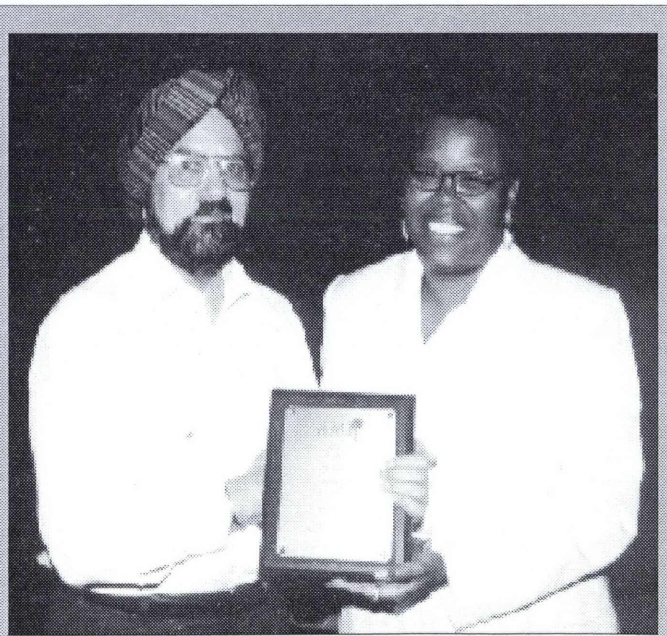


Honoring the SC Alliance Campus Directors

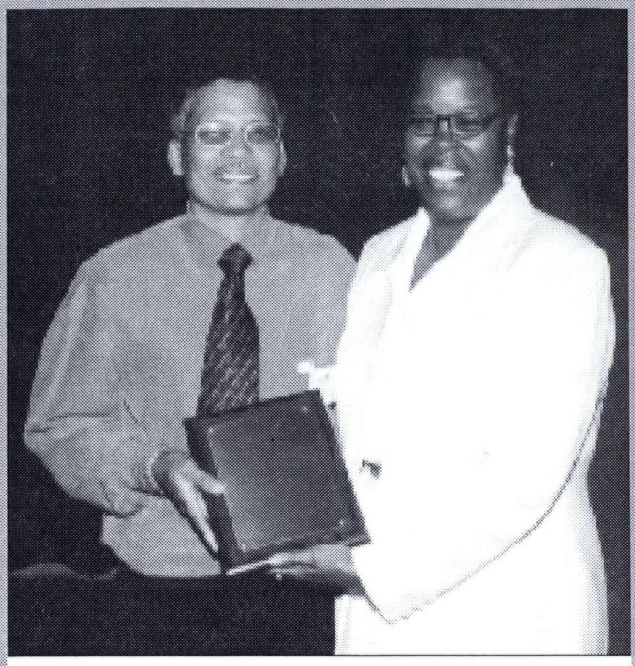
Achieving Success in Research and Education

Special Presentations

Ms. Vivian Counts
Benedict College



Dr. Shingara Sandhu
Claflin Univeristy



Dr. Dinesh Sarvate
College of Charleston

Dr. Judith Salley
South Carolina State University

10th Anniversary

Dr. Cassandra Smith
Voorhees College

Dr. Michael Perkins
University of South Carolina

Louis Stokes Alliance

Winning Presentation Abstracts

Vashtia Bennett[1]; Dr.Dinesh G. Sarvate[2]
[1]College of Charleston: Sophomore
College of Charleston

A new lite magic cube and enclosing of magic squares

We define an interesting cube with entries from 1 to n^2 instead of the magic cube which contains n^3 numbers. We prove that such cubes exists for order 1 and 4 only. Enclosing problem of magic squares will be discussed. A known construction of magic squares is used to obtain the minimal enclosing of a magic square of order 3 into a magic square of order 9 and it is shown that why a smaller order enclosing is not possible.

Olivia Brown[1]; Tameka Sumter and Dr. Erin Connolly[2]
[1]College of Charleston: Sophomore
University of South Carolina

"What's All the Fuss About?: The Ethics of Stem Cell Research"

As technology progresses, medical scientists are finding new ways to cure and treat diseases that affect Americans. The latest research includes the study of stem cells. Research shows that adult stem cells and embryonic stem cells may be used to treat diseases such as Alzheimer's and Parkinson's by replacing malfunctioning cells with specialized stem cells. Although this scientific phenomenon creates a sense of hope in the medical field, the methods of acquiring embryonic stem cells, along with the limitations of adult stem cells, have fostered a sense of false hope in the hearts of many Americans. This controversy is partially due to the ethical issues associated with stem cell research. Our studies will further develop this moral dilemma, as well as reveal which type of stem cell is more reliable and attainable according to medical and scientific research.

Travis D. Chavis[1]; Stephen Shifizadeh; and Kenneth Chavin, M.D/Ph.D.[2]
[1]College of Charleston: Freshman
Medical University of South Carolina

Cerulenin and Ischemia Survival

Within fatty livers the release of the endotoxin as a result of ischemia can cause massive damage to the liver as well as other surrounding organs. Eventually this will lead to liver failure and the individual will require another liver or die. Cerulenin, is a fatty acid synthase that can be used to slow down the growth of the bacteria, ultimately limiting the amount of endotoxin that is released during reperfusion of the liver. **Method:** Two types of mice will be used ob/ob mice and lean mice. Both will be given Cerulenin followed by ischemia will be performed cutting circulation to the liver at various intervals and then the livers will be reperfused. Mice of both types will be observed one group for a period predetermined intervals and then sacrificed. In direct contrast to the Cerulenin mice there will be a set that receive no drug. These mice will also receive ischemia and reperfusion they will be allowed to die naturally. Tissue and liver samples will be taken from both Cerulenin mice and control mice and analyzed to see the effect that the drug has on the production of UCP-2 (protein found in endotoxin). **Hypothesis:** Both sets of mice will survive ischemia and reperfusion when given Cerulenin; however, only the lean will survive in the absence of Cerulenin. Mice receiving the drug when their liver and tissue samples are analyzed will show lower signs of UCP-2 present then those who received nothing.

Annette D. Davis[1]; Dr. Michael Huhns[2]
[1]Benedict College: Senior
University of South Carolina

Computer-Speech Technology and Interactions of Intelligent Software Agents

The objective of this project is to investigate the use of computer-speech technology for displaying and describing the interactions of intelligent software agents. Agents interact by sending messages, but the messages and their sequencing are not always obvious to the people that need to interact with the agents as well. By having the agents "speak" the messages, they will be able to interact with people more naturally. I used the Java Agent DEvelopment (JADE) framework, which is a software framework to develop agent-based applications. I also used FreeTTS, which is a speech synthesizer written entirely in the Java programming language. It enables a software developer to write Java code to synthesize and recognize speech. FreeTTS defines a standard, easy-to-use, cross-platform software interface to state-of-the-art speech technology. JADE and FreeTTS were downloaded from the Internet. I made sure each program was installed and running. I combined the ThanksAgent program from JADE and the HelloWorld program from FreeTTS to make the agents talk aloud. This project helped me to determine how computer speech can be used more effectively. Also, it provided me with information on the most reliable text-to-speech tools to use with agents or other software programs.

Yaenette N. Dixon-Mah[1]; Ben Moeller and Dr. Mark W. Dewhirst[2]
[1]College of Charleston: Senior
Duke University

Vascular Endothelial Growth Factor (VEGF) Expression in Chronically and Acutely Adapted Human Cancer Cells Under Acidosis and Hypoxia

Tumor cells increase secretion of many angiogenic factors, the major one being vascular endothelial growth factor (VEGF). It is known that hypoxia increases VEGF levels thus stimulating angiogenesis. Recently, it has been shown (1,2) that acute acidosis and hypoxia, separately, will alter VEGF amounts in a pH and hypoxic dependent manner. However, the interaction between O_2 amounts and pH using chronically adapted tumor cells has not been examined. This project examines specifically, *in vitro*, the amounts of VEGF (as assayed by ELISA) produced when various human cancer cells are grown chronically and acutely at pHs of 6.8 and 7.2 and then introduced to acidic and normal pH under normoxic and hypoxic conditions. Alterations in the patterns of VEGF secretion following acute exposure to acidosis were heterogeneous between cell lines. Chronic exposure to acidosis dramatically increases steady state VEGF production for some lines, and can also change the patterns of VEGF secretion following hypoxic insult. With further experiments we hope to investigate the mechanistic link between chronic acidic adaptation and VEGF response to acute environmental changes.

1.Shi Q, Le X, Wang B, Abbruzzese J, Xiong Q, He Y, and Xie K. (2001). Oncogene. 20, 3751-3756
2.Fukumaura D, Xu L, Chen Y, Gohongi T, Seed B, Jain R. (2001). Cancer Research. 61, 6020-6024

Cody Ford[1]; John Brader; Dr. David Rocheleau; Dr. Abdel-Moez Bayoumi[2]
[1]University of South Carolina: Sophomore
University of South Carolina

Piezoelectric Controlled Electromechanical Devices
Electronic Valves Camless Engine

In today's Internal Combustion Engine (ICE) a camshaft controls the displacement of the engine valves. The pistons drive the crankshaft, which turns the camshaft, which displaces the engine valves. A car's cam profile is what makes it either fuel efficient or high performance. The Advanced Actuators Group of the University of South Carolina developed a novel device to actuate the engine valves directly and independently, resulting in a "camless engine." The purpose is to produce an engine with infinitely variable timing and variable displacement. Piezoelectric technology is used to control hydraulic fluid and ultimately the movement of the engine valve. One of the things that needed to be done was to determine the step response of the valve. A step response was used to ascertain how much lag time was in the valve displacement by investigating how much time it took the engine valve to open relative to when the signal was sent for it to open. These tests were run with a spring in place and without. The purpose of the spring was to close the engine valve. Then a collar was designed to close the valve without the spring. The purpose was to find out how the response differed with and without the spring in place. The results showed that there was indeed a difference in the step response of the system.

Tiffany Hall[1];Dr. Claudia Benitez-Nelson[2]
[1]Voorhees College: Junior
University of South Carolina

Temporal Patterns in Carbon, Nitrogen, and Phosphorus within Open Ocean Plankton

CO_2 is an important greenhouse gas and a potentially major contributor to global warming. In the oceans, plankton consume atmospheric CO_2 during growth (photosynthesis). Thus, they play a major role in atmospheric CO_2 removal. Therefore, it is necessary to understand what promotes plankton abundance and growth in the ocean. The goal of this project is to investigate plankton nutrient limitation over diurnal, monthly, seasonal, and interannual time scales. Monthly plankton tows were collected in the North Pacific Subtropical Gyre (NPSG) at Station ALOHA from December 1999 to August 2001. Samples were analyzed for Carbon (C), Nitrogen (N), and Phosphorus (P) in the 64 um plankton tow size fraction using high temperature combustion and colorimetric techniques. The average C/N, N/P and C/P ratios were 3.9 ± 1.4, 63.3 ± 57.7, and 203.8 ± 155.4, respectively. This is in direct contrast to the canonical Redfield C:N:P ratio of 106:16:1 often used by Oceanographers to access nutrient limitation. Our results generally imply that the plankton are limited by C and P. Seasonal C:N, N:P, and C:P ratios imply P limitation during the summer, when N:P and C:P ratios significantly decrease relative to the winter. These results further indicate that P may be the 'ultimate' limiting nutrient in these organisms. An increase in the C:P and N:P ratio during the summer further suggests the appearance of N_2-fixing organisms. Taken together, our results support the hypothesis of a climate induced transition from N to P limitation in the NPSG over time.

Jamika Livingston[1]; Dr. David S. Himmelsbach[2]
[1]South Carolina State University: Freshman
USDA-ARS

Automatic Determination of Chemometric Preprocessing for Multiple Year Data

Chemometric preprocessing parameters were determined for multiple year spectral and chemical data using automation in MATLAB software. The process was applied to two years of near-infrared (NIR) and Fourier-transform Raman (FT/Raman) spectral data to provide calibrations for the prediction of the amylose and protein contents of rice flour. Data was utilized from sample years 1996 and 1999. Data were collected on a Foss/NIRSystems 6500 monochromator and a Nicolet 950 FT/Raman spectrometer, respectively. Separate instrument background corrections for each year's data were performed to partially correct for instrument changes over the 3-year period. The data files were then imported into MATLAB for processing. Direct Standardization, using a common set of data, was employed generating an instrument transfer function to further correct for instrument changes and make the 1996 data appear as if it were collected under the same instrumental conditions as the 1999 data. The combined data sets were then processed using the automated routines developed to produce the output of root mean squared error (RMSE) vs. smooting parameters and smoothing parameters vs. latent variables. From the output plots generated, the best overall preprocessing parameters were determined to produce a robust calibration equation from multiple year data by which future chemical results can be predicted with increased confidence.

Mathew J. Moore[1]; Dr. Daniel Smith[2]
[1]Voorhees College: Junior
South Carolina State University

User-friendly Web-based Data Delivery

Sharing data is essential in scientific research so that others may check the work, and build upon it. Such sharing is greatly facilitated if researchers external to project can easily access the data. While database tools are appropriate for large (Megabytes) data sets, much smaller (kilobytes) data sets could be more easily accessed using a standard web browser. This project creates prototype web pages in the JavaScript language to demonstrate the design of such a web-based data delivery system. Simplicity of the interface insures that an external scientist can access data with minimum of effort.

Troy Nelson[1];Tasha Reid; Dr. Wally Peters[2]
College of Charleston: Sophomore
University of South Carolina

"A New Era of Learning: Internet-Based Distance Education"

Today the Internet has made a dominant surge in our society. In fact, the Internet has been cited as the "new oral culture." Its presence has reached over into our educational systems, creating a new era of learning. This era of learning is headed by an Internet-based distance education component that is the trend of the educational system. The purpose of our research is to show that productive contemporary education is two-dimensional in that it consists of a blend of traditional classroom and Internet-based aspects. We argue that these two dimensions create balance that simply signifies a new era in our educational system; this era allows for a system that is based on proximity learning, which is the combination of traditional face-to-face classroom interaction along with contemporary Internet-based distance education. In our efforts to show the balancing effect that Internet-based distance education and traditional classroom settings produce, our methods include extensive review of academic journals and articles. Our methods also include the surveys of students that encompass both distance education and the traditional classroom setting.

Monique Phillips[1]; Dr. Mark Lazzaro[2]
College of Charleston: Junior
College of Charleston

Subcellular localization of dynein in conifer pollen tube

Pollen grains are important for fertilization in land plants. The pollen grain delivers sperm to the egg for fertilization. Tube elongation differs in conifers and flowering plants at the cellular level. Mocrotubules are functionally important in coinfers for tip elongation. They are found in a longitudinal array in the tube and are concentrated at the tip. In this experiment, the conifer *Picea abies* was employed as our model system. In order to better understand the function of the microtubules in pollen tubes, the location of dynein, a microtubule motor protein, in this gymnosperm was determined. It was hypothesized that the microtubules in gymnosperms function in the organization of the pollen tube, and thus dynein, a microtubular motor protein, would be found throughout the tube positioning organcelles. Dynein was first identified in total protein extracts from *Picea abies* pollen using immunoblots from acrylamide gel electrophoresis. The pollen tubes were then immunolabeled with a dynein antibody and a fluorecently labled secondary antibody in order to determine the location of the dynein. Confocal microsopy was used to view the labeling. Dynein labeling was concentrated at the tip. From this we can surmise that dynein probably plays an important role in the streaming and elongation in gymnosperms.

Rashada Ross[1]; Dr. Linda R. Jones[2]
College of Charleston: Junior
College of Charleston

Measuring the Uptake of Merocyanine 540 (MC540) and Chloradinitrobenzene (CDNB) Within A549 Lung Cancer Cells

Photodynamic therapy (PDT) is a treatment that has been used by researchers and doctors over the past two decades as a means of cancer treatment. In this particular treatment a dye is injected into the tumor and then light is shined on it a certain wavelength. The dye nor the light are damaging alone, but together they cause singlet oxygen to be produced within the tumor and be destroyed. This treatment is very effective because normal cells and/or tissue within the body are not harmed. Merocyanine 540(MC540) is use as the dye for the treatment of bone marrow for leukemia patients. MC540 is a photosensitizing dye that reacts when exposed to green light. It is not yet known the mechanism of MC540 uptake. However, it is known that L1210 mouse leukemia cells are sensitive to this dye and A549 human lung cancer cells are resistant to MC540. Our hypothesis is that A549 lung cancer cells have multidrug resistance transporters that inhibit the accumulation of multidrug resistant substrates in that particular cancer cell. (The dye enters the cells, but the transporters driveit back out). Chlorodintrobenzene is used in this treatment because it acts as an inhibitor. By adding CDNB thethe tranporters are as a result kept occupied, thus allowing the MC540 to remain in the cell. The results of this project will help to explain the mechanism of MC540 PDT.

Terica Simpson[1]; Dr. Subbi P. Mathur and Dr. Rajesh S. Mathur[2]
[1]College of Charleston: Freshman
College of Charleston

Effect of Insulin-like Growth Factor (IGF)-binding Proteins on Cell Proliferation and Apoptosis in Cervical Cancer

Aim: To determine the effects, if any of Insulin-like Growth Factor (IGF)-binding Proteins on Cell Proliferation and Apoptosis in Cervical Cancer. Since previous work from this laboratory has shown the involvement of IGF-II in cervical cancer, it is important to know if IGF-binding proteins have any effect on cell proliferation and more importantly on programmed cell death. **Method**: Human Papillomavirus (HPV)-negative cervical cancer cell line HT-3 and HPV-positive ME-180 cervical cancer cells will be incubated with IGF-II, as well as IGF-binding proteins 3 and 5. The cells will be harvested at 24 and 48 hours after incorporation of the test compound in the medium. The supernants will be evaluated for the levels of IGF-II by enzyme-linked immunosorbent assay. The cells will be divided into two portions, one to study the extent of proliferation (direct cell count), DNA damage (dye inclusion test), and measurement of Cytochrome C and Caspase C. Levels of EGF-R, IGF-II, and IGF-binding proteins in the cells will be enumerated in the other portion using a semi-quantitative immunofluorescent antibody assay. **Anticipated Results**: The IGF-bindings proteins 3 and 5 may have diverse effects on the cell proliferation and cell death.

Theotis L. Washington[1]; Dr. Marco Valtorta[2]
University of South Carolina: Senior
University of South Carolina

User Interface Support for Learning Bayesian Networks from Data

Bayesian networks exist as a tool to aid in reasoning with uncertainty. They are, in essence, a probabilistic representation and modeling scheme that has gained much acceptance in the artificial intelligence community. A Bayesian network structure is a directed acyclic graph (DAG), which consists of vertices and edges. The vertices correspond to events (or variables) and the edges enforce constraints on the conditional independence relation for the joint probability of the variables. These networks are generally displayed in a way that permits easy interpretation. In practice, it is common to simply design a Bayesian network by hand or with the aid of some software package. Using these methods, the designer is more susceptible to maintain the aesthetic properties of a DAG and a Bayesian network. However, if you generate a Bayesian network from data and want to create a visual representation of it, what tools exist to enforce the drawing conventions, constraints, and aesthetic properties of the network? The work to be presented extends results obtained by graduate students Moninder Singh and Bing Xia, who designed and implemented an algorithm to learn Bayesian networks from data. It will extend their work in such a way that it will provide the user with file format conversion and visualization tools to properly display Bayesian networks learned from data. These tools were designed and implemented using the Java programming language and various graph drawing application program interfaces (API) that provided significant support for the hierarchical structure of Bayesian networks.

Christina White[1]; Dr. Timothy A. Mousseau[2]
[1]University of South Carolina: Junior
University of South Carolina

The Reproductive Ecology of the Alien Invasive Love Bug, Plecia nearctica

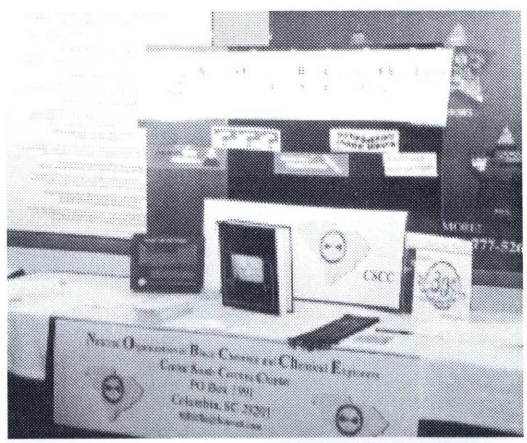
The love bug, *Plecia nearctica*, is characterized by a prolonged period of copulation whereby males and females are locked in tandem for 56 hrs on average. We hypothesize that: 1) during this time period significant extragametic materials are transferred from the male to the female, in addition to sperm. It is believed that these extragametic materials are incorporated by the female into egg production, 2) that there is assortative size mating between males and females. This is expected to enhance flight maneuverability while the flies are in copula. In this study we will sample both mating and non-mating individuals from a number of populations from Florida. Flies will be weighed using a Cahn Electrobeam microbalance and body length measured using a Wild dissecting microscope. Analysis of covariance will be used to test for the effects of copulation on male weight loss and female weight gain, and linear regression will be employed to test for size assortative mating. We found that there was not a significant difference in body length among non-mating and mating males (t-test: $t_{163} = 0.97$, $P=0.336$). However, there was a significant difference in weight between the non-mating and mating males (t-test: $t_{163} = 4.04$, $P< 0.0001$). Therefore, males transfer about 16% of there body mass to females during copulation. Our data also indicate that larger females mate with larger males ($F_{1, 79} = 5.78$, $P<0.05$), which is consistent with the assortative mating hypothesis.

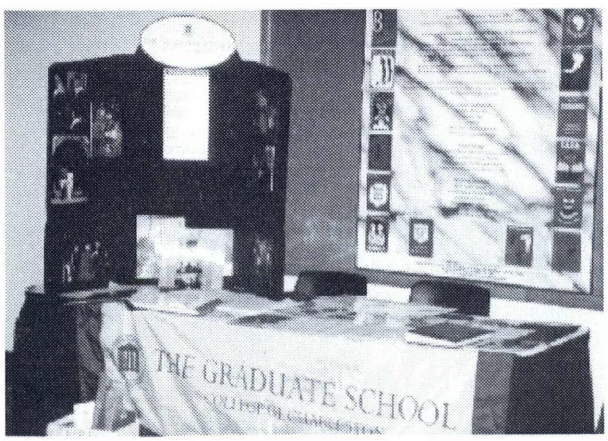
Brendon Wilson[1]; Dr. Lynn Wike[2]
[1]University of South Carolina: Senior
Westinghouse Savannah River Site

Removing Fire Ants from Their Parent Material

Fire Ants are a mobile species of insect. Due to the design of their bodies, they are able to float on water. Whenever flooding occurs along a river, almost the entire colony is able to move with the waters. A huge raft, made of the bodies of the ants and the queen, is constructed. The ant raft will continue to float until it bumps into land. Once they hit land, the ants proceed to disturbed, open areas, where there is plenty of sunlight. Unfortunately, these disturbed areas include various places of human activity. Freshly cut lawn, cleared fields, sidewalks, and fence posts are common areas of fire ant inhabitance. Only about ten percent of the Savannah River Site is being used for daily human activities. However, the fire ants are still colonizing areas where they are unwanted. The contaminated waste sites of SRS are disturbed areas where the ants live and eat. Whatever is in the ecosystem will show up in the ants. Simply destroying the nests through extermination would be a costly procedure due to the vastness of the site. Therefore collection of the ants is preferred for a bioassay or biological assessment. Since the nest is usually six feet below the mound, removal of the mound would leave six-foot holes. Thus, two devices of collecting a pure sample of ants from their parent material, or mound, were designed. One device is an active sampler, and the other is passive. The passive sampler is easier and less costly to construct. However, the amount of fire ants that can be sampled is limited. The active sampler maximizes the amount of fire ants to be sampled. At the same time, it also has a more complicated concept and design.

SCAMP would like to thank the universities, companies and organizations that attended the 2002 summer research conference.





NSF

Benedict College

Ms. Vivian Counts
Dept of Biological and Physical Sciences
1600 Harden Street
Columbia, SC 29204
803-253-5280

Claflin University

Dr. Shingara Sandhu
JST Science Bldg
Orangeburg, SC 29115
803-535-5447

Clemson University

Dr. Bob Snelsire
EE Department
Clemson, SC 292634
864-656-5915

College of Charleston

Dr. Dinesh Sarvate
Department of Mathematics
66 George Street
Charleston, SC 29424
843-953-5736

Midlands Technical College

Mr. Rick Bailey
Department of Mathematics
316 S. Beltline Blvd
Columbia, SC 29205
803-738-7618

South Carolina State University

Dr. Judith Salley
Department of Biology
206 Hodge hall
Orangeburg, SC 29117
803-536-8509

University of South Carolina

Dr. Michael M. Perkins
College of Engineering & Information Technology
Swearingen Center
Columbia, SC 29208
803-777-2706

Voorhees College

Dr. Cassandra Smith
Dept of Natural and Computer Science
1411 Voorhees Rd
Denmark, SC 29042
803-793-3351

Proceedings of the SCAMP Research Conference provided by SCAMP Statewide Office.

Designed by Saphronia R. Johnson
Photos by Bennie Brown Photography

SCAMP is dedicated to increasing the chances of success in Sciences, Mathematics, and Engineering in South Carolina.

Swearingen Center, Columbia SC 29208
803-777-2706
www.cosm.sc.edu/scamp