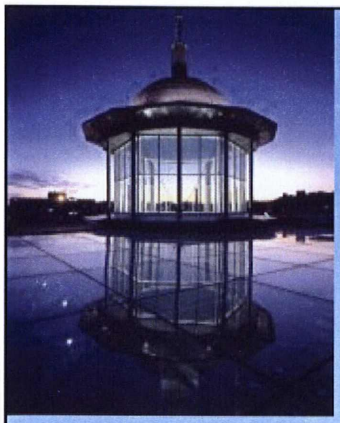

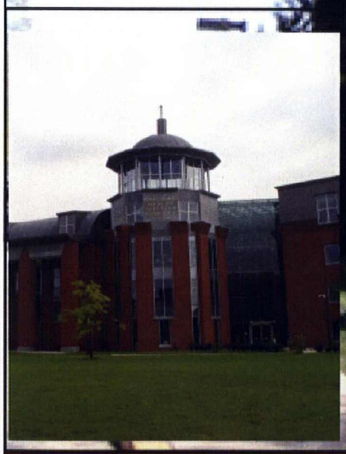

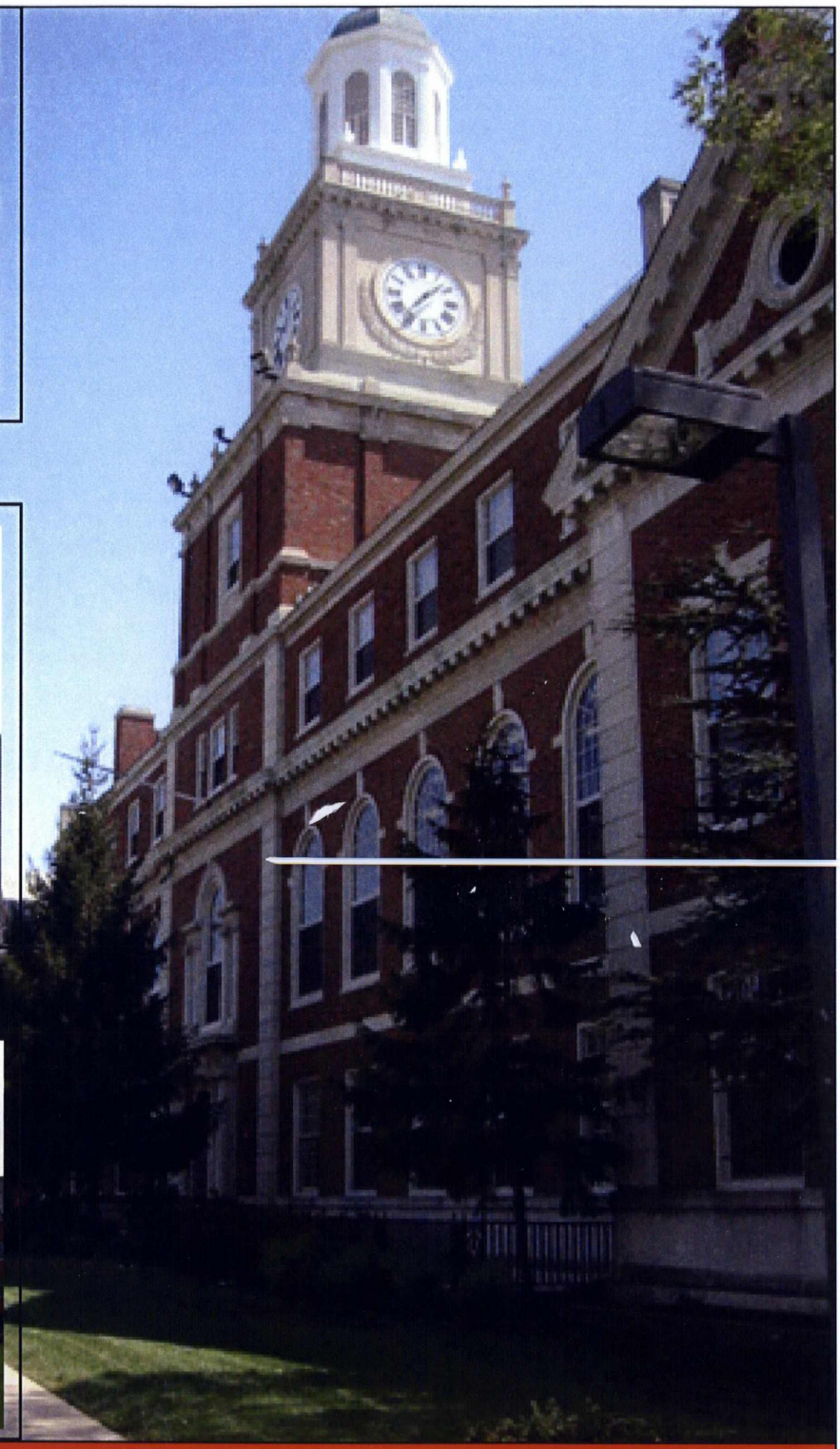

WBHR-LSAMP
Board of Advisors Meeting 2005

The National Science Foundation

WBHR LSAMP

Washington/Baltimore/Hampton Roads Louis Stokes Alliance for Minority Participation Program

Science
Technology
Engineering
and
Mathematics

Undergraduate Research Symposium

Howard University Blackburn Center
October 17, 2005
7:30 AM - 2:00 PM

HOWARD UNIVERSITY
IS PROUD TO HOST THE
BOARD OF ADVISORS MEETING
OCTOBER 17, 2005
SHOWCASING FACULTY-MENTORED RESEARCH

Howard University Hosts

H. Patrick Swygert, President

Dr. Richard A. English, Provost and Chief Academic Officer, Principal Investigator, Washington Baltimore Hampton Roads-Louis Stokes Alliance for Minority Participation (WBHR-LSAMP)

Dr. Clarence Lee, Executive Director and , Co-Principal Investigator, WBHR-LSAMP

Dr. William Gordon, Alliance Coordinator, WBHR-LSAMP

HOWARD UNIVERSITY

OFFICE OF THE PROVOST AND
CHIEF ACADEMIC OFFICER

October 17, 2005

Dear Conference Participants:

On behalf of H. Patrick Swygert, President of Howard University, and the Presidents of Bowie State University, the University of the District of Columbia, Hampton University, Morgan State University, Norfolk State University, and Virginia State University, I welcome you to the annual meeting of the Board of Advisors of the Washington Baltimore Hampton Roads – Louis Stokes Alliance for Minority Participation (WBHR-LSAMP) program.

The annual Board meeting gives the Advisors an opportunity to evaluate current and proposed programmatic activities and policies of the WBHR-LSAMP program. At the meeting, in addition to issues related to program development, the Board of Advisors will provide advice to conference participants regarding best practices in the scientific and engineering communities. They will also offer recommendations that will assist us in preparing more undergraduate students who are underrepresented in the science, technology, engineering, and mathematics disciplines.

I extend my sincere appreciation to all Alliance members for their continued support of and participation in the program. I especially want to thank all mentors for their continued dedication and hard work in enriching and diversifying the educational experiences of underrepresented students in science, technology, engineering, and mathematics. I applaud the mentors for the work they did in assisting their students with the development of their outstanding oral and poster presentations.

I encourage each of you to continue to give your very best in support of the WBHR-LSAMP program. I look forward to the opportunity I will have to review the various program highlights and achievements as we begin Phase III of our unique program.

Sincerely,

Richard A. English

Richard A. English, Ph.D.
Provost, Chief Academic Officer and
Principal Investigator, WBHR-LSAMP

RAE:dak

2400 Sixth Street, NW • Suite 405
Washington, DC 20059

(202) 806-2550
Fax (202) 806-4971

Philosophy of WBHR-LSAMP

The Washington Baltimore Hampton Roads- Louis Stokes Alliance for Minority Participation (WBHR-LSAMP) is committed to the goal set by the National Science Foundation, to significantly increase the number of underrepresented minorities receiving BS degrees in the sciences, engineering, and mathematics. To achieve this goal, WBHR-LSAMP has developed strategies to emphasize and facilitate recruitment, retention and enrichment in the course work and research experiences of undergraduate students on the campuses of the members of the Alliance. The seven Alliance members include Bowie State University, the University of the District of Columbia, Hampton University, Howard University, Morgan State University, Norfolk State University and Virginia State University. The ultimate goal of the WBHR-LSAMP program is to double the number of students receiving a bachelor's degree in science, technology, engineering, and mathematics and to encourage students to pursue graduate training that will ameliorate the declining numbers of U.S. citizens who choose careers in science, technology, engineering and mathematics.

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Program Schedule

Moderator: Dr. William Gordon

Monday, October 17, 2005

7:30 A.M. - 8:30 A.M.	Registration, Poster Presentation Set-Up, and Continental Breakfast Gallery Lounge – Blackburn Center
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9:10 A.M. - 9:55 A.M.	Poster Presentations Ground Floor Plaza – Blackburn Center
10:00 A.M. - 12: 00 P.M.	Oral Presentations Moderator: Dr. Shawn Abernathy Reading Room – Blackburn Center
12:10 P.M. - 1:30 P.M.	Meeting and Luncheon for Advisory Committee, Co-Principal Investigators, and Coordinators Gallery Lounge – Blackburn Center
12:10 P.M. - 1:30 P.M.	Luncheon for Students Howard University Faculty Dining Room Blackburn Center
1:30 P.M. - 2:00 P.M.	Wrap-up Session

POSTER PRESENTATIONS

Poster Presentations (9:10 A.M.– 9:55 A.M.)

Location: Ground Floor Plaza

BOWIE STATE UNIVERSITY

Student: Breanna Dudley
Title: **CONCEALED HYPODERMIC SYRINGE**
Mentor: Dr. Michael Goloubev, Bowie State University, Department of Biology

Student: Daniel Green
Title: **X-SEED SUPER COMPUTER CLUSTER: APPLE G5 X-SERVE HIGH PERFORMANCE COMPUTING FACILITY AT BOWIE STATE UNIVERSITY**
Mentor: Dr. Mark Matties, Bowie State University, Department of Computer Sciences

HAMPTON UNIVERSITY

Student: Thomas Cudjoe
Title: **DOSE DISTRIBUTION MEASUREMENTS FOR BREAST BRACHYTHERAPY CANCER TREATMENTS**
Mentor: Dr. Paul Gueye, Hampton University, Department of Physics

Student: Natasha Ivey
Title: **MITOCHONDRIA INVOLVEMENT IN PROGRAMMED CELL DEATH IN ALZHEIMER'S CELLS**
Mentor: Dr. Karen Davis, Hampton University, Department of Biology, Assistant Professor

Student: Alister Primo
Title: **ULTRASONIC METHODS OF TESTING DISBONDS**
Mentor: Dr. Vadivel Jagasivamani, Hampton University, Department of Electrical Engineering

Student: Marcie Rice
Title: **AN ANALYSIS OF DRINKING WATER AND VEGETATION FOR PESTICIDE RESIDUES**
Mentors: Professor Kishima, Chemistry Department, USDM
Dr. Isai Urasa, Hampton University, Department of Chemistry

Poster Presentations (9:10 A.M.– 9:55 A.M.)

Location: Ground Floor Plaza

Student: Nia White
Title: **GROUNDWATER ANALYSIS AND DEFLUORIDATION OF GROUNDWATER SUPPLY IN NJORO, KENYA AND SURROUNDING AREAS**
Mentor: Dr. Ward J. Mavura, Egerton University, Minority International Research Training Coordinator, Njoro, Kenya

HOWARD UNIVERSITY

Student: Adrienne D. Bolden
Title: **FURTHER STUDIES ON THE ANTIFUNGAL EFFECTS OF A DARK-PIGMENTED STRAIN OF BACILLUS MOJAVENSIS**
Mentor: Dr. Lafayette Frederick, Howard University, Department of Biology, Professor Emeritus

Student: Robin Kindred
Title: **OPTIMIZATION OF ENZYME-INITIATED SURFACE POLYMERIZATION OF POLYHYDROXYBUTYRATE (PHB) POLYMER ON GOLD-PATTERNED SURFACES**
Mentors: Ms. Nuttawee (Por) Niamsiri, Cornell University, Department of Food Science, Ph.D. candidate
Dr. Carl A. Batt, Cornell University, Department of Food Science, Principal Investigator

Student: Headley E. Murray
Title: **THE PERFORMANCE OF XML DATA CONVERSION FOR APPLICATION DOCUMENTS**
Mentor: Dr. Moses Garuba, Howard University, Department of Systems and Computer Science, Assistant Professor

Student: Patrick Rogers
Title: **SYNTHESIS OF TUBUBLYSIN ANALOGS AS POTENTIAL ANTI-CANCER DRUGS**
Mentor: Dr. Robert Fecik, University of Minnesota, Department of Medicinal Chemistry, Assistant Professor

Poster Presentations (9:10 A.M.– 9:55 A.M.)

Location: Ground Floor Plaza

Student: Brittney Shaw
Title: **USE OF IMMUNOHISTOCHEMISTRY FOR MAP-2 EXPRESSION IN RATS DURING NEURONAL DAMAGE FROM NERVE AGENTS**
Mentors: Dr. Hemayet Ullah, Howard University, Department of Biology, Assistant Professor
Dr. Kathy Szabo, Walter Reed Army Institute of Research, Diagnostic Pathology, D.V.M
Dr. Keith Steele, Walter Reed Army Institute of Research, Diagnostic Pathology, D.V.M. PhD.

MORGAN STATE UNIVERSITY

Student: Alioune Diallo
Title: **COMPUTER-AIDED DESIGN (CAD) SOFTWARE USE AS NETWORK SOLVER FOR TUNABLE MEMS DEVICES, CIRCUITS, AND SYSTEMS**
Mentor: Dr. Jeyasingh Nithianandam,Morgan State University, Department of Electrical and Computer Engineering, Assistant Professor

Student: Teisha Hall
Title: **SYNTHETIC VISION SYSTEMS**
Mentor: Dr. Craig Scott, Morgan State University, Department of Electrical and Computer Engineering, Associate Professor

Student: Wil Henderson
Title: **THE MODELING OF ALUMINUM GALLIUM ARSENIC HBT INVERTER**
Mentor: Dr. Corey Dickens, Morgan State University, Department of Electrical and Computer Engineering, Associate Professor

Student: Rolicia Martin
Title: **EFFECTS OF FOOD RESTRICTION AND AD LIBITUM FEEDING ON SLEEP DEPRIVATION-ASSOCIATED HYPERMETABOLISM IN RATS**
Mentor: Dr. Michael Koban, Morgan State University, Department of Biology, Assistant Professor

Poster Presentations (9:10 A.M.– 9:55 A.M.)

Location: Ground Floor Plaza

Student: Trizan Moore
Title: **A STUDY OF WATSON'S TRIPLE INTEGRALS**
Mentor: Dr. Asamoah Nkwanta, Morgan State University, Department of Mathematics, Associate Professor

NORFOLK STATE UNIVERSITY

Student: Angelitta Britt
Title: **MATHEMATICAL MODELING IN BUSINESS: TIME IS MONEY**
Mentor: Dr. Jiashi Hou, Norfolk State University, Department of Mathematics, Assistant Professor

Student: George F. Khan
Title: **COMBINING AND MODIFYING THE CTAB AND DNAZOL PROTOCOL FOR THE EXTRACTION OF PLANT DNA.**
Mentor: Dr Camellia Okpodu, Norfolk State University, Department of Biology, Department Chair

Student: Ashley Turner
Title: **MANUFACTURING WITH COMPUTER NUMERICAL CONTROL (CNC)**
Mentor: Dr. Jeenson Sheen, Norfolk State University, Department of Technology, Associate Professor

Student: Josiah Wrensford
Title: **INVESTIGATIVE STUDIES OF THE MO(VI)-NTA COMPLEX USING NMR TECHNOLOGY**
Mentor: Dr. Kenneth Hicks, Norfolk State University, Chemistry Department, Professor

Poster Presentations (9:10 A.M.– 9:55 A.M.)

Location: Ground Floor Plaza

UNIVERSITY OF THE DISTRICT OF COOLUMBIA

Student: Henok Iegesse and Michael Gabriel
Title: **MUNICIPAL WATER PROCESSES AND ELEVATED LEAD CONCENTRATIONS IN WASHINGTON D.C.**
Mentors: Dr Esther Ososanya, University of the District of Columbia, Department of Engineering and Applied Sciences
Dr. Calvin Brooks, University of the District of Columbia, Department of Engineering and Applied Sciences

Student: Steven Omoijuanfo and Daykaker Karter
Title: **RENEWABLE ENERGY: WIND-SOLAR HYBRID ENERGY SYSTEM**
Mentor: Dr. Esther T. Ososanya, University of the District of Columbia, Department of Electrical Engineering, Professor
Dr. Calvin Brooks, University of the District of Columbia, Department of Mechanical Engineering, Associate Professor

VIRGINIA STATE UNIVERSITY

Students: Teresa Bennett, Margaret Kamara, and Eyitayo J. Akoda
Title: **SCREENING *VERNONIA GALAMENSIS* GERMPLASM FOR OIL, VERNOLIC ACID, AND LIPASE ACTIVITY**
Mentor: T. Andebrahn, and A. Mohamed, Virginia State University, Department of Biology

Student: Latres Davis
Title: **EXPERIMENTAL STUDY ON VIBRATION OF A BELL TYPE STRUCTURE**
Mentors: Dr. Jahangir Ansari, Virginia State University, Engineering and Engineering Technology Department, Assistant Professor
Dr. Yoon Kim, Virginia State University, Engineering and Engineering Technology Department, Assistant Professor

Student: Syleena Guilford
Title: **EFFECTS OF ACUTE STRESS ON BRACHIAL ARTERY BLOOD FLOW MEASURED VIA ULTRASOUND**
Mentor: Sheila G. West, Pennsylvania State University, Department of Biobehavioral Health

Poster Presentations (9:10 A.M.– 9:55 A.M.)

Location: Ground Floor Plaza

Students: Jennifer Hill, Makena Hammond, Lakeila Powell, and O. Taylor
Title: **IMPROVE VERNONIA OIL QUALITY THROUGH THE USE OF MICROWAVE HEATING**
Mentor: T. Andebrahn, and A. Mohamed, Virginia State University, Department of Biology

Student: J. Riley and Carmen Batiste
Title: ***AZADLRACHTIN* (A NEEM PRODUCT) AS AN ANTIPROTOZOAN AGENT AGAINST *TRYPANOSOMA MUSCULI* INFECTION IN SWISS WEBSTER (SW) MALE MICE. PART II**
Mentors: Dilip Sen, Virginia State University, Department of Biology
Shobha Sriharan, Virginia State University, Department of Agriculture

ORAL PRESENTATIONS

Oral Presentations (10:00 A.M.– 12:00 P.M.)

Location: Reading Room

CHEMISTRY

University of the District of Columbia

Student: Jeffrey Zulu
Title: **SYNTHESIS AND EVALUATION OF VITAMIN E CONJUGATES**
Mentor: Dr. Norman Kondo, University of the District of Columbia, Department of Chemistry Department, Professor

Hampton University

Student: Kia Walcott
Title: **STUDIES OF VIOLET DYE PRODUCTION BY MARINE FUNGUS FROM TANZANIA**
Mentor: Dr. Isai Urasa, Hampton University, Department of Chemistry

COMPUTER SCIENCE

University of the District of Columbia

Students: Michael Nyemenim, Togba Liberty, and Jeremy Wittes
Title: **THE ESCAPE ON THE TANGENT**
Mentors: Dr. Brooks
Prof. Steadman
Prof. Horton
Dr. Nayar
Dr. Fleming
Mr. Harouna
Mr. Mathews

ENGINEERING

University of the District of Columbia

Students: Steven Omoijuanfo and Daykaker Karter
Title: **RENEWABLE ENERGY: WIND-SOLAR HYBRID ENERGY SYSTEM**
Mentors: Dr. Esther T. Ososanya, University of the District of Columbia, Department of Electrical Engineering, Professor
Dr. Calvin Brooks, University of the District of Columbia, Department of Mechanical Engineering, Associate Professor

Norfolk State University

Student: Andera Pinkney-Hawkins
Title: **AUTOMATION OF A PHOTOLUMINESCENCE SPECTROMETER**
Mentor: Dr. Alan Doolittle, Georgia Institute of Technology, Electrical and Computer Engineering Department, Professor

Oral Presentations (10:00 A.M.– 12:00 P.M.)

Location: Reading Room

Virginia State University

Student: Latres Davis

Title: **EXPERIMENTAL STUDY ON VIBRATION OF A BELL TYPE STRUCTURE**

Mentors: Dr. Jahangir Ansari, Virginia State University, Engineering and Engineering Technology Department, Assistant Professor
Dr. Yoon Kim, Virginia State University, Engineering and Engineering Technology Department, Assistant Professor

Morgan State University

Student: Kenneth Kamri

Title: **IMPLEMENTING AN ALGORITHM USING COMPLEX PROGRAMMABLE LOGIC**

Mentor: Dr. Kemi Ladeji-Oasis, Morgan State University, Department of Electrical and Computer Engineering, Assistant Professor

Student: Jamisa Curry

Title: **ENZYMATIC ANALYSIS OF TISSUES EXTRACTED FROM RATS EXPOSED TO MICRO GRAVITY**

Mentor: Dr. Gbekeloluwa B. Oguntimein, Morgan State University, Department of Civil Engineering, Associate Professor

NATURAL SCIENCES

Howard University

Student: Nicole Ramsey

Title: **EFFECT OF CORACTIN ON CELL MIGRATION AND V-SRC T RANSFORMATION**

Mentors: Ms. Jennifer R Kowalski, Harvard University, Biological & Biomedical Sciences Program, Cancer Biology Program Beth Israel Deaconess Medical Center and Department of Medicine, Harvard Medical School, Ph.D candidate
Dr. Sheila M. Thomas, Harvard University, Cancer Biology Program Beth Israel Deaconess Medical Center and Department of Medicine, Harvard Medical School, Principal Investigator/Assistant Professor

Oral Presentations (10:00 A.M.– 12:00 P.M.)

Location: Reading Room

Bowie State University
Student: Bette Donahue, Daryl Davis
Title: **PARTICIPATING IN THE INTERNET MOTION SENSOR PROJECT**
Mentor: Dr. Jide Odubiyi, Bowie State University, Department of Biology

Norfolk State University
Student: Kira Howell
Title: **REPLACEMENT OF WILDTYPE/MUTANT CAT CONSTRUCTS WITH LUCIFERASE CONSTRUCTS**
Mentor: Dr. Tabmitha Jervey, Norfolk State University, Department of Biology, Assistant Professor

Hampton University
Student: Jonathan R. Brent
Title: THE EFFECTS OF ANTICOAGULANT DRUGS ON AAV-2 MEDIATED GENE TRANSFER
Mentor: Valder Arruda, Joerg Schuettrumpf, and Alex Schlachterman, University of Pennsylvania School of Medicine, Deptment of Hematology, Children's Hospital of Philadelphia

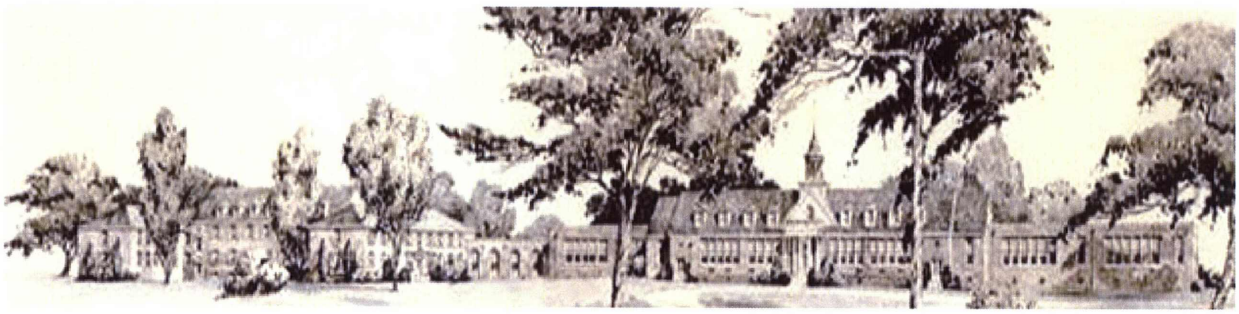
Howard University
Student: Robin Kindred
Title: **OPTIMIZATION OF ENZYME-INITIATED SURFACE POLYMERIZATION OF POLYHYDROXYBUTYRATE (PHB) POLYMER ON GOLD-PATTERNED SURFACES**
Mentors: Ms. Nuttawee (Por) Niamsiri, Cornell University, Department of Food Science, Ph.D. candidate Dr. Carl A. Batt, Cornell University, Department of Food Science, Principal Investigator

Bowie State University
Student: Crystal Cobb
Title: **OPEN VERSES ENDOSCOPIC RADIAL GRAFT HARVESTING**
Mentor: Dr.Robert Poston, University of Maryland, School of Medicine

Howard University
Student: Ravindra Gopaul and Thomas Hardy
Title: **THE EFFECT OF ROAD DISTURBANCES ON THE POLLINATION OF *Asclepias curassavica***

Abstracts

Bowie State University



Bowie State University

OPEN VERSES ENDOSCOPIC RADIAL GRAFT HARVESTING

Crystal Cobb. School of Medicine, University of Maryland

The internal mammary artery (IMA) has proven to be the superior conduit for coronary artery bypass grafting (CAB). The relatively high incidence of early failure of saphenous vein grafts has forced clinicians to investigate alternate conduit options for CAB. (1). One such option is the radial artery (RA). The RA was first described as a bypass conduit by Dr. Carpentier in 1970s (2) but soon abandoned because of poor early patency results. Several years later, it was discovered by Dr. Carpentier's group that numerous RA grafts thought to be occluded were widely patent on follow-up angiography. It was concluded that procurement related trauma was largely responsible for this observed tendency for perioperative arterial spasm. Following general adoption of more delicate procurement techniques, several groups have reported early and mid-term patency results following RA grafting that are significantly better than that described for veins (3). However, using routine CT angiographic follow-up of all RA grafts during a 1-year period, we noted evidence of spasm ranging from focal to diffuse in 6 out of 11 grafts evaluated. Therefore, RA spasm appears to be a persistent problem using current methods of open procurement. In several different applications, endoscopic techniques have been shown to reduce tissue trauma relative to open surgical procedures (4). Guidant has recently developed a procedure for endoscopic RA harvesting using the VASOVIEW™ System. In preliminary trials, this endoscopic approach has proven to be a safe and efficient method for harvesting radial artery grafts with superior cosmetic results. We would like to evaluate this system in a prospective clinical study to evaluate the following *hypothesis*: Compared the traditional, open procurement, endoscopic harvest of the RA will reduce the incidence of postoperative spasm in the RA when used as a coronary artery bypass graft.

Student: Crystal Cobb, Bowie State University, Model Institutions of Excellence
Mentor: Dr.Robert Poston, University of Maryland, School of Medicine

PARTICIPATING IN THE INTERNET MOTION SENSOR PROJECT

Bette Donahue, Daryl Davis and Jide Odubiyi, Ph.D., Department of Biology, Bowie State University

The Internet Motion Sensor (IMS) project is a globally-scoped Internet threat monitoring system whose goal is to measure, characterize and track threats such as denial of service attacks, fast moving worms and routing exploits. It uses a distributed network of aggregators and IP network sensors to monitor various blocks of dark address space (those with no active hosts) for Internet activity. The distributed nature of the IMS system allows researchers to explore the differences in threats between address and topologically diverse locations while its decentralization makes the system both extremely scalable as well as extensible.

Students: Bette Donahue and Daryl Davis, Bowie State University, Department of Biology
Mentor: Dr. Jide Odubiyi, Bowie State University, Department of Biology

CONCEALED HYPODERMIC SYRINGE

Breanna Dudley, Dr. Michael Goloubev, Dr. Richard Denise D.D.S., Ms. Mitsue Wiggs, Department of Biology, Bowie State University

The sight of any needle not only amplifies or exasperates fears but also the perception of pain. Apprehension concerning needles has been present in the medical professionals for decades. With the advent of modern technology and biomedical engineering it is now possible to conceal needles to reduce the amount of apprehension felt by the patient. The objective of this project is to create a syringe with a hidden needle. Conceptual computer simulations have been run for a device that conceals the needle and works according to the same principle as a regular hypodermic syringe. Using CAD (computer aided design) a three dimensional model of such device has been created and analyzed.This new device can be used in any medical facility that would deal with patients that are easily scared by the needle. The cost of such syringe would not be significantly higher than conventional means; however, it would be more beneficial to the patient by relieving unnecessary stress. The design is protected by an intellectual property disclosure.

Student: Breanna Dudley, Bowie State University, Model Institutions of Excellence
Mentor: Dr. Michael Goloubev, Bowie State University, Department of Biology

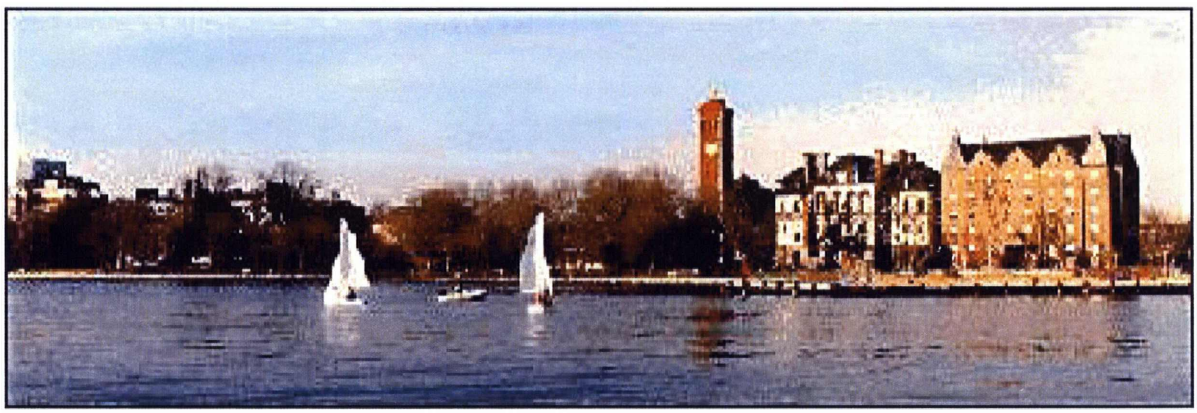
X-SEED SUPER COMPUTER CLUSTER: APPLE G5 X-SERVE HIGH PERFORMANCE COMPUTING FACILITY AT BOWIE STATE UNIVERSITY

Daniel Green, Department of Computer Science, Bowie State University

Apple built the PowerPC G5, the world's first 64-bit desktop processor at the time to solve the world's immense computing needs. This allowed Bowie State University to create a Super Computer Cluster to handle projects that were too great for the average computer. The release of the X-Serve PowerPC G5 has allowed scientists to accomplish even more rigorous calculations, in Bowie State University's X-Seed High Performance Networking and Computing facility. The PowerPC G5 is the result of a fruitful collaboration between Apple and IBM, two companies known as rivals that have solved the problems posed to them from their customers for many years. IBM and Apple co-created a PowerPC architecture that could run 32-bit and 64-bit programs. When a computer has 32-bit or 64-bit processors the bit size describes the width of the microprocessor's data stream. The data stream is a process of the sizes of its registers and the internal data paths that run the registers. A 64-bit processor compiles data and instructions across 64-bit-wide data paths, in comparison with the 32-bit-wide paths on 32-bit processors. Also 64-bit processors have wide registers that hold very precise 64-bit numbers. Now available at Bowie State University's X-Seed High Processing Networking and Computing, the PowerPC G5 has next-generation architecture built for speed and parallel operations. This great computing power is available on Apple systems today at Bowie State University. In addition students built and manage the X –Seed High Performance Networking and Computing facility.

Student: Daniel Green, Bowie State University, Department of Computer Science
Mentors: Dr. Mark Matties, Bowie State University, Department of Computer Sciences

Hampton University



Hampton University

THE EFFECTS OF ANTICOAGULANT DRUGS ON AAV-2 MEDIATED GENE TRANSFER.

Jonathan R. Brent. Department of Biology, Hampton Unviersity
Valder Arruda, Joerg Schuettrumpf and Alex Schlachterman. Department of Hematology, University of Pennsylvania School of Medicine

Adeno-associated viral (AAV) vectors (serotype 2) have been used to transduce skeletal muscle and liver cells. However, the clinical application of gene therapy requires catheters and anticoagulants. Recent studies have found that anticoagulants inhibit gene transfer and lower expression using AAV2-hAAT-ApoE-hFIX. Current studies are aimed at determining the effect of anticoagulants on gene transfer using a different promoter and transgene. Thus, an AAV-2 vector with an Albumin promoter and the transgene for human a1 antitrypsin (hAAT) was used to transducer a murine animal model and the expression was measured at two-week intervals by enzyme linked immunosorbent assay (ELISA). Anticoagulants were shown to inhibit gene transfer with the transgene AAV2-Alb-hAAT. The data demonstrates that the inhibition of gene transfer is neither transgene nor promoter dependent.

Student: Jonathan Brent, Hampton University, Department of Biology, Senior
Mentors: Valder Arruda, Joerg Schuettrumpf, and Alex Schlachterman, University of Pennsylvania School of Medicine, Deptment of Hematology, Children's Hospital of Philadelphia

DOSE DISTRIBUTION MEASUREMENTS FOR BREAST BRACHYTHERAPY CANCER TREATMENTS

Thomas Cudjoe. Department of Biology, Hampton University
Dr. Paul Gueye. Department of Physics, Hampton University

There have been recent developments in cancer research under the Center for Advanced Medical Instrumentation (CAMI) at Hampton University. This very promising research is at the verge of changing the way cancer treatments will be performed in the future. In particular, CAMI shows the possibility of measuring the dose distribution delivered to patients during Brachytherapy based treatments in real time by using scintillating fibers. Brachytherapy is an advanced cancer treatment that uses radioactive sources inside or in close proximity to cancerous tumors, thus minimizing exposure to neighboring healthy cells. This radiation oncology treatment unlike many others is localized and precise. The latest involvement of CAMI is in the development of a scintillator fiber based detector for the Mammosite (balloon device) from Proxima, Inc. Radioactive sources are inserted into a small plastic catheter (shaft) and push at the end of the tube. At that location, a water filled balloon surrounds the source and allow uniform gamma radiation of the cancer tumors. There is presently no capability of this device to provide measurements of the location of the source, as well as the radiation emitted from the source. Recent data were acquired to evaluate the possibility of measuring the dose distribution during breast brachytherapy cancer treatments with this device. The experiments used a Mammosite, a $^{90}Sr/^{90}Y$ (laboratory tests) and ^{192}Ir (hospital tests) radioactive sources, in addition to 1 mm^2 scintillating fibers surrounding the shaft. Preliminary results will be presented and discussed.

Student: Thomas Cudjoe, Hampton University, Department of Biology, Senior
Mentor: Dr. Paul Gueye, Hampton University, Department of Physics

MITOCHONDRIA INVOLVEMENT IN PROGRAMMED CELL DEATH IN ALZHEIMER'S CELLS

Natasha Ivey. Department of Biology, Hampton University

Alzheimer's disease (AD) is a progressive neurodegenerative disorder involving a number of abnormal interactions. There is surmounting evidence that suggests that the AD brain is hampered by oxidative stress that may be a key contributor to neuronal death and AD pathological development. Over recent years, a great deal of research has been directed at elucidating the role of apoptosis regulators and their involvement in the development of AD. Functional mitochondrial alterations can result in the initiation of cell death programs that are believed to contribute to cell death in neurodegenerative disorders. Mitochondria are being considered the connection between cellular stress signals activated during nerve cell injury and the execution of nerve cell death. Mitochondria are also believed to be regulated by families of proteins that can trigger and increase the permeability of the outer and or inner mitochondrial membrane. Increased permeability can lead to the release of apoptotic-inducing factors from mitochondria. The role in mitochondria is crucial; it is known that there are multiple apoptotic pathways that emanate from the mitochondria. It is our experimental plan to investigate at the molecular level what involvement mitochondria may have in cell damage seen in AD fibroblasts following exposure to toxicity. Our specific aims will be to examine the structural condition of mitochondria isolated from Aged Match Controls (AgMC) in comparison to AD fibroblasts using fluorescence microscopy, to isolate the mitochondrial DNA from AD and AgMC fibroblast at varying stages of exposure to toxicity and then examine the mtDNA by microarray analysis. Microarray analysis will determine if there are any genes that are differentially expressed in the two experimental sets. It is our belief that the results from these experiments will provide insight into the molecular interactions involving mitochondria and its involvement into programmed cell death as it relates to the pathology of Alzheimer's disease.

Student: Natasha Ivey, Hampton University, Department of Biology, Senior
Mentor: Dr. Karen Davis, Hampton University, Department of Biology, Assistant Professor

ULTRASONIC METHODS OF TESTING DISBONDS

Alister Primo and Vadivel Jagasivamani. Department of Electrical Engineering, Hampton University

Ultrasonic pulse echo method of testing materials has been used for evaluating the integrity of structural components. Detection of the adhesive bond integrity is one of the major concerns in several industries such as the Aviation industry. The skin of every aircraft is being tested for soundness of bonding periodically to avoid catastrophic failure. The testing procedure is very laborious and consumes a lot of time to perform. Bonded test samples of aluminum were prepared with different qualities of bonding. The samples were tested using pulse-echo method to evaluate the integrity of bonds. Amplitudes of reflections from the bond interface, time-of-flight in the sample, and attenuation of sound waves in the material were experimentally measured. In the current work, an optimum method of identifying disbonds using the measured data have been evolved and reported.

Student: Alister Primo, Hampton University, Department of Electrical Engineering, Senior
Mentor: Dr. Vadivel Jagasivamani, Hampton University, Department of Electrical Engineering

AN ANALYSIS OF DRINKING WATER AND VEGETATION FOR PESTICIDE RESIDUES

Marcie Rice. Department of Chemistry, Hampton University

Pesticides, at one time in history, were thought to be "a farmer's best friend". However, with the publishing if Silent Spring by Rachel Carson in 1962, pesticides (especially DDT) became the environment's worst enemy. Vikuge Farm located in Dar es Salaam, Tanzania is an example of the effect that pesticides can have on the environment when exposed in large quantities. Utilized as a storage area for a large amount of pesticides in the 1980's, the farm became one of the most contaminated sites in the world when a storage shed collapsed in 1990 polluting the water, soil and plants on the farm. The purpose of the research was to gain information on the local distribution of the pesticides in the water and plants on the farm. The results found through gas chromatography analysis of samples collected from the farm displayed extremely high concentrations that exceeded the limits set by the World Health Organization. The data collected served as a contributed to the on-going effort to prevent further contamination on the farm and to protect the health of those that live on the farm.

Student: Marcie Rice, Hampton University, Department of Chemistry
Mentors: Professor Kishima, Chemistry Department, USDM
Dr. Isai Urasa, Hampton University, Department of Chemistry

STUDIES OF VIOLET DYE PRODUCTION BY MARINE FUNGUS FROM TANZANIA.

Kia Walcott and Dr. Isai T. Urasa. Department of Chemistry, Hampton University

The objective of this study was to manipulate the Anthraquinone biosynthesis in marine fungi to produce a cheap and environmentally friendly source of Anthraquinone dye intermediates. The fungus in this study was isolated from the marine sediments of the Dar es Salaam coast, in Tanzania, and was grown on two microbial media: Malt Extract agar/broth and Aquatic Yeast agar/broth. A series of media variations were made to optimize dye production and fungal growth at pH 3.5, 4.5, 5.5, and 6.5. For the media variations, three different types of media were employed: Malt Extract Broth, Aquatic Yeast Broth, and Czapeck Broth. Carbohydrate variation within the media was performed using Aquatic Yeast Broth. Glucose, fructose, insulin, starch, and lactose were substituted, each at a concentration of 2% instead of 1%. A time course of dye production was taken using a spectrophotometer to test the absorbance of the pH 6.5 media and its contents at a wavelength of 405nm. Thin layer chromatography was also performed on the media and its contents using various solvents (e.g. ethyl acetate, methanol, petroleum ether, and acetone) to induce the best Rf values. Each strip was tested for its UV response at wavelengths of 254nm and 365nm. At the conclusion of these variations, it was found that pH 6.5 promoted the most dye production. The Aquatic Yeast Broth and Malt Extract Broth were the most conducive to fungus growth. The fructose containing media produced the most growth and dye coloring. It was also determined that the fungus in this study continually produced dye for a period of eight weeks.

Student: Kia C. Walcott, Hampton University, Department of Chemistry, Senior
Mentor: Dr. Isai Urasa, Hampton University, Department of Chemistry

GROUNDWATER ANALYSIS AND DEFLUORIDATION OF GROUNDWATER SUPPLY IN NJORO, KENYA AND SURROUNDING AREAS

Nia White. Department of Chemistry, Hampton University

Throughout many parts of the world, high concentrations of fluoride occurring naturally in groundwater have caused widespread *fluorosis*, a serious bone disease, among local populations. Water samples taken from boreholes, holes drilled into the earth as exploratory wells that serve as a major source of water, on the campus of Egerton University and the city of Njoro were analyzed for Calcium, Zinc, Copper, Manganese, Iron, and Fluoride. The results show that there may be some correlation between levels of fluoride and other trace metals. The amount of fluoride in water samples is also analyzed based on location of the borehole from which it was taken. Water samples are treated with bone char to determine if and how much bone char can serve as a water filtering agent.

Student: Nia C. White, Hampton University, Department of Chemistry, Senior
Mentor: Dr. Ward J. Mavura, Egerton University, Minority International Research Training Coordinator, Njoro, Kenya

Howard University

Howard University

FURTHER STUDIES ON THE ANTIFUNGAL EFFECTS OF A DARK-PIGMENTED STRAIN OF BACILLUS MOJAVENSIS

Adrienne D. Bolden. Department of Biology, Howard University

Additional studies have been conducted on the effect antifungal substances, of a dark pigmented strain of Bacillus, now identified as B. mojavensis, have on inhibiting the growth of species of filamentous fungi and yeast. The bacteria have been challenged on potato-dextrose agar (PDA) and nutrient agar (NA) under ambient room light and temperature as well as under controlled light and temperature conditions. There have been no significant differences in the results obtained under different cultural conditions. Significant differences have been obtained when challenges on the two culture media have been compared. PDA plates have provided the best results since all fungi tested grew well on this medium but poorly on NA. Growth of B. mojavensis was equally good on PDA as on NA except the dark pigment was minimal on Na. Out of the 19 fungi tested in these experiments growth of 16 was strongly inhibited after more than two weeks, one was inhibited initially but gradually invaded the inhibition zone after two weeks, and the antifungal substances appeared to have no effect on the growth of three of the filamentous species. The fungi tested were Alternaria solani, Aposhaeria sp., Aspergillus fumigatus, Botrytis cinerea, Candida sp/ Chaetomium sp., Colletotrichum sp., Entermophthora coronata, Fusarium sp., Paecilomycess sp., Penicillium sp., Periconia sp., Sordaria fimicola, Syncephalastrum sp., Trichoderma sp., Zygorhynchus sp., and two unidentified filamentous fungi designated MSC 39 and MSC 40. Growth of A. fumigatus, the species of Penicillium tested, and the MSC 39 culture was not inhibited. The Trichoderma isolate was initially inhibited but eventually invaded the inhibition zone.

Student: Adrienne D. Bolden, Howard University, Department of Biology Pre-Med, Senior
Mentor: Dr. Lafayette Frederick, Howard University, Department of Biology, Professor Emeritus

THE EFFECT OF ROAD DISTURBANCES ON THE POLLINATION OF *Asclepias curassavica*

Ravindra Gopaul and Thomas Hardy. La Virgen, Costa Rica

Roads occupy an extremely large portion of land mass in the world today, and primarily function to facilitate the transport of people between locations. As roads offer many benefits, we rarely take into account the potential disturbances caused by use of these large corridors, such as land fragmentation, noise, wind, and air pollution. In our study, we examined whether road disturbances have an effect on pollination success of *Asclepias curassavica* in roadside and pasture habitats, as well as how pollinia abundance, butterfly abundance, and species richness vary between these habitats. Results showed a higher abundance of pollinia in the roadside versus pasture habitat, which suggests that roadside disturbances reduce pollination in *A. curassavica*. We also found a lower abundance of butterflies in the roadside habitat, which suggests that roadside disturbances also reduce the number of potential pollinators. Greater species richness was found in the roadside habitat. However, this result may change with a greater sample size. Our results suggest that road disturbances do impact pollination of *Asclepias,* and provide a basis to examine other species, which may be similarly effected.

Students: Ravindra Gopaul and Thomas Hardy, Howard University, Department of Biology

OPTIMIZATION OF ENZYME-INITIATED SURFACE POLYMERIZATION OF POLYHYDROXYBUTYRATE (PHB) POLYMER ON GOLD-PATTERNED SURFACES

Robin Kindred. Department of Biology, Howard University

Polyhydroxyalkanoates (PHAs) are polymers produced by bacteria that serve as intracellular storage of carbon and energy for use during times of nutritional and environmental stress. These polymers are important from an economical and ecological standpoint because they make excellent-quality biodegradable plastics. In addition to these properties, PHA polymer has the potential to make micro-scale structures that can be used within microfluidic pumps and other small scale devices. Prior to incorporating PHB polymer, which is a type of PHA, in micron-scale devices, research was done to optimize the enzyme-initiated surface polymerization of PHB polymer on gold-patterned surfaces by increasing polymer production, improving the enzymatic activity of immobilized PHB synthase and reducing non-specific binding of the PHB synthase and/or the granule bound-synthase to non-patterned surfaces during polymer synthesis. This was successfully accomplished with the use of various additives.

Student: Robin P. Kindred, Howard University, Department of Biology, Senior
Mentors: Ms. Nuttawee (Por) Niamsiri, Cornell University, Department of Food Science, Ph.D. candidate
Dr. Carl A. Batt, Cornell University, Department of Food Science, Principal Investigator

THE PERFORMANCE OF XML DATA CONVERSION FOR APPLICATION DOCUMENTS

Headley E. Murray. Department of Systems and Computer Science, Howard University.

XML is a meta-language that allows one to design a markup language, used to allow for the easy interchange of documents on the web (WWW). XML's complications derive from its benefits; namely, its verbosity and adaptability. This study looks at the XML specification, explaining its processing model and some of its capabilities. This study investigates the performance issues associated with relationships between converting data from DOC, PDF, TXT, HTML and possibly other formats to XML format.

Student: Headley E. Murray, Howard University, Department of Systems and Computer Science, Senior
Mentor: Dr. Moses Garuba, Howard University, Department of Systems and Computer Science, Assistant Professor

EFFECT OF CORACTIN ON CELL MIGRATION AND V-SRC TRANSFORMATION

Nicole Ramsey. Department of Biology, Howard University, Summer Honors Undergraduate Research Program, Harvard Medical School

Cortactin is a cytoskeletal adaptor protein which is localized to the leading edge. Cells infected with cortactin shRNA migrate less than those infected with control shRNA. This result suggests that cortactin is important for cell migration and may act by regulating localization or activation of its binding partners. Using cortactin RNAi and v-src infection we determined the effect cortactin inhibition has on cell morphology, anchorage-independent growth, enhanced tyrosine phosphorylation, and actin rearrangements. v-Src transformed fibroblasts display a rounded and spindly morphology compared to normal fibroblasts. In the absence of cortactin, v-src was still able to induce this rounded, spindly phenotype. In contrast, loss of cortactin affected v-src-induced anchorage independent growth. Fewer colonies were observed with cortactin inhibition, suggesting that cortactin is required for v-src-induced anchorage independent growth. We examined whether cortactin may regulate the profile of tyrosine-phosphorylated proteins detected in v-src-transformed cells. Loss of cortactin did not have any overall effects on total cell tyrosine phoshporylation. Further examination of two specific src substrates also revealed no obvious differences in the absence of cortactin. Taken together, these data suggest that cortactin may be required for some aspects of v-src-induced transformation.

Student: Nicole B Ramsey, Howard University, Department of Biology, Junior
Mentors: Ms. Jennifer R Kowalski, Harvard University, Biological & Biomedical Sciences Program, Cancer Biology Program Beth Israel Deaconess Medical Center and Department of Medicine, Harvard Medical School, Ph.D candidate
Dr. Sheila M. Thomas, Harvard University, Cancer Biology Program Beth Israel Deaconess Medical Center and Department of Medicine, Harvard Medical School, Principal Investigator/Assistant Professor

SYNTHESIS OF TUBUBLYSIN ANALOGS AS POTENTIAL ANTI-CANCER DRUGS.

Patrick Rogers. Department of Chemistry, Howard University

Tubulysins are peptide natural products isolated from *Archangium gephyra* and *Angiococcus disciformis*. These natural products inhibit tubulin polymerization and display potent anticancer activity, particularly in multi-drug resistant cancer cell lines. This study will investigate the structure-activity relationships of tubulysins through the total synthesis of tubulysin analogs with modified tubuphenylalanine derivatives. This study will increase our understanding of how tubulysins bind to tubulin and how to optimize their anticancer activity for the treatment of multi-drug resistant cancers.

Student: Patrick Rogers, Howard University, Department of Chemistry, Senior
Mentor: Dr. Robert Fecik, University of Minnesota, Department of Medicinal Chemistry, Assistant Professor

USE OF IMMUNOHISTOCHEMISTRY FOR MAP-2 EXPRESSION IN RATS DURING NEURONAL DAMAGE FROM NERVE AGENTS

Brittney Shaw. Department of Biology, Howard University

Microtubule-associated protein 2 is the major microtubule associated protein of brain tissue. MAP-2 is known to promote microtubule assembly, form side arms on microtubules and interact with neurofilaments, actin, and other elements of the cytoskeleton. MAP-2 is sensitive to many inputs with functions in the growth, differentiation, and plasticity of neuron modification, and rearrangement is an early obligatory step which modify neuronal function. MAP-2 expression is down regulated as an early manifestation of neuronal damage in a number of disorders such as CNS ischemia, traumatic brain injury and organophosphate toxicity. In this study, tissue sections of normal and lithium-diidopropyl flurophosphate (DFP)-treated rats were routinely processed and used to determine MAP-2 expression variation in the brain by immunohistochemistry. The objective was to determine: how much variation in apparent MAP-2 expression exists between individual normal rats, DFP-treated rats, DFP-treated rats with little neuronal damage and DFP-treated rats with extensive neuronal damage. Also, does MAP-2 expression correlate with histomorphalogical evidence of neuronal damage?

Student: Brittney N. Shaw, Howard University, Department of Biology, Senior
Mentors: Dr. Hemayet Ullah, Howard University, Department of Biology, Assistant Professor
Dr. Kathy Szabo, Walter Reed Army Institute of Research, Diagnostic Pathology, D.V.M
Dr. Keith Steele, Walter Reed Army Institute of Research, Diagnostic Pathology, D.V.M. PhD.

Morgan State University

Morgan State University

ENZYMATIC ANALYSIS OF TISSUES EXTRACTED FROM RATS EXPOSED TO MICRO GRAVITY

Jamisa Curry. Department of Medical Technology, Morgan State University

Space travel is a subject area of interest that deserves a lot of attention. Studies have shown that long-term exposure to microgravity conditions affect body organs such as the heart, brain, and muscles. Research reports from NASA Ames Research Center show that microgravity exposure in mice results in a significant decrease in muscle oxidative capacity and other reports in literature have concluded that increased activity of catalase (CAT) and (SOD) appear in rats after exercise training. Other researchers also found that exercise training prior to simulated weightlessness, and dobutamine administration during simulation, helped prevent large decreases in skeletal muscle antioxidant and oxidative enzyme levels. In this project the specific activities of catalase (CAT) and superoxide dismutase (SOD), extracted from tissues (liver, diaphragm and soleus muscle) of rats that have been exposed to simulated microgravity condition and control were studied. The enzymes were extracted from the tissues with two different buffer PBS and Tris/HCl. Preliminary results of the specific activities of CAT and SOD show a change after they are compared to the control. The SOD specific activities in all the tissues (diaphragm, liver, soleus) extracted in PBS buffer were lower for the experimental tissue compared to the control. SOD specific activities extracted in Tris/HCL buffer from the diaphragm and soleus were also slightly lower compared to the control CAT specific activities extracted from the diaphragm with PBS buffer was higher compared to the control. CAT specific activities extracted with PBS buffer from both the liver and soleus were lower in the experimental compared to the control. CAT specific activity in the diaphragm extracted with Tris/HCl buffer slightly lower than that of control while the CAT specific activity in the soleus showed a large difference compared to the control.

Student: Jamisa Curry, Morgan State University, Department of Medical Technology, Sophomore
Mentor: Dr. Gbekeloluwa B. Oguntimein, Morgan State University, Department of Civil Engineering, Associate Professor
Mentor: Dr. Michael Koban, Morgan State University, Department of Biology, Assistant Professor

COMPUTER-AIDED DESIGN (CAD) SOFTWARE USE AS NETWORK SOLVER FOR TUNABLE MEMS DEVICES, CIRCUITS, AND SYSTEMS

Alioune Diallo. Department of Electrical and Computer Engineering, Morgan State University

During the past few years, it has become apparent that MEMS and micromachining can be used to enhance devices and circuits which results in significant advantages when compared to conventional ICs. Today's customers are demanding smaller, lighter products with more features. As a result, manufacturers are being forced to come up with technological breakthroughs in order to satisfy this demand. MEMS are a combination of mechanical and electrical features in a very small package. They can be used where traditional mechanical structures would be too bulky. The development of capacitive membrane switches has enabled exciting innovation in phase shifters. In this research paper, we are using APLAC software as a network solver for MEMS devices, circuits and systems. Multiple MEMS devices, as well as the circuit that are needed to implement a tunable MEMS comb drive are connected and investigated. These circuits with MEMS components have a significant impact on electronic systems.

Student: Alioune Diallo, Morgan State University, Department of Electrical and Computer Engineering, Junior
Mentor: Dr. Jeyasingh Nithianandam,Morgan State University, Department of Electrical and Computer Engineering, Assistant Professor

SYNTHETIC VISION SYSTEMS

Teisha Hall. Department of Electrical and Computer Engineering, Morgan State University

The need for improved safety in air traffic has increased because the Flight Safety Foundation has predicted that air traffic is expected to double over the next decade. NASA's Aviation Safety Program has proposed to develop a Synthetic Vision System that will provide pilots with improved situational awareness. A synthetic vision system is a database derived system which utilizes precise Global Positioning System navigation and integrity-monitoring sensors to provide an unrestricted synthetic view of the aircrafts current external environment. With the aid of a SVS pilots will be equipped with an unobstructed view of terrain regardless of weather and, or time of day which will enhance situational awareness. The SVS will eventually be used in military, commercial and general aviation aircrafts. The Project hopes to help NASA drastically reduce the number of Aviation accidents caused by Controlled Flight into Terrain (CFT, when the Pilot miscalculates his position and has an accident) and low visibility, thereby reducing the stress on the pilot and increasing his/her performance. The stored geo-spatial data is available in the form of DEM (Digital Elevation Model) files, which must be rendered in order for them to be readable by a pilot. The output after rendering is a mathematical approximation of the actual terrain. Current SVS uses a polygonal rendering method that is not efficient at producing a precise image. This project will explore the point cloud rendering technique using OpenGL software, at the present time no other SVS has incorporated this rendering technique. OpenGL is a software interface to graphics hardware. This interface consists of about 120 distinct commands, which you use to specify the objects and operations needed to produce interactive three-dimensional applications. This method of rendering has produced more precise 3-dimensional images, but is just as fast as the other options available.

Student: Teisha Hall, Morgan State University, Department of Electrical and Computer Engineering, Senior
Mentor: Dr. Craig Scott, Morgan State University, Department of Electrical and Computer Engineering, Associate Professor

THE MODELING OF ALUMINUM GALLIUM ARSENIC HBT INVERTER

Wil Henderson. Department of Electrical and Computer Engineering, Morgan State University

Using the device simulator Silvico/Atlas, a physical model of an Aluminum, Gallium and Arsenic (AlGaAs) heterojuction transistor (HBT) will be simulated. From the physical model, I-V data and transfer curves will be produced. Based on the I-V data and the physical parameters of the device, a small signal equivalent model will be created. Next the small model will be used to create an inverter. The inverter will be simulated in a circuit simulator.

Student: Wil Henderson, Morgan State University, Department of Electrical and Computer Engineering, Senior
Mentor: Dr. Corey Dickens, Morgan State University, Department of Electrical and Computer Engineering, Associate Professor

IMPLEMENTING AN ALGORITHM USING COMPLEX PROGRAMMABLE LOGIC

Kenneth Kamri. Department of Electrical and Computer Engineering, Morgan State University

A complex programmable logic device (CPLD) is a type of an integrated circuit that provides the ability to customize programs and reprogram the component function. This research entails implementing algorithms using complex programmable logic devices. The CPLD used in the research is the on the University Program 2 Educational Development Board. A hardware design language, very high speed integrated circuit hardware description language (VHDL), is used. This language allows for implementation of algorithms by writing commands and compiling the commands to detect any errors before downloading on the development board. The advantage of using this language is that it easily facilitates the implementation of complex algorithms and troubleshooting for errors is easy. The problem addressed by the research is implementing algorithms that do not run in real-time in software. The CPLDs help to achieve the real-time running of the algorithms. In this rescarch I calculated the length and width of shadows collected by a weather radar. My task involved characterizing the number of adjacent shadows in an array. When the weather radar first hits the terrain the readings collected are either 1 or 2 depending on how strong the reflected signal is and just before it hits a terrain the reading is -3. When it reads 0 this signifies a shadow. The shadow length and width is determined from an algorithm that I will implement using VHDL.

Student: Kenneth Kimari, Morgan State University, Department of Electrical and Computer Engineering, Junior
Mentor: Dr. Kemi Ladeji-Oasis, Morgan State University, Department of Electrical and Computer Engineering, Assistant Professor

EFFECTS OF FOOD RESTRICTION AND AD LIBITUM FEEDING ON SLEEP DEPRIVATION-ASSOCIATED HYPERMETABOLISM IN RATS

Rolicia Martin. Department of Biology, Morgan State University

In previously conducted research, it has been determined that sleep deprivation produces severe physiological and psychological damage over an extended period of time. Hyperphagia is found to be an after effect of sleep deprivation and death is imminent. Many studies have been conducted over the years, from sleep deprivation as a cause of physiological damage to it being a type of stress. Ultimately, sleep deprivation has bcen found to increase the metabolic rate and the food consumption of the rat, as it was determined in a 1989 study by Rechtschaffen et al. We are conducting a variation of the study done in 1989 by Rechtschaffen et al. and introducing a new element—food restriction. This experiment is actually two experiments being conducted simultaneously. Experimental rats used in this research are either sleep-deprived and food-restricted or sleep-deprived and ad libitum fed. Both experiment and control rats were placed in the same apparatus to conduct the experiment, but control rats were able to live in cages, whereas the experiment rats were placed in Plexiglas tanks for the duration of sleep deprivation. Rats were weighted daily. As of yet, results from the sleep deprivation experiments have not bcen determined.

Student: Rolicia F. Martin, Morgan State University, Department of Biology, Junior
Mentor: Dr. Michael Koban, Morgan State University, Department of Biology, Assistant Professor

A STUDY OF WATSON'S TRIPLE INTEGRALS

Trizan Moore. Department of Mathematics, Morgan State University

Van Peype (1938) did a study on ferromagnetic anisotropy. In this study, he introduced three triple integrals. Fowler (1938) presented the problem of evaluating these integrals and for some time no one could solve them. Watson (1939) was able to solve the integrals for three different values. These integrals have gone on to be called Watson's Triple Integrals. Watson's Triple Integrals have been used in the study of body centered, face centered and simple cubic lattices which directly links to random walks. In this project, Watson's Triple Integrals is being studied. To establish a foundation to study these integrals, we are studying important properties and applications of triple integrals in general. The integrity of the Watson's Triple Integrals with various computer algebra systems such as Maple, Mathematica, MATLAB is surveyed and derived. Our long term goals is to show how these integrals connect to random walks.

Student: Trizan Moore, Morgan State University, Department of Mathematics, Senior
Mentor: Dr. Asamoah Nkwanta, Morgan State University, Department of Mathematics, Associate Professor

Norfolk State University

Norfolk State University

MATHEMATICAL MODELING IN BUSINESS: TIME IS MONEY

Angelitta Britt, Department of Mathematics, Norfolk State University

Mathematical modeling of delays in business consists of investigating and quantifying the relationship between various delays and their effects on businesses, such as fluctuation, revenue, and cost. The mathematical models are described by a set of equations using calculus and algebra. The Stella 8.0 software is used to simulate the effects of delays on businesses by solving those equations numerically. In this study, we model the competition between two businesses and study the competitive edge of one business making more efficient business decisions over another. The quantitative results are shown by graphs and tables. It models the supply-demand chain- management of two businesses selling the same products and competing for market shares. The supply-demand chains are made of five (5) basic parts, which are: Order, Inventory, Price, Sales/Total Sales, and Total Demand. To emphasize the delay effect, we assume that the two businesses make the same decisions in inventory control, but with different efficiencies in making and carrying out ordering and pricing decisions in terms of shorter or longer delay days. The model demonstrates that the more efficient business experiences much less fluctuation in inventory, ordering, price, and sales than its competitor, thus it can greatly reduce its business cost. By observing all of these factors, it will be possible to determine exactly how much time is how much money.

Student: Angelitta Britt, Norfolk State University, Department of Mathematics, Sophomore
Mentor: Dr Jiashi Hou, Norfolk State University, Department of Mathematics, Assistant Professor

REPLACEMENT OF WILDTYPE/MUTANT CAT CONSTRUCTS WITH LUCIFERASE CONSTRUCTS

Kira Howell, Department of Biology, Norfolk State University

Several characteristics of the Human Cytomegalovirus (HCMV) make it a virus in need of innovative and abundant research. Infection rates are copious in children and with its ability to lie latent in its host indefinitely; HCMV may be considered a silent predator. UL98 is one gene responsible for the synthesis of HCMV viral DNA, and it is therefore imperative to understand its endo/exonuclease activity. To do this, an environment that is optimal for this study must be achieved. Currently, studies involving the UL98 promoter are done using chloramphenicol acetyltransferase (CAT), a gene that cannot be tracked without the use of costly and potentially harmful radioisotopes. The bioluminescent gene luciferase (LUC) is not only a cost effective replacement, but it also provides a safe environment for an undergraduate laboratory. The objective of this study is to remove the putative UL98 promoter region from the pUL98CAT construct and replace it in a construct containing the LUC gene. Once the new plasmid is constructed, it will be manipulated via mutation and deletion in order to characterize how viral factors, specifically IE86 and IE72, bind to the promoter and affect gene expression. Methods: The UL98 fragment within the pUL98CAT construct was cut with HindIII, leaving a recircularized pSVoCAT plasmid in tact. The pGL3Basic plasmid was cut at the unique HindIII site, thereby linearizing it. The isolated UL98 fragment was then replaced in the LUC plasmid, thereby creating the pUL98LUC construct. The UL98 fragment within the pUL98CAT construct was isolated via acrylamide gel electrophoresis and the resulting 421bp band was cut out and purified to remove residual ethidium bromide. The pGL3basic plasmid was cut with HindIII and a ligation reaction ensued to allow or UL98 to bind to the newly linearized sticky ends. The new pUL98LUC construct was amplified for 48 hours then assayed and sequenced to verify that the insertion was successful. Replacement of the CAT gene with the LUC gene has provided the foundation upon which to study the viral factors affecting UL98 gene expression. The new biolilluminescent gene construct may now be used to track how viral factors, such as IE86 and IE72, bind to the promoter region and affect gene expression without the use of costly and potentially harmful radioisotopes.

Student: Kira Howell, Norfolk State University, Department of Biology, Junior
Mentor: Dr. Tabmitha Jervey, Norfolk State University, Department of Biology, Assistant Professor

COMBINING AND MODIFYING THE CTAB AND DNAZOL PROTOCOL FOR THE EXTRACTION OF PLANT DNA.

George F. Khan, Department of Biology, Norfolk State University

We developed a quick (less than 1 hour), inexpensive and consistent protocol for extracting DNA from woody tissue by combing two current protocols (CTAB and DNAzol). Both CTAB (hexadecyltrimethylammonium bromide) and DNAzol protocols present limitations. CTAB is time consuming and does not allow flexibility when working with lots of samples. Although the DNAzol protocol is relatively quick (~1.5 hours) it always resulted in more RNA than DNA from woody tissue. Our objective was to see if combining the two protocols would allow us to isolate clean DNA faster. The extraction and isolation procedure consisted of: pre-incubating the samples in an extraction buffer (12.5mg CTAB, 5M NaCl, 1M Tris, 0.5M EDTA, β-mercaptoethanol); incubating the sample at 65°C for 30 minutes; followed by the addition of the DNAzol protocol using a 1:4 ratio of plant material to 100μL of DNAzol buffers; increasing the centrifugation speed from 5000 to 6600*g* to aid in the separation; and eliminating the phenol: chloroform extraction step usually used in the CTAB protocol to remove protein. The DNA concentration of all samples were calculated using a spectrophotometer, as well as checked in a 1% TAE agarose gels stained with ethilium bromide. In comparison to the two standard protocols (i.e., DNAzol and CTAB), our new protocol yield 70-100 fold increase in total genomic DNA and no RNA was evident on the agarose gels of the final products. This new combine protocol is both fast and preliminary experiments have shown that the genomic DNA resulting from the combined procedure can be used for RAPD's and PCR. We will be using this new combined protocol for DNA fingerprinting studies to investigate and inventory plants from the Dismal Swamp.

Student: George F. Khan, Norfolk State University, Department of Biology, Junior
Mentor: Dr Camellia Okpodu, Norfolk State University, Department of Biology, Department Chair

AUTOMATION OF A PHOTOLUMINESCENCE SPECTROMETER

Andera Pinkney-Hawkins, Department of Engineering, Norfolk State University

Semi-conductors have a wide range of properties and applications for this reason it is imperative that the characterizations of these materials are accurate. Semi-conductors are sensitive to their environments due to the fact that they are chemical compounds interactions with certain solutions can cause defects or alter there functionality. Semi-conductors are commonly examined using a spectrometer through a process called photoluminescence spectroscopy. In order to acquire reliable data in a more efficient and timely manner a plan has been implemented to upgrade and automate a photoluminescence spectrometer. The Lab View automation program is very user friendly and easy to understand. This program will serve as the basis for any future additions or innovations to the spectrometer which will benefit semi-conductor research. The spectrometer will be used to measure the optical potential of an InN/Ga semi-conductor which has only been simulate by a computer and is said to be ideal for solar cells.

Student: Andera Pinkey-Hawkins, Norfolk State University, Department of Engineering, Junior
Mentor: Dr. Alan Doolittle, Georgia Institute of Technology, Electrical and Computer Engineering Department, Professor

MANUFACTURING WITH COMPUTER NUMERICAL CONTROL (CNC)

Ashley Turner, Department of Technology, Norfolk State University

The purpose of this research is to improve educational methodology and experience in Manufacturing with Computer Numerical Control (CNC) machines. The rising labor cost and lacking of skilled workers shift tremendous work offshore. To stay competitive, the machine tools used to produce parts computer numerically controlled (CNC). The benefits of CNC machines are saving money, time, accuracy, repeatability, as well as the reliability of the products. It is very important to prepare our students with advanced skilled in manufacturing filed with CNC knowledge. To familiarize the participant with CNC machines, sample CNC projects are used to show the various functions of CNC programming; i.e.; G- Codes and M-codes. Then participant uses these projects to master the CNC machines operations by input and revising the programs to the CNC machines and produce the parts. Lastly, the participant will utilize the knowledge learned in the process to design, program and produce parts with CNC machines. Currently, CNC courses taught at Norfolk State University is a stand- alone module and not utilized the CAD. This project will investigate the method to transfer turning models from directly to Boxford Lathe.

Student: Ashley Turner, Norfolk State University, Department of Technology, Senior
Mentor: Dr. Jeenson Sheen, Norfolk State University, Department of Technology, Associate Professor

INVESTIGATIVE STUDIES OF THE MO(VI)-NTA COMPLEX USING NMR TECHNOLOGY

Josiah Wrensford, Department of Biology, Norfolk State University

The purpose of this research project was to devise methods in order to understand the reaction mechanism of the reduction of the monomeric Mo(VI)-Nitrilotriacetic acid (NTA) complex to the Mo(V)-NTA dimer by the reducing agent, sodium dithionite. Data was obtained via the use of 60 and 300MHz Proton Nuclear Magnetic Resonance (H-NMR) Spectrometers. All solutions were prepared in deuterium oxide and also included 0.008M tetramethyl ammonium chloride (TMA), which was used as a reference marker. The H-NMR spectra of a solution containing an initial concentration of 0.033M NTA (also contained 0.042M Mo(VI)) was taken as it reacted with the reducing agent. The proton NMR spectral results showed the decrease of a peak associated with the Mo(VI)-NTA monomeric complex (0.72 ppm from the TMA marker) and the growth of a peak taken to represent the presence of the Mo(V)-NTA dimer (0.61 ppm from the marker). The change in both peaks was more obvious after an extended period of time when the reaction was completed. Preliminary results also established that the presence of the Mo(V)-NTA mono-oxygen bridged intermediate could be detected by way of NMR spectroscopy. This was represented as a distinct "hump" in the graph of the monomer peak height ratio. The data obtained from the reaction of a solution that does not undergo the intermediate phase, Mo(VI)-Iminodiacetic acid (IDA), with sodium dithionite supports this hypothesis since there was no distinct "hump" in its graphical analysis.

Student: Josiah Wrensford, Norfolk State University, Department of Biology, Senior
Mentor: Dr. Kenneth Hicks, Norfolk State University, Chemistry Department, Professor

University of the District of Columbia

University of the District of Columbia

MUNICIPAL WATER PROCESSES AND ELEVATED LEAD CONCENTRATIONS IN WASHINGTON D.C.

Henok legesse. Department of Engineering and Applied Sciences, University of the District of Columbia
Michael Gabriel. College of Arts and Sciences, University of the District of Columbia

This study examines the relationship between elevated lead concentrations within the District's municipal water system as a function of water treatment and distribution processes. Eclectic municipal experiences and approaches including biosensor monitoring are contrasted using emerging scientific data. Until recently most water samples taken from the District exceeded the Federal concentration standard of 15ppb.As the deleterious physiological effects of lead via water ingestion included brain and kidney damage two major municipal actions were green lighted. District authorities sought selective replacement of lead pipelines within the distribution system and the deployment of phosphoric acid as a passive anticorrosion lead inhibitor However evidence from Madison, Wisconsin suggests that this use of phosphoric acid may violate the Federal Clean Water Act by encouraging eutrophication. Additionally in Maui, Hawaii phosphoric acid use as a lead anticorrosion inhibitor has it implicated in lung congestion and eye and skin problems.

Students: Henok legesse, University of the District of Columbia, Department of Engineering and Applied Sciences
Michael Gabriel, University of the District of Columbia, College of Arts and Sciences
Mentors: Dr Esther Ososanya, University of the District of Columbia, Department of Engineering and Applied Sciences
Dr. Calvin Brooks, University of the District of Columbia, Department of Engineering and Applied Sciences

THE ESCAPE ON THE TANGENT

Michael Nyemenim. Department of Electrical Engineering, University of the District of Columbia
Togba Liberty. Department of Computer Science, University of the District of Columbia
Jeremy Wittes. Department of Mathematics, University of the District of Columbia

Parametric equations can be used to calculate and find the path of an object that is suddenly released from an elliptical rotation. By making use of the tangent to the ellipse and the object's elliptical velocity, the final position of an object can be predicted, after it is suddenly released from the ellipse. Using a fictional example from Star Wars, calculations will be done to show how similar complex, but interesting problems are solved.

Students: Michael Nyemenim, University of the District of Columbia, Department of Electrical Engineering
Togba Liberty, University of the District of Columbia, Department of Computer Science
Jeremy Wittes, University of the District of Columbia, Department of Mathematics
Mentors: Dr. Brooks
Prof. Steadman
Prof. Horton
Dr. Nayar
Dr. Fleming
Mr. Harouna
Mr. Mathews

RENEWABLE ENERGY: WIND-SOLAR HYBRID ENERGY SYSTEM

Steven Omoijuanfo and Daykaker Karter. Department of Mechanical Engineering, University of the District of Columbia

The wind-solar hybrid energy system is a project that was set up to further enhance the development of renewable energy, combining wind and solar energy in a single system. This project integrates a 400 watts wind turbine with an existing 30 watts solar system to generate an average seasonal wattage of 9.3 kWh. The project allows for the addition of wind energy inputs in conjunction with the solar panel for fuel saving. In this view, a battery bank is introduced to manage the load demand during peak hours. The project demonstrates how wind-solar hybrid energy system is used as ways by which devices, machineries, and tools are powered to bring ease to humanity. The basics of these sources of energy, how they are formed, and used to generate electricity are explained in this study. The merits, demerits and also the factors affecting the location of the hybrid system were discussed.

Students: Steven Omoijuanfo, University of the District of Columbia, Department of Mechanical Engineering, Junior
Daykaker Karter, University of the District of Columbia, Department of Mechanical Engineering, Senior
Mentors: Dr. Esther T. Ososanya, University of the District of Columbia, Department of Electrical Engineering, Professor
Dr. Calvin Brooks, University of the District of Columbia, Department of Mechanical Engineering, Associate Professor

SYNTHESIS AND EVALUATION OF VITAMIN E CONJUGATES

Jeffrey Zulu. Department of Chemistry, University of the District of Columbia

The aim of this project is to conjugate antitumor nucleosides to major vitamin E components α-tocopherol and δ-tocopherol. The mode of action for these nucleosides dictates that they must first be phosphorylated by cellular enzymes in a stepwise manner to the triphosphate level in order to become activated. Thus, there is an advantage in introducing these drugs in the 5'-monophosphorylated form since the first the first phosphorylation step is probably the most difficult. The highly charged nucleotide would not, however, be able to readily penetrate the cell membrane. To avoid this problem, the highly lipophilic tocopherol unit can be attached to the 5'-mononucleotide form of the drug via a phosphodiester linkage that would tremendously increase the membrane transportability of these compounds.

Student: Jeffrey J. Zulu, University of the District of Columbia, Department of Chemistry, Junior
Mentor: Dr. Norman Kondo, University of the District of Columbia, Department of Chemistry Department, Professor

Virginia State University

Virginia State University

SCREENING *VERNONIA GALAMENSIS* GERMPLASM FOR OIL, VERNOLIC ACID, AND LIPASE ACTIVITY

Teresa Bennett, Margaret Kamara and Eyitayo J. Akoda. Department of Biology, Virginia State University

Vernonia galamenesis is an annual herb and native of Africa. Under optimum conditions, Vernonia seeds contain up to 40% epoxy oil and this oil has up to 80% vernolic acid (CIS- 12,13- epoxyoleic acid). Attention has been focused on the domestication and commercialization of *Vernonia galamensis* as a new industrial oilseed crop for the production of epoxidized oil. At Virginia State University, 63 accessions of vernonia were analyzed for oil, Vernolic acid (VA) and lipase activities (LA). Significant differences for seed yield, oil content and VA were observed among the evaluated accessions. The variation in yield was also reflected in seed size and the mean size was 3.5 grams/100 seeds. The mean of the total oil was 18% and ranged from 14 to 31% where the majority of the accessions fall within the overall mean. The VA mean of the accessions was 55% and ranged from 38 to 77% and 49% of the accessions had Vernolic acid content which exceeded the mean. *Vernonia galamensis* var. *australis* had the highest VA. Vernonia sp. from Zambia and *V. noveboracensis* had the lowest. *Vernonia galamensis* var. *ethiopica* produced in Virginia had significantly higher VA than other tested species. Vernonia germplasm were also evaluated for lipase activities. Wide variations in lipase activity were found among tested germplasm. Mean lipase activity was 377.6 μg released $C_{18:0}$/g meal and ranged from 151 for *V. cinerscens* to 1010 for *V. perrottetii*. In general, germplasm from Zambia characterized by higher lipase activity than those from Zimbabwe, Malawi, Tanzania, and other unknown places. Variation in free fatty acid in the seeds among species was also found. The mean free fatty acid was 16 mg/100g seed and ranged from 16 for *V. philipsoniana* to 37.3 for *V. cinerea*. No correlation was found between lipase activity and free fatty acid contents within the seeds. Zambian germplasm had the lowest free fatty acid content and USA/VA had the highest.

Students: Teresa Bennett, Margaret Kamara, and Eyitayo J. Akoda, Virginia State University, Department of Biology
Mentors: T. Andebrahn, and A. Mohamed, Virginia State University, Department of Biology

EXPERIMENTAL STUDY ON VIBRATION OF A BELL TYPE STRUCTURE

Latres Davis. Department of Engineering & Engineering Technology, Virginia State University

In practice bells are imperfect and the ideal symmetries are usually all broken due to irregularity of shape, material property, and local defects of casting process. Therefore, vibration analysis of bell type structures become complicated and sometimes predicting precise results is not possible. Lack of generalized mathematical representation of bell vibrations, necessitates numerical and/or experimental methods to determine the vibration characteristics of this type of structures. Rapid advances in Virtual Instrumentation programs in one hand and precise data acquisition systems on the other hand, cause the analysis of such a complex vibration problems to be feasible in a normal research laboratory. In this study LabView is used for experimental measurements of the first five natural frequencies and corresponding mode shapes of a bell. The experimental modal parameters obtained by impact testing are compared with corresponding results obtained by a finite-element analysis.

Student: Latres Davis, Virginia State University, Department of Engineering & Engineering Technology, Computer Engineering, Senior
Mentors: Dr. Jahangir Ansari, Virginia State University, Engineering and Engineering Technology Department, Assistant Professor
Dr. Yoon Kim, Virginia State University, Engineering and Engineering Technology Department, Assistant Professor

EFFECTS OF ACUTE STRESS ON BRACHIAL ARTERY BLOOD FLOW MEASURED VIA ULTRASOUND

Syleena Guilford. Department of Biology, Virginia State University
Sheila G. West. Department of Biobehavioral Health, Pennsylvania State University

We conducted a randomized, controlled trial to examine the effects of acute stress on vascular endothelial function in 29 men and women with elevated or normal cholesterol. In previous studies, a significant reduction in endothelial function in the immediate post stress period was observed. It is possible that differences in blood flow after stress may explain the variability observed by past studies. The goal of this research was to examine post-stress changes in brachial artery blood flow and blood velocity and to test whether cholesterol status alters this hemodynamic response to stress. We found significant reductions in baseline blood flow volume and blood flow velocity at 45 and 90 min post-stress. In addition, the percent increase in volume and velocity caused by cuff deflation was higher at 90 min post-stress vs. the resting baseline. There were no significant differences in blood flow responses between subjects with high vs. low cholesterol.

Student: Syleena Guilford, Virginia State University, Department of Biology
Mentor: Sheila G. West, Pennsylvania State University, Department of Biobehavioral Health

IMPROVE VERNONIA OIL QUALITY THROUGH THE USE OF MICROWAVE HEATING

Jennifer Hill, Graduate, Makena Hammond, Lakeila Powell, and O. Taylor. Department of Biology, Virginia State University

Epoxy oils are important in industry for the manufacture of plastic formulations, protective coatings, lubricants, and other products. A natural low-viscosity, epoxy oil is now available from the seeds of *Vernonia galamensis* (Cass.) Less, a herbaceous member of the sunflower family. The new development in domestication of V. *galamensis* has renewed the national and international interest in this plant as a good source of seed oil rich in vernolic acid. Venonia seeds have high lipase activity in the resting state. This is shown by lipolysis of this oil when seeds are crushed prior extraction. A new method was developed to inactivate the lipolytic activity in the seed prior extraction. In this method microwave heating process is used. Time, power setting, and moisture content were tested and optimum conditions for eliminating lipolytic activities were identified. The main objective of this study is to determine the effect of these conditions on the quality of vernonia oil. No significant difference in the epoxy and oxygen contents of oil extracted from microwave heated vernonia seeds at 8% and 15% moisture or different power setting. However, there were significant differences when the seeds were microwave heated for 80 second/5g seed or higher. The acid value of the oil was significantly decreased from 15 to 3 % with increasing microwave heating time from 0 to 80 second, then gradually increased from 3 to 7% with increasing time from 100 to 180 second. At higher microwave heating time more vernolic acid was released causing reduction in vernolic acid content of the oil.

Students: Jennifer Hill, Makena Hammond, Lakeila Powell, and O. Taylor, Virginia State University, Department of Biology
Mentors: T. Andebrahn, and A. Mohamed, Virginia State University, Department of Biology

AZADLRACHTIN (A NEEM PRODUCT) AS AN ANTIPROTOZOAN AGENT AGAINST *TRYPANOSOMA MUSCULI* INFECTION IN SWISS WEBSTER (SW) MALE MICE. PART II

J. Riley. Department of Biology, Virginia State University
Dilip Sen. Department of Biology, Virginia State University
Shobha Sriharan. Department of Agriculture, Virginia State University
Carmen Batiste. Department of Biology, Virginia State University

The Swiss Webster (SW) male mice treated with test compound, a 90% *Azadirachtin,* suggested that the drug administered prior to, simultaneously with, and after inoculation of *Trypanosoma musculi* (5X 10^4/ 25 g mouse) affected the parasitemic levels during the course of infection. The control group developed higher parasitemic levels on 15 and 17 Post Inoculation (PI) days when compared with other experimental counterparts. This investigation suggests that the timing of administration of *Azadirachtin* may have potential antiprotozoan effects against the stercorarian hemoflagellates developed in the SW male mice. (Supported by the BRIDGES to Baccalaureate and AMP Programs, 2004-'05).

Students: Carmen Batiste, Virginia State University, Department of Biology
J. Riley, Virginia State University, Department of Biology
Mentors: Dilip Sen, Virginia State University, Department of Biology
Shobha Sriharan, Virginia State University, Department of Agriculture

WBHR-LSAMP Students Conducting Research

Principal Investigators

Dr. Richard A.English
Provost and
Chief Academic Officer
Howard University
Washington, DC 20059
(202) 806-2550
(202) 804-4971 Fax
renglish@howard.edu

Dr. Clarence M. Lee
Co-Principal Investigator
Executive Director
WBHR-LSAMP
Howard University
Washington, DC 20059
(202) 238-2511
cmlee@howard.edu

Dr. William Gordon
Alliance Coordinator
Department of Biology
Howard University
Washington, DC 20059
(202) 238-2511
(202) 986-7752
wgordon@howard.edu

Co-PI's and Alliance Institution

Dr. Joyce M. Jarrett
Interim Provost
Hampton University
Adm. Bldg., Room 103
Hampton, VA 23668
(757) 727-5201
Fax (757) 727-5085
Joyce.jarrett@hamptonu.edu

Dr. Joan Robinson
Provost and VP for
Academic Affairs
Morgan State University
1700 East Cold Spring Lane
Truth Hall, Room 300
Baltimore, MD 21251
(443) 885-3350
Fax (443) 885-8289
jrobinson@moac.morgan.edu

Dr. Wilhelmina Reuben-Cooke
Provost and Acting VP for
Academic Affairs
University of the DC
4200 Conn. Avenue NW
Wash., DC 20008
(202) 274-6031
Fax (202) 274-5305
wreuben-cooke@udc.edu

Project Coordinator

Dr. Elaine Eatman
Hampton University
Dept. of Biology
Dupont Bldg., Room 101
Hampton, VA 23668
(757) 727-5267/5278
Fax (757) 727-5961
Elaine.eatman@hamptonu.edu

Dr. John Wheatland
Morgan State University
School of Engineering
5200 Perring Parkway
Baltimore, MD 21251
(443) 885-3864
Fax (443) 885-8218
jawjr@eng.morgan.edu

Dr. Ester T. Ososanya
University of the DC
Dept. of Electrical, Engrng.
4200 Conn. Ave., NW
Washington, DC 20008
(202) 274-5837/4631
Fax (202) 274-4631
cbrooks@udc.edu

Co-PI's and Alliance Institution

Dr. Elsie M. Barnes
Acting VP for Academic Affairs
Norfolk State University
700 Park Avenue
Norfolk, VA 23504
(757) 823-8408
Fax (757) 823-9435
embarnes@nsu.edu

Dr. W. Eric Thomas.
Provost/VP for Academic Affairs
Room 206 Virginia Hall
Virginia State University
Petersburg, VA 23806
(804) 524-5997
Fax (804) 524-5738
ethomas@vsu.edu

Dr. Patricia Ramsey
Provost
Bowie State University
14000 Jericho Park Road
Bowie, MD 20715
(301) 860-3462/3460
Fax (301) 860-3466
pramsey@bowiestate.edu

Project Coordinators

Dr. Sandra Deloatch
School of Science & Technology
Norfolk State University
700 Park Avenue
Norfolk, VA 23504
(757) 823-8561
Fax (757) 823-9114
sjdeloatch@nsu.edu

Dr. M. Hadi Moabad
Virginia State University
Harris Hall, Room 113
Petersburg, VA 23806
(804) 524-5833/5285
Fax (804) 524-5817
mmoadab@vsu.edu

Dr. Elaine Davis
Dept. of Natural Sciences
Bowie State University
14000 Jericho Park Road
Bowie, MD 20715
(301) 860-3876/4464
Fax (301) 860-3346
edavis@bowiestate.edu

Board of Advisors for WBHR-LSAMP

1. Dr. S. James Gates, Jr. – Board of Advisors Chairman
   John S. Toll Professor of Physics and Center for String and Particle Theory Director
   University of Maryland
   College Park, MD 20742-4111
   Tel: (301) 405-6025
   Email: gatess@wam.umd.edu

2. Dr. Marian Johnson-Thompson
   Director, Education and Biomedical Research Development
   National Institute of Health
   National Institute of Environmental Health Sciences
   P.O. Box 12238
   Research Triangle Park, NC 27702
   Tel: (919) 541-4265
   Email: johnso21@niehs.nih.gov

3. Dr. Marsha Lillie-Blanton
   Vice President in Health Policy
   Henry J. Kaiser Family Foundation
   1450 G Street N.W. Suite 250
   Washington, D.C. 20005
   Tel: (202) 347-5270
   Email: mlillie-blanton@kff.org

4. Dr. Linda Phaire-Washington
   Senior Program Leader
   Argonne national Laboratory
   9700 South Cass Avenue/DEP
   Argonne, Illinois 60439-4845
   Tel: (630) 252-1751
   Email: Lwashington@dep.anl.gov

5. Dr. Carl E. Anderson
   President
   Kappa Scholarship Endowment Fund, Inc.
   2100 Yorktown Road N.W.
   Washington, D.C. 20012
   Tel: (202) 829-8367
   Fax: (202) 829-8367 (please fax)

6. Ms. Andrea D. Mickle
   President and CEO
   Minority Access, Inc.
   5214 Baltimore Avenue
   Hyattsville, MD 20781
   Tel: (301) 779-7100
   Email: amickle@minorityaccess.org

7. Dr. V. Michelle Chenault
   Associate Director for Science
   Office of Science and Technology
   Food and Drug Administration
   Center for Devices and Radiological Health
   Rockville, MD 20857
   Tel: (301) 827-2889
   Email: vmc@cdrh.fda.gov

PRESIDENTS

Howard University
Mr. H. Patrick Swygert J. D
President
2400 Sixth Street, N.W.
Washington, D.C. 20059
(202) 806-2500
Fax (202) 806-9243
hswygert@howard.edu

Hampton University
Dr. William R. Harvey
President
East Queen Street
Hampton, VA 23668
(757) 727-5231
Fax (757) 727-5746
William.Harvey@hampton.edu

Norfolk State University
Dr. Alvin J. Schexnider
Interim President
2401 Corprew Avenue
Norfolk, VA 23404-3907
(757) 823-6870
Fax (757) 823-2342
president@nsu.edu

University of the District of Columbia
Dr. William L. Pollard
President
4200 Connecticut Avenue, N.W.
Washington, D.C. 20008
(202) 274-5100
Fax (202) 274-5304
wpollard@udc.edu

Bowie State University
Dr. Calvin W. Lowe
President
14000 Jericho Park Road
Bowie, MD 20715
(301) 860-3555
Fax (301) 860-3510
clowe@bowiestate.edu

Morgan State University
Dr. Earl S. Richardson
President
Office of the President
Morgan State University
Cold Spring Lane & Hillen Rd.
Baltimore, MD 21251
(443) 885-3200
Fax (410) 319-3107
earls@moac.morgan.edu

Virginia State University
Dr. Eddie Moore, Jr.
President
Virginia State University
P.O. Box 9001
Petersburg, VA 23806
(804) 524-5070
Fax (804) 524-6506
eddiemoore@vsu.edu

The Howard University LSAMP would like to thank everyone for helping to make the Board of Advisors Meeting a true success.