

Spring 2013, Vol. 49

# TRANSACTIONS

NATIONAL INSTITUTE OF SCIENCE



# Table of **CONTENTS**

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## **TRANSACTIONS**

The National Institute of Science  
Spring 2013, volume 49

- X Letter from the Editor**
- X Review Board and Officers**
- X Plenary Session Speakers**  
James Earl King Hildreth, PhD, MD
- X NIS Distinguished Lecture**  
Thomas LaVeist, PhD
- X The Hot Zone Summit**  
***“STDs at Historically Black Colleges and Universities: A Major Health Concern”***  
  
**Panelists:**  
Xian R. Brooks  
William C. Jenkins, PhD, MPH  
Tanya Telfair LeBlanc, PhD, MS  
Dana Cropper Williams, MPA, MHR  
**Moderator:** Marian Johnson-Thompson, PhD
- X NIS Memorial Lecture - “The HeLa Saga”**  
  
Mr. David “Sonny” Lacks  
Sherrie Flynt Wallington, PhD  
Kirk Yancy Williams, PhD  
Shawneequa L. Callier, JD  
**Moderator:** Deepak Kumar, PhD
- X Beta Kappa Chi Seminar**  
Henry A. Moses, PhD
- X Awards Banquet**  
George Hill, PhD
- X Workshops**

## **Student Presentation Awards and Abstracts**

- X Graduate Session B**
- X Undergraduate Oral Session**
- X Undergraduate Poster Session**
- X High School Program**

## **Reports**

- X 2012 Meeting Evaluation Report**  
Stephanie Graves, Garnetta Turner and  
Nithya Raghavan

- X Announcements**

### **Front Cover**

Meeting theme “Social Determinants of and Progress in Health Disparities

### **Back Cover**

Group Photo from the meeting

## **Acknowledgements**

*The National Institute of Science and Beta Kappa Chi Scientific Honor Society would like to thank the National Institute of General Medical Sciences, National Institutes of Health, for its continued financial support of students attending and for supporting the mission and goals of the meeting.*

*We would like to thank AmPrint, LLC. for superb printing services of booklets, graphic designs etc. for the 69th Joint Annual Meeting of the NIS and BKK and Colella Photography for serving as the meeting’s photographer.*

*The National Institute of Science, Beta Kappa Chi Scientific Honor Society, Tennessee State University, and Fisk University would like to take this opportunity to extend their sincere appreciation to the many volunteers whose time and efforts have contributed towards bringing the 69th Joint Annual Meeting to fruition.*

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## *From the Editor's desk.....*

Tennessee State University (TSU) in conjunction with Fisk University (FU) co-hosted the 69th Joint Annual Meeting of the NIS/BKX at Nashville, TN, from March 21-25, 2012. The meeting was well organized under the capable leadership of the co-chairs Terrance Johnson PhD (TSU), Patricia McCarroll, MS (FU) and the NIS/BKX Executive Council and Planning Committee.

The meeting was held at the LOEWS Vanderbilt Hotel, Nashville, TN and the workshops were conducted at Tennessee State University (Main Campus). The theme of the meeting was **"Social Determinants of and Progress in Health Disparities"**. The existence of substantial disparities in mortality, morbidity, risk behaviors, and hazardous environmental exposures among segments of the U.S. population have been well-documented. Differences in social determinants, such as poverty, low socioeconomic status (SES), and lack of access to healthcare exist along racial and ethnic lines. It is a fact that social, political, racial and economic issues are important determining factors of our lifestyle, which can have a more profound effect upon our health than medical care alone. The Department of Health and Human Services (DHHS) has come up with an initiative and action plan to reduce racial and ethnic health disparities. This plan involves expanding healthcare access, data collection, and the use of evidence-based interventions that will contribute to health equity for vulnerable populations that are defined by income, geography, disability, sexual orientation or other important characteristics. Since every individual should have the opportunity to reach their full potential for health, the HHS motto very aptly underscores this plan – "A Nation Free of Disparities in Health and Health Care."

With this agenda in mind and in order to create awareness in our youth, the 69th Joint Annual Meeting once again included the "Hot Zone Summit" whose discussion topic was "STDs at Historically Black Colleges and Universities: A Major Health Concern". Prior to the introduction and presentation of a panel representing key national programs and one local program designed to combat STDs on HBCU campuses, an original six-minute video produced and copyrighted by the National Institute of Science was

shown. This highly descriptive video presented a brief overview of the scientific and health aspects of STD and the problems they present on college campuses. This summit was spearheaded with renowned panelists such as William C. Jenkins, PhD, MPH; Tanya Telfair LeBlanc, PhD, MS; Dana Cropper Williams, MPA, MHR; and a student representative Xian Brooks. The Hot Zone summit was moderated by Marian Johnson-Thompson, PhD.

The 69th Joint Annual Meeting was kicked off with noteworthy clinical researcher Dr. James E.K. Hildreth, Dean, University of California–Davis as the plenary session speaker whose area of expertise is how the HIV enters the cells and causes infection. The NIS Distinguished Lecture speaker was Thomas A. LaVeist, Ph.D. who is the Director of the Center for Health Disparities Solutions at the Johns Hopkins Bloomberg School of Public Health and the William C. and Nancy F. Richardson Professor of Health Policy and Management. Dr. LaVeist's research on minority health, cultural competency issues and racial disparities in the US has made him a most sought after speaker. The NIS memorial lecture was titled the "The HeLa Saga", and consisted of a panel of speakers. The session was opened by Mr. David Lacks, the son of Henrietta Lacks, whose cells commonly known in the scientific world as HeLa cells, became one of the most important tools in medical research. The ethical and legal issues that have been raised since the publishing of his mother's biography in the 2010 book, **The Immortal Life of Henrietta Lacks**, by Rebecca Skloot was discussed in this session. Noteworthy speakers in their field included Shawneequa Callier, JD, MA, Assistant Professor in the Department of Clinical Research and Leadership at the George Washington University School of Medicine and Health Sciences (GW), Kirk Williams, PhD, ORISE Fellow, at the Food and Drug Administration and Sherrie Flynt Wallington, PhD, an Assistant Professor and Program Director of the Health Disparities Initiative at the Lombardi Comprehensive Cancer Center of Georgetown University. This session was moderated by Dr. Deepak Kumar, Chairperson of the Department of Biology, Chemistry and Physics, University of the District of Columbia and, co-Director of the UDC Cancer Research and Education Academy.

The BKX seminar and luncheon was presided by Henry Moses, PhD, Executive Director, Meharry

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## | EDITOR'S DESK

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National Alumni Association, Inc. Professor Emeritus of Biochemistry Meharry Medical College & Distinguished Professor Department of Chemistry; Division of Natural Sciences Fisk University Nashville, TN. He is a highly sought after lecturer in biochemistry and in programs focused on exposing and encouraging young people to consider the biomedical sciences as a career choice.

The meeting concluded with a high note at the Awards Banquet with another distinguished speaker, Dr. George Hill, the Assistant Vice Chancellor for multicultural affairs, special assistant to the provost and Vice Chancellor for Health Affairs at the Vanderbilt University.

The high school component was also a great success. A large number of area schools participated in the high school program with very high quality posters presented by high school students. The invited speaker for the awards ceremony was Bryan Kent Wallace, Director, Physics Laboratories, Fisk University.

Seven different workshops highlighting the meeting theme and other topics that were of interest to the students were also conducted at TSU.

Due to its popularity, we continued the "Evening Expo at the Marketplace" which was initiated at the 2010 Joint Annual Meeting. This is a venue where students have the opportunity to interact with exhibitors, counselors, and mentors who have the expertise to help outline the best plans for their academic future based on the students' academic credentials, career goals, and financial status. Students bring their business cards (provided by their sponsor and the NIS), career plans, hopes and dreams, as they enter the Marketplace. This issue (Vol. 49, spring 2013) will also include the highlights of the above events including photographs. It will also include the AWARD WINNING ABSTRACTS from all oral and poster presentations.

We wish to acknowledge the efforts of those who contributed their time, resources and never ending supply of patience, in bringing this journal to fruition. We owe a special thanks to our exceptional graphic artist and printer Mr. Alex Medley (AMPrint, LLC) who prints all the announcement, Transactions and program books for the meeting. We wish to thank Colella Photography for serving as the meeting's photographer. The effort

put in by the meeting evaluation team including the surveys, statistical analysis of the data and generation of the report is appreciated. This information helps us to make every meeting better by paying heed to the attendees responses.

If you have comments or suggestions regarding this journal or the meeting website, please contact the staff at:

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# TRANSACTIONS

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**James Earl King Hildreth, MD, PhD**

Dean, University of California–Davis  
College of Biological Sciences  
Davis, California

## OPENING **PLENARY** SESSION

How HIV, or human immunodeficiency virus, enters cells and causes infection.

**James E.K. Hildreth** is the Dean of the UC Davis College of Biological Sciences, which is one of the most prestigious institutions for graduate and undergraduate studies departments of Molecular and Cellular Biology and Internal Medicine.

Prior to his appointment at UC Davis, Davis, CA, Dr. Hildreth served as Director of the National Institutes of Health Center for Health Disparities Research in HIV, Meharry Medical College, Nashville, TN since 2005. Before coming to Meharry, he was a faculty member at the Johns Hopkins University, Baltimore, MD. Dr. Hildreth became the first African American in the 125-year history at Johns Hopkins School of Medicine to earn full Professorship with tenure in the basic sciences. At Hopkins he rose from Assistant Professor to becoming the first Associate Dean for Graduate Studies and Associate Dean at the Johns Hopkins School of Medicine, wherein he served for several years.

Hildreth's area of expertise is how HIV, or the human immunodeficiency virus, enters cells and causes infection. While serving as Chief of the Division of Research for the National Institute of Health's National Center on Minority Health and Health Disparities, NIH, Hildreth and his research team made a groundbreaking discovery in 2001. They had discovered that cholesterol had a profound effect upon the ability of HIV to enter and cause infection in cells and that removing the fatty substance from a cell's membrane can block that cell from being infected. Since that discovery, he has been involved with developing topical microbes or "chemical condoms" to block HIV transmission and thus infection. Dr. Hildreth has developed the concept of a 'chemical condom' to be used as a vaginal gel.

Dr. Hildreth has a breadth of publications and has received numerous accolades, awards and honors in recognition of his outstanding professional achievement, as well as his commitment to service. In 2008 Dr. Hildreth was elected to The Institute of Medicine (IOM). Election to the IOM is considered one of the highest honors in the fields of health and medicine and recognizes individuals who have demonstrated outstanding professional achievements and commitment to service.

A native of Arkansas, Dr. Hildreth received his bachelor's degree from Harvard University, Cambridge, MA in 1979 graduating magna cum laude. He attended the University of Oxford, Oxford, UK as a Rhodes Scholar and earned his doctorate in immunology in 1982. He returned to the US and received his medical degree five years later from Johns Hopkins University School of Medicine (1987). He is also a member of the Institute of Medicine, which is a section of the National Academy of Sciences.

Of all his accomplishments and his love for research, nothing brings him more professional joy than to mentor undergraduates. Each year he invites a few undergraduates into his lab. He said "Almost every year, I invite a few undergraduates to work in my lab. Undergraduates ask those questions no one else thinks to ask, and sometimes they come up with the answers no one else has thought of. They bring their own particular energy and spark to lab work and discussions."

## | NIS DISTINGUISHED LECTURE

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### **Thomas LaVeist, PhD**

Director, Center for Health Disparities Solutions  
Johns Hopkins Bloomberg School of Public Health  
Baltimore, Maryland

## NIS DISTINGUISHED LECTURE

Educator, research scientist, public speaker, advocate and author, **Thomas A. LaVeist, Ph.D.** Dr. LaVeist is the Director of the Center for Health Disparities Solutions at the Johns Hopkins Bloomberg School of Public Health and the William C. and Nancy F. Richardson Professor of Health Policy and Management. He has taught his passion - minority health and public policy - at this institution since 1990. Dr. LaVeist's research on minority health, cultural competency issues and racial disparities in the US has made him a most sought after speaker for prestigious professional conferences, workshops and association meetings concerning these issues. He is a frequent visiting lecturer on minority health issues at other Universities. He has had many media appearances in CNN, National Public Radio and other media venues.

Dr. LaVeist describes his research and writings as: "focused on three broad thematic research questions: 1) What are the social and behavioral factors that predict the timing of various related health outcomes? (e.g. access and utilization of health services, mortality, etc.) 2) What are the social and behavioral factors that explain race differences in health outcomes? and, 3) What has been the impact of social policy on the health and quality of life of African Americans? His expertise on U.S. health and social policy, the role of race in health research, social factors contributing to mortality, longevity and life expectancy, quantitative and demographic analysis and access, and utilization of health services has made him the "go to" expert consultant for many US federal agencies and healthcare organizations on these issues. He has been funded by such prominent agencies as: the National Institute on Minority Health and Health Disparities, NIH, the Agency for Healthcare Research and Quality, and the CDC. He is also funded by several other foundations.

Dr. LaVeist has authored and co-authored numerous articles in various scientific, medical and professional publications; over 35 just within the last 6 years. He has authored an edited volume, *Race, Ethnicity and Health* (Jossey-Bass Publishers, 2002) and a book, *Minority Populations and Health: An Introduction to Race, Ethnicity and Health Disparities in the United*

*States* (Jossey-Bass Publishers, 2005). His critiques and exposés on health disparities through articles he has written for publications such as *Black Enterprise*, *Newsday* and *Newsweek Magazines* and the *Baltimore Sun*, reaches beyond the scientific community.

Just as Dr. LaVeist seeks to "develop an orienting framework in the development of policy and interventions to address race disparities in health-related outcomes", he also seeks ways to bridge another passion- educational disparities and the African American youth. He is involved with a number of publications specifically directed towards African American youth and their parents about the college application process. These publications help them navigate the college application process from how to choose a college to how to finance the endeavor. He wrote "The DayStar Guide to Colleges for African American Students", and is co-author, along with his brother of "8 Steps to Help Black Families Pay for College". Dr. LaVeist also conducts the research for the *Black Enterprise* bi-annual publication "Top 50 Colleges for African American Students".

Dr. LaVeist is the recipient of numerous awards. He was among the 2011 *Who's Who in America*, as well as in the 5 previous years, and *Who's Who among African Americans*. He was the recipient of the Innovation Award in 2008, a prestigious award bestowed by the National Center on Minority Health (now an Institute, NIMHD), National Institutes of Health, Bethesda, MD. He was inducted as a member of the Delta Omega – Honorary Society in Public Health, Alpha Chapter – Johns Hopkins Bloomberg School of Public Health in 2006. He was been a fellow of the Brookdale Foundation since 1992.

Dr. LaVeist received his bachelor's in medical sociology from the University of Maryland Eastern Shore and a Ph.D. in medical sociology from the University of Michigan. The American Sociology Association awarded his dissertation the 1989 Outstanding Dissertation in Medical Sociology. Dr. LaVeist did his postdoctoral fellowship in public health at the University of Michigan, School of Public Health.

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# The **HOT ZONE** Summit

## “STDs at Historically Black Colleges and Universities: A Major Health Concern”



In the United States, sexually transmitted diseases (STDs) are a major public health problem and the number of infected youth is alarming. One out of every four teens present with an STD. Additionally, STDs have shown increased incidence on U.S. college campuses with the highest incidence in Historically Black Colleges and Universities (HBCUs). On college campuses, the most common STD infection is caused by human papilloma virus (HPV/genital warts), followed by chlamydia and gonorrhea infections. Other common STDs include HIV/AIDS, herpes, trichomoniasis, and syphilis. Recent information from HBCU campuses reveal that the incidence of HIV infections is increasing. From an economic standpoint, STDs represent a significant cost to the nation's health care system and the acute and long term impact on an individual's health status can be devastating. For example, it is now known that HPV can lead to cervical cancer, some STDs can lead to infertility, some STD infections can cause greater susceptibility to HIV, and the phenomenon of increased drug resistance presented by some STDs negatively impact effective treatment. As a result, both public and private sectors have identified a variety of educational and preventive measures to combat this problem. HBCU campuses have developed their own educational initiatives and some are being directed by student leaders. Government and advocacy groups are addressing STD infections on college campuses and the CDC has initiated a campaign in conjunction

with the popular musician, “Ludacris,” to emphasize HIV testing. Some specific reasons for the high STD incidence include lack of educational awareness about safe sex habits, the increased participation in “casual” sex and men having sex with men. This panel was represented by individuals from key national programs and one local program designed to combat STDs on HBCU campuses. Additionally, the panel included a student representative majoring in Public Health education from North Carolina Central University. Prior to the introduction and presentation of this panel, an original six-minute video produced and copyrighted by the National Institute of Science was shown. Panelists addressed the problem by providing information on the incidence and prevalence of STDs, risk factors, mechanisms for prevention and treatment, and other important information. The overall goal was to ensure that students were aware about STDs on college campuses and to provide mechanisms for prevention.



# HOT ZONE PANELISTS



**Xian R. Brooks, Undergraduate Student**

Public Health Education Major North Carolina Central University  
Durham, North Carolina

**Xian Brooks** is a junior in Public Health Education at North Carolina Central University, in Durham, NC. He is the current president of the Society of Future Health Educators, a member of Eta Sigma Gamma, the National Health Education Honorary, and a UNC-Chapel Hill Public Health Fellow. Born and raised in Louisville Kentucky, Xian developed his love for public

health education, by way of LGBT(lesbian, gay, bisexual and transgender) community organization. Post undergrad, Xian plans to attend a MPH program focusing on health behavior and health education. He then plans to attend a physician's assistant program, with the goal of opening an LGBT focused clinic. Xian works as a research assistant at UNC-Chapel Hill in the Department of Epidemiology on a study that measures the sensitivity of a home PAP test. As a research assistant, Xian plans and implements recruitment techniques, updates the participant database, and prepares collected sample aliquots.



**William C. Jenkins, PhD, MPH**

Professor of Public Health Sciences (Retired) Research Center on Health Disparities  
Morehouse College  
Atlanta, Georgia

**Dr. William C. Jenkins** is a retired professor of Public Health Sciences in the Research Center on Health Disparities at Morehouse College. He also served as Director of the Research Center on Health Disparities (2008-2010) and was on the staff of Meharry Medical College as an Adjunct Professor of Epidemiology. During his tenure at these institutions, he taught epi-

demiology, biostatistics, bioethics and public health courses. This past year (2010-2011) he was a Senior Fellow at the Institute for African American Research at the University of North Carolina, Chapel Hill.

Along with teaching, Dr. Jenkins life's work and research revolved around health disparities and its related issues. Before coming to Meharry, Jenkins worked over twenty years in various positions as coordinator, supervisor, manager, deputy assistant and chief in various departments at the Centers for Disease Control and Prevention, Atlanta, Georgia. There he coordinated programs and implemented policy for HIV/AIDS and STDs prevention and control in the minority populations, provided statistical services, and advocated specifically for minority issues pertaining to control of HIV. Dr. Jenkins managed the Tuskegee Participants Health Benefits Program Office for eight years. In this position he maintained the study archives and was responsible for the health and welfare of the participants of the "Study of Untreated Syphilis in the Negro Male" and their families and advocated for and managed the Presidential Apology (Clinton) to the survivors of this study. He also served as a program officer for the Bioethics Center at Tuskegee University. His research projects involved studying the causes of health disparities to finding new tools/concepts to eradicate racial and ethnic health disparities. Dr. Jenkins has written book chapters, has numerous publications and has given multiple presentations on epidemiology, bioethics, health disparities and public health issues.

Dr. Jenkins holds a membership in several professional organizations such as the American Public Health Association, Society for the Study of African American Public Health Issues and American Statistical Association. Currently, he serves on several advisory boards including the Morehouse College Public Health Science Institute, Women's Resource and Research Center Advisory Board, Harvard School of Public Health Diversity Committee Advisory Board, Dorothy I. Height Center for Health Equity and Evaluation and the Board of Directors of the American College of Epidemiology.

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He is the recipient of many prestigious awards including the Distinguished Alumni Award from the University of North Carolina Chapel Hill. He also holds membership in many outstanding associations and has numerous publications in epidemiology and public health issues.

Dr. Jenkins received his Bachelor of Arts in Mathematics from Morehouse College; Master's of Science in Biostatistics from Georgetown University, Washington, DC; Master's of Public Health and a PhD in Epidemiology from the University of North Carolina Chapel Hill. Dr. Jenkins did a postdoctoral fellowship in Biostatistics at Harvard University, Boston, Massachusetts.



**Tanya Telfair LeBlanc, PhD, MS** [EIS 2000]

Deputy Director, Office of Health Equity  
National Center for HIV/AIDS, Viral Hepatitis, STD and TB Prevention  
Centers for Disease Control and Prevention  
Atlanta, Georgia

**Dr. LeBlanc** [formerly Tanya Telfair Sharpe] is Deputy Director, Office of Health Equity of CDC's National Center for HIV/AIDS, Viral Hepatitis, STDs, and TB Prevention. An Anthropologist (BA, MS) and Sociologist (PhD) with 20+ years' experience and research in HIV/AIDS epidemiology, social epidemiology and social inequality, maternal and child health, substance use during pregnancy, disparities in health among women, minorities, and poor families. Current research includes exploring links between macro social forces such as income distribution, education quality, health literacy and access to standard care, and chronic and infectious disease outcomes. In addition, Dr. LeBlanc is conducting an analysis of the critical role of community based HIV-prevention programs for achieving health equity among hard to reach populations.

Her CDC career began as an Epidemic Intelligence Service (EIS) Officer in HIV/AIDS epidemiology, working with core and behavioral surveillance systems. Dr. LeBlanc (Sharpe) participated in one of the Anthrax outbreak investigations post September 11, 2001 and received a number of awards. Later, as a behavioral scientist with the National Center for Birth Defects and Developmental Disabilities, Dr. LeBlanc led research and development of a fetal alcohol exposure curriculum for medical schools. In addition, she served as the lead scientist for translation and dissemination of evidence based behavioral interventions for HIV prevention among youth and injection drug users. Numerous scientific, public health and other publications include her book ***Behind the Eight Ball: Sex for Crack Cocaine and Poor Black Women***, Taylor and Francis, October 2005 a highly regarded public health monograph presenting an account of crack cocaine addicted inner city poor women's lives. The book links crack addiction, crack related prostitution among poor black women and disparities in STDs, HIV and unplanned pregnancies to social determinants.

Dr. LeBlanc was lead editor of a number of thematic special issues of peer reviewed journals including Black Women and HIV/AIDS: Epidemiology, Risk Behaviors and Prevention published in ***Women and Health*** December 2007, and HIV/AIDS among Ethnic and Racial Minority Youth: Current Issues, published in ***The Journal of Equity in Health*** in November 2009. In "Social Determinants of Disparities in HIV/AIDS and Sexually Transmitted Diseases among Black Women: Implications for Public Health Policy" published in the March 2012 issue of the ***Journal of Women's Health***, Dr. LeBlanc and colleagues discuss poverty, loss of status and support linked to declining marriage participation—all of which contribute to sexual risks.

Other experiences include a National Institutes of Health/ National Institute on Drug Abuse research fellowship at Georgia State University, and traditional and online university teaching.

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**Dana Cropper Williams, MPA, MHR**

Director of Training & Education National Coalition of STD Directors  
Washington, DC

Dana Cropper Williams, MPA, MHR, is the Director of Training and Education at the National Coalition of STD Directors (NCSD). She has extensive experience developing and facilitating workshops on various sexual health and wellness issues. Dana has a foundation in health, working in state government for 8 years as a Disease Intervention Specialist (DIS), an HIV counselor and educator and finally the state Family Planning Administrator. Prior to NCSD,

Dana worked with Northrop Grumman as a corporate trainer conducting strategic planning and organizational development workshops.

**MODERATOR**



**Marian Johnson-Thompson, PhD**

Professor Emerita  
Department of Biology, Chemistry and Physics  
University of the District of Columbia  
Washington, DC

Marian Johnson-Thompson, PhD is Professor Emerita of Biology at the U of the District of Columbia (UDC) in Washington, DC and Adjunct Professor in the School of Public Health at the University of NC Chapel Hill. A cancer researcher, microbiologist and educator, she is also a leader in several professional and civic organizations. She joined the NIEHS of the National Institutes of Health in 1992 and retired as Director of Education and Biomedical Research Development in 2008. Prior to that, she held positions at UDC, Goddard Space Flight Center, Lawrence Livermore, General Electric Space Science Center and the National Cancer Institute, NIH. As a member of several local, national and international committees and advisory boards that address her professional interests, Dr. Johnson-Thompson, is frequently invited to address issues related to science equity, health disparities and environmental justice, human subjects protection and emerging infectious agents. She has served as a reviewer/consultant for the NIH, NSF, EPA, Homeland Security, the Burroughs Wellcome Fund, DOD and NASA and she serves on the board of the NC Triangle Affiliate of Susan G. Komen for the Cure, the NC Environmental Defense Fund and the African Organization for Research and Training in Cancer. Previously, she served on the Durham, NC Environmental Affairs Board and she is a Golden Life Member of Delta Sigma Theta, Inc. Her active memberships include the American Society for Microbiology where she serves on the Public and Scientific Affairs Board, the American Association for Cancer Research, the American Society for Cell Biology, the American Association for the Advancement of Science, the Society of Sigma Xi and she is a member of Susan G. Komen for the Cure Advocates in Science. Her awards and honors are many and include the 1999 ONI Award from the International Congress of Black Women, several NIEHS and NIH Director's Awards, and the 2003 Thurgood Marshall Alumni Award. Dr. Johnson-Thompson is an elected Fellow of the American Academy of Microbiology and a Fellow of the American Association for the Advancement of Science. Dr. Johnson-Thompson received her BS and MS degrees in microbiology from Howard U and her PhD in molecular virology from Georgetown U Medical School. In 2009, she received the Outstanding Alumni Achievement Award from Howard University.

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# THE HELA SAGA

## The Immortal Cells of Henrietta lacks



**Mr. David "Sonny" Lacks**, joined by a panel of judicial, medical and scientific experts, conveyed the story of his mother's cells, commonly known in the medical and scientific world as "HeLa cells", which became one of the most important tools in medical research and the ethical and legal issues that have been raised since the publishing of his mother's biography in the 2010 book, *The Immortal Life of Henrietta Lacks*, by Rebecca Skloot. Issues such as who owns the rights to your cells, right of information, informed consent, business profiteering and, medical apartheid among others were discussed.

*David "Sonny" Lacks Jr., is the third child and second son born to Henrietta and David Lacks. A truck driver by vocation, he is now a crusader. His mission is to carry on the promise and efforts he and his siblings had made years ago: to fight for recognition of their mother and let the world know of the immeasurable contribution she has made to science and mankind. "She was a giving person," Lacks said of his mother, "many beneficial things have come from her cells. I know she would appreciate this being a giving situation". David Lacks is a father, grandfather and great-grandfather. When not on speaking in engagements, Mr. Lacks resides in Turner Station, Maryland.*



### **Shawneequa L. Callier, JD**

Assistant Professor  
Department of Clinical Research and Leadership  
School of Medicine and Health Sciences  
The George Washington University  
Washington, DC

**Shawneequa Callier, JD, MA**, is an Assistant Professor in the Department of Clinical Research and Leadership at the George Washington University School of Medicine and Health Sciences (GW). She has dedicated much of her career to examining the bioethical and legal issues raised by advancements made in genetic research, and has published manuscripts about concerns related to genetic discrimination and patients' expectations about the use of their genetic samples. Prior to joining the faculty at GW, Ms. Callier examined the ethical, legal, and social implications (ELSI) of genetic research at the World Health Organization, the Nuffield Council on Bioethics, and the Center for Genetic Research Ethics and Law, an NIH Center of Excellence in ELSI research located within the Bioethics Department at Case Western Reserve University. Ms. Callier holds a Master of Arts degree in Bioethics from Monash University and a Juris Doctor degree from the Georgetown University Law Center.



### **Kirk Yancy Williams, PhD**

ORISE Fellow  
Food and Drug Administration  
Rockville, Maryland

**Kirk Yancy Williams, PhD**, received his B.S. in Chemistry from Dillard University in his hometown of New Orleans, and one of his M.S. degrees in Biochemistry and Biophysics from Rensselaer Polytechnic Institute. His Ph.D. research focused on computational models of phytoestrogens, mycoestrogens, and diethylstilbestrol derivatives as estrogens.

His research involved developing a predictive algorithm for determining the binding free energy of a variety of known or suspected Endocrine Disrupting Chemicals (EDCs) and then analyzing the binding free energies to de-

## | NIS MEMORIAL LECTURE

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termine the contribution of each functional group to the overall binding free energy on an atomic level. This helped in determining the relationship between ligand-binding domain conformation and sequence (different species of ER) and the binding free energy. Utilizing the information above, he developed QSAR models that described the structure and chemical properties required for phytochemical estrogen receptor binding. These models were used to predict the estrogen activity of phytochemicals that had not been tested for ER binding and to determine what structural features were required for phytoestrogens to bind to the estrogen receptor. This research earned him a degree from Tulane University.

He joined the Section on Statistical Genetics at the University of Alabama at Birmingham in June 2009. His research interests include genetic inheritance of various disorders, protein structure prediction, and drug development from environmental compounds. Dr. Williams is currently an ORISE Fellow at the Food and Drug Administration in Rockville, Maryland. He is authored many peer-reviewed publications and has been an invited speaker in both national and international conferences. He is the recipient of numerous awards such as Scholastic Achievement Awards, NIGMS Minority Access to Research Careers (M.A.R.C.) Traineeship and Fellowship Awards.



**Sherrie Flynt Wallington, PhD**

Assistant Professor of Oncology  
Program Director, Health Disparities Initiative Lombardi Comprehensive Cancer  
Center Georgetown University Medical Center Washington, DC

**Sherrie Flynt Wallington, PhD**, is an Assistant Professor and Program Director of the Health Disparities Initiative at the Lombardi Comprehensive Cancer Center of Georgetown University. She completed her postdoctoral fellowship with the Harvard School of Public Health and the Dana-Farber Cancer Institute. Her research program examines

the role of health communication in reducing and eliminating cancer health disparities. She has a primary interest in developing HPV educational interventions, particularly those that target minority and underserved women. She earned her undergraduate and master's degrees from the University of North Carolina at Greensboro and her doctoral degree from Howard University.

### MODERATOR



**Deepak Kumar, PhD**

Department of Biology, Chemistry and Physics  
College of Arts and Sciences  
University of the District of Columbia  
Washington, DC

**Deepak Kumar, PhD** is a tenured Associate Professor, Chairperson of the Department of Biology, Chemistry and Physics, UDC and, co-Director of UDC Cancer Research and Education Academy. He also holds an adjunct appointment in the Department of Oncology at Georgetown University, is a member of the Molecular Targets and Developmental Therapeutics (MTDT) program and M.S. Tumor biology education committee. At UDC, he is the director of two courses in the Master's Program: 1) Research Methods; and, 2) Molecular and Cellular Biology. At the undergraduate level, he teaches cell biology, and mentors students in his laboratory on a regular basis. Dr. Kumar has extensive research experience in cancer gene discovery and functional genomics. His current research includes the characterization of molecular targets for cancer therapy and prevention. He has authored more than 40 publications and has been awarded 5 US and European patents. He is an associate editor for BMC Bioinformatics, reviewer on several journals and serves on the review committees of the Department of Defense Breast and Prostate Cancer Research Program, Susan Komen Foundation and Special Emphasis Panel of the National Center for Minority Health Disparities.

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**HENRY A. MOSES, PhD**

Executive Director  
Meharry National Alumni Association, Inc.  
Professor Emeritus of Biochemistry  
Meharry Medical College

Distinguished Professor Department of Chemistry;  
Division of Natural Sciences  
Fisk University Nashville

## BKX SEMINAR AND LUNCHEON

Henry A. Moses received the B.S. degree in Chemistry at Livingstone College, Salisbury, NC and the M.S. and Ph.D. degrees in Biochemistry at Purdue University. He was Professor of Biochemistry and Associate Vice President of College Relations and Lifelong Learning at Meharry Medical College in Nashville, Tennessee. He is senior author of over thirty publications in the areas of metal toxicity and mineral metabolism. Dr. Moses has served as Coordinator/Director of numerous national conferences, workshops and symposia over the past thirty years. He recently served as a member of the Cancer Research Manpower Review Committee, National Cancer Institute, National Institutes of Health and currently serves on the National Sciences Foundation. Undergraduate Laboratory Improvement Panel as a Reviewer for the RCMI Program, National Institutes of Health and on the Panel for the selection of Pre Doctoral Fellows of the National Science Foundations. He was National Treasurer of Beta Kappa Chi Scientific Honor Society for 37 years.

Dr. Moses is active with Senior citizens in the city of Nashville and has completed the four weeks Senior Partners Program of the Knowles Senior Citizen Center. He served on the Advisory Committee of the Joint Program in Medical Technology of Tennessee State University and Meharry Medical College. He served on both the Southern Association of Colleges and School Accreditation Committee and the Liaison Committee on Medical Education Accreditation Committees at Meharry. Frequently he is called upon to tour guests of the College.

Dr. Moses is a highly sought lecturer in biochemistry and in programs focused on exposing and encouraging young people to consider the biomedical sciences as a career choice. He normally gives 8-10 presenta-

tions annually. Dr. Moses is the Founder and National Coordinator of the Alumni Chapter Student Mentoring Program of the Meharry National Alumni Association and coordinates the student mentoring of thirteen alumni chapters across the nation.



Currently, Dr. Moses is Professor Emeritus of Biochemistry (Active) and Executive Director of the Office of Alumni Affairs at Meharry Medical College. He is also Distinguished Professor of Chemistry and Biology at Fisk University in the Department of Chemistry, Division of Natural Sciences.

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**Dr. George Hill**

Assistant Vice Chancellor for Multicultural Affairs & Special Assistant to the Provost & Vice Chancellor for Health Affairs  
Vanderbilt University Medical Center  
Nashville, Tennessee

## AWARDS BANQUET

Dr. Hill is the Assistant Vice Chancellor for multicultural affairs, special assistant to the provost and Vice Chancellor for Health Affairs at the Vanderbilt University. He has also served as the Associate Dean for Diversity in Medical Education at the Vanderbilt University School of Medicine (VUSM) and as Director for the school's first Office for Diversity in Medical Education.

Dr. Hill came to Vanderbilt University School of Medicine in 2002. He was recruited for the university's first Office for Diversity in Medical Education whose goals would be to increase the number of medical school applications and matriculating students into VUSM from broader backgrounds (economically, ethnically, religious, etc.). Vanderbilt School of Medicine wanted someone at the helm who had a genuine understanding of the mission of the Office, the know how to get it done and the talent to rally those around him join him in accomplishing these goals. Vanderbilt knew the perfect person for the job: he was at Meharry Medical College with over 19 years proven experience as an accomplished leader in a variety of administrative and senior faculty positions at Meharry: Dean of the School of Graduate Studies and Research, Vice President for Sponsored Research, Associate Vice President for International Affairs and Director of the Division of Biomedical Sciences, and a tenured professorship in Microbiology. Additionally, Dr. Hill served at the Colorado State University teaching and conducting research and established a mentoring program for minority students. In 1999 he was the recipient of the "Giant In Science" award by the Quality Education for Minorities Network for his continuous and effective efforts in motivating minority students to pursue the sciences.

Vanderbilt heavily recruited him and received much more than they had envisioned. Dr. George Hill changed

the face of the typical matriculating Vanderbilt Medical School student to reflect that of the changing nation... "a more diverse population of different races/ethnicities, sexual orientation, economic backgrounds, rural versus urban upbringing, and varying religious backgrounds." During his nine year tenure (2002-2011), the number of minority students graduating from Vanderbilt Medical School and graduating with MDs increased over three-fold from the previous nine years (1992-2001).

Dr. Hill is also a distinguished educator, mentor and researcher. A faculty member in the Department of Microbiology and Immunology at VUSM, he holds the titles of the Levi Watkins Jr. Professor and tenured Professor of pathology, microbiology and immunology. His groundbreaking studies on the electron transport systems in African trypanosomes (*Trypanosoma brucei*) which is transmitted by the Tsetse fly has made him an expert on "African sleeping sickness" and is considered one of the world authorities on this disease as well as on the microbiology of infectious diseases. A Principal investigator of several R01 grants, many PhD, MS and postdoctoral fellows were mentored in his laboratory.



A frequent recipient of NIH funding, Dr. Hill has served the NIH and NSF in many capacities, most recently as a member of the NIGMS/NIH Advisory Council. He retired from his position September 2012.

Dr. Hill has led a distinguished career in biomedical research and medical education. A few of his accomplishments to date include: being named a member of the Institute of Medicine of the National Academy of Sciences in 1998; serving as president for the National Foundation for Infectious Diseases, where he also received the organization's Utz Leadership Award; receiving the Seymour Hunter Prize from the Society of Protozoologists; and also serving on the National Institute for General Medical Sciences Council, the National Institute of Allergy and Infectious Diseases Board of Scientific Counselors. He has been nominated to serve on the NIH Fogarty International Center Scientific Advisory Board beginning in January 2012. Hill was elected to the Institute of Medicine of the National Academy of Sciences in 1998 and a Fellow of the Academy of Microbiology in 2002. Always one to give back to his community, George Hill pledged a \$200,000 leadership gift that will allow Rutgers to open the Hill Family Center for College Access. Hill and his brother were inducted into the Rutgers University Hall of Distinguished Alumni in January 2012.

Twin to his brother Washington Hill, a physician, Dr. Hill was born in Camden, New Jersey. He received a B.S. degree from Rutgers' Camden College of Arts and Sciences, New Jersey; a MS from Howard University, Washington, DC. and a PhD from New York University, New York. He went abroad to Great Britain and assumed a position at the University of Cambridge as a NIH Postdoctoral Fellow. Hill was also a Fulbright Scholar at the University of Nairobi, Kenya.





# | AWARDS BANQUET

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## I. Expanding Your Global Horizon



**Lisa D. Cain, Ph.D.**

Director, Medical School Enrichment Programs, Office of Student Affairs  
Associate Professor, Dept. Neuroscience and Cell Biology  
University of Texas Medical Branch (UTMB) at Galveston  
Galveston, Texas

The world today is heavily impacted by increased globalization. This is observed on an economic, social and political level. The existence of sophisticated technology makes globalization even more feasible. Corporations, health care and educational institutions are beginning to expand their global outreach. It is obvious that financial decisions and decisions impacting politics, health care and scientific research have a significant impact not only in the United States but also on other countries. Large disparities in health care persist both within and between countries. Health disparities between poor and rich countries are growing and it is important to bridge this gap. Scientific discovery should be a global initiative. A discovery in one country can have a significant impact on other countries. The establishment of scientific research collaborations among individuals from different countries is expanding. It is important that students with an interest in science and medicine expand their horizons and become familiar with the educational, collaborative, partnerships and business opportunities that are available on an international level. The purpose of this workshop “Expanding Your Global Horizons” is to provide information of the benefits of being involved with science and medicine on an international level.

*Educator, Neuroscientist, Administrator and Artist*

*Lisa D. Cain, Ph.D. is a native of Canton, Mississippi and a graduate of Holy Child Jesus High School, Canton, Mississippi. A distinguished Honors College graduate of Jackson State University, she received a Bachelor of Science degree in biology in 1984. As a student at Jackson State University, Cain was an exemplary leader. She was chosen Miss Jackson State University 1983-84. In 1989, Cain received a Ph.D. from the Anatomy Department at the University of Mississippi Medical Center. She was a postdoctoral fellow in the Department of Anatomy at Robert Wood Johnson Medical School, Piscataway, New Jersey from 1989-90 and was a postdoctoral fellow in neuroscience in the Center for Advanced Biotechnology and Medicine at Robert Wood Johnson Medical School from 1990-1992.*

*Presently, Dr. Cain is an Associate Professor in the Department of Neurosciences and Cell Biology at the University of Texas Medical Branch (UTMB) at Galveston, where she teaches medical and graduate students and is an Associate Member of the Institute for Medical Humanities. She is co-course director for the Graduate School of Biomedical Sciences Cell Biology course, Director of the Aerospace Medicine Track Curriculum and she holds an administrative position as the Director of the Medical School Enrichment Programs in the Office of Student Affairs. As Director of the Medical School Enrichment Programs she is responsible for implementing research and academic programs for medical and undergraduate students. She is the past Vice Chair of the Curriculum Committee of the School of Medicine (2006-2008), an Osler Student Society Mentor and a UTMB Council Member for the Joint Medical School Admissions Program. Dr. Cain is a member of the Medical School Admissions Committee, the International Oversight Committee, the Gross Anatomy Course Planning Committee and the Education in Research Committee. She was recently elected to the UTMB Faculty Senate and is Chair of the Administrative and Academic Affairs Committee of the Faculty Senate. She is a 2007 graduate of the renowned UTMB “Scholars in Education Program”.*

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Cain's background is in neuroscience. Her research at UTMB has involved cholinergic neuron survival and investigating agents that protect spinal cord neurons against the effect of glutamate toxicity and other insults. Over the years, she has served as a mentor to undergraduate students, graduate research students, postdoctoral fellows, medical students and junior faculty. She is the recipient of many awards. In August 2008 she received the Pre-Clinical Women in Medicine Award from the female medical students at UTMB for her excellence in mentoring and teaching. In February 2009, she was selected by the Associate Dean of Student Affairs and Admissions to be a Faculty Marshall for the 2009 UTMB medical school graduating. In 2010 she was selected as Citizen of the Year for Galveston County by the Pan Hellenic Council of the Greeks. In 2011 she received the highest honor of being selected a faculty hooter for the 2011 medical graduating class.

In addition to her duties at UTMB, she is involved in national and international affairs. She is the Gulf Coast Representative for the African Scientific Institute (ASI), founded in 1967, and includes more than 500 fellows from over 25 countries who have contributed significantly to science and technology. She is head of the international "Healthcare Initiative" for ASI. She is also on the Board of Directors and is a Southern United States leader for the Korle-Bu Foundation (Canada) which is addressing the critical need for improved neurological care in Ghana and the West African region. She serves as chair of their research committee. She has served as an international educational consultant and has collaborated with individuals in Canada, Paris and Africa. She is the CEO of LC Global Consulting/Development Company. Cain is also a folk artist whose art has been exhibited at several galleries throughout the United States.

## II. Applying to Graduate School: How to Get in and Stay in: Preparing for Success in the Graduate School Application Process



**Rochelle L. Woods, PhD**

Assistant Director for Undergraduate Development  
Office of Academic Multicultural Initiatives University of Michigan  
Ann Arbor, Michigan

This workshop provides an overview of various aspects of the graduate school application process. The workshop will discuss the importance of grades, standardized test scores (such as the GRE), personal statements, writing samples, and letters of recommendations. The workshop will discuss various ways applicants can strengthen their graduate school application. In addition, participants will receive information on funding sources and ways to secure funding for graduate education. The workshop will be most beneficial to freshman, sophomores and juniors.

*Dr. Rochelle L. Woods is the Assistant Director for Undergraduate Development for the Office of Academic Multicultural Initiatives at the University of Michigan. She also serves as the Program Director of the Leaders and Best (LAB) program for which is designed to increase the retention and graduation rates of educationally and economically disadvantaged undergraduate students. Dr. Woods served as Research Associate at the Center for Science Education at EDC in Newton, MA and as a Postdoctoral Fellow at the Center on Race and Social Problems at University of Pittsburgh. She has researched and published on US and South African higher education, focusing on issues of retention, racial climate and educational attainment of underrepresented minorities. Dr. Woods holds a Ph.D. and M.A. in Sociology from University.*

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### III. Designing Effective Technology Enhanced Courses



**Sajid Hussain, PhD**

Chair, Department of Business Administration  
Associate Professor of Mathematics and Computer Science  
Fisk University  
Nashville, Tennessee

In this workshop, we will explore a few information technology (IT) tools and techniques to increase effective teaching and learning in the courses. The presentation will include a brief overview of Learning Management Systems (Blackboard, Moodle, etc), Assessment Tools (e.g., LiveText, Quality Matters Rubrics), Collaborative Tools (GoogleDocs), and Mobile Apps. We will also explore multimedia tools (e.g., Prezi and Screencast-o-matic) to create effective presentations. Further, there will be a brief overview of developing mobile apps for android platform. In Fall 2011 at Fisk University, several freshmen students developed mobile apps using ApplInventor, Google/MIT Media Lab tool. Although these freshmen students were from all majors (Psychology, Sociology, History, Business, etc) and had no prior programming experience, they were able to design and create their own mobile apps related to health care, virtual campus tour, security, etc. In summary, the workshop will introduce several latest and emerging IT tools to enhance teaching and learning.

*Dr. Sajid Hussain joined the Fisk family in 2009 as associate professor of computer science in the Department of Mathematics and Computer Science. The next year, he was named Chair of the Department of Business Administration. Previously, Dr. Hussain taught four years, at the Jodrey School of Computer Science, Acadia University, Canada. Dr. Hussain received his Ph.D. in electrical engineering from the University of Manitoba, Canada, 2004. Dr. Hussain is investigating energy efficient communication protocols and security techniques for mobile, ubiquitous, and pervasive applications. He is interested in smart homes, telehealth, and industry automation. He has published more than 70 refereed journal, conference, and workshop papers.*

*Dr. Hussain's research has been financially supported by several grants and contracts, such as UNCF/Google award (2010-11) to establish a Pervasive and Ubiquitous Computing Lab at Fisk. When he taught in Canada, he obtained funds from competitive grants awarded by the Natural Science and Engineering Research Council, Atlantic Innovation Fund, and the Nova Scotia Health Research Foundation. Dr. Hussain is the program director for Fisk's online initiative funded through Title III.*

*He has co-organized several journal special issues, conferences, and workshops. He has served on many technical program committees and reviewed papers for several journals. Further, he has reviewed grant proposals for NSERC's Discovery, SPG, and RTI grants. He is a senior member of IEEE. He also holds memberships of IET and CIPS, as well as Sigma Xi and Delta Mu Delta honor societies.*

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## IV. Community Based Participatory Research on Health Disparities, A Mechanism for Instituting Service Learning Initiatives



**Linda H. McClellan, MPH**

HBCU Wellness Project of Meharry Medical College  
Nashville, Tennessee

Participants are introduced to the Meharry HBCU Wellness Project initiative as an intervention used to address major public health issues in communities of color by harnessing the potential of campuses and students through the development of community resources and partnerships. As a result, students are trained to become Student Health Ambassadors (SHAs) who develop IRB-approved programs that are implemented at the community level. In addition, it is anticipated that as a result of participation, the students will elect to choose careers in the health professions including public health, medicine, dentistry or related areas. Therefore, as a result of participation, the audience, at a minimum, will be able to:

1. Demonstrate an understanding of service learning using a CBPR approach to reduce health disparities in African American Communities.
2. Identify HBCUs as an untapped resource with the potential to reduce health disparities in the communities in which they are located.
3. Examine outputs of a major Meharry HBCU Wellness partnership with Discovery Health through the exploration of student developed public service announcements on pre-conception health (Fisk University) and stigma in HIV/AIDS (Lemoyne-Owen College).

*Linda Hockett McClellan, a native of Nashville, Tennessee, graduated from Pearl Senior High School. She enrolled in the University of Tennessee in Knoxville and graduated with a Bachelor of Arts degree in Human Services. Several years later, she received the Master of Public Health degree from the University of Tennessee, College of Education's School of Public Health. Ms. McClellan has used her Health Education specialty 34 years in many different programs aimed at improving health outcomes for people impacted by sickle cell disease, hypertension, couples at risk for having an infant with sickle cell disease, health disparities in North Nashville and, most recently through the HBCU Wellness Project's Summer Institute. Through this endeavor, minority students are encouraged to consider careers in medicine, dentistry, public health and related fields. Of additional importance as the Service Learning Coordinator for the Meharry HBCU Wellness Project, Ms McClellan works to encourage civic responsibility among Student Health Ambassadors while fostering reciprocal learning in communities with clear identifiable needs. This is done by assisting students from five Tennessee HBCUs in the development, implementation and evaluation of community projects centered on issues that are important to members of the HBCU communities.*

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## V. The GRE & MCAT Prep Exams

### Kaplan, Inc



**Andrew McGarrity, Business Development Manager**

Kaplan Test Prep Center, Nashville, Campus  
Nashville, Tennessee

A mind is a terrible thing to waste...so is time when you're taking a standardized exam. Kaplan Inc, is one of the most recognized, utilized and successful college, graduate and professional schools examination preparatories in the country. In this workshop, Mr. McGarrity will discuss strategies and tips that are essential to successfully approaching, taking and scoring well on any standardized examination.

*Andrew McGarrity is a Business Development Manager at Kaplan Test Prep. Andrew primarily works to increase overall interest in Kaplan's products through grassroots sales and marketing efforts. Prior to his work with Kaplan, Andrew worked for the White House in Washington DC as a White House Protocol Officer. In this role he coordinated the visits of foreign leaders to the White House, Camp David, and other significant locations across the United States. He now lives in Franklin, TN with his wife and 3 month old daughter.*

## VI. Study Techniques for College Success

**Karen Redden, PhD**

Department of Biology, Chemistry and Physics, University of the District of Columbia  
Washington, DC

College students often find the amount of academic work expected of them to be overwhelming. With the ideal ratio of study time per classroom contact hour being three to one, students may wonder how they can fit the needed study time into their busy lives. Many methods have been developed over time to address these concerns. Combined with good time management, strategies such as mind mapping, question analysis, and post-exam debriefing can significantly improve the mastery of course material.



**Dr. Karen Redden** graduated from George Mason University in 2006 and went on to complete her M.S. at Mason in 1999. She received her Ph.D. in Systematics and Evolution from George Washington University in 2006. Her dissertation was on the morphological and molecular evolution of basal Leguminosae endemic to the Guiana Shield, South America. She was a postdoctoral fellow at the George Washington University and the Smithsonian Institution's Botany Department. Dr. Redden is currently a research associate and general botanical collector for the Biological Diversity of the Guiana's program at the Smithsonian Institution. Her next expedition, funded through the National Geographic Society's Waitt grant, will take her to another unexplored tepui in Guyana in May 2012. She has numerous

*publications including new species descriptions, monographic revisions and floristic treatments for Guyana, Venezuela and French Guiana. Dr. Redden has taught both in the classroom and conducts field courses in the rainforest of Guyana. Currently, Dr. Redden is a visiting professor at the University of the District of Columbia and teaches General Biology and Botany. In her courses she teaches not only the biological content but also conveys*

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the skill sets needed to become a successful student. She has mentored a number of students and trained them in molecular and morphological techniques and phylogenetic reconstruction.

## VII. Basic Geographic Information Systems (GIS) Overview for Cancer related Issues



**Darlette Meekins**

Geographic Information Systems (GIS)  
Analyst/Cartographer  
Virginia Department of Transportation  
Richmond, Virginia

The course is designed to introduce students to the fundamental concepts and applications of Geographic Information Systems (GIS), specifically to Health related issues and Health management and Environmental analyses. Basic GIS concepts such as map characteristics, spatial analysis with emphasis on cancer data incorporated with geographic data to demonstrate how this information may be applied to various decision making processes.

**A. KNOWLEDGE BASE**

1. The students will know the basic principles of GIS.
2. The students will know of several uses of GIS in a host of applications.
3. The students will access scholarly information about GIS from the Internet.
4. The students will recognize the importance of GIS to society.
5. The students will know about maps.
6. The students will know how to apply GIS to Cancer relate topics.

*Ms. Meekins is currently employed as a Geographic Information Systems Analyst/Cartographer, for the State of Virginia, and functions as an adjunct faculty member at Virginia State University teaching Geographic Information Systems (GIS) and Global Positioning Systems (GSP). She earned a Bachelor of Science degree in Geology from Virginia State University; and in 1990, she received a Master of Science Degree in Geology from Iowa State University. Since that time Ms. Meekins had been employed with, Mobil and Exxon Oil companies, Aerospace Center Defense Mapping (NGA) and the State of Virginia. Through those jobs she have been intricately involved in Geology, Cartography, GIS Analysis, instructing, computer programming, information technology, Geodesy and photogrammetry. Ms. Meekins completed GIS professional courses, which earned her a certification in GIS, from George Mason University. She is currently in pursuance of a PhD, with Old Dominion University, in their Community College Leadership Program. Her goal is to become a full time professor focusing on Geology, Geography, Earth Science or Environmental Science. Ms. Meekins hopes to integrate the following tools and applications of GIS, GPS and Remote Sensing to the above field of study. Students' retention and guidance during their college experience is extremely important to her.*

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# 69th BKX/NIS

## Joint Annual Meeting

# AWARD WINNERS

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### Graduate Session B I (GSSB-I)

#### I Prize Winner

##### ***Modulation of miRNA Expression in Prostate Cancer Cells by the Dietary Flavonoid Quercetin***

**Lachundra Mosley**<sup>1</sup>, Khalda Fadlalla<sup>2</sup>, Clayton Yates<sup>1</sup>, Timothy Turner<sup>1</sup>, Temesgen Samuel<sup>2</sup>. Departments of <sup>1</sup>Biology and <sup>2</sup>Pathobiology, Tuskegee University, Tuskegee, AL.

Prostate cancer in men is the most commonly diagnosed and the second most cause of death in men. There is a growing interest to prevent prostate cancer through dietary adjustments or supplements. Quercetin is a widely available dietary polyphenolic flavonoid that is abundant in the skins of fruits and vegetables, and has anti-cancer activities. Even though research on flavonoids and their anti-cancer potentials is ongoing, the mechanisms behind their abilities to inhibit carcinogenic processes are not fully understood. We propose that microRNA (miRNA) modulation is a potential candidate mechanism and that dietary polyphenols could modulate miRNA expression or biogenesis to influence prostate cancer biology. In this study, we will examine the potential of quercetin to modulate miRNA expression in prostate cells. To address this, we will first profile the expression of diverse miRNAs in control and quercetin-treated cells by using miRNA profiling PCR array technology. MicroRNAs that are strongly and consistently modulated by the treatment will be validated in further steps and their targets identified. Changes in similarly treated normal prostate epithelial cells will be compared to those from cancer cells. Our preliminary screenings show that treatment of DU-145 prostate cancer cell lines with quercetin induces changes in miRNA expression. With

further validation, the identity and biological functions of the miRNAs and their targets will help us identify some of the mechanisms through which dietary polyphenols such as quercetin may act as anti-cancer bioactive compounds.

#### II Prize Winner

##### ***Increased Detection of Salmonella typhimurium using Chicken IgY immobilized to a SPReeta Sensor Surface***

**Carl E. Darris**, Samuel Nahashon, Fur-Chi Chen. Department of Agricultural Sciences, College of Agriculture, Human & Natural Sciences, Tennessee State University, Nashville, TN.

Due to the frequent outbreaks of food borne illnesses, the use of biosensors for the real-time detection of food-borne pathogens has grown in interest. Biosensor detection eliminates traditional limits of recombinant single chain variable fragment antibody from chicken immunized with *Salmonella typhimurium*. Briefly, the effect of utilizing avian antibodies on the detection sensitivity and specificity of a SPReeta biosensor was explored. In the first phase of the experiment IgY antibodies were extracted from the egg yolk of immunized chickens at concentrations ranging from 2.5-7 mg/ml with a purity of 95% and then immobilized to the SPReeta sensor surface. The IgY antibodies were biotinylated and immobilized on the gold sensor surface using neutravidin. Preliminary studies have shown detection of salmonella down to 4 cfu/ml and salmonella OMP at a lower limit of 1 ug/ml on a SPReeta biosensor (Texas Instruments). Continued work in this project will investigate the detection limits of recombinant single chain variable fragment antibody libraries from chicken immunized with *S. typhimurium*.

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### III Prize Winner

#### ***Comparative Analyses of the Glucose-Dependent Insulinotropic Polypeptide Expressed in the Avian Hypothalamus***

**James Tyus**, Samuel N. Nahashon. College of Agriculture, Human and Natural Sciences, Tennessee State University, Nashville, TN.

Recently, genetic control of mechanisms regulating appetite, satiety, and excessive fat accretion has received considerable attention. Among the molecules thought to be important in this regulation is the glucose-dependent insulinotropic polypeptide (GIP). Following carbohydrate/lipid consumption, GIP stimulates pancreatic secretion of insulin, and leads to increased uptake of blood glucose by the liver. Also, GIP is implicated in the gut-brain axis regulation of feeding behavior. Previous reports suggested that GIP was secreted exclusively in the intestine. Here, we provide evidence for the expression of a diverse GIP gene in the avian neuronal appetite center. A transcriptomic library was constructed from mRNA isolated from the guinea fowl (GF) hypothalamus. A 349 bp GIP transcript, showing 89% similarity with its Gallus ortholog, has been isolated. Predictive translation of the +1 frame-shifted ORF yielded a 76-residue peptide showing 79% homology with the Gallus form. Multiple sequence alignment against ortholog sequences has revealed two regions of high (>90%) conservation. Functional motifs were analyzed using the Eukaryotic Linear Motif resource. The most pronounced conserved regions detected included an N-glycosylation site, a glycosaminoglycan attachment site, and a proprotein convertase cleavage site. Across species, regions of low (<60%) conservation exhibited higher variability in the avian-mammalian contrast, suggesting an evolutionary divergence in GIP lineage. GF GIP tertiary structure has also been predicted via the Protein Homology/analogy Recognition Engine and modeled using the Visual Molecular Dynamics tool. Detection of GIP in the avian brain is quite remarkable as it provides further insight on hypothalamic regulation of appetite and nutrient utilization in poultry.

### Graduate Session B-II (GSSB-II)

### I Prize Winner

#### ***Synthesis and Characterization of Biphenol Based Tetrachlorocyclo-triphosphazene Poly(Arylene Ether Sulfone) Hybrid Copolymers for Proton Exchange Membrane Fuel Cells***

**Tiffany N. Thompson**<sup>1</sup>, Juan C. Tuberquia<sup>2</sup>, Natalie Y. Arnett<sup>1</sup>. Department of Life and Physical Science, Fisk University, Nashville, TN; <sup>2</sup>Vanderbilt University, Department of Chemistry, Nashville, TN.

The purpose of this research was to prepare a series of novel copolymers suitable for fuel cell membranes via a two step reaction. This will serve as a pathway to overcome the limitations associated with disulfonated poly(arylene ether sulfone) or PAES copolymers, such as high proton conductivity at low relative humidity and decreased water solubility at high levels of sulfonation, by combining the unique properties of disulfonated PAES with those of HCCP. The introduction of HCCP into the PAES backbone will add additional reactive sites to allow post modification of the copolymer to occur by subsequently incorporating various functional groups. In the first step, hybrid monomers were prepared by reacting hexachlorocyclo-triphosphazene (HCCP) trimers with biphenol (BP) in a 1:2 ratio to create the linear disubstituted BP based tetrachlorocyclo-triphosphazene (BPTCCP) hybrid monomer. The appearance of the -P-O-C- linkage between BP and HCCP was confirmed by FTIR and observed between 914-994 cm<sup>-1</sup>. Subsequently, the hybrid monomer will be reacted with SDCDPS and DCDPS to yield a series of linear disulfonated BPTCCP PAES-XX hybrid copolymers.

### II Prize Winner

#### ***Synthesis and Characterization of Bisphenol A based Poly(Arylene ether sulfone) Hybrid Copolymers as Proton Exchange Membranes for Fuel Cells***



## | AWARD WINNERS

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**Susan Ramos-Hunter**<sup>1</sup>, Vaughn Franklin<sup>1</sup>, Queen Stevenson<sup>2</sup>, Juan Tuberquia<sup>1,3</sup>, Natalie Arnett<sup>1</sup>.  
<sup>1</sup>Fisk University, Nashville, TN; <sup>2</sup>Martin Luther King Magnet School, Nashville, TN; <sup>3</sup>Vanderbilt University, Nashville, TN.

The objective of this research was to prepare novel disulfonated bisphenol A tetrachlorocyclotriphosphazene poly(arylene ether sulfone) (BATCCP PAES-XX) hybrid copolymers to serve as proton exchange membranes in fuel cells (PEMFC). The TCCP backbone allows for post modification of the polymer based on desired hydrophilic or hydrophobic groups. The two step synthesis route utilized first prepared BATCCP hybrid monomers from the reaction of hexachlorocyclotriphosphazene (HCCP) with bisphenol A (Bis A). The subsequent monomer will be reacted with disulfonated and unsulfonated dichlorodiphenyl sulfone, SDCDPS and DCDPS respectively, to form BATCCP PAES-XX with varying degrees of sulfonation. Characterization of the monomer structure and properties were accomplished using FTIR, NMR, TGA, and DSC.

### **No III Prize Winner**

## Undergraduate Biology A (Bio-A)

### **I Prize Winner**

#### ***Potential Differences in Specific Neuronal Subpopulations in the Nucleus of the Solitary Tract (NTS) During Postnatal Development***

**Jenkins, Melveshia**, Jennifer John. Fisk University, Nashville, TN.

Although previous studies suggested differences in respiratory control mechanisms between adult male and female rats, it is unclear if these differences exist during specific periods of postnatal development, including a putative critical window at postnatal (P) age. The NTS plays multiple integral roles in respiratory control, and has been shown to express the neurokinin 1 receptors (NK1R), the estrogen receptor- $\alpha$  (ER $\alpha$ ), and N-methyl-D-aspartate receptor type 1 (NMDAR1). In this study, it was hypothesized that there would be differences in

neuron counts, NTS areas and/or neuronal densities of specific neuronal populations in the NTS. The medullas from six groups of male and female rats from five age groups (P10-11, P12-13, P14-15, P30-33, and P90) were extracted, cryoprotected, frozen-sectioned (25  $\mu$ m), and mounted on slides for immunohistochemical labeling for NK1R, ER $\alpha$ , and NMDAR1. After staining was completed, images of the NTS and surrounding regions were obtained and compared.

### **II Prize Winner**

#### ***Behavioral Ecology of Eastern Box Turtles in the Long Island Central Pine Barrens***

**Jasmin Jenkins**<sup>1</sup>, Alexandra Mancuso<sup>2</sup>, Timothy Green<sup>3</sup>, Murty S. Kambhampati<sup>1</sup>. <sup>1</sup>Southern University at New Orleans, New Orleans, Louisiana; <sup>2</sup>Siena College, Loudonville, NY; <sup>3</sup>Brookhaven National Laboratory, Upton, NY.

Eastern Box Turtles are the most common terrestrial turtles native to the Long Island Pine Barrens (LIPB). Box turtle behavior varies according to their environment, habitat disruption, nesting, and temperature. With box turtles being diurnal animals, weather may play a key role in their daily activity. They prefer the early morning and evening to forage when the heat is less intense. They have also been known to travel more frequently after a rain fall. Box turtles have been known to travel in areas less than four hectares, but studies show that some have traveled significant distances. A study was conducted at Brookhaven National Laboratory (BNL) to observe how the weather affects the behavior of box turtles. Each turtle that was captured was weighed, measured, and shell notched for identification. Radio telemetry equipment was used to track 6 turtles daily and using a global positioning system (GPS) each point was recorded and imported into a geographic information system (GIS). Data was collected for a total of 7 weeks, and compiled on a weekly basis. Observations showed that the turtles greatest distances traveled were when the temperature was at an average of 23.4°C and relative humidity at 58.2%. Statistics of the data collected showed that on an average of 24.4°C and higher the turtles would burrow in the leaf litter, and on an average of 21.1°C and lower is when the turtles would forage. Data from the GIS showed that

female turtles travel farther distances than the male turtles which can be the result of the females needing a greater home range than the males for nesting purposes. For future studies Pen dent data loggers are going to be attached to the turtles to measure the micro climate within each turtle's home range. These loggers are going to be able to record temperatures and light. This study furthers our understanding of eastern box turtle behavior in the LIPB. [This work was supported by NSF (grant # HRD-0928797 and DUE-0806894) for financial support and DOE/BNL for facilities.]

### III Prize Winner

#### ***The Characterization of L.4.1 in Growth Suppression in a Drosophila melanogaster Model***

**Eboni D. Chambers**<sup>1</sup>, Jacob D. Kagey<sup>2</sup>, Kenneth H. Moberg<sup>2</sup>. <sup>1</sup>Department of Biology, North Carolina A&T State University, Greensboro NC; <sup>2</sup>Department of Cell Biology, Emory University School of Medicine, Atlanta, GA.

*Drosophila melanogaster* is a powerful genetic model for studying of cancer cell pathways and tumor suppressor genes. Our group recently identified L.4.1 as a novel homozygous recessive point mutation that produced overgrowth phenotypes by blocking apoptosis in the adult mosaic eye of *D. melanogaster*. The studies utilize a conditional growth suppressor screen that used a block in cell death. Combined use of *D. melanogaster* and inactivation of the apoptosis pathway through mutations in the *dark*<sup>82</sup> gene makes it possible to observe phenotypes from novel homozygous recessive point mutations in flies that would otherwise induce apoptosis. The objective for the present study was to characterize the role of L.4.1 in cell growth regulation, mitosis, and differentiation pathways through genetic mosaics. Specific protein markers were used to analyze differences in the described pathways between mutant and wild-type L.4.1 eye discs. Compared to wild-type, L.4.1 mutants had a significant decrease in DIAP staining, suggesting that mutant L.4.1 overgrowth is conditional upon a block in apoptosis. Clones of *dark*<sup>82</sup>, L.4.1, and eye discs entirely mutant for *dark*<sup>82</sup>, L.4.1 demonstrated a significant delay in differentiation. This was confirmed by a corresponding decrease in the Elav protein; a marker for cell differentiation. This data suggests that the delay in differentiation has a

correlation with prolonged cellular proliferation within the cell. The *D. melanogaster* genome contains many human orthologs which function in similar cellular pathways and processes. Genetic mapping of the L.4.1 gene could thus be a valuable tool in studying genes that play a role in the development of human cancer.

## Undergraduate Biology B (Bio-B)

### I Prize Winner

#### ***Understanding the Effect of Valine-124 of Hepatitis B Virus Core Protein in Viral Replication***

**Debresha Shelton**<sup>1</sup>, Nuruddin Unchwaniwala<sup>1</sup>, Dan Loeb<sup>2</sup>. <sup>1</sup>Fisk University, Nashville, TN; <sup>2</sup>McArdle Laboratory for Cancer Research, Department of Oncology at University of Wisconsin, Madison, WI.

Despite the advancements in Hepatitis B virus vaccination, HBV has still chronically infected ~360 million world-wide; 1 million deaths are attributed to acute or chronic HBV infection each year. HBV is the leading cause of hepatocellular carcinoma. Nucleoside analogues like lamivudine target the viral polymerase (P), however, they are not fully effective due to high resistance rates. Zlotnick and colleagues using purified core protein showed that the amino acid, valine-124 in the hydrophobic pocket of core protein is essential for proper rate of capsid assembly. V124W, V124F and V124A showed aberrant rates of capsid assembly in vitro. This study has shown that mutations at V124, namely V124A, V124Y, V124S, and V124F accumulated lower core protein than the wild-type (WT). All mutants displayed lower levels of capsids than WT.

### II Prize Winner

#### ***Biomphalaria glabrata: Genotypic and Phenotypic Variability Among Nonsusceptible Strains***

**Michael Smith**, Carolyn Cousin. University of the District of Columbia, Washington, D.C.

*Biomphalaria glabrata*, the intermediate host to *Schistosoma mansoni*, exhibits immunological

## | AWARD WINNERS

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phenotypic diversity within this species. Several are nonsusceptible, thus preventing the maturation of the miracidial larvae, thus disrupting the worm's lifecycle. Other lifecycle disruption possibilities include the use of nonsusceptible snails as a replacement for susceptible snail. Several phenotypic differences have been found in nonsusceptible snails. LAC-Line, a nonsusceptible snail, loses its resistance when mated for multiple generations. The loss in resistance appears to be coupled to major abnormalities in its albumen gland. It is felt that there maybe a correlation between the resistant phenotype and reproductive capabilities. We propose to examine 2 strains of *B. glabrata* at the ultrastructural and molecular levels to determine the structure of their albumen glands and molecular differences. These procedures were conducted as soon as eggs are produced, as well as after mating and selfing for two generations. BS-90 (consistently nonsusceptible) and LAC (varying in its susceptibility) were examined and their albumen glands excised and processed for routine TEM. DNA was extracted from similar snails using lysis buffer containing 2% CTA, incubated with proteinase K using the standard phenol/chloroform extraction. Ten primers were used to perform DNA amplification by RAPD-PCR. The PCR products were examined using polyacrylamide gel electrophoresis and silver stained. Products from 3 of the primers presented polymorphic markers lineage and the ultrastructure of the albumen glands showed variations. The genes CO1, 16s and 18s were amplified and then sequenced. The genotypic differences of the two strains showed unique nucleotide polymorphisms. (Support by NIH Grant R25CA129-035).

### III Prize Winner

#### ***Impact of BP Oil Spill 2010 on Atlantic Croaker and the Intestinal Microbes***

**Gawain Kiffin**, Illya Tietzel. Department of Natural Sciences, Southern University at New Orleans, New Orleans, LA.

Besides natural oil spills, manmade oil spills are catastrophic for marine environments, especially fish. The Atlantic Croaker is native to the Gulf of Mexico where the oil spill occurred. As a bottom feeder fish it might be exposed to both dispersed oil and oil deposited at the sea bed. Intestinal microbes are influenced by uptake of oil and ingested microorganisms. *Alcanivorax*

*borkumensis* can metabolize oil and was found at spill sites. Therefore it is hypothesized that (1) the BP oil spill affected the Atlantic croaker, (2) that oil microbes such as *A. borkumensis* or its genes such as *alkB* might be present in the intestine. To study effects of the BP oil spill on the fish, Atlantic Croakers were captured during field trips after the spill. Numbers, weight, length and height were recorded. Negative controls are specimen from outside oil spill areas. Real Time polymerase chain reaction (PCR) specific for the gene *alkB* served detection of oil microbes. *A. borkumensis* with the *alkB* gene for catabolism of oil was cultured as positive control, *E. coli* is negative control. Specimens from the Gulf showed changes of length and weight over time. Cultivation of *Alcanivorax borkumensis* is currently repeated because of contamination. Future research should investigate whether changes were aided by the presence or absence of *alkB* gene or associated oil microbes. (The research was sponsored by NSF MCB-1051237).

## Undergraduate Biology C and D (Bio-C/Bio-D)

### I Prize Winner

#### ***Novel Therapeutic Approach for Glioblastoma Multiforme***

**Rhonde'e Caldwell**, Ryon Clarke, Kevin Lee. Norfolk State University, Norfolk, VA.

Glioblastoma Multiforme (GBM) is the most common and lethal primary brain tumor in humans. These tumors are characterized by rapid proliferation, cellular atypia, and angiogenesis. Because of its rapid growth and resulting lack of blood supply, GBM tissue often exhibits areas of ischemia and necrosis. These areas provide serious obstacles for clinical treatment because of the increased resistance to radiation and chemotherapy, due, in part, to phenomenon called preconditioning induced tolerance. One of the major molecular players in this phenomenon is hypoxia-inducible factor-1 (HIF-1), a transcription factor with a number of downstream target proteins responsible for cell survival, proliferation, apoptosis, and angiogenesis. The aim of this study was to determine whether transient oxygen delivery to

hypoxic tumor tissue would make cells more vulnerable to radiation and whether this resistance was caused by the alteration of expression of HIF-1. Hypoxia (1% oxygen) in a C6 glioma cell line was achieved in a tri-gas incubator sealed with 94% N<sub>2</sub>, 1% O<sub>2</sub> and balance CO<sub>2</sub>. Previously hypoxic glioma cells were treated with radiation following a 20-minute reoxygenation protocol and subsequent return to hypoxic conditions. HIF-1 $\alpha$  expression level was verified by Western blot analysis. Surviving tumor cell fraction was quantified using a clonogenic assay. In control glioma cell group, there was a surviving fraction of approximately 10% after radiation treatments. In hypoxic glioma cells, there was a surviving fraction of approximately 20%. However, the surviving fraction was decreased to approximately 3% when cells were transiently exposed to normoxic conditions prior to radiation. Western blot analysis indicated a high expression of HIF-1 in hypoxic glioma cells after radiation. However, HIF-1 expression was abolished in glioma cells that were transiently reoxygenated and then treated with radiation under hypoxic conditions. The results of the study indicate that resistance of hypoxic glioma cells to radiation treatment may be reversed by a transient exposure to normoxic conditions. (Funding provided by University of Virginia Summer Research Internship Program).

## II Prize Winner

### ***Efficacy of Pumpkin Seed Oil in Parasite Control in Lambs***

**Clinton Williams**, Dahlia Jackson-O'Brien. Department of Agriculture & Natural Resources, Delaware State University, Dover, DE.

The primary objective of this study was to determine the effectiveness of pumpkin seed oil in controlling internal parasites in Katahdin lambs (Ovisaries). Pumpkin seed oil was used as a natural dewormer, or drug administered to rid the body of parasites, instead of chemical dewormers. Dewormers contain anthelmintics, an agent capable of eliminating parasites, including internal worms. The target parasite in this study is *Haemonchus contortus*, commonly known as the barberpole worm, or wire worm. The barberpole worm is a dangerous parasite that feasts on blood by piercing the lining of the abomasum, or fourth stomach of small ruminants. Once feeding has begun, anemia is the most common symptom to follow and if

it becomes severe and left untreated, death will occur. To meet the objective, the study utilized 18 Katahdin lambs separated into two treatments, a control (CON; n = 10 lambs) and a pumpkin seed oil group (PUM; n = 8 lambs). Starting at d 0 (start of experiment) and every week for 21 days, each lamb in the PUM group was drenched with 0.40 ml of pumpkin seed oil per kg of body weight. Lambs in the CON group received a similar drench of water each week. On dosing days, body weights, fecal and blood samples were collected from each animal in both treatments. Fecal samples were taken to determine fecal egg counts using the Modified McMaster technique while blood samples were collected to determine packed cell volumes.

## III Prize Winner

### ***Agrobacterium-Mediated and Biolistic Transformation Methods to Confer Resistance to Stress Cold of *Jatropha curcas****

**Aurellia Whitmore**<sup>1</sup>, Ben Tabatabai<sup>2</sup>, Puthiyaparambil Josekutty<sup>2</sup>, Sairam Rudrabhatla<sup>2</sup>. <sup>1</sup>Southern University at New Orleans, New Orleans, LA; <sup>2</sup>The Pennsylvania State University-Harrisburg, Middletown, PA.

*Jatropha curcas* is a non-food, perennial biofuel crop geographically limited to the tropical and subtropical world. It is naturally drought resistant, native to Mexico and Central America, belongs to the family Euphorbiaceae and has been cultivated in tropical and subtropical regions. To confer resistance to cold stress, we transformed *Jatropha* using Agrobacterium-mediated and biolistic transformation methods. We used reporter genes (GUS and GFP) and CBF3 gene with a stress inducible promoter (rd29A) in the transformation studies. Successful transformation with GUS and GFP were demonstrated using GUS staining and microscopic observation of green fluorescence respectively. GUS transformants were PCR positive and molecular analysis is being carried out on putative CBF3 transformants. (This project was funded by the National Science Foundation (NSF) and performed at Pennsylvania State-Harrisburg).



## Undergraduate Computer Science/Mathematics/ Physics/Earth Science/ Environmental Science A and B (CMPE-A/B)

### **No I and II Prize Winners**

### **III Prize Winner**

#### ***Determination of Efficiency of Technical Indicators***

**Gino P. Loverde**, Joe Omojola. Southern University at New Orleans, New Orleans, LA.

On a daily basis, investors make decisions on buying or selling a stock in order to make money. These decisions are based on several factors including rumors, fundamentals, recommendations, and technical indicators. In this research, we study the performance of several technical indicators over a period of one year to decide which of them is more accurate in making our buy or sell decisions. The indicators we considered are exponential moving average (EMA), Aroon, moving average convergence-divergence (MACD), and relative strength index (RSI). These indicators were tested over the Top 30 Dow Jones Industrial components.

## Undergraduate Psychology/ Science Education/Social Sciences A (PSE-A)

### **I Prize Winner**

#### ***Because I Said So: Parents Conceptions About Choices for Children at Ages 5, 10 and 15***

**Janene Cielto**<sup>1</sup>, Douglas Medin<sup>2</sup>. Howard University, Washington, D.C.; <sup>2</sup>Department of Psychology, Northwestern University, Evanston, IL.

Choices are important. Previous research has proposed that individuals' choices aid in revealing intricate reflections of the self that converge at a location of

race, social class and culture. Although researchers have explored the connections between individual development and choice in great detail, few have sought to investigate how individuals, namely parents, think and conceptualize choice for their children. The current study explores how parents frame notions about choice for their children. African American working class (n = 17) and middle class (n = 14) mothers were interviewed regarding their concepts of choice for children at 5, 10 and 15 within specific domains. In open-ended interviews, mothers reported the extent to which choices about bedtime, meals, clothing and visiting friends should be determined by parents, negotiated between parent and child or left up to the child. Results suggest that social class differences do significantly impact how parents think about choices for children. The child's age, as well as the domain of choice impacted the way mothers thought about choice for children. Rating scale questions also revealed that parents' attitudes about the use of choice as a parenting strategy vary as a function of social class.

### **II Prize Winner**

#### ***The Effect of Paternal Parenting Stress on Child Cognitive Development at 24 months of Age***

**Kimele Gray**<sup>1</sup>, Antoinette Farmer<sup>2</sup>. <sup>1</sup>Delaware State University, Dover, DE; <sup>2</sup>School of Social Work, Rutgers, the State University of New Jersey, New Brunswick, NJ.

There is a great deal of research that investigates the association between parenting stress and child developmental outcomes. Research has found that mothers' parenting stress has an adverse affect on child cognitive development. However, there is very little research on fathers' stress and how it affects child developmental outcomes. We hypothesize that paternal parenting stress and paternal stress related to difficult parent-child interactions has a negative effect on child cognitive development. For this study, data were collected from the Early Head Start Research and Evaluation Study to examine this relationship (analysis sample of 600 fathers and 600 children). The findings indicate no significant association between paternal parenting stress and child cognitive development. However, paternal parenting stress related to difficult father-child interactions has a negative impact on child cognitive development. Also, the impact of fathers

stress is greater for sons' cognitive development than daughters' cognitive development. The clinical implications for observing father-son interactions and developing coping strategies for parenting stress are discussed.

### ***NO III Prize Winner***

## Undergraduate Psychology/ Science Education/Social Sciences B (PSE-B)

### **I Prize Winner**

#### ***The Science of Kinesiology and the Treatment of Rotator Cuff Surgery***

**Sherisa Forward**<sup>1</sup>, James Saylor<sup>2</sup>, Frederick McLaughlin<sup>1</sup>. <sup>1</sup>Department of Biology, Fort Valley State University, Fort Valley, GA; <sup>2</sup>Elite Sport and Spine Physical Therapy, Byron, GA.

To study the science of movement, by which limbs are damaged or not mobile, physical therapy which is a branch of kinesiology is used. Physical therapy is a dynamic profession with an established theoretical and scientific base and widespread clinical applications in the restoration, maintenance, and promotion of optimal physical function. Physical therapists (PTs) are health care professionals who diagnose and treat individuals of all ages, from newborns to the very oldest, who have medical problems or other health-related conditions that limit their abilities to move and perform functional activities in their daily lives. When there are cases such as disorders of bursae and tendons in the shoulder region we work on range of motion, rebuilding muscles, strength training, and performing exercises that make people mobile again. We also developed home exercise programs (HEP). Home Exercise Programs are sets of exercises for each patient to do while at home based on their individual therapeutic need. We hypothesized that the physical therapy treatment done on disorders of bursae can also be performed on those returning from rotator cuff surgery and it will build their muscles and help gain mobility just as quickly. Methodology includes establishing diagnoses, prognoses, and plans of care, for ten patients who have had surgery on their rotator cuff. Patients were evaluated by taking measurements

with certain tools and demographics were examined before we started any type of rehabilitation. We performed these protocols to help determine whether the problems to be addressed were within the scope of physical therapist practice. In conclusion, studies have shown that this regimen would decrease the patients' healing time as well as the expense of medical bills.

### **II Prize Winner**

#### ***Experiencing Goat Milk Ice Cream***

**Nadine Cater**<sup>1</sup>, Frederick McLaughlin<sup>2</sup>, Linda Johnson<sup>1</sup>, Dwayne Daniels<sup>3</sup>. <sup>1</sup>College of Agriculture, <sup>2</sup>Department of Biology, <sup>3</sup>Department of Chemistry, Fort Valley State University, Fort Valley, GA.

Studies have shown that goat's milk is 13% higher in calcium than cow's milk. Goat's milk has 47% more vitamin A and less lactose than cow's milk. Unfortunately, these benefits are overshadowed by the general population's unfamiliarity with goat milk. Most people are not willing to try something that is not mainstream. This behavior can produce an automatic dislike for an untried product. Once the stigma associated with goat milk ice cream is dispelled, members of the Fort Valley State University community would be more receptive to including goat milk ice cream in their diets based on taste and nutritional properties associated with it. Participants will compare two spoons of ice cream in a blind test taste at the taste test lab in the meat processing plant on Fort Valley State University Campus. One spoon will be traditional ice cream and the other will be made from goat milk. The texture, taste, and creaminess of the samples will be compared. Participant will be then be asked if he/she would be willing to incorporate the goat's milk ice cream into his/her diet based on the nutritional value. Through a side by side taste comparison of regular ice cream to goat milk ice cream, I will prove that goat milk ice is a tasty alternative to regular ice cream.

### **III Prize Winner**

#### ***The Effect of Asthma Education in a Pediatric Pulmonary Clinic***

**Prince Eleeh**. Southern University and A&M College, Baton Rouge, LA.



## | AWARD WINNERS

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Asthma is a common chronic inflammatory disease of the airways that may be characterized by different recurring symptoms, reversible airflow obstruction, and bronchospasm. Symptoms include wheezing, coughing, chest tightness and shortness of breath. Although asthma cannot be cured presently, symptoms can be controlled with patient management education, medical treatment and avoiding exposure to allergens and environmental allergens that trigger an attack. Many cells and cellular elements play a role in asthma, including mast cells, eosinophils, T-lymphocytes, macrophages, neutrophils, and epithelial cells. The combination of genetic and environmental factors are said to be the cause of it. An implementation of an asthma education in UNM hospital has shown that asthma education has led to a decrease in the rate of readmission within 30 days. It is important to note that asthma education is not only done in the hospital but rather it can be done in various places such as: schools, community centers, and homes of patients, as they have shown to improve asthma control. Patient education may be provided by trained community resident, physical therapists and pharmacists.

### Undergraduate Chemistry A and B (CH-A/B)

#### I Prize Winner

##### ***The Preparation of Organic Molecules with Planar Geometry for the Modification of Carbon Nanotubes***

**Chavella Ingram-Robrson**, Frederick McLaughlin.  
Fort Valley State University, Fort Valley, GA.

Through the preparation of organic molecules with planar geometry, the surface of a carbon nanotube can be modified to accept the interaction of the molecules. This modification of the carbon nanotube is done by using the smallest interaction. Different forms of Imidazole were produced to show that the simplest form of polymerization is made up of fused aromatic rings. This research shows that this interaction causes the carbon nanotube to be stronger because of the  $\pi$   $\pi$  stacking of the aromatic rings. The  $\pi$   $\pi$  stacking will lead the modified carbon nanotubes to be produced on an industrial size scale having a super mechanical

strength. Therefore the carbon nanotubes will have the ability to assist in biomedical applications, department of defense, electronics, and many more.

#### II Prize Winner

##### ***Refractive Index Sensitivity of Dye-Doped Silica-Coated Gold Nanorods***

**Kayla Love**<sup>1</sup>, Karole L. Blythe<sup>2</sup>, Kathryn M. Mayer<sup>2</sup>, Katherine A. Willets<sup>2</sup>. <sup>1</sup>Department of Chemistry, Langston University, Langston, OK; <sup>2</sup>Department of Chemistry and Biochemistry, University of Texas at Austin, Austin, TX.

Noble metal nanoparticles have distinguished optical properties that can be beneficial for biological applications, surface enhanced spectroscopy, and catalysis. The nanoscale size of these particles can be both beneficial as well as can pose various limitations. It is known that silica coated gold nanorods (AuNRs) have a linear wavelength response to increasing refractive index; however, there is a limit to how much an image can be resolved due to the size and shape of a particle. The size of the particle adds to the difficulty in detection. The Localized Plasmon Resonance (LSPR) of the dye-doped silica-coated AuNRs changes in different solvents. Gold nanorods that are rinsed in organic solvents demonstrate specific trends that help identify the environment of the nanorod. Increasing the probe capability of the nanorods should invariably broaden the ability of detection. The goal of this project was to increase the fluorescence of the silica coated gold nanorods rinsed in various organic solvents using Nile red dye without affecting these trends. We synthesized gold nanorods, then etched them using hydrochloric acid for size adjustment. We then silica-coated the nanorods and imbedded Nile red dye into the pores of the silica shell. Next, we took the UV-VIS spectrum of the silica coated nanorods in different solvents and plotted the wavelength of maximum absorbance against refractive index. Our results indicated that the linear trend for the refractive index and LSPR were indeed maintained. Nile red dye did not impact the established trend and only enhanced detection. Our Future studies will include conducting test using the coated AuNRs and rinsing them in organic solvents with and without Nile red dye; to help determine if the Nile red dye is a contributing factor in the established trend.

### III Prize Winner

***The Function of Ethylene in *Synechocystis* sp. PCC 6803***

Jalissa Wynder<sup>1</sup>, Randy Lacey<sup>2</sup>, Brad Binder<sup>2,3</sup>.

<sup>1</sup>Department of Chemistry, Southern University and A&M College, Baton Rouge, LA; <sup>2</sup>Department of Biochemistry and Cellular and Molecular Biology, University of Tennessee, Knoxville, TN; <sup>3</sup>Sensing & Signaling REU Program, University of Tennessee, Knoxville, TN.

Ethylene is a gaseous plant hormone that is important to many plant processes such as seed germination and ripening. Responses to ethylene are regulated by a set of receptors that are unique to each plant species. Bioinformatic analysis showed that ethylene binding like sequences have been found in cyanobacteria species. The purpose of our research is to investigate the role of ethylene signaling in cyanobacteria using *Synechocystis* sp. Based on the similarities between the DNA sequence of cyanobacteria and plant ethylene receptors, we hypothesized that lateral gene transfer may have occurred during endosymbiosis. To study ethylene binding in cyanobacteria, we determined if the presence of *Synechocystis* gene product, slr1212, in cyanobacteria is capable of binding ethylene and whether the knockout of *Synechocystis* gene disruption has a phototaxis response in this organism. slr1212, an evolutionary precursor to the ethylene signaling receptors found in other plants, was cloned into an *E. coli* expression vector and the amount of ethylene binding protein produced was measured using a radioligand binding assay. The *Synechocystis* slr1212 gene knockout was generated using homologous recombination. Analysis of slr1212 binding of ethylene in both whole cell and membrane preparation demonstrate that this protein has a high affinity for binding ethylene. However, when the *Synechocystis* gene was disrupted, we observed no significant change in phototaxis response in cyanobacteria. Our preliminary data suggest that the role of slr1212 gene in cyanobacteria may be different from what is observed in other organisms.

## Undergraduate Posters

### Biology

#### I Prize Joint Winners

***Understanding Hepatic Immune Activation in the SIV/Macaque Model of HIV***

Phoebe Lewis<sup>1</sup>, Joseph L. Mankowski<sup>2,3,4</sup>, Suzanne E. Queen<sup>2,3,4</sup>, Jamie L. Dorsey<sup>2,3,4</sup>. <sup>1</sup>Department of Biology, Langston University, Langston, OK; <sup>2</sup>Department of Molecular and Comparative Pathobiology, <sup>3</sup>Department of Pathology, <sup>4</sup>Department of Neurology, Johns Hopkins School of Medicine, Baltimore, MD.

Neurological complications seen in the late stages of HIV/AIDS patients are an important area of current HIV research. Understanding the relationship between physiological changes in the periphery and the central nervous system is integral in discovering and understanding future treatment options. In this study, we hypothesized that hepatic macrophage immune activation can trigger inflammation in the brain, linking systemic immune responses to CNS immune activation associated with dementia. The liver regulates many aspects of systemic innate immune responses including responses to viral infections such as HIV. Resident macrophages in the liver, known as Kupffer cells, and recruited macrophages that arrive from the blood are crucial cellular players in this process. The SIV/macaque model of HIV is well-suited for examining macrophage activation in the liver to determine whether hepatic macrophages play a role in regulating systemic and CNS immune responses. Using immunohistochemistry, we measured expression levels of two known macrophage activation markers, CD68 and CD163, during progressive stages of infection. We also used real-time RT-PCR to measure the expression levels of SIV and several inflammatory cytokines including TNF-alpha, INFN- Beta, and MX. In these studies, we determined that hepatic macrophage activation does develop during progressive stages of infection in the SIV-inoculated macaques. We also identified potential soluble mediators of macrophage activation. Further studies are needed to determine how the immune activation in the liver correlates with CNS immune response. (The Johns Hopkins School of Medicine Summer Internship Program made this work possible).

## | AWARD WINNERS

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### ***Pesticide Resistance in *Hyalella azteca****

**Sara Nelson-Owens**<sup>1</sup>, Helen Poynton<sup>2</sup>. <sup>1</sup>Biology Department, Norfolk State University, Norfolk, VA; <sup>2</sup>Environmental, Earth and Ocean Sciences Department, University of Massachusetts, Boston, MA.

*Hyalella azteca* are sediment dwelling, primary consuming crustaceans that are commonly used for sediment toxicity testing. Dwelling in the sediment makes them openly accessible to many products of run-off; including pesticides. Pyrethroid pesticide use is increasing in the agricultural market, resulting in increased toxicity to non-target organisms such as *Hyalella azteca* at minute concentrations. However, some populations of *H. azteca* in the central valley of California have remained viable despite pesticide exposure. Upon further exploration, this resistance has been attributed to mutations in the gene controlling sodium transporter channels. DNA will be isolated from adult *H. azteca*, amplified using Polymerase Chain Reaction, and sequenced. We will then isolate, amplify, and sequence DNA from the resistant *H. azteca*. When compared to non-resistant *Hyalella azteca*, we expect to see specific point mutations in the sodium transporter gene of the resistant *Hyalella azteca*. We can then hypothesize that these point mutations provide resistance to pyrethroid pesticides in *H. azteca*.

## II Prize Joint Winners

### **Does Phosphorylation of *Drosophila melanogaster* E2F1 Affect its Stability in the Cell Cycle?**

**Jamie L. King**<sup>1</sup>, Christina I. Swanson<sup>2</sup>, Robert J. Duronio<sup>2</sup>. <sup>1</sup>North Carolina A&T State University, Greensboro, NC; <sup>2</sup> Department of Biology, University of North Carolina, Chapel Hill, NC.

In *D. melanogaster*, transcription factor E2F1 controls the cell's entry into S phase of the cell cycle. Previous findings from the lab show that E2F1 is targeted for degradation during S phase by the complex known as CRL4<sup>Cdt2</sup>. If E2F1 remains during S phase, it can induce apoptosis. However, previous research also shows that E2F1 is protected from degradation during cell cycles 1-15 in the *Drosophila* embryo, even though CRL<sup>Cdt2</sup> is fully active throughout these early cell cycles

and that E2F1 is post-translationally modified at this developmental stage. The goal of this research was to investigate whether post-translational modification, specifically phosphorylation, might protect E2F1 from ubiquitylation and degradation. In order to investigate this question, we generated a battery of E2F1 "phosphomimic" proteins, where the putative phosphorylation sites in E2F1 were altered so that E2f1 would appear to be constitutively phosphorylated. These "phosphomimics" were produced through site directed mutagenesis, and then these mutant forms of E2F1 were subcloned into a GFP-tagged vector. The E2F1-GFP fusion constructs were transfected into *D. melanogaster* S2 cells and their cell cycle profiles were analyzed, by comparison to wild type E2F1, using flow cytometry. Preliminary results indicated the first two constructs were not stabilized by phosphorylation. Early testing allowed us to determine whether our mutations, and therefore phosphorylation, affected the S-phase stability of E2F1 in S2 cells. Future directions include testing these mutations in an *in vivo* model. Our results will provide additional insight into E2F1's regulation, which has important implications for both development and tumorigenesis.

### **Reconstitution of Functional Mitochondrial Complex II within Phospholipid Bilayer Nanodiscs**

**David N. Mendez**<sup>1</sup>, Christine T. Schwall<sup>2</sup>, Nathan N. Alder<sup>2</sup>. Norfolk State University, Norfolk, VA; Department of Molecular and Cell Biology, University of Connecticut, Storrs, CT.

Membrane proteins are inherently difficult to study by traditional analyses because they are insoluble in aqueous environments. Recent advances in the reconstitution of these hydrophobic proteins into nanodiscs as model membrane systems have yielded unprecedented insights into their structure and function. The goal of this project was to isolate membrane protein complexes from the mitochondria of Baker's Yeast (*Saccharomyces cerevisiae*) for the reconstitution into nanodiscs and subsequent analysis of their enzymatic activity. Specifically, respiratory complex II from mitochondrial inner membrane was successfully reconstituted with high yield and activity based on various independent spectroscopic analyses. This marks a technical advance for the analysis of the activity and associated pathologies of membrane proteins isolated from native membranes.

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### III Prize Joint Winners

#### ***Assessing the Cytotoxic Effects of Potential Anticancer Drugs on Breast, Lymphoma and Ovarian Cancer Cells***

**Grant Pierre**<sup>1</sup>, Erica Bozeman<sup>2</sup>, S. Balasubramanian<sup>3</sup>, Periasamy Selvaraj<sup>2</sup>. <sup>1</sup>Prairie View A&M University, Prairie View, TX; <sup>2</sup>Emory University, Atlanta, GA; <sup>3</sup>University of Madras, Chennai, India.

Cancer is the second leading cause of death in the United States according to the CDC. Between 1985 and 2010, cancer incidences have doubled and by 2030 they are expected to triple. Due to this many new compounds are being investigated for their antitumor properties such as Ukrain and a newly synthesized compound ZTHA. The anticancer drug Ukrain, along with ZTHA, has been shown in published and preliminary studies to show cytotoxic activity against several cancerous cell lines. Ukrain, a semi synthetic derivative of the plant *Chelidonium majus* L. has been shown in various studies to be a potent inducer of apoptosis in lymphoma, ovarian, melanoma, and colon cancer cell models. Similarly, ZTHA has shown promising results from preliminary studies as an inducer of apoptosis in the Du-145 human prostate adenocarcinoma, and TRAMP 1, 2, and 3 prostate cell lines. As a newly synthesized compound, there is little data for the effect of ZTHA on other tumor cell lines. Furthermore, there are questions to the widespread effectiveness of Ukrain. This study has the following goal: to test the in vitro cytotoxicity of Ukrain and ZTHA in the following cell lines; human breast cancer cell line (SKBR-3), mouse T-Cell lymphoma (EG7), and human ovarian (ID8) cancer cell lines. Tumor cells were plated at 90-95 % viability with varying concentrations of Ukrain and ZTHA. ZCHA, another synthesized compound, was used exclusively as an isomer control for ZTHA. Cell death was assessed using the Trypan Blue Exclusion method. We observed a time and dose dependent decrease in cell count and viability for SKBR-3, EG7, and ID8 following Ukrain treatment. Likewise following ZTHA treatment, we also observed a time and dose dependent decrease in viability for the SKBR-3, EG7, and ID8 cell lines. At higher concentrations (50 µg/mL), Ukrain led to significant decreases in viability and cell count compared to the untreated cells. 72 hours post-treatment with Ukrain yielded 10 %, 20%, and 40% viable cells for the EG7, SKBR-3, and ID8 cell lines respectively. ZTHA caused decreases in viability in all cell lines compared to untreated cells, but was not as potent an inducer of cell death as Ukrain, with

the exception being ID8 cells. 72 hours post treatment with ZTHA yielded 60% and 40% viable cells for EG7 and SKBR-3 respectively, while only 20% of ID8 cells remained viable. In conclusion, Ukrain has been further established as a potential anticancer drug by showing cytotoxic effects to a wider range of cancer cell lines. Furthermore, ZTHA, a novel compound, has shown promising cytotoxic effects on SKBR-3, EG7, and ID8 cell lines warranting future study.

#### ***Are the Regression Models Published in the Field of Environmental Science Reproducible?***

**Tiaria Porche**<sup>1</sup>, Murty Kambhampati<sup>1</sup>, Fred Rispoli<sup>2</sup>, Vishal Shah<sup>2</sup>, Timothy Green<sup>3</sup>. <sup>1</sup>Southern University at New Orleans, New Orleans, LA; <sup>2</sup>Dowling College, Oakdale, NY; <sup>3</sup>Brookhaven National Laboratory, Upton, NY.

This study focuses on the use of statistical analysis in research concerning environmental science projects, which were published in various scholastic journals during 2004–2010. The main objective of this study was to validate the regression models presented in the published articles. We hypothesize that all of the articles will not contain all of the necessary information to reproduce the published regression models, and may further identify some type of error. A total of 266 biological articles were selected and analyzed. Screening for articles using regression analysis as the statistical method narrowed down the search to 26 articles. The data given in the 26 articles was used to develop the regression model using Microsoft Excel and compared to the published models. Only four of the articles have been validated 100% with the simulated/constructed models. On the contrary, the other twenty-two regression models failed to be reproduced using the published data. We found that in many publications the amount of information provided was not sufficient to reconstruct the model. In some publications, we believe that there were errors associated with the model development leading to non-reproducible models. The errors expressed may have occurred during the input of data into the software. Further studies are being carried out to understand the errors involved and elucidate the minimum information required to obtain the model from the publications. The advantage of being able to reproduce the given information validates if the statistical methods are used in the most effective and correct way possible. (The research study was funded and supported, in part by, the National Science Foundation grants # HRD-0928797 and DUE-0806894; and the Department of Energy).



### Chemistry

#### I Prize Winner

##### ***The Characterization of Noncovalent Fluorescent Protein Probes and Polystyrene Beads by Way of Spectrometry and Capillary Electrophoresis***

**Brandi Jordan**<sup>1</sup>, Cayla Lowe<sup>2</sup>, Kathryn Riley<sup>3</sup>, Christa Colyer<sup>3</sup>. <sup>1</sup>Hampton University, Hampton, VA; <sup>2</sup>Spelman College, Atlanta, GA; <sup>3</sup>Wake Forest University, Winston-Salem, NC.

Proteins and other large biopolymers have tremendous clinical, biological, and even environmental significance, but it can be difficult to separate them from complex mixtures and to measure trace quantities present in such mixtures. Noncovalent binding of the dye to proteins will cause a significant enhancement in the fluorescence of the bound dye. This will allow for detection with high sensitivity by capillary electrophoresis with laser-induced fluorescence (CE-LIF). It is our goal to study the properties of novel fluorescent dyes that will be able to serve as probes for protein analytes. Our studies sought to characterize the interaction of dye CL-126 with bovine albumin serum (BSA). The dye CL-126 was diluted in three separate buffers (acidic, neutral, basic) and was prepared with a 1:1 ratio to BSA, at various concentrations. Absorbance data was collected on an Agilent 8453 UV-Vis spectrometer. CL-126 showed optimal absorbance in the acidic buffer. In the future, similar methods will be conducted on the fluorimeter as were completed on the UV instrument. Analogously, we seek to develop separation strategies for polystyrene beads of different sizes and with different extents of surface derivatization of functionalization. Polystyrene beads can serve as platforms for advanced biomolecular selection and analysis methods. It is important to characterize the polystyrene beads and understand their inherent mobilities. The polystyrene beads were at various diameters (100, 243, 500, and 100 nm). They were prepared by diluting the stock solutions in the filtered diluted buffer (Tris/Borate/Na<sub>2</sub>EDTA; TBE). These studies were conducted on an Agilent G1600A Capillary Electrophoresis System. The beads were detected by absorbance at 214 nm. The beads were detected at individual separations based on their size. The migration times for the 100, 243, and 500 nm beads are too close to afford a well-resolved separation. So, buffer additives or focusing techniques will be explored to improve the separation of the various beads.

#### II Prize Winner

##### ***Development of a Protein Based System for the Detection of Organophosphates Using the pH-Dependence of Enhanced Green Fluorescent Protein***

**Jasmine Fluker**, Jared Harris, Libby G. Puckett. North Carolina Agricultural and Technical State University, Greensboro, NC.

This project is designed to address a need for the detection of a general classification of organic molecules that can be found in pesticides and chemical warfare agents, namely organophosphates. Organophosphates (OP) are harmful neurotoxins that inhibit mammalian acetylcholinesterase, an enzyme that hydrolyzes acetylcholine, thereby affecting neuromuscular transmission. Even low-level exposure to these compounds can be detrimental to the environment and to human and animal health; therefore, their use is regulated by the EPA. It is estimated that organophosphates account for 38% of all of the insecticides used globally. This fact, along with the threat of chemical warfare agents, makes the detection of a wide range of organophosphates necessary. Organophosphorus hydrolase (OPH) was discovered in the late 1980's after scientists found a species of bacteria, *Pseudomonas diminuta*, which was thriving in pesticide-contaminated soil. The OPH produced by the bacteria essentially detoxified the organophosphates and allowed the bacteria to survive. OPH has a broad specificity for organophosphates, thus making it a very popular enzyme for remediation of organophosphates that are found in pesticides and chemical warfare agents. Recombinant DNA technology will be used to create a unique plasmid which will contain a gene that encodes for the production of a fusion protein between the enzyme, OPH, and a reporter protein. EGFP is one of the most widely exploited reporter proteins and will be used for in this project. The OPH end of the fusion protein will catalyze the cleavage of organophosphate substrates resulting in the release of 2 protons. The decrease in pH will subsequently result in a decrease in the fluorescence of the EGFP. Thus, fluorescence can be correlated to the detection of substrates and their concentration. This biosensing system will be able to detect fluctuations in local pH by monitoring the decrease in fluorescence emission of the fusion protein and can be used to quantify any organophosphate. This OPH-EGFP protein, when expressed and purified,



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can be utilized to develop a homogeneous assay for the detection and quantification of organophosphates.

### Joint III Prize Winners

#### ***A Kinetic Model of Long-Term Potentiation and Long-Term Depression Mechanism in Synaptic Transmission***

**Bronson Haynes**, Yankang Chen, Satish Nair. Norfolk State University, Norfolk, VA.

This research focuses on intracellular circuits that implement long-term potentiation (LTP) and long-term depression (LTD) at prefrontal accumbal synapses. These synapses undergo plasticity due to chronic cocaine but the mechanisms involved are not known presently. The model is implemented using software package NEURON. The model includes calcium-dependent mechanisms of enzymes leading to phosphorylation and dephosphorylation of the GluR1 subunits, S831 and S845, on the  $\alpha$ -amino-3-hydroxy-5-methyl-4-isoxazolepropionic acid (AMPA) receptors on the postsynaptic cell. The model also includes N-methyl-D-aspartate (NMDA) receptors that allow calcium to enter the cell; this calcium binds to calmodulin to form a calcium-calmodulin complex whose concentration depends on the calcium concentration. Through high calcium stimulation, the enzymes calmodulin kinase II (CaMKII) and protein kinase A (PKA) phosphorylates the GluR1 subunits, S831 and S845, which allows the AMPA receptor to have increased opening time, thus increasing their conductance on the postsynaptic cell. This induces LTP and LTD. LTP results from the S831 phosphorylation site being phosphorylated by CaMKII during high calcium levels, and LTD results from S845 phosphorylation site being phosphorylated by PKA during low calcium levels. Through low calcium stimulation, protein phosphatase 1, PP1, dephosphorylates the AMPA receptor thus resulting in no induction of LTP and LTD. The model provided predictions that were consistent with experimental data and provides an important step in understanding LTP and LTD in the prefrontal accumbal synapses due to chronic cocaine. These synapses are consistent in various areas of the brain.

#### ***Myosin VI Behavior Due to Insertion and Fluorescent Labeling of N-Terminal Reactive Cysteine***

**Alisha Henderson**<sup>1</sup>, James A. Spudich<sup>2</sup>. <sup>1</sup>Department of Chemistry, Hampton University, Hampton, VA; <sup>2</sup>Department of Biochemistry, Stanford University School of Medicine, Stanford, CA.

Myosin VI is a member of the myosin family that walks toward the minus end of actin filaments, opposite to all other known myosins, and is processive in vitro. Its mechanism of processivity and aspects of its structure are still unclear. Myosin VI goes through cycles of ATP hydrolysis that powers its motion. Those cycles are coordinated between the two heads. Researchers have yet to determine how the coordination of nucleotide binding and release between the two heads occurs. A long-term goal of the lab is to directly visualize fluorescently labeled ATP binding to and releasing from each myosin head as it walks along the actin filament. The challenge with accomplishing this goal is seeing an individual fluorescent ATP in the presence of high concentrations of fluorescent ATP. We were investigating whether an N-terminal fluorescently labeled cysteine could be attached to the myosin VI head to act as a FRET donor to fluorescently labeled ATP. To this effect we tested this recombinant protein to determine if the label or mutation affected myosin VI behavior. By conducting protein transfections and purifications, using fluorescent imaging and SDS-PAGE gels, we were able to obtain and verify an ample amount of purified protein. We then used motility assays to ensure if the myosin VI was active and to compare this mutated protein to the control myosin by calculating velocities. The fluorescent labeling was successful; however the labeling occurred for M6 Hot Cys and M6 control, whereas we hope to preferentially label M6 Hot Cys. Additionally, over labeling seemed to occur that destroyed motor activity. In the future, once the labeling technique is refined to successfully label only the N-terminal reactive cysteine on the myosin VI mutant and preserve motor activity, then it will allow the use of TIRF and FRET techniques to investigate the mechanism of ATP hydrolysis for myosin VI. (This research is supported in part by the Stanford University Amgen Scholars Program).

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## Computer Science/ Mathematics/Physics/Earth Science/Environmental Science (CMPE)

### I Prize Winner

#### ***Structural Investigation of Nitride SiC-SiO<sub>2</sub> Interfaces***

**Tolani Olonisakin**, Roland Barbosa, Warren Collins.  
Department of Physics, Fisk University, Nashville, TN.

Silicon Carbide has a large potential for high-temperature and high-power applications due to its wide range of advantageous properties. The SiC-SiO<sub>2</sub> interface, however, has limited the performance and commercializing of SiC-based transistors. The purpose of this research was to study the structural environment of nitrated SiC-SiO<sub>2</sub> interfaces in an effort to explain how nitridation improves the interface quality of the material. SiC-SiO<sub>2</sub> structures annealed in nitric oxide (NO) and forming gas (N<sub>2</sub>/H<sub>2</sub>) were investigated using x-ray photoelectron spectroscopy (XPS) and the fourier transform infrared spectrometer (FTIR). XPS analysis revealed the presence of C-N, C-C, C-O, Si-N, Si-O-N, Si-O and Si-C at the NO-annealed SiC-SiO<sub>2</sub> interface and N<sub>2</sub>/H<sub>2</sub>-annealed SiC-SiO<sub>2</sub> interface with the exception of Si-O-N at the interface of SiC-SiO<sub>2</sub> annealed in N<sub>2</sub>/H<sub>2</sub>. IR analysis showed intense peaks at 1468.06 and 1460.08 in the NO-annealed SiC-SiO<sub>2</sub> and N<sub>2</sub>/H<sub>2</sub>-annealed SiC-SiO<sub>2</sub> samples respectively.

### II Prize Winner

#### ***The Effect of Fetal Bovine Serum on Quahog Kidney Cells Exposed to Cadmium***

**Alania Foxx**<sup>1</sup>, William E. Robinson<sup>2</sup>.<sup>1</sup>Biology Department, Norfolk State University, Norfolk, VA; <sup>2</sup>Environmental, Earth and Ocean Sciences Department, University of Massachusetts, Boston, MA.

Cadmium (Cd) is one the major metal pollutants that are stressors to marine animals and their environments. Marine bivalves have been used for more than 25

years to monitor costal pollution. Cd toxicity depends in part upon the uptake/exposure these animals experience and it has been found that the bivalve kidney bioconcentrates Cd more than any other organ. We adapted cell culture procedures to investigate the exposure of cadmium chloride (CdCl<sub>2</sub>), both in the presence and absence of Fetal Bovine Serum (FBS) in medium, on the kidney cells of the quahog *Mercenaria mercenaria* L.. Dissociated kidney cells were exposed to concentrations of CdCl<sub>2</sub> ranging from 0 to 5000 mM for 24, 48, and 72 hours. Cells were counted using a Coulter Counter (Z1 Dual Cell and Particle Counter) and their viability assessed using Trypan Blue. The aim of this study was to see if FBS was linked to the low toxicity levels of CdCl<sub>2</sub> exposure in quahog kidney cells. We concluded that there were differences in the cells that were exposed to FBS/CdCl<sub>2</sub> and cells that were just exposed to CdCl<sub>2</sub>, but there was too much variability to make a final conclusion if the toxic effect was less in either. Further experiments will be done and hopefully, this will allow us to conduct comparable exposures with Histidine-rich Glycoprotein, the predominant metal-binding protein in quahog blood. (This research was made possible by the National Science Foundation).

### III Prize Winner

#### ***HT Campus Database***

**Jarrett Lindsey**, Huston-Tillotson University, Austin, TX.

The goal of this project is to develop a campus database designed specifically for advisors and students whose majors are Computer Science and Computer Information Systems. Students will have limited access to certain information; such as teacher grades reports and history, disciplinary reports of other students and overall student data in general. Faculty and Staff will have much more privileges and will be able to view student history, class schedules and even nurse visits. The project will be written in SQL language. A great deal of time will be placed on understanding and mastering the SQL language so that the project will be a success. Once completed, I will present this project to my school for consideration in adopting this efficient database management system.

## Psychology/Science Education

### I Prize Winner

***Georgia Ave/Petworth Community: A Pilot Study Assessing Resiliency in Response to Preparedness***

**Philip Dubois**, Caleb Laster, Yolonda Long, Etaba Assigana. University of the District of Columbia, Washington, DC.

During the 1990's, terrorist actions using biological weapons and the fear that rogue states possessed such weapons placed bioterrorism on the political agenda, which created a policy window widened by the September 11 attacks. This project sought to investigate community preparedness and resilience of a specific area in Washington D.C. for a biological attack, the Georgia Avenue-Petworth neighborhood. We formulated a hypothetical scenario involving a biological attack and researched how this community would respond in the event of a smallpox attack. To visualize the smallpox attack, a NetLogo multi-agent model was developed to demonstrate the spread of the disease within a population. We also created a survey instrument developed for churches, public schools, and community centers in the Georgia Avenue-Petworth area to assess their ability to provide services in the event of a biological attack. Definitively, a bioterrorism attack is, "the deliberate release of viruses, bacteria, or other germs (agents) used to cause illness or death in people, animals, or plants." The existence of bioterrorism as a public health issue brings clear notice of communicable viruses such as orthopoxvirus, better known as smallpox. For the purpose of this research, we wanted to discover how prepared this community was in order to bring awareness to communities across the nation in the hopes of promotion of emergency preparedness nationally. (Funded by UDC HS-STEM Homeland Security Science and Technology Research Grant).

### II Prize Winner

***"A Stroke of Genius", An Intervention Strategy in Stroke Prevention***

**Contessa Davis**, Patricia McCarroll. HBCU Wellness Program, Fisk University, Nashville, TN.

Strokes are the fourth leading cause of death in America and this statistic only gets grimmer for African-Americans. African-American adults are 50% more likely to have a stroke than their white adult counterparts. African-American that suffer with obesity, hypertension and high cholesterol are at higher risk for a stroke. The objectives of this study was to increase the awareness of strokes in lower-income communities, enable every participant to identify at least three risk factors and warning signs of strokes and, to stress the importance of exercise and heart healthy diets in stroke prevention. Pre- and post assessments were administered before and after a seminar session on stroke prevention and the importance of proper nutrition and exercise. The goal of this study was to educate two hundred participants about stroke prevention.

### III Prize Winner

***Attachment and Coping Mechanisms in Families Dealing with Drug and Alcohol Addiction***

**Zalika Cobb**, Candice Crowell. Department of Psychology, Howard University, Washington, D.C.

The earliest stage of attachment begins with a caregiver and a child. Minimal research has been conducted on the relationship between attachment styles and substance abuse. What has been done has demonstrated that people with insecure attachment styles are more likely to have substance abuse disorders. Detection of attachment problems is an important factor contributing to successful treatment outcomes in alcoholic inpatients. Additionally, the research promotes that those recovering from substance abuse should be aware of their attachment styles, which could aid in their recovery process. What has not been further investigated is the connectedness of substance abuse disorders, attachment, and the quality of relationships with children and other family members. To improve an addicts' life, one must acknowledge the attachment style when working with addicts in recovery. Improvement can be measured by insight to origin of addiction, adoption of positive coping skills, life satisfaction, length of time between relapse, and the relationship improvement with family and friends. Further investigation is required to determine the importance of recognizing how secure attachment will lead to more successful recovery.



# HIGH SCHOOL Poster Competition



A unique feature of the NIS/BKX Joint Annual Meeting is its multi-prong Science Enrichment Component. It is the only annual national scientific forum that incorporates this type of component that at its core is community service and outreach. One of the 'prongs' of this component is the High School Poster Competition. The competition has been a standard feature of the Joint

Meeting for the past five years. High School students (and sometimes middle school) in the city/town of the Joint Meeting's host school(s) are invited to compete in the session. Students may prepare a poster of their current science projects or one previously prepared or presented at a science fair competition or other forum. The students, though judged by separate criteria, present in the same room, alongside of college students. The top placing high school posters will receive monetary awards, provided by the National Institute of Science: 1st Place (\$150); 2nd Place (\$100); 3rd Place (\$75); and Honorable Mention (\$50). The winners will additionally be recognized at the Awards Banquet and are invited to attend this event, with an accompanying parent or teacher, as a guest of the Joint Meeting. The teacher who brings the most presenting students will receive an award and recognition for his/her efforts. Participating students and teachers will receive the conference bag, meeting program book and a certificate of participation.



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**69th BKX/NIS**

*Joint Annual Meeting*

**EVALUATION REPORT**

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**Prepared by:**

Stephanie Graves

Garnetta Turner

Nithya Raghavan



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## Introduction

In 1943, two independent African American scientific organizations, Beta Kappa Chi Scientific Honor Society (**BKX**) and the National Institute of Science (**NIS**) met and decided to jointly provide a forum for African-American scientists and students to come together under the auspices of a credible national scientific meeting to present their research data. This transpired during a period when African-American scientists, professionals and students could not present their scientific research data to their peers at majority meetings. They decided the forum would not only be a meeting for exchange of scientific research data, but would stimulate professional, academic and student networking. During these past years, the meetings have grown in a manner in which the established goals have been achieved. Although not documented, but based on citations from long term members' personal experiences, these meetings appear to have played a role in increasing the numbers of African American students who have entered and remained in Science, Technology, Mathematics and Engineering (STEM) and bio-medical related professions. However, It can be documented that during the past 10 years, there has been an increased number of participants from 200 to 500 and an expansion of the number of universities attending the meetings. We celebrated the 69th year of the existence of this forum, which alone, is a testament to the longevity and an acknowledgment of our networking skills. This 69th Joint Meeting of the National Institute of Science and the Beta Kappa Chi Scientific Honor Society was held at the site where these meetings first began namely, Nashville, Tennessee. The 69th meeting was held in March 21-25, 2012 and addressed the theme "The Social Determinants of and Progress in Health Disparities". This meeting was co-hosted by the Tennessee State University and Fisk University. A large contingent of undergraduate and graduate students, faculty members and exhibitors traveled from all over the US and Puerto Rico. Over 488 undergraduate and graduate students, faculty and exhibitors in total attended this meeting and approximately 100 high school students participated in the high school poster session. **This year had the highest number of abstracts (242) ever submitted.** In the oral presentation category there were a total of 137 abstracts (Undergraduate Biology-44, Chemistry-16, Computer Science/Mathematics/Physics/Earth Sciences-22, Psychology/Social Sciences/Science Education-31, Graduate Students-24) and in the undergraduate poster category there were 105 abstracts. Thus, approximately half the participants presented at the meeting. In spite of the record number of attendees, only 136 participants completed the exit evaluation form. During subsequent years computer and engineering has been added. The National Institute of General Medical Sciences has partially funded this meeting through a T36 grant. Although funding from the NIH via a MARC Ancillary grant occurred for 3 years in the early 1990's and was not renewed, long term funding began in 1999 and is currently committed to continue until 2015. The NIS is in its fourth grant cycle. The goals of the joint annual meeting are as follows:

- To provide a forum for students to exchange research data and information through oral and poster presentation sessions.
  - To enhance exposure, interest and opportunities for students (undergraduates and graduates through workshops, Town Hall Meetings, Hot Zone Series, a Market Place where students can shop for future academic exposures, student meetings, a Summa lecture with a Nobel Laureate presenting and a series of distinguished lectures.
  - To provide awards for outstanding presentations, oral and poster, by undergraduate and graduate students.
  - To provide awards or special recognition to outstanding professionals.
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## | EVALUATION

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- To enhance student opportunities through the establishment of a network of research professionals, faculty, administrators, and exhibitors who will recruit students to graduate, professional schools and post-baccalaureate programs.
- To promote and develop scientific interest and literacy in youth by BKX chapters and NIS clubs interacting with their respective local public school systems through community outreach activities.

Increasing minority representation at the undergraduate and post-graduate levels and beyond in the fields represented at the Joint Annual Meetings would have a tremendous impact in minority communities and increase their visibility in the national scientific arena. The National Science Foundation's latest numbers reported a decrease in the enrollment of minority students in science. We feel that it is important to nurture these individuals in order to retain their interest in Science, Technology, Mathematics and Engineering (STEM) disciplines by offering support activities that will convince them that this is an area worth investing time and planning for a successful career. As cited by many faculty sponsors through oral communication, this is the reason that many of them assist students in "whatever way possible" to attend this Joint National Meeting including those students who are just beginning to major in STEM disciplines. However, faculty sponsors indicated that the student- participants were fully involved in planning and getting additional funds to cover registration fees, which are generally not paid by the meeting planners. The intention of this report is to evaluate the extent to which the 69th Joint Annual Meeting met its stated goals and to recommend ways in which they could be implemented even better. This Evaluation Report is divided into 3 sections:

**Part I:** Student and Faculty Profiles

**Part II:** Assessment of Student Presentations, Lectures, Workshops, Hot Zone Summit, Exhibitors

**Part III:** Overall Meeting Assessment

### **Methodology**

Approximately 28% (136/488) of the Individuals attending the 69th Joint Meeting of NIS and BKX completed the exit evaluation forms, which were distributed at the Award's Banquet. In past years, these assessment tools have been disseminated after each workshop and after many of the featured activities. Rather than to resume the paper evaluation after each session and workshop, it was decided at the 68th Joint meeting that questions pertaining to the overall meeting would be placed on the exit questionnaire at the Awards Banquet. Seven workshops were held at the 69th Joint meeting and included the following: (1) Expanding your Global Horizon (*Lisa D. Cain, PhD., University of Texas Medical Branch (UTMB) at Galveston*); (2) Applying to Graduate School: How to Get in and Stay in: Preparing for Success in the Graduate School Application Process (*Rochelle L. Woods, PhD, Office of Academic Multicultural Initiatives, University of Michigan*); (3) Designing Effective Technology Enhanced Courses (*Sajid Hus-sain, PhD, Department of Business Administration, Fisk University*); (4) Community Based Participatory Research on Health Disparities, A Mechanism for Instituting Service Learning Initiatives (*Linda H. McClellan, MPH, HBCU Wellness Project of Meharry Medical College*); (5) The GRE & MCAT Prep Exams (*Andrew McGarrity, Business Development Manager Kaplan Test Prep Center, Nashville*); (6) Study Techniques for Colleges Success (*Rosie Sneed, PhD., and Karen Redden, PhD., Department of Biology, University of the District of Columbia*); (7) Basic Geographic Information Systems (GIS): Overview for Cancer related Issues (*Darlette Meekins, Analyst/Cartographer, Virginia Department of Transportation*).

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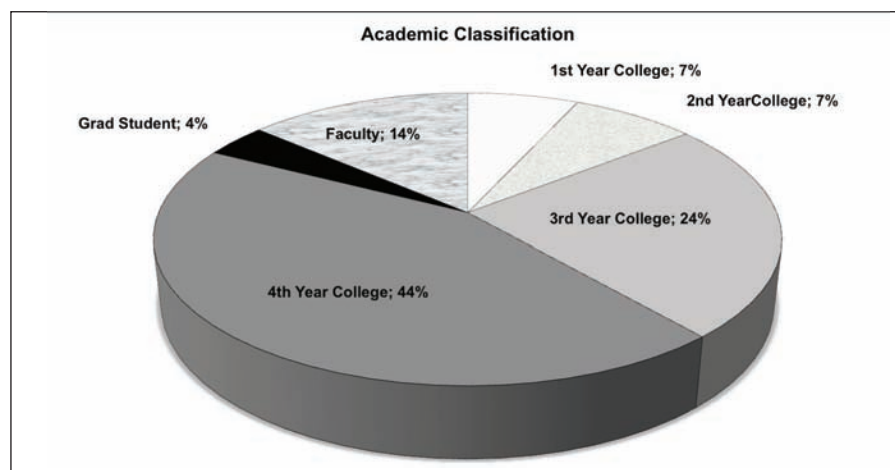
Other meeting events that are among the wide array of activities of the Joint Annual meeting include: the Opening Plenary Session, Distinguished lecture, undergraduate and graduated student presentations, undergraduate posters, exhibitors' interaction, the Hot Zone Summit, the NIS Memorial Lecture, The BKX Lecture, Workshops etc. The Hot Zone Summit's theme was "**STDs at Historically Black Colleges and Universities: A Major Health Concern**". STDs have shown increased incidence on U.S. college campuses with the highest incidence on Historically Black Colleges and Universities (HBCUs). On college campuses, the most common STD infection is caused by human papilloma virus (HPV/genital warts), followed by chlamydia and gonorrhea infections. Other common STDs include HIV/AIDS, herpes, trichomoniasis, and syphilis. Recent information from HBCU campuses reveal that the incidence of HIV infections is increasing. Prior to the introduction and presentation of a panel representing key national programs and one local program designed to combat STDs on HBCU campuses and which also included a student representative majoring in Public health education from North Carolina Central University, an original six-minute video produced and copyrighted by the National Institute of Science was shown. This highly descriptive video presented a brief overview of the scientific and health aspects of STD and the problems they present on college campuses. Panelists addressed the problem by providing information on mechanisms for prevention and treatment and the role that their particular organization played, as well as other important information they deemed relevant. The overall goal was to ensure that students are aware about STDs on college campuses and to provide mechanisms for prevention.

The evaluator attended the entire meeting and obtained information via observations at various events. This report relies on simple descriptive statistics and can be said only to a reflection of the experiences of those students and faculty who handed in the evaluation sheets. Microsoft Excel was used to analyze the quantitative data. In recognition of the Meeting's central purpose to support the career aspirations of students, especially the undergraduates in STEM fields, the majority of the analyses presented here focus on student experiences and their reactions to those experiences.

## Part I: Student and Faculty Profiles

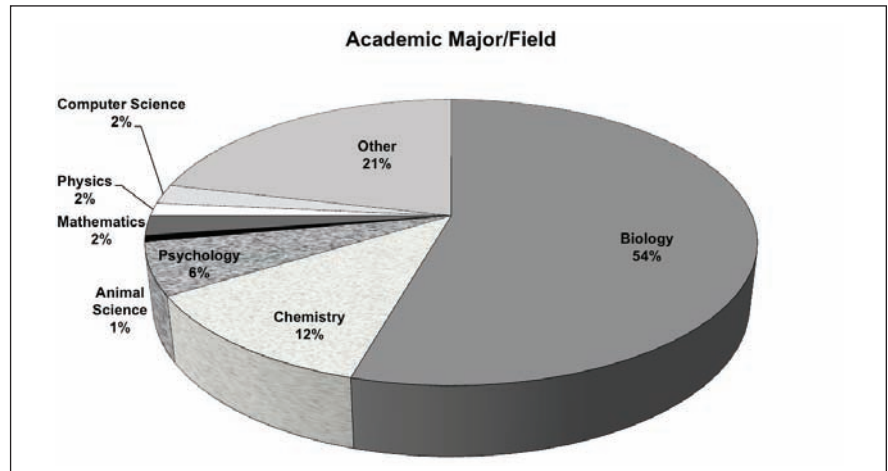
**STUDENTS:** Out of the total attendees only 136 participants completed the exit evaluation forms with seniors representing the largest number to have completed the evaluations. This group was followed by juniors and faculty (**Fig. 1**). The female students represented 65% and male students represented 35% of the total responding participants. Third and fourth-year female students comprised nearly 60 percent of all respondents.

**Figure 1:** Academic-levels of the participants responding to the evaluation questionnaire at the Joint Annual Meeting



Of the students who completed the evaluation questionnaire biology majors represented (54%), Chemistry (12%), computer science (2%), psychology (6%), mathematics (2%), physics (2%), animal science (1%) and all other combined disciplines (21%) (**Fig. 2**).

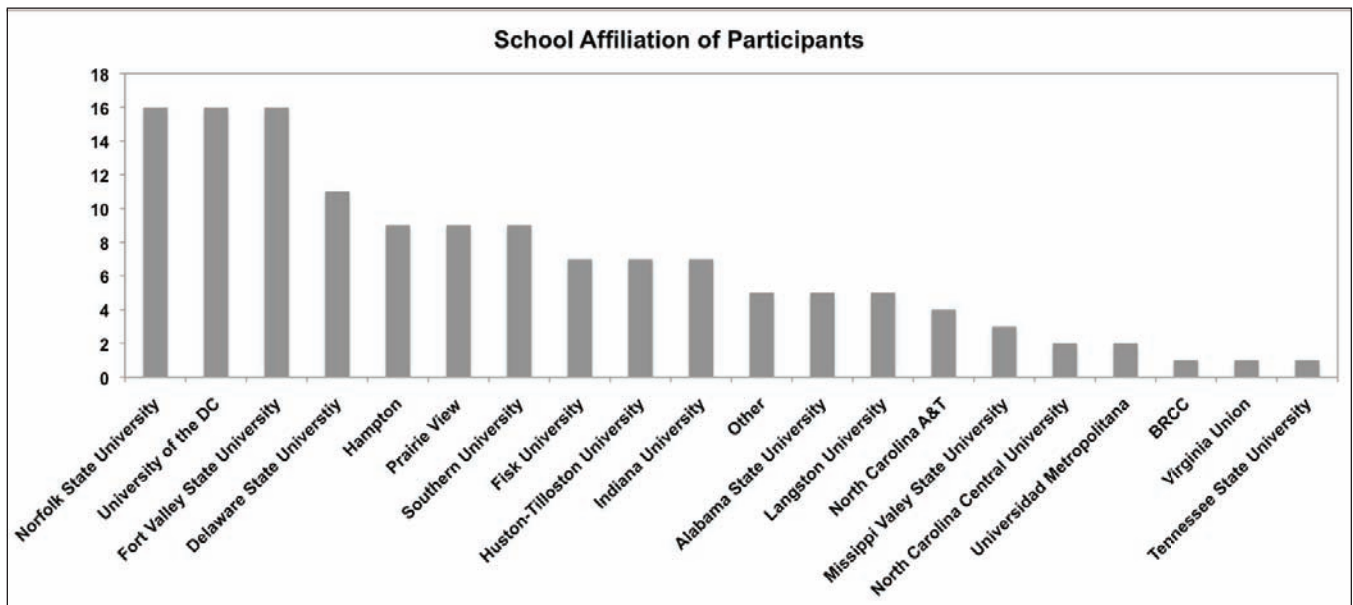
**Figure 2:** Academic disciplines of students who completed the exit.



Among the students who indicated their school affiliation (**Fig. 3**), respondents represented 19 colleges and universities: Norfolk State University, University of the District of Columbia and Fort Valley State University (16); Delaware State University (11) Hampton, Prairie View A&M University and Southern University and A & M College (9); Fisk University, Huston Tillotson University and Indiana University (7), Langston University, Alabama State University, and Others (5), North Carolina A&T University (4), Mississippi Valley State University (3), Universidad Metropolitana and North Carolina Central University (2), BRCC, Virginia Union and Tennessee State University (1).

Specific colleges and universities not represented in the previous meeting but that were represented at this meeting were Dillard University, Hinds University, Inter-American University-Barranquitas, Puerto

**Figure 3:** College/University affiliation of students who completed the exit evaluation



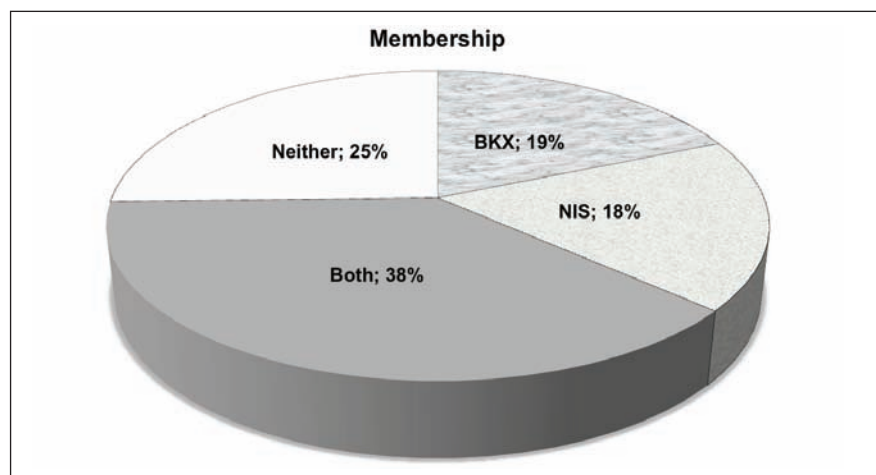
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Rico, Johnson C. Smith University, Medger-Evers College, Savannah State University, St. Augustine's College, Tennessee State University and Universidad del Turabo, Puerto Rico. Some school increased their representation e.g. Delaware State University (from 13 to 25), Fisk University ( from 4 to 15) and Tennessee State University (from 0 to 8). Also, several schools that sent students last year did not do so this year, including Lane College, Mississippi Valley State University, Philander Smith College, Polytechnic Institute of Puerto Rico, Universidad del Este, Carolina, Puerto Rico and Virginia Union College.

This data was based on the various student abstracts that were submitted either in the oral or poster sessions. As far a membership affiliations to the sponsoring organizations, students completing the questionnaire cited that only 19% claimed membership in BKX and 18% in NIS; 38% indicated they had dual memberships in both NIS and BKX, while 25% did not have any affiliation (**Fig. 4**).

The students attending the meeting indicated that their' most important reasons for attending the Joint Meeting, in order of importance were: presenting their research, exposure to new ideas and information, meeting distinguished scientists, networking, and socializing. The average response to each of the first four items was roughly midway between "very important" and "fairly important." In contrast,

**Figure 4:** Student affiliations to either BKX, NIS or both.



socializing ("social activities at the meeting") lagged far behind in importance and the next to the last item which was networking. As later discussed in this report, socializing appeared to have been more important to students than they had initially indicated. All of the students responded to the inquiry about the importance of presenting their work at a scientific forum. It should be noted that 53% of the respondents were first-time attendees to the Joint Meeting. All cited that they felt that they were experiencing their first significant presentation opportunity. This 53% first-time Joint Meeting attendee-presenter was down from 67% from a year ago. However the total number of abstracts that were submitted increased from 185 from the previous year to 242 this year which is a 24% increase in the number of abstracts submitted.

Most students cited that they wanted very badly to attend the meeting even if they had to supplement the financial assistance that they would receive from the NIS. One hundred and eighteen of 136 student respondents – 87 percent of the total – indicated that they had received financial aid to attend the meeting. About 92% of those who received funding indicated that they would not have been able to attend if travel funds were not available. Only 13% of the respondents indicated that they did not receive any

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travel assistance. Dropping out from the meeting or not attending the meeting was attributed to the length of the conference which created conflicts with a range of academic obligations, family obligations and other commitments. One student cited that his peers did not attend the meeting because it was too much time away from school and that some students could not afford being away from school for that long. Some students cited scheduling conflicts, blamed poor attendance on the overlap between attending other conferences and mid-terms/ exams. Nineteen students suggested that information about the conference might not have been readily available or there was a lack of communication regarding the conference. A few respondents blamed non-attendance of fellow students on non-membership to either BKX nor NIS. (They were “not a member of BKX/NIS”), suggesting that organizers, advisors, and meeting planners continue to face a challenge in disseminating accurate information about the meeting.

**FACULTY:** The 19 faculty members who completed and returned their exit evaluation questionnaires included 9 men and 10 women. There were 11 biologists, 1 in education leadership, 1 bioinformaticist, 1 mathematician, 1 physicist, 2 chemists and 2 did not identify an area of expertise. Their affiliations were with the University of the District of Columbia, Virginia Union University, and North Carolina A&T University ; Fort Valley University State (4), Bennett College, and Prairie View University and Alabama State University (2 each). Two chose not to cite their school affiliations.

Twenty six percent of the faculty respondents were members of BKX, 5% were members of NIS, 53% belonged to both organizations while 16% had no affiliation to either organization. Sixteen of the 19 faculty members had attended at least one Joint Annual Meeting previously. They valued the meeting most for the opportunity and exposure to new ideas and information. In contrast to the previous years faculty were very much interested in socializing. Fifty seven percent of faculty received financial assistance to come to the meeting and all those who received assistance said they would not have been able to participate otherwise.

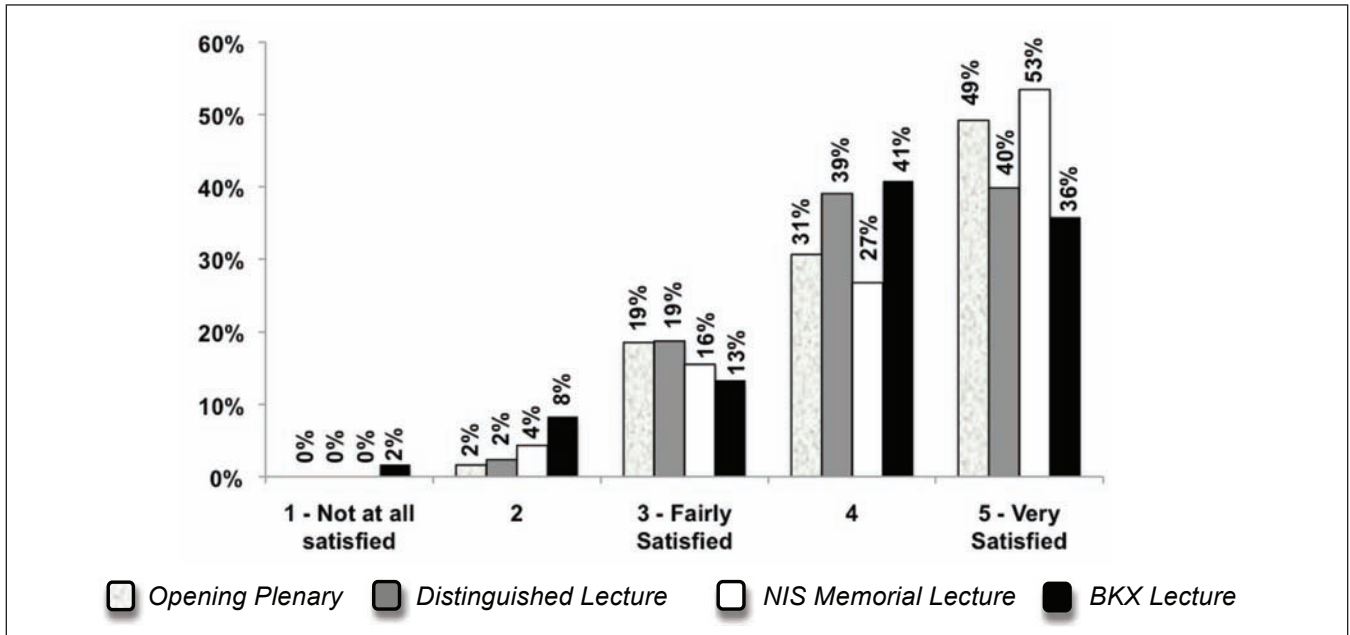
## **Part II: Session Assessments**

Many of the respondents enjoyed several sessions/activities of this year’s meeting. Many cited that they had a favorite session. Six out of ten identified at least one “favorite” session. The invited speaker events that received the most “favorite” mentions were the events with the highest attendance from both faculty and students (**Fig. 5**). This year the most favorite session in the invited speakers category was the NIS Memorial Lecture titled “The HeLa Saga” which highlighted the story behind “HeLa cells”, a cell line that was derived from cervical cancer cells in 1951 from Ms. Henrietta Lacks. This cell line became one of the most important tools in medical research. The ethical and legal issues that has been raised since the publishing of biography of Henrietta Lacks in the 2010 book, “**The Immortal Life of Henrietta Lacks**”, by Rebecca Skloot were discussed during this session and additional issues such as who owns the rights to ones cells, right of information, informed consent, business profiteering and, medical apartheid among others will be discussed. The opening plenary lecture by Dr. James Hildreth, Dean, University of California–Davis College of Biological Sciences was rated the next best. Dr. Hildreth’s area of expertise is how the human immunodeficiency virus (HIV) enters cells and causes infection and he has been involved with developing “chemical condoms” to block HIV transmission and thereby blocking infection. Respondents felt like his lecture was intriguing, stimulating and, informative.

Among the “favorite” activities was the very well-attended undergraduate/graduate student oral and undergraduate poster presentations (**Fig. 6**). The Undergraduate/Graduate Presentations (oral presen-

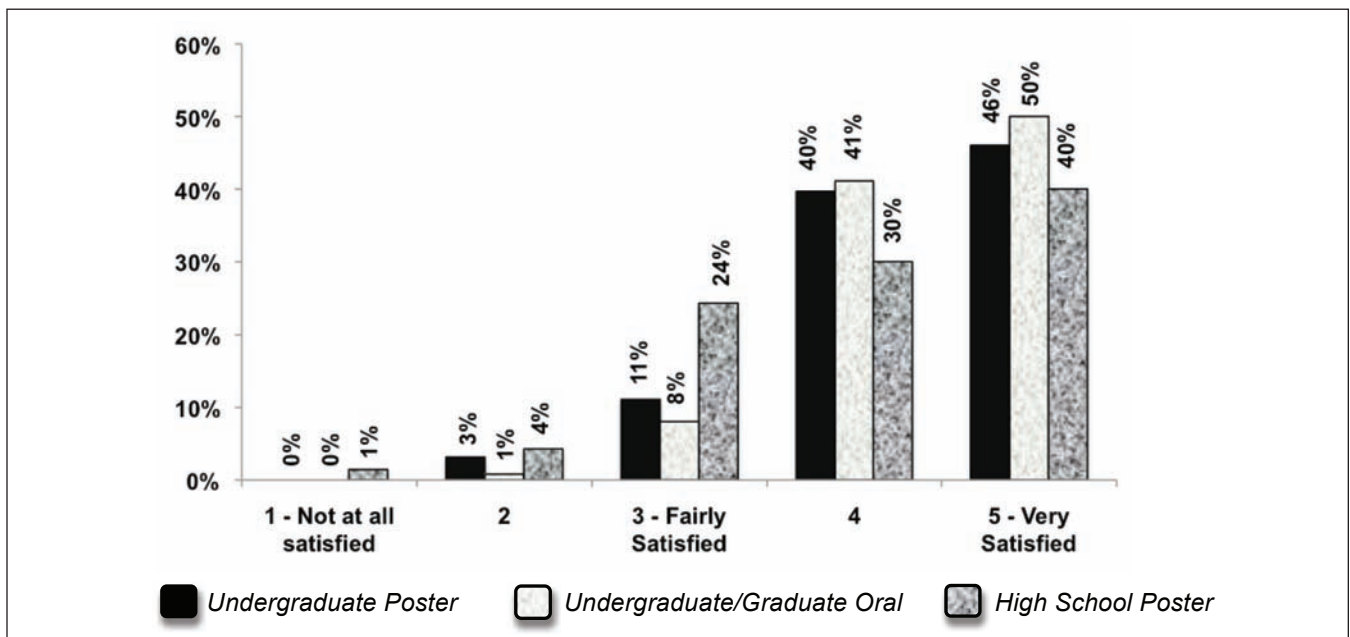
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**Figure 5: Ratings of the various Invited Speaker Sessions**



tations) session received the highest number of favorable mentions (50% were highly satisfied and 41% were well satisfied). Many felt that this was the true reason why they were present at the meeting. This activity was given the highest rating by individual respondents, (particularly undergraduate students) and faculty members who had prepared these students to make their presentation. Respondents expressed great satisfaction with this event since the vast majority of the meeting attendees are undergraduates and listening to their peers was very valuable for their own self assessment.

**Figure 6: Ratings of the various Student Sessions**

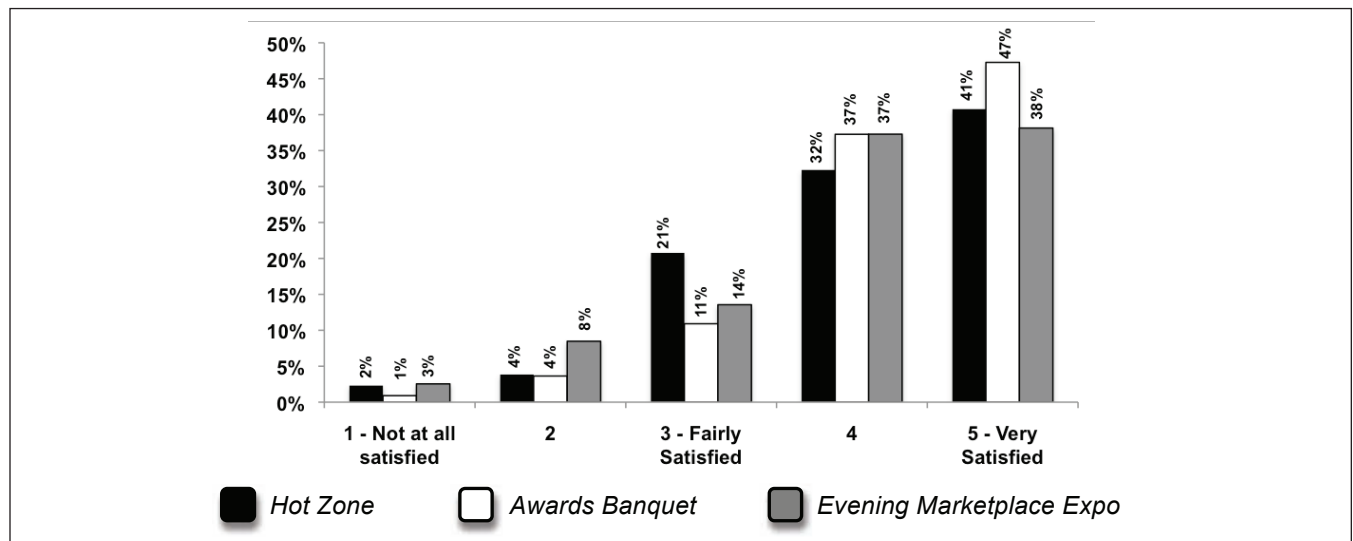


Students enjoyed presenting at the both the platform and poster sessions while the faculty members felt satisfied in their students successes. The Undergraduate Presentations received the highest individual satisfaction scores. Graduate students gave some of their highest marks to the Graduate Symposia, which focused on their work.

While the High school poster session may not garner the highest approval rating among the attendees (70%), it is certainly a science enrichment program for the local schools in the city where the Joint Annual Meeting is held. A unique feature of the NIS/BKX Joint Annual Meeting is its multi-prong Science Enrichment Component. It is also an annual national scientific forum that incorporates this type of component, that at its core, is community service and outreach. One of the 'prongs' of this component is the High School Poster Competition. The competition has been a standard feature of the Joint Meeting for the past five years. High School students (and sometimes middle school) in the city/town of the Joint Meeting's host school(s) are invited to compete in the session where students can present a poster of their current science projects or one previously prepared or presented at a science fair competition or other forum. The students are judged by separate criteria from that used to judge college students. The top placing high school posters receive a certificate and monetary awards. The teacher who brings the most presenting students also receives an award and recognition for his/her efforts.

According to the completed exit evaluation forms (the only one given out during this meeting) at the Awards Banquet), the next most favorite activity was the Awards Banquet itself and the social hour following it. Every respondent cited that they enjoyed the awards banquet and that they were extremely satisfied with it. Senior-year students gave this event their second highest rating. A highly rated component at the Awards Banquet was the lecture by Dr. George Hill, Assistant Vice Chancellor for Multicultural Affairs & Special Assistant to the Provost & Vice Chancellor for Health Affairs, Vanderbilt University Medical Center, Nashville, TN. The event received a 84% moderate to very satisfactory rating from all groups which was higher than the 49% approval rating from last year (**Fig. 7**). The students enjoyed the social hour that included karaoke and dancing following the awards banquet. In previous Joint Annual Meetings, first- and second- year students tended to give exhibitors lower ratings than other attendees. This year however, the evening marketplace expo received a 75% satisfactory rating (an all time high)

**Figure 7:** Ratings of Hot Zone, Awards Banquet and Evening Marketplace Expo events



which was much higher than the previous year's 48% rating. This year's freshmen and sophomores appeared to be interested in more information about future career and graduate school possibilities to plan ahead for their long term decisions in these distressed times. This may have been a compounding factor in the satisfactory ratings (**Fig. 7**) obtained regarding the marketplace expo event.

Positive feedback obtained regarding the marketplace expo event indicated that most participants felt satisfied that they had the opportunity to meet other graduates and undergraduates from various institutions and were able to be kept informed of the many great opportunities that could further their academic future. The students also indicated that they could mingle and network with their peers in a relaxed atmosphere. Therefore the overall satisfaction for this event was very high.

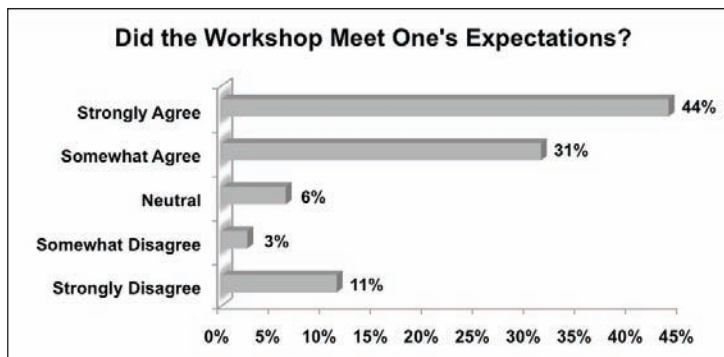
### Workshops

Seven workshops were held at the 69th Joint meeting and included the following: (1) **Expanding your Global Horizon** (*Lisa D. Cain, PhD., University of Texas Medical Branch (UTMB) at Galveston*); (2) **Applying to Graduate School: How to Get in and Stay in: Preparing for Success in the Graduate School Application Process** (*Rochelle L. Woods, PhD, Office of Academic Multicultural Initiatives, University of Michigan*); (3) **Designing Effective Technology Enhanced Courses** (*Sajid Hussain, PhD, Department of Business Administration, Fisk University*); (4) **Community Based Participatory Research on Health Disparities, A Mechanism for Instituting Service Learning Initiatives** (*Linda H. McClellan, MPH, HBCU Wellness Project of Meharry Medical College*); (5) **The GRE & MCAT Prep Exams** (*Andrew McGarrity, Business Development Manager Kaplan Test Prep Center, Nashville*); (6) **Study Techniques for Colleges Success** (*Rosie Sneed, PhD., and Karen Redden, PhD., Department of Biology, University of the District of Columbia*); (7) **Basic Geographic Information Systems (GIS): Overview for Cancer related Issues** (*Darlette Meekins, Analyst/Cartographer, Virginia Department of Transportation*).

Amongst the workshop student attendees 59% were Biology, 14% Chemistry, 9% Psychology and 5% dual majors. 1% had not yet declared their major and 2% gave no response. The bulk of the student attendees were juniors (30%) and seniors (38%). Faculty attendees and sophomores contributed 9% each, Graduate students 5% and others 2%. At least 89% of the registrants attended most of the workshop session and 83% agreed that that the presenters knew their subject. 75% of the workshop participants agreed that they learned from the session that it was very helpful to have attended the workshop and that it met with their expectations (**Fig. 8**).

Generally, respondents agreed that the Opening Plenary speech given by Dr. James Hildreth and at the Awards Banquet by Dr. George Hill were excellent. The BKX Lecture by Dr. Henry Moses received a

**Figure 8:** Ratings of the different workshops offered and whether it met with the participants expectations





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satisfactory rating too. While the Undergraduate Presentations were the most popular the overall rating of the meeting was at its all time high at 86%. In general, students were also enthusiastic about their own presentation platforms while the faculty gave other events higher ratings than did students. There are discrepancies among the choice of the favorite component and their rating of individual components. Although few considered the Award's banquet as their favorite, it received a very highly rating and in contrast while the undergraduate presentations received high ratings, few considered it as a favorite. Students across the board rated the overall Joint Annual Meeting much higher than they did last year, moving from high 4s (well satisfied) to low 5s (very satisfied). Faculty members continued to give the overall Joint Annual Meeting a high rating.

There were several comments with a negative impact. Of note was the concern about the quality of food served. Many felt that the quality of food provided was inadequate. Others concerns cited that the hotel should have offered free or continental breakfast, while others suggested picking venues that offered free breakfast. Another complaint was the lack of adequate funding especially for international students. A few attendees complained about the lack of innovative and interesting speakers. Some suggested that the speakers should be more motivational and offer varied information instead of being purely scientific.

Time management at the conference was an issue that produced several comments especially regarding starting events on time, having too many packed sessions and not enough free time at the end of the evening, waiting time for posters to be judged, hour long dinners and talks, ending the sessions/workshops on time. Once again, many attendees had complaints about the limited time they felt they had to network and socialize. Those who found exhibitors that matched their field of interest generally rated them highly while those that did not, requested alternate exhibitors in their field of study and gave this event a lower rating. Since the joint annual meeting is always hosted by an HBCU in a historic place there were many requests that the meeting take advantage of the local color and locale by offering a tour of the city/historical landmarks as part of the meeting agenda. The students were dissatisfied by the judging process in both oral and poster presentations. Some suggestions were that judges not interrupt presenters during their presentation but asking the questions at the end of their talks, to better organize judges so that all students are judged by individuals knowledgeable in their field and to have better judge selection.

### **Recommendations to improve the Meeting overall:**

**Have both faculty advisors (prior to travel) and the meeting chairperson in the opening plenary session explain to the students the objectives of a scientific meeting.** Many students felt that a major component of the meeting was to socialize with other students even at the expense of having fewer scientific sessions. It should be clarified to the students that the objectives of the meeting is to network with experts in the field, become informed about STEM and STEM careers, and not just socialize. The objective(s) of the meeting is to lay the foundation for a future scientific career, learn how to present one's work, and show a willingness to be critiqued by experts in the field, thus learning the fundamentals of scientific conduct and having fun at the same time.

**Efficient time management.** Respondents noted that when the meeting schedule was jam-packed and that when one session ended late, it affected every event that followed. When time management is lax attendees started assuming that timed events were meaningless. There should be enough built-in

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lag time between events so that tight schedules can be adhered to with ease and punctuality. A ten minute break during the morning and afternoon session should be discussed for future meeting planning.

**Better compliance in filling out evaluation/exit surveys.** Given that there were 488 participants only 136 turned in the evaluation forms. This does not provide reliable data in terms of participants expectations and requirements in planning future meetings. Alternate methodology for data collection at a couple of points must be implemented (where data can be collected in a systematic and mandatory manner) without overwhelming the meeting attendees with repetitive surveys.

**More unified judging process.** It has always been a problem to assess the judging process at each session. While some judges tend to mark the speakers with very high scores, some tend to always give poor scores. Comparing judges scores from 4 different biology sessions for example is always confusing because based on the judges scoring system a session may not have any winners at all when all 4 sessions are combined for awards. A more unified judging process must be devised to prevent resentment and discontent among students.

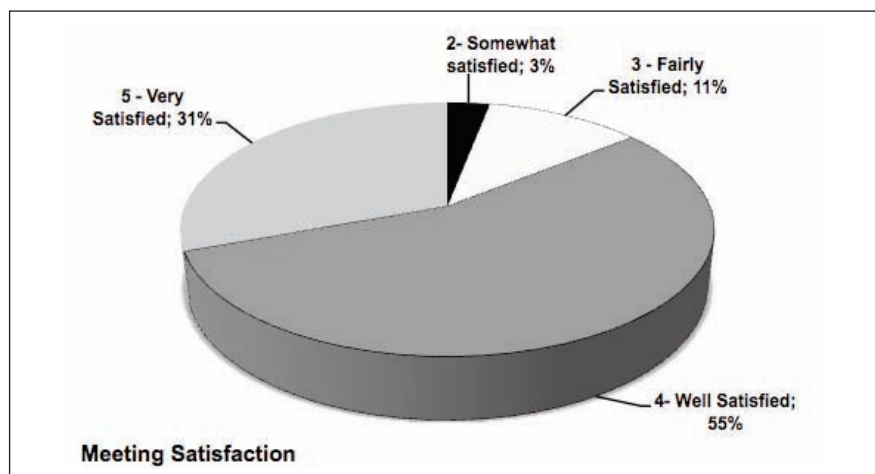
**Provision of meals.** While it is not possible to please all palates, it should be possible to provide fewer choices but better quality of food at the meeting venue. It also may not be possible to always pick hotels that provide free breakfasts since only smaller hotels or hotels in smaller towns tend to do that. In addition, with the meeting getting bigger every year, the requirement for larger capacity hotels has become a necessity.

#### **Part IV: Overall Meeting Assessment**

##### ***Did the 69th Joint Annual Meeting meet the objectives?***

The overall rating of the 2012 meeting was excellent. Eighty six percent of respondents rated the meeting as a 4 or 5 on a 1-to-5 scale, where 5 means “very satisfied,” 3 means “well satisfied,” and 1 means “very dissatisfied” (**Fig. 9**). The 86% is up from the 82% rating given in 2011 which is only a marginal increase. Eleven percent gave the meeting a 3 (fairly satisfied). About 3% rated the meeting at 2 (somewhat satisfied) and none at 1 (not all satisfied).

**Figure 9:** Overall satisfaction rating of the 69th joint annual meeting



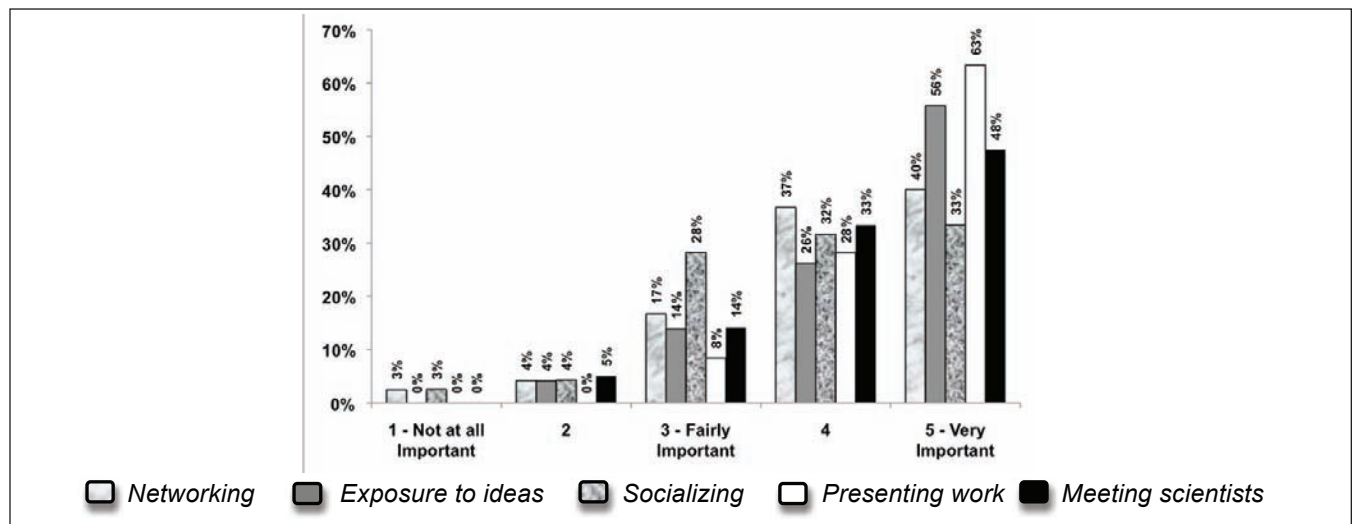
**Objective 1: To provide an avenue for the exchange of information through scientific sessions that informs participants about current scientific advances in the STEM fields.**

- Participants were requested to fill out a questionnaire about their expectations for the meeting and later had to respond as to whether those expectations were met from a scale of 1-5 where 1 was not important while 5 was very important.
- Research related to science and technology was the subject of invited lectures, as well as student presentations. Overall attendance at these sessions ranged from 75% at the various lectures and Awards Banquet to 98% percent at the Student Presentations. Faculty attendance ranged from 50% at the Awards Banquet to 95% at the Student Presentations.
- Ninety four percent of students cited presenting their work at the meeting and exposure to ideas and information as an important objective of attending the meeting. Of those 91% believed that this objective had been met to their satisfaction.
- Amongst the meeting attendees, 88% had expectations of networking, 79% of meeting distinguished scientists, 95% had expected exposure to new ideas and information and 70% had expectations of socializing at the meeting. The exit evaluations showed that 91% of the attendees indicated that their expectation of networking had been achieved, 81% indicated that they had been able to meet distinguished scientists and were exposed to new ideas and, 65% had their social expectations met.
- The highest expectation was that of student presentations (>90%) and that was met as indicated by full attendance by both the student population and faculty and the overall rating of those sessions (>90%).

**Conclusion:** The meeting objective was met in all categories.

**Objective 2: To establish a network of students and research professionals to disseminate information about graduate and/or professional schools and internships with a view toward increasing the number of minorities in science.**

*Figure 10: How well the attendees expectations of the meeting were met and its importance*



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- To allow undergraduate and graduate students opportunities for learning and mentoring by attending workshops (or comparable activities), student meetings, and lectures at the annual meeting.
  - The Meeting agenda included numerous lectures, workshops and student presentations. The student presentations and scientific lectures provided ample opportunity for interaction between student presenters and faculty members and other career scientists. Over the course of the meeting there were many informal opportunities for mentoring and exchange of ideas.

**Conclusion:** The Meeting continues to provide opportunities for student mentoring, and the majority of students believed that their mentoring needs were met and they were able to meet with the invited speakers.

**Objective 3: To provide awards and special recognitions for outstanding presentations given by undergraduate and graduate students and high school students**

- More awards were presented for excellent presentations at the 69th Joint meeting than at any previous meeting. Students gave the Undergraduate Presentation (Oral and poster) sessions a very high rating. Feedback on the exit evaluation forms included, perhaps unavoidably, a few complaints about the judging.
- High School students who are part of the meeting outreach program also received awards for exceptional posters during the Joint Annual Meeting (please see details in the next section under objective4).
- The Awards Banquet earned among the highest satisfaction rating of any invited speaker session at the Meeting from both students and faculty.

**Conclusion:** This objective was met.

**Objective 4: To form bonds between host institutions and the surrounding communities including school systems (public and private) in order to promote scientific literacy and scientific studies among youth, especially minorities.**

- The number of high school students attending the meeting was over one hundred. Different schools from the Nashville area were represented.
- The high school component of the meeting outreach also presents awards. The top placing high school posters receive monetary awards, provided by the National Institute of Science and in addition the winners get recognized at the Awards Banquet and are invited to attend this event, with an accompanying parent or teacher, as a guest of the Joint Meeting. The teacher who brings the most presenting students also receives an award and recognition for his/her efforts. Participating students and teachers also receive the conference bag, meeting program book and a certificate of participation.
- Ninety-five percent of the high school students indicated that it was a major learning experience.
- One hundred percent of the attendees cited that they would like to attend another Joint Annual Meeting and make a presentation.

**Conclusion:** This objective was met.

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# Meeting **Announcements**

## **MEETING ANNOUNCEMENT**

The 71st Joint meeting of NIS/BKX will be hosted during Spring 2014 at a venue yet to be determined (look for the announcement in the meeting website [www.nisbkxmeeting.org](http://www.nisbkxmeeting.org) in Fall 2013).

## **STUDENT TRAVEL GRANT**

The National Institute of Science provides travel grants for science students and faculty to present research papers at the Joint Annual Meeting of NIS/BKX. Applicants must be members of NIS or BKX to be eligible for the award. Awardees will be selected on the basis of their qualifications, references from mentors, and career interests. Preference will be given to authors of abstracts submitted prior to presenting research at the Annual Meeting. Please be informed that the **NIS Travel Awards** can provide only **PARTIAL** funding for student travel/lodging to this meeting. The number of students requesting funding is growing faster than NIS resources. Each school may be responsible for funding as much as two-thirds of the expense of the trip.

Travel funds request for each school will be sent to the NIS or BKX mentor. The travel award will be sent to the schools faculty sponsor or representative. Hotel reservations, registration fees and hotel accommodations are the responsibility of the awardee school/faculty sponsor.

Students are expected to attend the entire conference a minimum of four days. If accepted, students are expected to arrive in time to attend the Opening Plenary Session, at least two workshops, distinguished lectures, the Memorial Lecture, student meetings, and visit the exhibit hall.

## **AWARDS**

The Joint Meeting sponsors a Graduate Symposium (Graduate Sessions A and B) for graduate students or young investigators with terminal degrees **within the past two years**, to present their research at the Joint Annual Meeting and an undergraduate poster session. Awards are given for the most competitive presentations. Research areas are in biology, chemistry, environmental science, physics, computer science, mathematics, science education, engineering, earth sciences and psychology.

## **GRADUATE SESSION A**

In order to participate in Graduate Session A an abstract and a manuscript must be submitted prior to making the presentation at the Joint Annual Meeting. Graduate Session A manuscript (Microsoft Word) must include an introduction, materials and methods, results and discussion, illustrations, and references and e-mailed **ONLY to [webmaster@nisbkxmeeting.org](mailto:webmaster@nisbkxmeeting.org)**. The entire manuscript should not to exceed 5 typed pages (8.5 x 11"). The abstract and manuscript must be camera ready. The manuscript will be reviewed and evaluated by two scientists prior to the meeting. Winners in Graduate Session A will have their manuscripts published in the next "Transactions" journal after making revisions suggested by the reviewers. Approximately, ten participants will be selected for oral presentations in Session A. Selected individuals will be eligible for the Graduate Presentation A award which will be based on evaluation of the manuscript including the abstract and oral presentation.

## **GRADUATE SESSION B**

For **Graduate session B**, only an abstract must be submitted. Separate awards will be made for Graduate Session B based on the written abstract and oral presentation.

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## | MEETING ANNOUNCEMENTS

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**NOTE:** Individuals who wish to be considered for Graduate Sessions A or B or the undergraduate oral or poster session should submit an abstract **electronically** at the web site URL (**[www.nisbkxmeeting.org](http://www.nisbkxmeeting.org)**) that will be found in the 2010 announcement booklet.

### **UNDERGRADUATE ORAL SESSION**

For the **Undergraduate oral session**, only an abstract must be submitted by the due date. Awards will be based on the oral presentation during the meeting.

### **UNDERGRADUATE POSTER SESSION**

For the **Undergraduate Poster Session** only an abstract must be submitted by the due date. Awards will be based on the poster presentation during the meeting.

**NOTE:** Graduate students are **NOT ELIGIBLE** to present posters.

### **ABSTRACT SUBMISSION INFORMATION**

**No abstracts will be accepted by e-mail. All abstracts must be submitted ONLY through the meeting website [www.nisbkxmeeting.org](http://www.nisbkxmeeting.org)**

### **NIS would like to hear from you**

Write or e-mail comments, opinions or suggestions to the Transactions Editor Dr. Nithya Raghavan (raghavan.nithya@gmail.com) or the Conference Director Dr. Carolyn Cousin (ccousin@udc.edu). If you need information on how to start a new NIS chapter in your school, please contact Ms. Kim Fenwick at the address given below to get your starter kit. Additionally, let us know about the NIS Chapter activities you plan during the year. Other chapters may generate ideas from your plans for use in a unique setting. NIS Chapters need to maintain contact throughout the year.

## **Contact information on NIS activities**

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69th Joint Annual Meeting of the NIS, BKX  
Nashville, TN ~ March 2012

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