WELCOME FROM THE PRESIDENT

I am pleased to welcome you to the Nineteenth Annual Symposium of the Association of Computer Information Science and Engineering Departments at Minority Institutions (ADMI) as we celebrate our 25th Anniversary. The theme of this year’s conference is *Surfing Through A Sea of Data*. We are extremely excited about this conference because we will host our first Cybersecurity Challenge. For the next two days ADMI will continue our long tradition of showcasing faculty and student research. There will be multiple opportunities for networking, hands-on workshops, and special sessions. Again this year, we focus on graduate education by offering a Graduate School Recruitment Fair. Please refer to the Schedule at a Glance and take advantage of all of our intellectually stimulating activities.

The ADMI Board of Directors would like to thank our symposium sponsors and speakers for their generous support. We also extend a special thanks to the Symposium and Local Arrangements Committees for their untiring labor to make this conference a great success.

We hope you find this conference both interesting and energizing and that you enjoy meeting up with old friends and making new contacts. We look forward to receiving your feedback on this conference and to seeing you again at ADMI 2015!

WELCOME TO ADMI 2014!

Thanks for joining us,
E. Rebecca Caldwell, Ph.D.

SYMPOSIUM COMMITTEE
Dr. Thorna Humphries, Norfolk State University, Co-Chairperson
Dr. Jean Muhammad, Hampton University, Co-Chairperson
Mr. Timothy Holston, Mississippi Valley State University, Poster Chairperson
Dr. Elva Jones, Winston Salem State University
Ms. Christy Chatmon, Florida A&M University

LOCAL ARRANGEMENTS CHAIRS
Dr. Linda Hayden, Elizabeth City State University, Chairperson
Dr. Thorna Humphries, Norfolk State University

Cybersecurity Challenge Committee
Dr. John Sands, Moraine Valley Community College
Ms. Christy Chatmon, Florida A&M University
Dr. Thorna Humphries, Norfolk State University
### Symposium at a Glance

**Thursday, April 3, 2014 – Westin Virginia Beach Town Center**

<table>
<thead>
<tr>
<th>Time</th>
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<tbody>
<tr>
<td>5:00-7:00 pm</td>
<td>ADMI Board Meeting/Dinner</td>
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<tr>
<td>6:00-7:00 pm</td>
<td>Registration</td>
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**Friday, April 4, 2014 – Westin Virginia Beach Town Center**

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
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<tbody>
<tr>
<td>7:30-8:15 am</td>
<td>Breakfast</td>
</tr>
<tr>
<td>7:00-7:00 pm</td>
<td>Registration</td>
</tr>
<tr>
<td>8:30-8:45 am</td>
<td>Welcome</td>
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<tr>
<td>8:45-9:30 am</td>
<td>Keynote</td>
</tr>
<tr>
<td>9:30-10:30 am</td>
<td>Faculty Session</td>
</tr>
<tr>
<td>10:30-10:45 am</td>
<td>Break</td>
</tr>
<tr>
<td>10:45am -12:30pm</td>
<td>Faculty Session</td>
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<tr>
<td>12:30-2:00 pm</td>
<td>Luncheon</td>
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<tr>
<td>2:00-2:30 pm</td>
<td>Break</td>
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<tr>
<td>2:30-5:00 pm</td>
<td>Faculty Session</td>
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<tr>
<td>3:30-3:45 pm</td>
<td>Break</td>
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<tr>
<td>5:00-7:00 pm</td>
<td>Graduate and Job Fair</td>
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<tr>
<td>6:00-7:30 pm</td>
<td>Reception</td>
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<tr>
<td>7:30-10:30 pm</td>
<td>Beach Excursion</td>
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## Symposium at a Glance

**Saturday, April 5, 2014 – Westin Virginia Beach Town Center**

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<tr>
<td>7:30-8:30 am</td>
<td>Breakfast</td>
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<tr>
<td>8:30-10:30 am</td>
<td>Joint Session (Dr. John Sands, Moraine Valley Community College)</td>
<td>(Monarch 3)</td>
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<tr>
<td>10:30-10:45 am</td>
<td>Break</td>
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<tr>
<td>10:45-12:15 pm</td>
<td>Student Poster Session</td>
<td>(Monarch 4 and 5)</td>
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<tr>
<td>12:30-2:00 pm</td>
<td>Luncheon (Dr. Andrea Lawrence, Title: History of ADMI -25th Anniversary)</td>
<td>(Monarch 3)</td>
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<tr>
<td>2:00-2:30 pm</td>
<td>Break</td>
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<tr>
<td>2:30-3:30 pm</td>
<td>Joint Session (David Nelson-VMware)</td>
<td>(Monarch 3)</td>
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<tr>
<td>3:30-4:00 pm</td>
<td>Break</td>
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</tr>
<tr>
<td>3:45-5:30 pm</td>
<td>Undergraduate Student Papers</td>
<td>(Monarch 3)</td>
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<tr>
<td>6:30-8:00 pm</td>
<td>Banquet and Awards Ceremony</td>
<td>(Monarch 3)</td>
</tr>
<tr>
<td>8:00-9:30 pm</td>
<td>ADMI Board Meeting</td>
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<tr>
<td>8:00-10:00 pm</td>
<td>Free Time</td>
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In early 2010 the National Institute of Standards and Technology (NIST) was selected as the lead agency for the National Initiative for Cybersecurity Education (NICE) and they identified Dr. McDuffie to be the Lead of this important National Initiative. In his previous position he had been appointed the Associate Director of the National Coordination Office (NCO) for Networking and Information Technology Research and Development (NITRD) in February 2008. Prior to joining the NCO, Dr. McDuffie served as the Deputy Director of the Office of Naval Research (ONR) – Science and Technology for America’s Readiness (N-STAR) Initiative. He also served as the Lead Program Director for the Federal Cyber Service: Scholarship for Service (SFS) Program at the National Science Foundation (NSF). He was an Assistant Professor at Florida State University in the Department of Computer Science where he taught both graduate and undergraduate courses in CS for seven years. Dr. McDuffie received his Ph.D. and M.S. degrees in Computer Science from the Florida Institute of Technology in Melbourne, Florida.

Dr. John Sands has been a professor of Information Technology at Moraine Valley Community College for 27 years. He also serves as the department chairperson for the Integrated Computer Technologies Department. John is the co-Principal Investigator of the Center for Systems Security and Information Assurance. He has his Ph.D. from Colorado State University School of Education and a MA from Governors State University. Dr. Sands has also been awarded several academic awards including Innovator of the Year and Master Teacher. Dr. Sands holds several industry certifications including CISSP, CCIA, CCNP, MCSE, and CCNA. He has also authored several textbooks, white papers and lab manuals and has been invited to speak at many national conferences. Dr. Sands has managed the creation and use of virtual teaching and learning environments to expand student experiential learning opportunities at a national level.
Dr. Richard Loft of the National Center for Atmospheric Research, has worked in high performance computing since joining Thinking Machine Corporation in 1989, and has worked at the National Center for Atmospheric Research (NCAR) since 1994. At SC 2001 he was on a team that received a Gordon Bell prize honorable mention for developing a scalable atmospheric dynamical core called the High Order Method Modeling Environment (HOMME), which was recently integrated as part of the widely used Community Earth System Model. In 2005, he was NCAR PI on an NSF project to deploy and evaluate ultra-scalable models on an IBM Blue Gene/L system. Dr. Loft is currently Director of the Technology Development Division (TDD) in the Computational and Information Systems Laboratory (CISL) at NCAR. In this capacity, he oversees CISL’s R&D efforts, in areas such as applied computer science, visualization and enabling technologies, and earth system modeling infrastructure. He leads NCAR’s participation in NSF’s Extreme Science and Engineering Discovery Environment (XSEDE) program, the follow-on to the decade-long TeraGrid project. Recognizing the need to engage the next generation in high performance computing, in 2007 Dr. Loft created the Summer Internships in Parallel Computational Science program at NCAR, and is currently developing an HPC curriculum based on small, affordable Raspberry Pi clusters.

Kim Yohannan is responsible the EMC Academic Alliance program in North America. Previously, she managed the global EMC Centera ISV Partner Program. Before EMC, she worked at Xplana Learning, an educational software company, as their Senior Director of Operations and at Nortel Networks where she was part of the certification exam team and was responsible for the NetKnowledge Program which provided curriculum to academic institutions. Before Nortel, Kim spent seven years as a primary school teacher with a focus in English as a Second Language (ESL).
ADMI WORKSHOP PRESENTERS

David Nelson is responsible for the VMware IT Academy Program and facets of the VMware Academic Program as well as eLearning and Business Development for Education Services. Previously, he was responsible for Sun Microsystems's Technology & Academic Resources philanthropic programs and prior to that was a Sr. Director responsible for Content Development, the Sun Educational Services business in Europe, Middle East and Africa and earlier for North America and Australia Educational Services. In addition, Mr. Nelson serves on the CompTIA Certification Advisory Council. Mr. Nelson has an MBA from Syracuse University with over 40 years of software development and customer service management experience in the computer industry.

David Nelson
IT Academy Program
VMware

Dr. Ted Mims has over forty years of successful experience as a teacher and administrator. He serves as Chair of the Computer Science Department at the University of Illinois at Springfield. In August of 2003, he was promoted to the rank of professor. Recently, his focus has been on providing leadership for the Computer Science Department as enrollments have increased. Dr. Mims is a successful teacher and administrative leader. His success is documented by the recognition he has received from local, state and national organizations. He has served as an external evaluator for associate, bachelor's and master's degree programs. In 2003, he was selected to serve as a Co-Principal Investigator (Co-PI) on the $2,997,615 NSF/ATE funded Regional Center for Systems Security and Information Assurance (CSSIA) grant that was renewed for an additional four years in 2006. He continues to serve as a CSSIA Co-PI on the $1,877,252 newly funded NSF/ATE grant for the National Resource Center for Systems Security and Information Assurance.

Dr. Ted Mims
Chair of the Computer Science
University of Illinois at Springfield
Dr. Cheryl Seals is an Associate Professor in the Computer Science and Software Engineering Department at Auburn University. Dr. Cheryl Seals is an assistant professor in Auburn University's Department of Computer Science and Software Engineering. She received her B.S. from Grambling State University, M.S. from North Carolina A&T State University and Ph.D. from Virginia Tech with all of her degrees in the area of Computer Science. Dr. Seals studies the area of novice programmers utilizing visual programming techniques, user interface design projects to improve interaction design, and game design & development and the dimensions games can add to computer literacy. She has a vested interested in programs that are community centered, increase diversity in technology, and targeted at helping today's youth strive for a better tomorrow. She continuously works with programs that provide computer interventions for students in the elementary, middle and high schools in the local area.
# Undergraduate Papers

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<thead>
<tr>
<th>Author</th>
<th>Title</th>
<th>Institution</th>
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<tbody>
<tr>
<td>1 Bernard Aldrich Jr.</td>
<td>Implementing a Snake Tool to Track the Ice Surface and Ice Bottom in a Radar Echogram</td>
<td>Jackson State University</td>
</tr>
<tr>
<td>Kyle Purdon</td>
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<tr>
<td>2 Danielle Butts</td>
<td>Design of a Comprehensive Tool to Decrease Public Access to Private Social Network Accounts</td>
<td>Norfolk State University</td>
</tr>
<tr>
<td>3 Jazette Johnson</td>
<td>Designing a Mobile Application to Assist Caregivers of Dementia Patients</td>
<td>Spelman College</td>
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<tr>
<td>4 Ifeanyi R. Onyenweaku</td>
<td>Big Data X-Informatics MOOC: Research into increasing the efficacy of this Massive Open Online Course</td>
<td>Mississippi Valley State, Elizabeth City State, Indiana University</td>
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<tr>
<td>Ya’Shonti Bridgers</td>
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<tr>
<td>Sidd Maini</td>
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<tr>
<td>5 Brandi Smith</td>
<td>Using Geometer’s Sketchpad to Draw 2D Fractals</td>
<td>Mississippi Valley State</td>
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<tr>
<td>6 Maya Smith</td>
<td>Analysis Functionality to enhance MATLAB default interpolation schema using mgstat</td>
<td>Winston-Salem State</td>
</tr>
<tr>
<td>7 Tori Wilbon</td>
<td>Update of the CERSER TeraScan Cataloguing System and the TeraScan Image Processing Scripts</td>
<td>Elizabeth City State</td>
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<tr>
<td>Derek Morris</td>
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<td>Jefferson Ridgeway</td>
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# Graduate Papers

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<tr>
<th>Author</th>
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<tbody>
<tr>
<td>1 Vikasini Chandrashekar</td>
<td>An Experience of Using Open Source Software (OSS) Seed for Student Development Project</td>
<td>Jackson State University</td>
</tr>
<tr>
<td>Author</td>
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<tr>
<td>1  John Angel</td>
<td>Comparative Review of the ECA and SMS Recycling Tools</td>
<td>Morehouse College</td>
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<tr>
<td>2  Robertson Bassy</td>
<td>Utilizing Embodied Conversational Agents for College Writing Labs</td>
<td>Morehouse College and Spelman College</td>
</tr>
<tr>
<td>Latecia McCauley</td>
<td></td>
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<tr>
<td>John Porter III</td>
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<tr>
<td>3  David Cherry</td>
<td>RVO Collision Avoidance in Unity 3D</td>
<td>Morehouse College, University of Minnesota</td>
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<tr>
<td>Stephen J. Guy</td>
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<td>Karamouzas, Ionnis</td>
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<tr>
<td>4  Darrion Crenshaw, Diego</td>
<td>3DP Autonomous Pet Feeding Robot</td>
<td>Hampton University</td>
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<tr>
<td>Santos</td>
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<tr>
<td>Deanna Reid</td>
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<tr>
<td>Paulo Minor</td>
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<tr>
<td>5  Donquel Davis</td>
<td>Estimating Surface and Bedrock layers in Polar Radar Imagery using</td>
<td>Winston-Salem State University and Spelman College</td>
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<tr>
<td>Dorias Brown</td>
<td>Active Contours</td>
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<tr>
<td>Zazie Lumpkin</td>
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<td>6  Ricky Dixon</td>
<td>Using Common Core State Standards of Seventh Grade Mathematics in</td>
<td>Mississippi Valley State University and Elizabeth</td>
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<td>Malcolm McConner</td>
<td>the Application of NXT LEGO® Robotics for CReSIS Middle School</td>
<td>City State University</td>
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<tr>
<td>Jessica Hathaway</td>
<td>Students</td>
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<tr>
<td>7  Antonio Guion</td>
<td>Configure and Customizing the HUBzero User Experience</td>
<td>Elizabeth City State University</td>
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<tr>
<td>Tatyana Matthews,</td>
<td></td>
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<tr>
<td>Nigel Pugh</td>
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<tr>
<td>8  Troy Hill</td>
<td>Leveraging the Cloud to Provide Web Access for A Simulator In A</td>
<td>Winston-Salem State University</td>
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<tr>
<td></td>
<td>Google Hangout Application</td>
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<tr>
<td>9  Dominique Hubbard</td>
<td>Designing Mobile Security Hands-on Labs Using a Virtual Environment</td>
<td>Florida A&amp;M University</td>
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<td>10  Marlena Ivory</td>
<td>Scientific Rocket with Terrain Classification Payload</td>
<td>Florida A&amp;M University</td>
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<td>11  Jerron Jamerson</td>
<td>Using Simulation in Robotic Path Design</td>
<td>Winston-Salem State University</td>
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<td>12  Marvin Turner, Johnathan</td>
<td>Designing Mobile Security Hands-on Labs Using a Virtual Environment</td>
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<td>Johnson, Akin Oladele</td>
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<tr>
<td>13  John Lewis</td>
<td>Android and iOS Application- Teaching Shapes and Colors</td>
<td>Jackson State University</td>
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<tr>
<td>Ayo Olutade</td>
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<tr>
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<tr>
<td>Kalyx McDonald, Courtney Farmer, Je’aime Powell</td>
<td>TeraScan Curriculum Development and Integration of SeaSpace Technology into the Classroom</td>
<td>Mississippi Valley State University and Elizabeth City State University</td>
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<td>John Porter, III, David Cherry</td>
<td>Spiritual Counseling for College Students Using Embodied Conversational Agents</td>
<td>Morehouse College</td>
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<tr>
<td>Joshua Posey, John Angel</td>
<td>African American Computer Science Graduate Mentoring using Embodied Conversational Agents</td>
<td>Morehouse College</td>
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<tr>
<td>Charles Scott</td>
<td>Adopting Secure Software Development Life Cycle in the Capstone Project</td>
<td>Hampton University</td>
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<tr>
<td>Aaron Smith</td>
<td>Enabling Single Point Data to Track Veteran Activity via Prototype Development</td>
<td>Norfolk State University</td>
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<tr>
<td>Brandi Smith, Andy Perkins</td>
<td>Analysis of Aflatoxin Accumulation in Maize for Gene Expression Prediction</td>
<td>Mississippi Valley State University</td>
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<tr>
<td>Jamal Thorne, Joshua Posey, Austin Tucker</td>
<td>Recruiting Students of Color Through Developing Online Graduate Student Panels</td>
<td>Morehouse College</td>
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<tr>
<td>Arsenio J. Taylor</td>
<td>High Performance Computing at FAMU</td>
<td>Florida A&amp;M Univ.</td>
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<tr>
<td>Nahom Tilahun, Princess Palmer, Andrew Villarrubia</td>
<td>Open Source Components for Building a Learning Environment for Software Development</td>
<td>Jackson State University</td>
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<tr>
<td>Chatavia Vaval</td>
<td>Culturally Sensitive Gaming Application to Increase Security Awareness amongst Middle Age Kids</td>
<td>Florida A&amp;M University</td>
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<td>Stephen E. Virgil Jr.</td>
<td>A Practical Investigation of Mental Health Applications</td>
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<td>Rashad Williamson, Kelechi Onyiriuka, Michael Cobb</td>
<td>Early North Carolina Colonial and Native American GPR Site Survey</td>
<td>Mississippi Valley State University, Elizabeth City State University</td>
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<tr>
<td>Jameelah Young</td>
<td>Psychoacoustics: How Does Sound Make Us Feel, and Why?</td>
<td>Hampton University</td>
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### Graduate Student Posters

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<tr>
<td>1</td>
<td>Jasmine Blunt</td>
<td>Patient Connect</td>
<td>Norfolk State University</td>
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<td>2</td>
<td>Gabrielle Buchanan</td>
<td>HTTPS: Is Your Website Truly Secure?</td>
<td>Hampton University</td>
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<td>3</td>
<td>C. Cameron Peele</td>
<td>Secure Software Development: Security Strength Testing Common E-Commerce Programming Language Combinations</td>
<td>Hampton University</td>
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<tr>
<td>4</td>
<td>Terrence L. Pugh</td>
<td>Utilization of Open Source Tools to Advance Mobile Forensic Curriculum Development</td>
<td>Norfolk State University</td>
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Symposium Presentation Abstracts

Overview of the National Initiative for Cybersecurity Education (NICE)

Presenter: Dr. Ernest McDuffie

This presentation will be an overview of the National Initiative for Cybersecurity Education (NICE). Initiative history, current status, and future directions will be covered along with insight into how cybersecurity education, awareness, training, and workforce development all interact and enable the larger Science, Technology, Engineering, and Mathematics (STEM) education enterprise of this country. A National Cybersecurity Workforce Framework document has been produced as part of this effort and provides the opportunity for the first time to discuss the total cybersecurity workforce using a common language. The ongoing adaption of this document inside and outside of Federal government will also be discussed.

Big Data in Atmospheric Science: climbing mountains of data to understand our planet

Presenter: Dr. Richard Loft

In the next decade, supercomputing technology is slated to advance from today’s petascale computers, capable of order 10^15 floating-point operations per second (flops), to exascale systems capable of 10^18 flops. This staggering amount of computing capability will enable scientists to develop a detailed, seamless understanding of the Earth’s climate and weather systems through computer modeling - but only if the data produced by these amazingly complex simulations can continue be explored and knowledge extracted from them. In endeavoring to model the Earth system at these computational scales, we face significant challenges, including: finding parallelism; developing accurate and faster numerical methods; challenging these models with observational data; and developing the tools and techniques to analyze and extraction of scientific knowledge from mountains of data. In this talk I will give a description of current petascale/petabyte resources, and give some glimpse at ways to address the various challenges and frontiers we face looking forward. Finally, I will argue that it is because breakthroughs in computer science, applied mathematics, statistics, and software engineering are needed to tackle these increasingly data centric challenges, that it is so vital that students get involved through internship and other programs.

A Changing Business Landscape - Big Data, Virtualization and Data Analytics

Presenter: Dr. John Sands

With so much data today, the difference between successful business leaders and surviving business leaders is often how well they leverage their information systems and critical business data. Major leverage equals significant business value, and that’s a big advantage over the competition. Data virtualization provides instant access to all the data you want, the way you want it. Virtualization provides the ability to implement faster, more powerful and efficient systems, while data analytics provides the ability to collect, organize and analyze mission critical data fast and more efficiently. Many big data projects originate from the need to answer specific business questions such as what customers really think about our brand, and how we can increase our sales intelligence and close more deals. With the right big data analytics platforms in place, an enterprise can boost sales, increase efficiency, and improve operations, customer service and risk management. Educational institutions that offer curricula that address these technologies will significantly impact their student success and better answer the call from business.

VMware’s Academic and IT Academy Programs

Presenter: David Nelson

Mr. Nelson will share information on virtualization technology and how it fits in Cloud Computing and describe VMware's Academic and IT Academy programs and how they can advantage academia.
Symposium Presentation Abstracts

EMC Academic Alliance’s Storage and Cloud Courses Supported by NDG’s NETLAB+

Presenter: Kim Yohannan

The need for ICT students to learn about storage and cloud computing has become mainstream in the era of server virtualization and the deployments of cloud infrastructures. In this session, you learn about the:

- Four technology-based courses (storage, cloud, big data analytics and backup & recovery) and the benefits available through the EMC Academic Alliance program
- The online ISM and CIS labs that are available through our partner, NDG

Challenges of Developing and Implementing Successful Online Degree Programs

Presenter: Dr. Ted Mims

A major challenge to the U.S. education system is the matriculation of students from high schools and community colleges through bachelor’s degree programs. The author will present the current status of research and tools he has developed to offer a high quality online bachelor’s degree program to these students.

As Head of the Computer Science Department at his school, the author has been involved in developing an online bachelor’s degree program and two-plus-two articulation plans with community colleges for several years. As a result of this work and research on the topic, he has developed a set of materials and best practices related to the matriculation of students through their final two years of high school, two years at a community college and into a four year school. He will articulate a step-by-step model for school administrators and counselors to follow in developing a matriculation plan for students to complete their bachelor’s degree online.

Today, two major concerns of parents, students, faculty and administrators are efficiency and effectiveness. In the area of efficiency, wise use of time, cost savings, increasing the number of trained and educated global workforce employees and increasing the number of college graduates from underrepresented groups in technology fields have been a focus of the author's research and will be delineated in the presentation. Effectiveness is measured in demonstrated results. Today a new term, "swirling", has been coined to describe the process students and parents are using to research technology programs and course offerings that lead to a bachelor's degree. A well-developed matriculation plan and planning in advance helps students reduce uncertainty as they pursue their bachelor's degree. Online programs that implement hands-on learning are providing an effective model to graduate students with the skill sets needed to compete for employment. Students must possess a skill set that will make them competitive. As educators, we must review our curriculum model that is typically based on the traditional classroom lecture format. The author has collected information on using online degree programs and matriculation models to increase the number of students completing bachelor’s degrees. He will present proposed models and solutions that demonstrate how we can successfully address these issues and graduate diverse students that are prepared for the workforce.

Students and parents are shopping for the most efficient and effective options for earning a bachelor's degree that will equip them with the technical and soft skills required to compete for jobs. They are becoming very sophisticated using swirling and the internet to identify the schools that are providing the most efficient and effective options for students to earn their degree. If college administrators and faculty want their school to succeed in attracting the best and brightest students, they need to consider participating in this new model that is emerging.
Faculty Paper Abstracts

Building an In-house Open Source Software (OSS) Community for Software Development Education

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This paper presents a method to utilize Open Source Software (OSS) community structures and products in Computer Science education, specifically software development and engineering. The proposed method builds an infrastructure for an OSS community that will be maintained and utilized by student users. It also provides a repository and knowledge base of student development projects so that it can be used as a virtual classroom for software development activities. In addition, this paper discusses the components and benefits of the proposed community, and OSS tools to implement its infrastructure.

Graduate Paper Abstracts

An Experience of Using Open Source Software (OSS) Seed for Student Development Project

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This paper presents our experience in identifying and using Open Source Software (OSS) seed for student development project. OSS is software that provides source code to download, modify, and redistribute, and thus it can be freely used for educational purposes. This paper discusses challenges and criteria to filter OSS projects and products for selecting appropriate OSS seeds. Benefits for students from using OSS code in software development are also discussed.
Implementing a Snake Tool to Track the Ice Surface and Ice Bottom in a Radar Echogram

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The Center for Remote Sensing of Ice Sheets (CReSIS) has collected hundreds of terabytes of radar depth sounder data over the Greenland and Antarctic ice sheets. This data has multiple purposes in the field of glaciology, including the measurement of ice bottom elevation that is used in the input-output method for estimating the mass balance and in ice sheet models. To do this, the ice surface and ice bottom need to be tracked in the radar echograms. An algorithm that is written in Python provides an accurate and efficient tool for tracking the ice surface and the ice bottom and will be translated and imported into native MATLAB code so that it can be used with CReSIS’s image browser and picker tool which is MATLAB based. This Python algorithm is based on a global snake method with simple cost functions. With the implementation of this function in MATLAB, tracking and picking the surface and the ground under the ice will make for a faster process than manually tracking the surface.

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Design of a Comprehensive Tool to Decrease Public Access to Private Social Network Accounts

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The increasing use of social media by internet users requires controlled effort to ensure privacy and protection of data from unintended viewers. Social media monitoring tools (SMMT) are available and used to extract data from social media sites (SMS) that expose personal information. This research effort involves the investigation of the security risk in using social media and the prospect of collecting a full synopsis of individuals who use multiple social networks. The research includes creation of a mock profile using various SMS, evaluation of the various SMMT environments to determine the level of difficulty required to retrieve profile data. Based on the results, desired security and privacy criteria are identified for incorporation into a comprehensive SMMT that will help the user recognize weaknesses in their privacy settings. The assessment of existing SMMT and design of the interface for a comprehensive tool is the scope of this work. By testing the effect of SMMT, the social network (SN) user will have knowledge of what he or she can do to prevent privacy violations from happening in the future.

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Designing a Mobile Application to Assist Caregivers of Dementia Patients

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Professional caregivers of patients who suffer from dementia are constantly looking for ways to better understand and treat their patients. Often times, patients that suffer from dementia are unable to effectively communicate their needs and yet it is critical that professional caregivers are able to accurately assess the current situation to respond appropriately. To assist professional caregivers with better understanding patients who suffer from dementia, we engage professional caregivers in the participatory design process of a mobile application that serves as a source of information about the symptoms of dementia and the different stages of Alzheimer’s disease. Thus, the mobile application enables them to better understand their patients’ behaviors in response to the progression of dementia.

Big Data X-Informatics MOOC: Research into Increasing the Efficacy of this Massive Open Online Course

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Big Data X-informatics Massive Open Online Course, taught by Dr. Geoffery Fox, is a course that has been available to students since spring 2013 at Indiana University, Bloomington, School of Informatics and Computing. However, due to the need to increase this courses efficiency, this research was aimed at creating features that will improve the interaction between Big Data X-informatics’ educational content and it’s users (students and professors).

In order to be able to achieve this goal, we had to understand the importance of information architecture, visual design and educational pedagogy, and use this gained knowledge to build an online course with efficient human-computer interaction. We made surveys on online educational sites such as Coursera, Udemy, Udacity, Duolingo, and MIT OpenCourseware. These surveys gave us the opportunity to observe features that enabled effective communication between the different calibers of students and the respective online courses, and observe features that did not achieve their goals.

Our findings from these researches enabled us to create new features or modify old ones that will enhance student-site interactivity and help impact more knowledge to the student. These features bring us closer to achieving our goal. However, this research is a perpetual project as it never comes to an end. This is due to the fact that new efficient designs and methods of impacting knowledge are always discovered. Nevertheless, the one thing that remains constant is that Big Data X-informatics is continually gaining good human-computer interaction via the understanding and accurate combination of information architecture and education pedagogy.
Analysis Functionality to enhance MATLAB default interpolation schema using mGstat

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The Center for Remote Sensing of Ice Sheets (CReSIS) has a large database of data that is examined by many researchers. This project consists of two enhancements to the CReSIS toolbox. The first was the need for extended analysis functionality in MATLAB. The objective of this project was to enhance MATLAB's default interpolation schema by using the mGstat package for the interpolation of point data. To accomplish this we needed to download and install the mGstat package then review the mGstat documentation and functionality. We then tested the mGstat interpolation methods by using the mGstat examples and later tested the mGstat interpolation methods using CReSIS data. The second project is a JavaScript viewer for echogram data that will be integrated into the web interface for the CReSIS geospatial database.

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Update of the CERSER TeraScan Cataloguing System and the TeraScan Image Processing Scripts

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The Center of Excellence in Remote Sensing Education and Research (CERSER) on the campus of Elizabeth City State University is currently tasked with the responsibility of receiving remotely sensed Advanced Very High Resolution Radiometer (AVHRR) data from orbiting National Oceanic and Atmospheric Administration (NOAA) satellites. This data is collected by SeaSpace TeraScan systems installed in the CERSER labs in Dixon-Patterson Hall.

In 2005, the processing system underwent a major update due to a migration to a new operating system. A minor update was needed at this time to deal with a second operating system migration and display of the processed images on the CERSER web site. Software and languages utilized for this task included PHP, JavaScript, HTML, Dreamweaver, phpMyAdmin, and SQL.

This project involves a major script development for the TeraScan processing equipment due to the upgrade in hardware. The ground station upgrades included a 3.7m X/L band, a 3.6m C band, and a 5.0m L band dishes, along with accompanying computing hardware. This new script processes both infrared and visible light images received into the Tagged Image File Format (TIFF) and place them on the server to be managed by the server-side scripts on a daily basis.
PatientConnect

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There are several doctor/patient mobile health IT applications that are available on mobile platforms. However, most of these applications are designed from the perspective of the physician as opposed to that of the patient. There are also some apps that do not offer the secure communication between a doctor/nurse practitioner (NP) and patient. In this project, we will design a mobile application, PatientConnect, that allows doctors/NPs and patients that have an existing medical relationship to communicate asynchronously about topics that can be addressed outside of an office visit (i.e. some test results, prescription refills, and examination of patient progress reports). We will discuss various models of delayed message communication systems and provide the rational for the system model that we adopt in this poster. We will also provide the interface for a prototype of the PatientConnect application along with the features that will be supported.

HTTPS: Is Your Website Truly Secure?

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This project will gather data on how various secure sites are using packet sniffing software such as Wireshark and Cryptool 2. Additionally, a comparison will be done on the different information that can be discovered on sites with the help of these software packages. During the course of the project, the traffic of HTTP-only sites and supposed HTTPS sites will be observed. Based on the observations, a determination will be made on the security status of the sites.

There is little expectation for the HTTP-only sites to be secure but what this project is really hoping to figure out is if HTTPS-sites are impenetrable and if it is not the reason why and how could it be fixed. For example an HTTPS site could have the designated protocol but as mentioned before they may not be truly be authenticated or the credentials may have been falsified. There is the possibility that the HTTPS fulfills most of its requirements but is neglecting a few of the security requirements which creates vulnerabilities that an attack could exploit. Also the last option is that it is truly secure. This paper will attempt to suggest ways to properly secure these protocols.
Secure Software Development: Security Strength Testing Common E-Commerce Programming Language Combinations

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Information security has become a focus in the computing industry, given the scale and severity of security breaches that have occurred in the past decade. Companies are now investing resources specifically towards securing information assets: intellectual property, consumer personal information and various other critical information sets. Various approaches to information security enforcement exist in literature and industry: enhancing cryptography systems, improving resource protection by adopting virtualization technology, and developing new software development platforms and models. In this research study, existing cryptographic systems, resources, and platforms will be investigated and implemented to perform security strength testing. This approach adopts secure software development processes and secure coding guidelines defined by industry (e.g., ISO 12207), academy (e.g., CMU SEI) and federal government (e.g., CERT).

To conduct a security performance study, this research implements, analyzes, and tests several simulated e-commerce websites including frontend applications and backend servers. Using the most common programming language combinations (e.g., PHP, Java, JavaScript, SQL), the simulated e-commerce websites created will employ the necessary controls and standards expected of companies. Each simulated website will be equivalent; however, controls will be developed in the manner specific to the programming language implemented. Once each simulation is developed, several known vulnerabilities will be injected. Thereafter, penetration testing and common forms of attacks will be executed against each website. Depending on the vulnerabilities exposed, modifications will be implemented and retested. This process will be repeated multiple times until the performance study is completed.

Utilization of Open Source Tools to Advance Mobile Forensic Curriculum Development

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Today’s rapid advancement in mobile technology and the constant growth of personal information being stored in mobile devices has revealed the need for mobile forensics and the increasing demand for individuals skilled in mobile forensics investigation. In order for the forensics community to have advances in the mobile forensics concentration, there is a need to clearly define an educational agenda for researchers and students. Once a role is clearly outlined, better educational material can be developed for students.

The vast mobile device market with its large variety of manufactures and architectures has created a problem for advancing mobile forensics education. Producing clear guidelines for mobile forensic steps and procedures are a challenge because they have to be tailored differently for almost every mobile device vendor. Compared to the desktop and laptop market, the mobile market is extremely diverse. We propose that in order to clearly define a mobile forensics agenda, there is a need to develop a curriculum guide and mobile forensics laboratory assignments that use open source mobile forensics tools. Although there are many commercial tools available today, they are generally too expensive for students to purchase in order to get hands-on experience in mobile forensics. The goal of this research effort is to develop laboratory assignments that make use of enough open source tools to expose students to necessary mobile forensics techniques. This will increase the body of knowledge
available to the mobile forensics community, validate the use of open source mobile forensics tools for legitimate use in computer science curriculum, support advancement of mobile forensics education and subsequently prepare students to become mobile forensics experts for the workforce.

This research addresses the need for mobile forensics educational materials by increasing the availability of resources and giving students practical mobile forensic experience at an affordable price. Laboratory assignments will be generated based on the Santoku-Linux, a Linux distribution created specifically for mobile forensics, mobile malware analysis, and mobile security testing. This version of Linux is dedicated to mobile forensics and will provide students with an open source platform to execute the real life scenarios that will be presented in the proposed laboratory guide. Santoku-Linux will provide the basic tools to give students the ability to analyze data, conduct data recovery, and seize digital evidence. In order to validate the usefulness of the proposed guided laboratory material, experimental trials will be conducted with university students. It is expected that this research will verify that the Santoku-Linux open source suite is viable for use in mobile forensics curriculum and to address how to bridge the gaps that are found, if any.

Research of past educational materials in digital and mobile forensics reveals that there is a significant need for this research and suggests that improvements can be made in mobile forensics’ educational material. Research is currently underway to test the tools available with the Santoku-Linux suite and to collect and survey a group of additional open source mobile forensic tools to produce a comprehensive laboratory packet that introduces users to the use and capabilities of these tools. Future work will add essential documentation for some of these open source tools. The educational materials will be validated and results will be used to create a guide to learning mobile forensics. Finally, the laboratory assignments will be uploaded to a website where lab directions can be downloaded for distribution.

Undergraduate Student Poster Abstracts

Comparative Review of the ECA and SMS Recycling Tools

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Relational agents are "computational artifacts designed to build long-term, social-emotional, relationships with their users." They are able to build relationships with their users that increase the user's enjoyment of the application. The disadvantage of this technology is that when the relational agent appears unrealistic, some users will find it challenging to build a relationship with the agent. In addition, due to software limitations on today's smartphones, relational agents may not be able to load on a mobile device. Short Message Service, or SMS, is a method through which six billion messages are sent from person-to-person through mobile phones every day making SMS an alternative interface to which many individuals will have mobile access. Using the Twilio API, an interface was developed with the same conversational functionality as relational agents. This paper investigates the potential of SMS interfaces as an alternative to interfaces using an Embodied Conversational Agent in specific scenarios.

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This research aims to reduce the stress on the writing center’s personnel and expand the center's offerings by providing students with web-based assistance using an Embodied Conversational Agent (ECA). The goals of this research are to construct and test an Embodied Conversational Agent that will answer user questions about writing papers in MLA formats. To collect information from undergraduate students about their current writing procedures in an undergraduate level setting. To collect quantitative and qualitative feedback on the initial thoughts and reactions of those students after interacting with a prototype of an ECA designed to provide better writing advice.

Reciprocal Velocity Obstacles (RVO) method which calculated the time to collision for each virtual agent to prevent collision was used to produce crowd simulation and generated using the game engine Unity 3D. Smooth collision avoidance was produced for multiple agents in the same environment by using RVO collision avoidance method. We employed three methods for generating crowd simulation using RVO collision avoidance in this experiment. The first method consisted of taking user input on the starting position, goal position, and speed of each agent to be simulated and rendered in the virtual environment and the information was exported to a file. The second method was to load pre-existing file information into Unity as input for the simulation. The third method was to start with only one agent that continuously moved to random goal positions and could be duplicated to produce more agents in its environment. This experiment was combined with another research student collision avoidance method called predictive forces collision avoidance so that the effectiveness of both collision avoidance methods could be compared. A user interface was developed to choose which collision avoidance method should be executed. The specific method to be chosen consisted of user input or the loading of a pre-existing file to simulate an environment and rendered in Unity.

The evolution of having robots to be able to do certain tasks has really grown over the past years. Robots are able to think of solutions to a problem within minutes, when the human mind can take days to plan. After all the planning, the human still does not have the problem solved as accurately as the robot. This concept allows the robot to be autonomous.
Sometimes we do not even realize, but robots can already be part of our daily life and help us spend less time on unwanted duties by automating this kind of activity.

One daily concern to individuals with animals is to feed them properly. Sometimes this responsibility can stop you from going out of town, hanging out with friends for a couple days and even working late. The 3DP Autonomous Pet Feeding Robot was created to alleviate the pressure of caring for pets (specifically dogs and cats) upon having to leave one’s residence without accommodation for the animal. It allows continuous user controlled feeding for a pet when the user is unable to tend to their respective animals.

Using Common Core State Standards of Seventh Grade Mathematics in the Application of NXT LEGO® Robotics for CReSIS Middle School Students

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This research was designed to focus on mathematical processes of the Common Core Standard in mathematics lesson plans for seventh grade students. Seventh grade students from two middle schools of Elizabeth City Public Schools in northeastern North Carolina were selected for this research at Elizabeth City State University (ECSU) for the Center of Remote Sensing of Ice Sheets (CReSIS). Pretest and posttest data were collected through student assessments and teaching observations to evaluate student growth in content knowledge, understanding and application. The Research Experience Teachers (RET) Team used mathematics strategies to teach various scientific, mathematical, and design concepts, through designing, by programming NXT LEGO® Robotics for the seventh grade level. The students received hands on experience for robotics construction and programming with application of mathematics, motion, and problem solving in a collaborative group setting.

Configure and Customizing the HUBzero User Experience

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HUBzero is an open source software package used to construct web sites for scientific research and educational activities. HUBzero was originally created by researchers at Purdue University in conjunction with the National Science Foundation (NSF) who sponsored the Network for Computational Nanotechnology to support nanoHUB.org. The HUBzero platform currently supports over 40 hubs across a variety of disciplines, including cancer research, biofuels, climate modeling, water quality, education, and more.

The team will investigate how HUBzero features are utilized for research, education, and scientific collaboration. The project will involve configuring and customizing the user experience on a new hub. The team will also learn
how to work with simulation workspaces and allow groups to collaborate. Finally the team will learn how to publish the hub to go public, and also how to use the new database component.

To accomplish this, the HUBzero team members will use data collected by the 2013 Research Experience for Undergraduates Pasquotank River Watershed Team who completed tests of five tributaries and the river itself. Streams tested were Newbegun Creek, Knobbs Creek, Areneuse Creek, Mill Dam Creek, and Sawyers Creek. The team will upload test data to a database to determine how HUBzero handles databases.

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**Leveraging the Cloud to Provide Web Access for a Simulator in a Google Hangout Application**

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Applications have become a mainstream approach to engage the world in technological media of all genres. A medium of such influence holds infinite possibilities that should be encouraged not only for recreational use, but educational use as well. Robotics intrigue youths of all ages, and should therefore be capitalized upon in the classroom setting. Expenses are the central setback when providing this technology, along with the knowledge to operate, troubleshoot, and the ability to significantly distribute this resource. This project describes my approach of leveraging the cloud to provide web based access to a simulator, capable of controlling real robots.

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**Designing Mobile Security Hands-on Labs Using a Virtual Environment**

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As mobile security becomes a pressing matter in our everyday life, it becomes more necessary for students to be properly instructed in how to detect and analyze malware on mobile devices. This research project is being conducted on the Android Platform. A virtual instance of the Android platform will be used on top of a Windows operating system using the HyperVisor virtualization client. Multiple forms of malware will be presented to students for analysis but they will all have the similar characteristics such a command control and they will transmit data to a remote server. Students will be required to employ various android analysis tools and techniques in order to gain relevant information about the mobile malwares. With this interactive level of teaching, students really begin to understand how malware operates which allows them to grasp concepts that are not so obvious when reading about them.

The advent of virtualization and the use of that technology in the classroom is quickly becoming a must-use technology in the modern classroom. With this setup, the use of a virtual Android OS allows students to interact with the environment. Using virtualization also helps to cut the cost of setting up a lab because it does not require nearly as much hardware to create the environment. The virtual environment also allows a higher level of customization in lab creation. The use of various versions of the Android system allows us to implement different kinds of malware which may not be available in every version. This level of customization also helps increase the depth that can be demonstrated about the malware to the students.
In the preliminary study of our labs, there was a significant rise in students understanding of how malware worked and in test scores of the students who used those labs. In this project we will demonstrate a series of hands-on labs and our virtual environments.

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**Scientific Rocket with Terrain Classification Payload**

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The NASA USLI research project is a project that challenges different universities to launch a rocket reaching a certain altitude that has a scientific payload. The scientific payload identifies the different types of surfaces and structures present on the grounds surrounding the rocket’s launch area in real time. The goal of the payload was to possess the capability to deliver the analyzed images to devices on the ground. To have preliminary design of the rocket’s launch and payload success criteria, we used software called Rocksim, which allows you to build your rocket with each component and gives you an estimate of the status of your flight. The Terrain analyses will use computer software that will analyze images during the flight of the rocket. That analyzed data will also be transferred to computing devices on the ground in flight.

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**Interactive Storytelling Agents for Graduate School Mentoring**

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Information from the CRA Taulbee survey and two reports from the National Research Council identify an alarming disparity among underrepresented minorities in Science and Engineering (S&E) fields, more particularly computer science. When compared to results from the 2010 Census, it is shown that African Americans and other groups are severely underrepresented in computing fields in juxtaposition to their share of the general population. To solve this problem, the CRCL looked into a variety of information sharing methods and decided to take a storytelling approach. The CRCL proceeded to develop a virtual storytelling agent to serve as an interactive mentor to students interested in attending graduate school; educating them on the benefits of applying to graduate school. After interacting with this mentor, users were then asked to complete a short survey that was used to evaluate its effectiveness.
SeaSpace and Elizabeth City State University (ECSU) signed a Memorandum of Understanding (MOU) in February of 2012. The MOU stated that ECSU would provide a training site for SeaSpace’s technology and data products along with integration of the products into classroom curriculum. In return, SeaSpace would provide ground stations for receiving direct broadcast data from various telemetries. The ground stations include a 3.7m X/L band, 3.6m C band, and a 5.0m L band dish, along with accompanying computing hardware. The purpose of this project was to generate a training curriculum focused on the K-12 classroom, college courses, and outside governmental agencies. The curriculum contains 15 modules, which as a whole could be presented as a 10-hour course that qualifies as one continuing education unit (CEU) for K-12 teachers and administrators. Example modules for “Introduction to Remote Sensing” and “Introduction to TeraScan” were also created as models for further components.

A Synopsis of Vulnerabilities in Cloud Computing and Techniques to Improve Its Security

Organizations and companies store more information and personal assets using cloud technology more today than in previous years. Due to the substantial growth in data that requires storage, organizations have begun taking advantage of offsetting their data storage to other companies through cloud storage media because of its availability and convenience. Over fifty percent of US companies use cloud computing with expectations of it rising over the next few years. This advantage however convenient is proven to have its challenges. Research has shown the biggest concern for cloud computing is in fact its security. The more assets placed in a cloud system, the more it becomes targeted for threats. The two largest perceived risks for cloud computing are inadequate IT training/auditing and the ability of a provider to enforce security policies. The purpose of this project is to highlight vulnerabilities associated with cloud computing and present a synopsis of techniques aimed at better securing the cloud.
Hydrodynamic Modeling of Laser-Target Interaction: Plastic Thin Foils

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The purpose of my investigation was to run hydrodynamic simulations of thin foils being ablated by a long nanosecond pulse and short picosecond laser pulse. These simulations were based on a physical experiment conducted on the ELFIE 100 TW LULI laser facility dedicated to the study of longitudinal ion acceleration using a high intensity picosecond laser pulse irradiating a 500 nm thick plastic foil exploded by a nanosecond pulse. In the simulations, the thickness of the target was varied. This experiment was conducted to prove that it is more effective to accelerate ions by using under-dense targets instead of solids, i.e. thin foils (any target less than 100 microns). Accelerating ions is useful in several applications because it produces high energy and current beams. Accomplishing this with a laser allows us to create compact energy that does not require electrostatic techniques or an enormous amount of space. In the context of plasma physics, producing ions can be used to probe plasmas and/or heat them to conditions similar to stars, as well as probe warm dense matter.

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Android and iOS Application- Teaching Shapes and Colors

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Have you ever had a young child who wants to play with your Android or iPhone? Would it be wonderful if you could open an app, give it to the child, and the app teaches the child shapes and colors just by tapping on the screen? Well we developed an Android and iOS app that teaches shapes and colors to kids ranging from 18 months to five years old. The way this app works is that when a child taps the screen, the shape and color changes randomly. When the shape and its color appears, the app says the name of the shape and the name of the color.

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Spiritual Counseling for College Students Using Embodied Conversational Agents

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This study seeks to construct and evaluate the effectiveness of an embodied conversational agent (ECA) to aid the college campus counseling centers. Spiritual guidance content was chosen to enhance students' wellbeing in addition to their spiritual health awareness. An ECA has been created and populated with content from a non-denominational church local to the institution where an experimental study will be conducted. An experiment has been designed to test the effects of the ECA opposed to a non-conversational spiritual advisement guide (spiritual advisor-wiki). The usability of the ECA will be compared to the usability of a generated online wiki programmed
with the same content. It is hypothesized that the students will prefer interaction with the ECA compared to the wiki.

African American Computer Science Graduate Mentoring using Embodied Conversational Agents

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An embodied conversational agent (ECA) was created and programmed to mentor African American computer science majors on their decision to pursue graduate study in computing. A survey was used to find areas of interest for the sample population. A between-group, mixed method experiment was conducted with 37 African American male undergraduate computer science majors where one group used the ECA mentor while the other group pursued mentoring advice from a human mentor. Results showed no significant difference between the ECA and humans.

Adopting Secure Software Development Life Cycle in the Capstone Project

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Security plays a very large role in software development. Without its existence, software would be vulnerable to many different types of attacks. Software security prevents leaks of confidential data, alteration of data without the knowledge of the system, and unauthorized access to the system. Implementing and building a secure software product involves a number of different things which include: careful construction, definition of software security requirements, and implementation of security policies. This framework will be used to develop and implement a trustworthy application. There are a number of different strategies that are required to securely deliver successful software. Using these strategies to secure software that was implemented in last year’s capstone project is a challenge that this paper will discuss. The product that was picked up from a team named 4Loop implemented a computerized stock trading application. Understanding that this product was implemented in last year’s course, it may be harder to implement such strategies but it is something to consider as changes and updates are issued out by the clients’ needs. To approach this goal, several entities in the product need to be considered. This includes an understanding of the security flaws within the product or the overall product process and what strategies can be adopted as the product moves further along. As the client issues out the given deliverables each week the secure software development cycle should be able to handle the proper specifications. This software product will be accessed using McCumber’s Cube model framework which evaluates information security.
Enabling Single Point Data to Track Veteran Activity via Prototype Development

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Visualization systems have endless possibilities and are steadily impacting society. The visualization of personal histories, youth records, medical records, and even transportation have already been implemented in existing systems. The Massachusetts Department of Veterans’ Services (MADVS) is currently interested in tracking the frequency and extent of the services and benefits used by veterans in the state; this means they need a system that would allow them to review single point data.

In this project, the goal is to develop prototypes that will visualize single point data which will be used to track veteran activity. This will test the hypothesis that different visualization approaches can tactically display data to spot patterns and trends, improve analysis of data, and better support conclusions formulated from analysis. Choosing a visualization approach definitively depends on the characteristics of the data being visualized. Using the most appropriate visualization approach is essential to avoid diminishing the quality of the data being displayed. The type of data must also be considered as well, and in this case point-based event data and interval-based event data are primarily what the MADVS will want visualized.

One approach used in this project included conducting a literature review of several visualization approaches to prove that implementing graphical representations will maximize the amount of data visualized. Visualization approaches used in this research include various developments of LifeLines, a visualization system, and heat maps, a graphical representation tool. These two visualization approaches were incorporated into low fidelity prototypes for review by the administration of the MADVS. The completed mock-ups are still being reviewed by administration and once feedback is received implementation of a final prototype will be underway. The final prototype will be generated by web based programming including Hypertext Markup Language (HTML), Cascading Style Sheets (CSS), Asynchronous JavaScript and XML (Ajax), JavaScript, and jQuery. Anticipating possible feedback to further previous ideas and collaborating with the researchers of the Institute for Visualization and Perception Research (IVPR) at the University of Massachusetts Lowell. [This project was supported by a grant from the DHS Summer Research Program Team for Minority Serving Institutions]
Analysis of Aflatoxin Accumulation in Maize for Gene Expression Prediction

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The fungus Aspergillus flavus, a common host of cereal grains and legumes, is a producer of the toxin, aflatoxin. The consumption of the toxin, even in tiny parts, has proven to be detrimental to farm animals and humans. The Corn Host Plant Resistance Research Unit of the USDA is working to develop corn plants that resist A. flavus, or do not allow it to produce aflatoxin. The aim of this study was to link single nucleotide polymorphisms (SNPs) and insertions and deletions (InDels) in maize DNA sequences with genes that may have functionalities related to resistance in maize. One method used was a program which was developed to automatically align DNA sequences and identify InDels, thus eliminating the need for manual alignment. Another method utilized a pipeline of scripts for locating genes near the SNPs in any user-defined window. The annotations for the discovered genes are then retrieved from various public databases (maizegbd, maizeseq, TAIR, and Phytozome.) Ultimately the goal is to be able to select progeny (offspring) from crosses of maize lines which have the resistance form of a gene and maize lines, with the susceptible form of the gene in order to ensure that new maize cultivars are resistant and future outbreaks of the toxin will be much less.

Recruiting Students of Color through Developing Online Graduate Student Panels

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Due to an increase in the population size of underrepresented minorities (URMs) and a critical shortage of U.S. citizens who are entering into academic majors involving Science, Technology, Engineering and Math (STEM), it is critical for the United States to create a “pipeline” for undergraduate minorities to increase their presence in STEM disciplines. Graduate school panels are frequently used to disseminate information to students regarding post-baccalaureate STEM education. This research is an attempt to virtualize audience-specific graduate school panels through an online multimedia application. The CRCL hypothesized that URM undergraduates with access to the application would be more encouraged to pursue graduate studies in STEM disciplines and that URM graduate students would benefit from peer support via the application, increasing their likelihood of obtaining a graduate STEM degree.
Open Source Components for Building a Learning Environment for Software Development

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A good learning environment must be built with good tools. Especially in the case of software development, the ability to quickly and painlessly work on the same project, or even the same code, is exceedingly important. This project intends to look at some of the best open source tools for the job, co-opt their strongest features, and re-appropriate them for an in-house software development collaboration system.

Open source software is software whose source code has been made available for other users. The source can then be copied, distributed, examined, and developed for other purposes. The main goal of the project is to create a decentralized software distribution and development platform for current and future students. This will make it easier for students to coauthor and contribute to projects, research, etc. As such, the project will require several resources to build an in-house software development learning environment. According to the basic concepts of software engineering, a centralized management and access control of the source code allows for a higher quality end product. Current popular OSS products to perform these functions include Trac (an enhanced wiki and issue tracking system for software development projects), Git (a distributed revision control and source code management system with an emphasis on speed), and GitHub (a web-based hosting service for software development projects that use the Git revision control system). This project aims to borrow major features from these components and combine them into a student-centric hosting, distribution, and learning environment.

This project aims to foster a software-focused learning environment by providing students with an easily accessible code repository for reference and inspiration. Each of the proposed pieces of software interacts with the others to provide a secure, highly usable method to share, create, and learn together.

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Update of the CERSER TeraScan Cataloguing System and the TeraScan Image Processing Scripts

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The Center of Excellence in Remote Sensing Education and Research (CERSER) on the campus of Elizabeth City State University is currently tasked with the responsibility of receiving remotely sensed Advanced Very High Resolution Radiometer (AVHRR) data from orbiting National Oceanic and Atmospheric Administration (NOAA) satellites. This data is collected by SeaSpace TeraScan systems installed in the CERSER labs in Dixon-Patterson Hall.

In 2005, the processing system underwent a major update due to a migration to a new operating system. A minor update was needed at this time to deal with a second operating system migration and display of the processed images on the CERSER website. Software and languages utilized for this task included PHP, JavaScript, HTML, Dreamweaver, phpMyAdmin, and SQL.
Along with this operating system update, a major script development was needed on the TeraScan processing equipment due to an upgrade in hardware. The ground station upgrades included a 3.7m X/L band, a 3.6m C band, and a 5.0m L band dishes, along with accompanying computing hardware. This new script will process both infrared and visible light images received into the Tagged Image File Format (TIFF) and place them on the server to be managed by the server-side scripts on a daily basis.

Early North Carolina Colonial and Native American GPR Site Survey

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The earliest English colonial populations in the new world spread rapidly through southeastern Virginia and northeastern North Carolina in the late 16th and early 17th centuries. These peoples had to overcome insufficient food sources, threat of attack by hostile indigenous peoples and even hostile European powers. Early, mutually beneficial, contact and relations with non-hostile Native Americans were often sought by European colonists as a survival strategy. Sites characterized by close proximity between colonists and natives were well known in Northeastern North Carolina.

Opportunities for expanded archaeological investigations of early historic colonial sites became possible with a collaborative research effort undertaken with the Museum of the Albemarle (MOA) and the Elizabeth City State University’s Center of Excellence in Remote Sensing Education and Research (CERSER) in June, 2012. Students in a summer research program for undergraduates engaged in a Ground Penetrating Radar (GPR) survey of a site related to the Culpeper rebellion of 1677.

This summer, in collaboration with MOA, a high-resolution GPR survey was performed of a known Native American settlement site that existed in close proximity to early colonial habitations near Edenton, NC, on the Chowan River. The survey was designed to reveal the presence of any buried remnant structures that might indicate adoption by Native Americans of cultural features of colonial life such as defensive fortifications, or structures that may have served either religious or commercial purposes such as a church or trading post. Alternatively, evidence for the presence of dwellings might indicate a closer affiliation between struggling colonists and the indigenous population.

The Native American colonial contact site survey team learned to use the Geophysical Survey Systems SIR-3000 Utility Scan Ground Penetrating Radar (GPR) and the associated RADAN 6.6 data processing software. It will perform a Ground Penetrating Radar survey at 0.5-meter spatial resolution of the most promising areas for colonist and Native American interaction as defined by prior MOA archaeological studies in collaboration with the museum’s archaeologist. Data collected will be processed and examined for any evidence of buried structural features. Surveying such sites with GPR is important due to modern threats to the maintenance of their pristine state. Threats to such sites include agricultural and forestry operations, commercial and residential development, and increasing shoreline erosion.
High Performance Computing at FAMU
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Computation is playing an ever increasing role in the conduct of modern scientific inquiry and experimentation. This poster targets to introduce HPC at FAMU and how STEM students use HPC through integrating computational components into existing math courses and making computing projects to fundamental STEM courses via active learning activities. The computing infrastructure and open sources for HPC are discussed in this poster as well.

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Culturally Sensitive Gaming Application to Increase Security Awareness amongst Middle Age Kids
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Children have become exposed to technology at an early age and use the internet as a tool for their day to day lives such as school and leisure activities. For example, according to Pew Internet Research, 74% of children ages 12-17 have access to the internet on cell phones, tablets, and other media devices at least occasionally [1]. This makes them vulnerable to becoming potential targets while using applications and social media. In hopes of increasing security awareness in young minorities, this project proposes a culturally sensitive approach [2] to developing scenarios for a gaming application. The uses of cultural sensitive techniques have been proven to improve students’ abilities to master new concepts [3]. The purpose of this application is to give children relatable scenarios that will engage them in using security tools to protect themselves, their personal information, and their devices from viruses, spyware, and spam. Not only this, but how to also commit to being ethical online users.

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A Practical Investigation of Mental Health Applications
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Mental illness contribute to health problems in people of all ages and mobile applications can provide assistance to those by identifying the contributing factors offering assessment, management, and treatment options. Over the course of one’s lifetime, should one experience mental health problems, one’s mood, behavior, and thinking could be affected. It affects how we think, feel, and act. Mental health includes our emotional, psychological, and social well-being and it also helps determine how we make choices, relate to others, and handle stress. There are many free Apps available, but it is hard to tell which one is best for one particular user. How can mental health apps assess and treat mental health problems? The goal of this project is to analyze the factors of mental health apps and give user insight of each app. A practical investigation of available mobile mental health applications will be studied and compared. In addition, summary for each app will be presented.

Psychoacoustics: How Does Sound Make Us Feel, and Why?
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Societies worldwide are familiar with the wonder of sound. The sound of laughter, conversation, a baby’s cry, a mother’s lullaby, rain, birds chirping, sirens, a song on the radio; they’re all reminders of the vivid experience of life. The art of sound and music is beautiful. What is even more fascinating is the science behind it. Psychoacoustics is an interdisciplinary field that studies human emotional, psychological and cognitive responses to sounds. This phenomenon has long been observed throughout history and is now an emerging field with many applications. An increasingly prevalent practice of this study is the use of music therapy. It is believed that sound has the ability to effectively heal people physically, emotionally and socially. Music therapy is an established health profession in which music is used within a therapeutic relationship to address physical, emotional, cognitive, and social needs of individuals.

A thorough conduct of a series of listening surveys and experiments has further validated the observations and assumptions of sound and music that so many are familiar with. By applying scientific methods of experimentation, the long loved aesthetic pleasures of sound can be applied for revolutionary purposes. This research closely analyzes the responses of subjects to various tones, chords, and melodic patterns. By recording both reported emotional experiences and physiological responses, fascinating discoveries have been made. These results suggest great potential of the therapeutic application sourcing from sound and music. With further assessment of the matter, it is expected to derive precise algorithms that can accurately predict one’s reaction to a particular sound. The scientific refinement of this matter will ultimately optimize its application as a therapeutic technique.
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