

The Symposium on Computing at Minority Institutions  
April 11 - 13, 2013, Virginia Beach, Virginia



# ***CULTIVATING INNOVATION RIDING THE NEW WAVES IN COMPUTING***



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# CULTIVATING INNOVATION RIDING THE NEW WAVES IN COMPUTING

The 2013 Symposium on Computing at Minority Institutions  
Association of Computer and Information Science/Engineering Departments at Minority Institutions

## SCHEDULE AT A GLANCE

Thursday, April 11, 2013 - HILTON VIRGINIA BEACH OCEANFRONT	
5:00-7:00 PM	<b>Board Meeting/Dinner</b> ( <i>Spotswood Arms Room/Catch 31</i> )
6:00-7:00 PM	<b>Registration</b> ( <i>Avamere Room</i> )
Friday, April 12, 2013 - HILTON VIRGINIA BEACH OCEANFRONT	
7:30-8:30 AM	<b>Breakfast</b> ( <i>Peacock Ballroom Salon C</i> )
7:00 AM - 7 PM	<b>Registration</b> ( <i>Cottage Row Foyer</i> )
8:30-9:00 AM	<b>Welcome</b> ( <i>Peacock Ballroom Salon A</i> ) Dr. Rebecca Caldwell, ADMI President, Winston-Salem State University Dr. Constance Bland, Symposium Chair, Mississippi Valley State University
9:00-10:30 AM	<b>Faculty Session - Dr. Linda Hayden</b> ( <i>Spotswood Arms Room</i> ) <b>Introduction to Gateways/HubZero</b> Ms. Stephanie Barr, National Center for Atmospheric Research (NCAR) Dr. Richard Loft, Science Gateways
	<b>Student Session - Dr. Andrea Lawrence</b> , Spelman College ( <i>Peacock Ballroom Salon A</i> ) <b>Graduate Education (Forum)</b> - Dr. Cheryl Seals, Auburn University
10:30 - 10:45 AM	<b>Break</b>
10:45 AM-12:30 PM	<b>Faculty Opportunities -Dr. Thorna Humphries</b> , Norfolk State University ( <i>Spotswood Arms Room</i> ) Dr. Loretta Moore, Jackson State University Dr. Mary Lou Soffa, University of Virginia
	<b>Internship Roundtable</b> ( <i>Peacock Ballroom Salon A</i> ) <i>Moderators: Patrina Bly &amp; Michael Jefferson, Elizabeth City State University</i> <i>Bernard Aldrich, Jackson State University ; Maya Smith, Winston-Salem State University</i> <i>Brian McClanahan, Norfolk State University</i>
12:30-2:00 PM	<b>Luncheon - Welcome: Dr. Jean Muhammad</b> ( <i>Peacock Ballroom Salon C</i> ) <b>Speakers:</b> Dr. Linda Hayden & Dr. Andrea Lawrence <b>AWARDS: CReSIS Scholars</b> - Dr. Linda Hayden
2:00-4:15 PM	<b>Student Posters- Mr. Timothy Holston</b> , Mississippi Valley State University ( <i>Peacock Ballroom Salon B</i> )
:30 - 6:30 PM	<b>Graduate Fair/Reception - Dr. Elva Jones</b> , Winston-Salem State University ( <i>Peacock Ballroom Salon B/C</i> )
Saturday, April 13, 2013 - HILTON VIRGINIA BEACH OCEANFRONT	
7:00 AM-12:00 PM 7:30 - 8:30 AM	<b>Registration</b> ( <i>Cottage Row Foyer</i> ) <b>Breakfast</b> ( <i>Catch 31</i> )
8:30 - 10:30 AM	<b>Faculty Workshop - Professor Robert Willis</b> ( <i>Spotswood Arms Room</i> ) <b>Information Assurance Workshop</b> Dr. Ted Mims, University of Illinois at Springfield Dr. John Sands, Moraine Valley Community College
	<b>Student Workshop - Dr. Thorna Humphries</b> ( <i>Peacock Ballroom Salon A</i> ) <b>Hands on Mobile Apps</b> - Dr. Mona Rizvi, Norfolk State University
10:30 AM	<b>Break</b>
	<b>Faculty &amp; Graduate Student Papers - Dr. Andrea Lawrence</b> ( <i>Spotswood Arms Room</i> )
10:45 AM-12:30 PM	<b>Student Workshop - Dr. Rebecca Caldwell</b> ( <i>Peacock Ballroom Salon A</i> ) <b>Information Assurance Workshop</b> - Dr. Ted Mims & Dr. John Sands
12:30 - 2:00 PM	<b>Lunch</b>
2:00 PM	<b>Undergraduate Student Papers - Dr. Constance Bland</b> ( <i>Peacock Ballroom Salon A</i> )
6:30 PM	<b>Awards Ceremony</b> ( <i>Peacock Ballroom Salon A</i> ) Dr. Gamaliel Cherry, NASA Aerospace Education Services Project Manager

## WELCOME FROM THE PRESIDENT



I am pleased to welcome you to the Eighteenth Annual Symposium of the Association of Computer Information Science and Engineering Departments at Minority Institutions (ADMI). The theme of this year's conference is **CULTIVATING INNOVATION: RIDING THE NEW WAVES IN COMPUTING**. For the next two days ADMI will continue our long tradition of showcasing faculty and student research. There will be 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 energizing 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.

### SYMPOSIUM COMMITTEE

Dr. Constance Bland, Mississippi Valley State University  
Mr. Timothy Holston, Mississippi Valley State University, Posters Chair  
Dr. Elva Jones, Winston Salem State University  
Dr. Andrea Lawrence, Spelman College

### LOCAL ARRANGEMENTS CHAIRS

Dr. Linda Hayden, Elizabeth City State University  
Dr. Thorna Humphries, Norfolk State University  
Dr. Jean Muhammad, Hampton University  
Dr. Bob Willis, Hampton University

We hope you find this conference both interesting and stimulating 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 2014!

**WELCOME TO ADMI 2013!**

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



# ADMI WORKSHOP PRESENTERS



**Dr. John Sands**  
Professor of Information Technology  
MORAIN VALLEY COMMUNITY  
COLLEGE

Dr. John Sands has been a professor of Information Technology at Moraine Valley Community College for 26 years. He has a Ph.D. from Colorado State University School of Education and a MA from Governors State University. Dr. Sands is the legal main contact at the Moraine Valley Community College CATC. He has served as the principle investigator on the NSF ATE project #9950037 as well as a Co-PI for the Center for System Security and Information Assurance, one of the country's first comprehensive Centers for Advanced Technology Education. Dr. Sands holds several industry certifications including CISSP, CCIA, CCNP, MCSE, and CCNA. He has also authored several text books, white papers and lab manuals and has been invited to speak at many national conferences, including the League for Innovation –CIT conference, the NSF PI conference, the NCATC annual conference and the AACC Annual Convention. Dr. Sands has also worked at Cisco Learning Institute as a senior researcher in technical education.



**Stephanie A. Barr**  
Diversity Coordinator  
Computational and Information Systems  
Laboratory (CISL)  
NATIONAL CENTER FOR ATMOSPHERIC  
RESEARCH (NCAR)

Stephanie A. Barr is the Diversity Coordinator for the Computational and Information Systems Laboratory (CISL) at the National Center for Atmospheric Research (NCAR), received a BS in mathematics with physics minor in 2007. She is currently a graduate student in curriculum and instruction at the University of Colorado at Boulder. Her research focuses on mentoring and sense of belonging as they relate to issues of access, recruitment, retention, and support of non-traditional and underrepresented populations. Ms. Barr's interdisciplinary expertise allows her to effectively build new and support existing partnerships between NCAR and several distinct partner communities: K-16, university research, minority serving institutions, community colleges, and the public. As a member of the Outreach Services Group, she plays a central role in conducting targeted visits to STEM departments to assess the potential for mutually beneficial collaborations, and supporting CISL scientists and staff as they carry out the lab's mission to actively seek, train, mentor, and integrate diverse new talent at NCAR and in STEM fields.

# ADMI WORKSHOP PRESENTERS



**Dr. Richard Loft**  
Director of  
Technology Development Division  
SCIENCE GATEWAYS

Dr. Richard Loft (Atmospheric Sciences) is Director of the Technology Development Division (TDD) in the Computational and Information Systems Laboratory (CISL) at NCAR. He is responsible for research in applied computer science, visualization and enabling technologies, and earth system modeling infrastructure. TDD operates the Earth System Grid (<http://www.earthsystemgrid.org>), a federated data system for distributing CMIP climate model intercomparison data.

Dr. Richard Loft has worked in high performance computing since joining Thinking Machine Corporation in 1989. At SC2001 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, Rich 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.



**Dr. Mona El-Kadi Rizvi**  
Associate Professor  
Computer Science  
NORFOLK STATE UNIVERSITY

Dr. Mona El-Kadi Rizvi is an Associate Professor of Computer Science at Norfolk State University. She received her Ph.D. and B.S. degrees from Old Dominion University in Norfolk, VA. Before entering academia, she worked in industry as a software developer for 19 years. Her research interests include computer science education, pervasive computing, and QoS in wireless networks.

## App Inventor Workshop

This workshop will introduce MIT App Inventor, a blocks-based programming environment for building Android apps ([appinventor.mit.edu](http://appinventor.mit.edu)). Attendees will learn the basics of programming with App Inventor, and create a simple app. To participate in the hands-on portion of the workshop, attendees should bring a laptop that has already been configured for use with App Inventor. The following link describes the steps required for setting up App Inventor:

[beta.appinventor.mit.edu/learn/setup/](http://beta.appinventor.mit.edu/learn/setup/)

# ADMI WORKSHOP PRESENTERS



**Dr. Mary Lou Soffa**  
Owen R. Cheatham Professor  
Computer Science Department  
UNIVERSITY OF VIRGINIA

Dr. Mary Lou Soffa is the Owen R. Cheatham Professor in the Computer Science Department at the University of Virginia and served as Department Chair from 2004 to 2012. Her research interests include optimizing compilers, virtual execution environments, software testing, program analysis, software security, and performance for multi-core architectures.

Soffa received the ACM/IEEE Ken Kennedy Award in 2012 and the Anita Borg Technical Leadership Award in 2011. She is an ACM Fellow and an IEEE Fellow. In 1999 she received the Presidential Award for Excellence in Science, Mathematics and Engineering Mentoring the same year. She was selected as a Girl Scout Woman of Distinction in 2003 and received the Computing Research Association (CRA) Nico Habermann Award in 2006.

## Opportunities in CS Organizations Workshop

This presentation will consist of personal and professional opportunities that are available through the computer science national organizations, including ACM, the Computing Research Association (CRA), and the ACM/CRA/IEEE Coalition to Diversify Computing. Programs, workshops and opportunities for awards will be described as well as how to apply.



**Dr. Ted Mims**  
Chair of the Computer Science  
UNIVERSITY OF ILLINOIS AT  
SPRINGFIELD

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.

# ADMI WORKSHOP PRESENTERS



**Dr. Loretta A. Moore**  
Associate Vice President for Research  
and Scholarly Engagement  
JACKSON STATE UNIVERSITY

Dr. Loretta A. Moore was recently appointed to the position of Associate Vice President for Research and Scholarly Engagement at Jackson State University (JSU) located in Jackson, Mississippi. Her portfolio includes the Academy for Research and Scholarly Engagement. Dr. Moore is the Principal Investigator on a grant from the National Science Foundation's ADVANCE program, which is aimed at advancing the careers of female faculty in the Science, Technology, Engineering and Mathematics (STEM) disciplines as well as the Social and Behavioral Science (SBS) disciplines. The project's overall purpose is to transform the institution's climate to promote equal opportunities for the advancement of all faculty. Dr. Moore serves as a Commissioner for the Computing Accreditation Commission of ABET. . She is a member of the Board of the Association of Departments of Computing at Minority Institutions; previously served on the U.S. Army Science Board; and currently holds membership in ACM, IEEE, and AAUW organizations. She is active in the recruitment, retention, and promotion of African-American Computer Scientists and actively supports the professional advancement of both students and faculty. Dr. Moore received her B.S. degree in Computer Science from Jackson State University and her M.S. and Ph.D. degrees in Computer Science from Illinois Institute of Technology.

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**Dr. Cheryl Seals**  
Associate Professor in the Computer  
Science and Software Engineering  
Department  
Auburn University

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 interest in programs that are community centered, increase diversity in technology, and targeted at helping today's youth strive for a better tomorrow. Seals continuously works with programs that provide computer interventions for students in the elementary, middle and high schools in the local area.



# ADMI AWARDS CEREMONY SPEAKER



## **Dr. Gamaliel “Dan” Cherry**

Langley Research Center  
Office of Human Capital Management  
NASA Aerospace Education  
Services Project Manager

Dr. Gamaliel Cherry grew up in the small town of Jackson, NC located in the Eastern Region of North Carolina where he graduated with honors from Northampton County High School East, in Conway, NC.

Gamaliel has served with the National Aeronautics and Space Administration for eight years in the areas of Education and Human Resources. Currently, he is the Agency director for NASA's Aerospace Education Services Project at Langley Research Center. In the past his duties consisted of serving as an Organization Development (OD) consultant, Training Specialist, and Executive Coaching program manager. His OD duties include coaching organizations to reach more efficient operations and developing custom engagements that focus on specific client needs. He monitors LaRC training requests and develops custom training programs that decrease skill gaps for organizations. His coaching responsibilities include matching potential coaches with clients at LaRC and monitor ongoing engagements ensuring client needs are met. He has served as the team lead for Langley's 21<sup>st</sup> Century Lab initiative and is currently the education and development sub-team lead for NASA Langley's Workforce Strategy Team.

During his tenure with the Education office, he has served as a presenter for NASA's Digital Learning Network, participated on several working groups to enhance education programs, and helped develop the Office of Education Performance Measurement system (OEPM).

Gamaliel holds a B.S. from Elizabeth City State University, a M.S. in Education, and a doctorate in Instructional Design and Technology from Old Dominion University. He currently resides in Hampton, VA with his wife Erika and their two daughters, Zoe and Zariah. He enjoys exercising at NASA gym and playing basketball. He also has recently taken up model helicopters as a hobby when he has spare time.

# STUDENT POSTERS - UNDERGRADUATE

NO	Author	Title	Institution
1	Abraham, Natasha	Oh, What a Tangled Web	Howard
2	Aldrich Jr , Bernard	Spectroscopic Image Signature Classification of Land Cover Types using Multi-Spectral Data within a Neural Network	JSU
3	Bell, John	Social Media System: An Automated Twitter Search for Adverse Weather Conditions Based on Geographical Location	MVSU
4	Bridgers, Ya'Shonti	Designing a Curriculum for Communicating Parallel and Distributed Computing Concepts to Underserved Communities	ECSU
5	Burns, Hasani	Exploring the Performance of the iRobot Create for Object Relocation in Outer Space	Hampton
6	Davis, Donquel	Culpepper Rebellion Archaeology Using Radar and Mapping Software	WSSU
7	Deschamps, Mark Brown, James	RFID Manipulated Multi-robot Coordination Systems	NSU
8	Edmonds II, Clarence	Android Application for Physical Activity	NSU
9	Farhat, Tarana	The Key Retriever Robot	Hampton
10	Hawkins, Devon	Silent Alert Robot	Hampton
11	Hubbard, Dominique	A Practical Study of Privacy Issues Location-Based Service	FAMU
	Herd, Jessica	A Practical Study of Tracking Laptops and Mobile Devices via Open Sources	FAMU
12	Jamerson, Jerron	Assistive Robotics: Vision, Navigation and Manipulation (Comparing Calliope to Kari)	WSSU
13	Johnson, Britney	A Leap into the World of Visualization Technology	Hampton
14	Johnson, Jazette	Mobile Healthcare Informatics: Alzheimer's Music Therapy Mobile Application	Spelman
15	Johnson, Shaquia	Utilizing Data Sets from the CReSIS Data Archives to Visualize Greenland Echograms Information in Google Earth	MVSU
16	Kumar, Namarta	Dynamics and interest rate control of a financial system with time-delayed feedback	MVSU
17	Lacy, Alexanderia	Optimizing Satellite Based Marine Debris Detection	MVSU
18	Macklin, Brooke	Introductory to CS-EE-ME: a-week long, high-school curriculum	MVSU
19	McClanahan, Brian	Application to Teach Machine Learning Concepts in Online Environment	NSU
20	McMillian, Blake	PR2 Teleoperation	Hampton
	Morris, Derek	Documentation of SeaSpace Ground Station Systems at ECSU	ECSU
21	Myles, Cornelius	Graphical 2D Webpage	MVSU
22	Okonkwo, Christopher	Testing of Physical Activity Monitor Systems (PAMS) for Manual Wheelchair Users	NSU
23	Owens, Aaron	Computational Neuropsychology/Neuropsychology with Computational Methods Spatial Working Memory in Ts65Dn Mouse Models using Y-Maze Apparatus	Morehouse
24	Peterson, Erica	Utilizing ArcGIS in Education to Map a Glacier and Its Changes Over Time	MVSU

25	Smith, Brandi	Analysis of Breast Cancer Cells Using Parallel Programming	MVSU
26	Smith, Khadijah	Evaluating Development and Maintenance of XML-based versus HTML-based Websites	WSSU
26	Smith, Maya	Utilizing Data Sets from the CReSIS Data Archives to Visualize Greenland Echograms Information in Google Earth	WSSU
27	Toledo, Albert	Neptune: Aquatic Search and Rescue Robot	Hampton
28	Turner, Marvin	Using Interactive Storytelling Agents to Broaden Participation in Computing	Morehouse
29	Vaval, Chatavia	A Practical Investigation of Steganography Detection Tools for Smartphones	FAMU

## STUDENT POSTERS - GRADUATE

No	Author	Title	Institution
1	Bly, Patrina	A Demographic Study of Students Participating in the CReSIS Education Program	ECSU
2	Eng, Alexander	Forensics Mobile Imaging: An On-The-Go Solution	NSU
3	Fennell, Tyisha	Developing a Residential Lock Solution Using a Mobile Phone	NSU
4	Rich, LaToya	Using Virtual Environments for Forensic Education	NSU
5	Williams, Crystal	Image Forensics Based-on Watermarking	FAMU

# **FACULTY PAPER ABSTRACTS**

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## **On the Use of Technologies such as Alice, Greenfoot, and Scratch to Teach Computer Science**

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While all of these technologies are very effective at introducing the student to Computer Science, each has its own strengths and weaknesses and the technology needs to be chosen very carefully based upon several factors. This paper examines the original design objectives of each of the technologies, the computer science concepts that these technologies present, and how these technologies are actually being used in the classrooms.

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## **Intelligent Tutor: Teaching Programming Strategies to Novice Programmers**

David Angulo Rubio

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Many programming environments for novices begin with the recognition that programming is a hard skill to learn. We attempt to build a programming environment that gives novice programmers a more manageable, learnable environment, called "Intelligent Tutor". This paper is intended to support students, novice programmers, who struggle with the basic concepts of how to program. Understanding where the difficulties lay (knowledge domain, pedagogical domain, and/or student domain) this study will develop a solution in the form of an Eclipse Plug-in called "Intelligent Tutor". This tool will help students overcome the learning curve that students have about programming and give them all the necessary help in order for them to easily understand programming concepts.

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## **Experiences Teaching Collaboration for Game Innovation to Computer Science Students**

Todd Shurn

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We discuss experience from collaborative assignments between an upper level computer science game programming course and a journalism new media course. Our objective was to improve the original game and the interactive media product quality through cross-disciplinary student teams. We encouraged students to create Microsoft Imagine Cup, The Entertainment Software Association (ESA) National STEM Video Game Challenge and Associated Press Style games. We expound on success, failure and lessons learned.



# GRADUATE PAPER ABSTRACTS

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## Applying Contract Net Protocol to the Monitoring of Structural Health of Aircraft

Gina Bullock  
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This paper reports on work on structural health monitoring done for NASA at North Carolina A&T. A multiagent system is envisioned where a hierarchically structured collection of agents monitors the health of a structure. The monitor agents lowest in the structure are associated with sensors on given regions. They negotiate with specialized agents to find suitable ones for classifying the events associated with the signals. The hierarchy reconfigures dynamically, and problem solving follows the structure of the hierarchy in opportunistic ways. Agent collaboration and organization are largely governed by the Contract Net Protocol. Here an agent with a problem decomposes it into sub-problems, for each of which it acts as the manager. It announces a sub-problem, and all interested agents submit a bid to the manager describing how they would solve it, and the manager selects the contractor for the sub-problem.

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## Validation of the 2003 Antarctic Grounding Line Through the Use of ENVI®

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The extent of the ice sheet and its dynamics or mass balance can be determined by making an accurate measurement of its area. To measure the area of the continent's ice sheet, the grounding line must first be accurately determined. The grounding line is the boundary between the grounded ice resting on land and the floating ice constituting the ice shelf perimeter of the continent. In a project entitled Antarctic Surface Accumulation and Ice Discharge (ASAID), Dr. Robert Bindschadler, lead an international team of glaciologists and computer scientists, including students from Elizabeth City State University (ECSU), obtained a more accurate measure of the area of the Antarctic ice sheet in order to determine its mass balance. That is, whether the amount of ice is growing or diminishing over long time intervals. Bindschadler's team determined the grounding line using methods of photogrammetry with LANDSAT Enhanced Thematic Mapper (ETM) image brightness and surface elevation data from the Geoscience Laser Altimeter System (GLAS) aboard NASA's Ice, Land and Cloud Elevation Satellite (ICESat) polar orbiting earth observatory. The ASAID grounding line (GL) was established using LANDSAT 7 and GLAS data obtained in 2003. However its accuracy had not been tested. With the current ASAID 2003 Grounding Line, the CERSER GL Validation Team was tasked by Dr. Bindschadler with determining its accuracy in two coastal regions and whether changes have occurred over long time intervals.

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**FORENSICS E-LEARNING: TEACHING LAW AND ORDER**

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It is common knowledge to professors that students learn in different ways. This research work presents an alternative or aid to traditional, in classroom lectures. We developed a web application and game that can be accessed from the Google Chrome Store and utilized by students. This research describes a fun and educational way for undergraduate and graduate students to learn selected digital forensics concepts. The intention is that this web application will serve as a resource for students while they are taking digital forensics courses or as a refresher after completion of digital forensics courses due to the lack of similar resources currently available. Our product will encourage students to succeed and increase interest in performing investigations through Computer-Assisted Learning (CAL).

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**Authentication Vulnerabilities in OpenEMR**

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Electronic record systems help the evolution of healthcare transactions from an inefficient, paper-based system to a more reliable, real-time paperless system. There exists a number of an Electronic Medical Record (EMR) system that allows doctors to find and store information efficiently. A widely used one is OpenEMR, which provides such features as handles electronic billing of patients and insurance, including Medicare, and gives users the ability to view and manage patient history and medical documents, including electronic prescriptions, as well as patients' visits and demographic information. It can also manage scheduling through its calendar feature, which can sort appointment types into categories and restrict when they can be scheduled based on type. Though OpenEMR 4.1.1 is HIPAA compliant and CCHIT certified, it still has security vulnerabilities. This paper reports some of the authentication vulnerabilities in OpenEMR 4.1.1

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## **Programming Learning Management Model for Teaching Introductory CS1 labs**

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The purpose of the fundamental programming (CS1) lab is to provide students with hands-on experience in computer lab and support them with on-site help. By creating an environment where students can learn, practice and discuss during the 2 and half hours lab, we are able to observe their ability to master and implement material and analyze their performance in class. We encourage TA (Teaching Assistant) to students and student to student interactions in order to solve whatever problems they have, including but not limited to, programming theory, programming structure and debugging.

The Computer & Information Sciences department at FAMU has been using Unix system to manage students' work, scores and profiles for years in teaching various programming classes. This management system provides a very efficient way to teach, store, and grade students' work. Considering the fact that on average upward of 100 students take fundamentals of programming class per semester such systems are needed to assist the flow of the class. We propose our teaching model and Unix management system as a system capable of being used for any introductory CS1 lab courses. Given data collected in our department we analyze and offer insights into some of the issues that arise while teaching CS1 labs and conclude that our model provides a very useful and efficient tool in teaching variant fundamentals of programming labs.

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## **Temporal Reduction And Loss Of An Ice Shelf In Pine Island Bay, Antarctica: 1972 – 2003**

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Observed changes in the Antarctica ice sheet have caused global concern that sea level rise driven by continued and possibly accelerated ice loss will increase the stress on coastal regions around the world. Changes in Antarctic ice loss are strongly concentrated in coastal regions of the ice sheet, in general, and in the Antarctic Peninsula and the Amundsen Sea regions, in particular Ice shelves are the floating extensions of grounded Antarctic outlet glaciers and are directly involved in retaining the ice sheet and controlling the rate of grounded ice discharge. In the Antarctic Peninsula, the sudden loss of entire ice shelves has preceded, and is held to be responsible for, large and sustained accelerations of the glaciers feeding those former ice shelves. In the Amundsen Sea region, indeed anywhere south of the Antarctic Peninsula, ice shelf thinning has been reported, but not completed ice shelf loss. This paper reports the first loss of an entire ice shelf south of the Antarctic Peninsula.

The gradual reduction of an ice shelf in Pine Island Bay is measured using 9 Landsat images spanning the years 1972 to 2003. Ice shelf area changes little in the first decade from the 6.18 km<sup>2</sup> areas measured on December 7, 1972 with slight growth to a maximum area of 7.78 km<sup>2</sup> observed in 1986. This maximum is followed by a nearly monotonic decrease in area and ultimate disappearance by January 17, 2003. No ice shelf has reappeared since 2003. Area measurements were preceded by coregistration and warping of each image to a pair of 2003 images used as geographic references. Four independent measurements of ice shelf area were made on each image with

an average standard deviation of 0.14 km<sup>2</sup> when lateral limits were imposed on the ice shelf. The specific cause of this ice shelf disappearance is unknown, but is probably related to increased basal melting by warmer waters in Pine Island Bay, believed responsible for ice shelf thinning and outlet glacier retreat and thinning reported throughout the munsen Sea region. This is the first report of complete ice shelf loss either so far south or in the Amundsen Bay region. This previously unnamed ice shelf is referred to in this paper as the Elizabeth City State University (ECSU) Ice Shelf.

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## **Wireless Sensor Networks and Data Fusion for Structural Health Monitoring of Aircraft**

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This paper discusses the integration of a multiagent based control system for a wireless sensor network used to create a more efficient system that is better able to take advantage of the networks set up and capabilities. A sensor web is a group of networked sensor nodes linked together physically or wirelessly to create a web for use in data detection and transfer. Incorporating multiple software agents as a multiagent system allows the hierarchy of the data transfer network to be customized to meet the needs of varying network necessities while also staying flexible enough to update as needed to meet the needs of state or situation changes. The agents are also able to break down large tasks into smaller subtasks in order to simplify complex tasks for more efficient processing. Agents are provided access to applications, which are trained offline, that provide classification services for characterizing events as they happen.

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## **Gaming As A Tool For Teaching Object-Oriented Programming Concepts In C++**

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Recently there have been several techniques introduced to attempt to stimulate the current student body's interest in computer programming—ranging from programming games to programming robots. The use of games to teach programming and programming concepts has shown some successful results in attracting and retaining students in computer science. In this paper, we will describe the design of a video game used as a tool to help teach students the object-oriented.

# **GRADUATE POSTER ABSTRACTS**



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## **A Demographic Study of Students Participating in the CReSIS Education Program**

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The development of a monitoring system is necessary for the tracking of past student participants of the National Science Foundation (NSF) Research Experience for Undergraduates (REU) programs at the Center for Remote Sensing of Ice Sheets (CReSIS) sites. Monitoring of these past students provides facilitating centers, such as CReSIS, with a historical database of student involvement, further accomplishments of those students, and a basic archive for future contact and possible collaborations. Analysis of the database will be used to support the national Science Technology Engineering and Mathematics (STEM) initiative and provide supportive documentation to NSF, the current funding agency for CReSIS.

The major goal for the construction of this monitoring system includes the compilation of an active database pertinent to information regarding past REU student participants. It is hypothesized that this newly built database will provide necessary information for analysis and support of study objectives. A final report of results are to serve as justification for current support received by NSF and as well, ensure future funding for programs, such as CReSIS, directly relevant to STEM

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## **Forensic Mobile Imaging: An On-The-Go Solution**

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Cyberforensics is a relatively new branch of forensics that deals with computers and the associated technologies. Reflecting computer technology, the field is constantly changing and evolving. While traditionally focused on desktop and laptop applications, the use of mobile devices such as smartphones and tablets remain relatively unexplored as serious forensic platforms. We have focused our research on developing forensic applications for use with mobile devices that are based on the open-source Android operating system produced by Google. The variety of Android devices and their large share of the mobile market make them a prime candidate for this research. The application we will be discussing is a combination write blocker and forensic imager that can be used to create forensic images of small capacity USB storage mediums such as USB Flash drives. The Android OS's nature as a heavily modified version of Linux assists in the creation of images that are compatible with a wide variety of analysis software..

We feel that this application will be useful for forensic first responders that arrive to a scene that contains time sensitive materials. The application would allow these first responders to quickly create forensic images of small capacity USB drives on their Android mobile devices. The images will be stored in the Android device internal memory or expanded memory such as a micro-SD card. Before creating the image the application generates a MD5 checksum to be used for verification. To facilitate the correct use of the application the user interface will be constructed in a step-by-step informational wizard that will guide the user through the process of creating a secure image that is viable as evidence. At this point in development the application is designed for Android devices that have been allowed super-user privileges, but we hope that future iterations will eliminate the need for this allowing for even greater widespread distribution throughout the cyberforensic community. Our ultimate goal is to create an application that is simple to use and becomes an asset to the field.

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## Using Virtual Environments for Forensic Education

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With the increasing number of mobile devices, smartphones have become a way of life. Consequently, this has generated various security concerns with smartphone users and has elevated the number of cybercrimes. As of June 2012, a market researcher of CNET News, named Steven Musil stated that Android smartphone users consume 50.8% of all smartphones. The Android platform is open source and was intended to evolve the developer community. Although this idea works to the advantage of the developers, it also works to a great advantage for hackers. To increase the pipeline of students in the cybersecurity field, I have developed an educational environment for undergraduate students to acquire a better understanding for basic mobile forensics. A virtual Linux environment has been constructed that will contain an open source digital forensic analysis tool, Sleuth kit, which is a UNIX-based command line tool to investigate digital crimes. There is a self-paced tutorial that will explain the forensic steps on how to image, analyze, and understand an Android forensic image. Upon the completion of the lab, it will be beta tested on undergraduate students to ensure that the labs are beneficial for future Forensic class projects.

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## Image Forensics Based-on Watermarking

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Doctored images, videos and audio are used to insert special objects into by copy-paste processing that conceals special objects from original images. Doctoring images is extremely common this day and age which goes back as far as the late 1800s. All image tampering isn't malicious when dealing with the entertainment industry but when it comes to the government and publishers receiving outside photographs questions of originality comes to mind. How do you differentiate an original picture from an altered one? A plethora of methods have been studied of different steps that can be taken to determine whether the package has been tampered with. Digital watermarking [1] seems to be evolving more amongst computer scientists. This is an approach from centuries ago used to copyright pictures for authentication [2] but sometimes invisible to the naked eye. This poster will provide a survey of different digital watermarking techniques that can be used to discover quickly the integrity of the image. In addition, this poster will also demonstrate the misleading strategies used on individuals receiving these images

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## **Developing a Residential Lock Solution Using a Mobile Phone**

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In society today, mobile devices have become part of everyday use. These are used mainly for their convenience and ubiquity, and are often understood to be personally trusted devices. These personal digital assistants (PDAs) typically contain a user's personal identification, daily transactions, and day to day activities. With the capabilities that mobile devices provide, users, in general, want to deny unauthorized access to keep their information confidential. By using mobile devices with multiple capabilities, users are able to take advantage of the wireless communication network containing multiple services such as GPS, internet access and Bluetooth. Utilizing these network services can help with accuracy of tracking users. This research effort involves use of mobile devices to monitor user locations and grant or deny access to a residence using a mobile device.

# UNDERGRADUATE PAPER ABSTRACTS

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## Predicting Marked Code-switching in African Languages

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Code-switching refers to the alternation by a speaker between multiple languages during a single conversation. It is a social phenomenon that is becoming increasingly common as society becomes more heterogeneous linguistically and culturally. This paper describes our effort in creating a statistical model that can predict cases of code-switching in a multi-lingual text. Firstly, in order to better understand the text, we modeled the major topics in the text using a natural language processing technique known as *Latent Semantic Analysis (LSA)*. After obtaining the major topics, we then modeled the change in the issues covered through the course of the transcript.

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## Blackout-Bot: Guidance for Household Emergencies

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The "Blackout-Bot" is a robot to be used in an emergency situation in particular at the time of power outage. In this paper a design and a prototype of Blackout-Bot have been implemented. Though limited in resources, we have produced a robot with the ability of providing assistance in small, but vital ways to a young child home alone, a senior citizen, or even one with a disability. This paper will also discuss benefits of Blackout-Bot to the society, its future, and potential enhancement.

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## Digital Submission of Abstracts for STEM Research Day

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Every Spring at Mississippi Valley State University, there is a day for the science, technology, engineering, and mathematics students to present research they have conducted over the past year. This day is known as STEM Research Day. The problem that occurs involves students submitting their materials to present for STEM Research Day. Students have the overhead of having a faculty member to approve their submissions via a manual process. To automate this process, a website was created to allow students to submit their research electronically. Once a submission is submitted, the student's information will be uploaded and can be viewed by an administrator for approval. A faculty member can easily email the author of a submission and inform them to correct any issues with their abstracts



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## **A Dashboard for Viewing Web-services Data for Structural Health Monitoring**

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Advisor: Dr. Albert Esterline

As a research assistant under the Army Research Grant, I am implementing a dashboard for displaying information for monitoring structural health of an aircraft. Dashboard will receive information in the form of XML (Extensible Markup Language) documents provided by Web services. The Web services are provided by the agents in the multi-agent system. I am addressing the multi-agent system and its integration with Web services and information available in the form of HTML documents. I am presented the task to create a dashboard in either HTML (Hypertext Markup Language) with some features implemented in AJAX (Asynchronous JavaScript). The purpose of the dashboard is to allow experimentation as well as to display system activity. Software applications for the project will be running on multiple workstations. My work includes learning the agent framework JADE, which is a Java application. Also, agents will be able to consume Web services (outside the agent system) as if they were agent services, and certain agent services will be made available as Web services. Web services are important for machine-to-machine communication, but information for human consumption will be provided in the form of HTML documents.

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## **Applying Common Core Standards in Grades 4th-10<sup>th</sup> Using LEGO Robotics**

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Common Core Standards includes critical content for all students in American education. Forty-eight of the fifty states have adopted the standards as of 2012. Previously, every state had its own set of academic standards and students in each state had been learning at different levels. In the new global economy, all students must be prepared to compete with students from around the world. Students are expected to develop deeper mastery of content and demonstrate what they know through writing and other projects. Changes to curriculum and instruction are more student-centered with greater focus on skills, abilities, and a shift towards more performance assessments. This research was designed to apply mathematical processes of the Common Core Standard in a lesson plan on the K- 12 academic level: elementary, middle and high school. The team used NXT LEGO® robotics to teach various scientific, mathematical, and design concepts, through designing, building, and programming the robots at each level. The students' received hands on experience with physics, mathematics, motion, environmental factors, and use problem solving in a collaborative group setting. The data was collected through observations.

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## CONCEPTUAL DESIGN OF A MOBILE APPLICATION FOR MUSIC THERAPY TO INFLUENCE MOOD SHIFTS

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Music therapy has been studied widely by music psychologists and music mood classifications have been researched by information technologists. The ability of music to relate to and actually even change human emotion has been explored previously and various explanations of this ability have been determined. This research attempts to apply this theory that music can effect human emotion by designing a mobile application for daily music therapy to alter the user's mood as they desire. This application could be used to assist in shifting ones emotion from an unwanted or unproductive mood to the desired or needed mood of the user. For example, if the user is energized but needs to rest, the application would play music with on a calming emotional melody and tempo. This research explores the possibilities of implementing such a mobile application which detects the mood and needs of the user via user input, selects songs from a database sorted by music mood, and provides musical playback in order to help the user achieve their desired mood. The following paper outlines the design and future work necessary to implement such an application.

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## Parallel and Heterogeneous Computing Architecture

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Modern processors are evolving into hybrid, heterogeneous processors with both CPU and GPU cores used for general purpose computation. Several languages such as Brook, CUDA, and more recently OpenCL are being developed to fully harness the potential of these processors. Programs written in these languages typically divide the control code running on the CPU and the performance-critical, data-parallel kernel code running on the GPUs. Several applications in image and video processing, games, financial modeling, and scientific computing have been shown to benefit significantly from this style of Computing. This research project examines how the acceleration of image rendering benefits from parallel and heterogeneous computing. The observation between all computing platforms is needed to decide which one is suitable for computing and producing images. Researchers have exploited parallelism to improve the performance of various applications, but there has yet to be a solution fast enough and effective enough. To achieve real time image production acceleration, an implementation must simultaneously exploit parallelism in the application by targeting a heterogeneous platform whose computational components (e.g. multiprocessors, graphics processors) are efficient. By using OpenCL as a canonical language for heterogeneous computing, and running several experiments, our research shows that heterogeneous computing techniques enable code to execute efficiently. The results also show that for maximum performance, it is beneficial for applications to utilize both CPUs and GPUs as accelerator targets. This research presents the results obtained by applying Parallel and Heterogeneous Computing.

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## **Web services for Structural Health Monitoring of a Multiagent System**

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In this paper, we will address the need and use of a multiagent system and a Web service; discuss how we are developing a structural health monitoring system and the need to use a variety of software systems to do so. Most aircraft systems are routine and scheduled based to where the whole structure is checked for its status of its parts and its overall health at a common checkpoint. Our structural health monitoring system illustrates the use of multiagent systems and Web services that help more aircraft systems respond to real-time situations and keep more aircraft systems in flight.

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## **Data Mining: Is LDA the best option?**

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This project is about research over information security in businesses, specifically with convincing employees to use and enforce security measures. After all, what is the point of a fabulous security system, if your employees aren't using it? Cyber intruders "pay more attention to the human link in the security chain than security designers", meaning that businesses need to not only invest in good cyber protection, but in making sure that their employees uphold those programs. At UCL an interactive survey with game-like elements was developed that gets information from employees to help design security systems that are less obtrusive to their jobs (Ruskov, Sasse, 2012). As a part of the "game", the user must suggest intervention methods to counter cyber attacks in different situation. This information is collected and that information is analyzed in this project. The objective of this project is to write a program that can classify this information so that it can be shown to future users when they enter similar inputs. A variety of models were reviewed to find the best fit to cluster the feedback from the game, and eventually Latent Dirichlet Analysis was chosen as the best fit because of the topics that it returns. Topics from the LDA will be presented as well as an evaluation of how different parameters affect the number of topics. Further research includes improving existing models and plans for a new model

# UNDERGRADUATE POSTER ABSTRACTS

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## Oh, What a Tangled Web

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The title of this abstract is taken from the classic poem, "Marmion" by Sir Walter Scott, written in 1808. The full quote, better known to many, is:

Oh, what a tangled web we weave,  
When first we practice to deceive!

Although Scott could never have dreamed of the Internet or the World Wide Web, his quote is perhaps more relevant today than 205 years ago.. As we observe more and more widespread instances of malicious software behavior on the Internet, there is growing evidence that a significant component of attacks that are taking place throughout industry and government involves deception --- on the part of the attackers, the attacked, defenders and observers --- either for deliberate or accidental deceptive purposes.

As an example of a recent series of incidents where deception can be suspected, we consider an article from a widely-considered reliable source, the Washington Post, in an article entitled "Banks seek NSA help amid attacks on their computer systems", written by Ellen Nakashima and published on January 11, 2013.

In short, the article indicates that a number of banks (six were listed by name) had approached the National Security Agency for assistance in protecting their computing environments after "a barrage of assaults that have disrupted their Web sites". In particular, it was reported that (a) the attacks may have been carried out by Iran; (b) that these attacks began about a year ago; (c) that they have intensified since September; and (d) that these attacks occur only on Tuesdays, Wednesdays, or Thursdays.

In order to gain a better understanding of these phenomena, we have conducted a detailed analysis of the Web traffic at the sites of the 20 leading banks in the United States. What we have found calls into question some of the claims indicated in the article. For example, only 60% of the leading 20 banks show any evidence that there may be a greater number of attacks in 2012 than in the previous year.

The article also indicates further intensity from September 2012 onwards. This is only potentially the case in 20% of the banks, and only one of the six banks indicated by name in the article. Our research does indicate that normal traffic on bank sites tends to be heavier in the midweek days, although to some this may seem to be counterintuitive. However, we find little evidence of increasing numbers of attacks on those days as opposed to others.

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## **Spectroscopic Image Signature Classification of Land Cover Types using Multi-Spectral Data within a Neural Network**

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Through improvements in technology, high resolution multi-spectral imaging allowed new capabilities to become available in the remote sensing field. Spectral signature classification technologies existed in the chemical spectroscopy field to identify minerals by way of active systems. The theory of this paper surrounded the premise that passive systems can provide spectral signatures of objects within images from satellite platforms. Specifically, this paper targeted land cover types from the Kittyhawk, North Carolina area. Multi-spectral signals presented up to seven individual readings per pixel. As the decision support system, a neural network was trained to determine the land cover type based on the band readings. In an effort to determine specific land cover types based on need, ground truthed spectral readings were also classified using a linear model to convert the readings into approximate satellite readings. The converted readings were then classified by the trained neural network. A minimal r-squared valued of 86% was required to be considered a viable method of image classification,

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## **Social Media System: An Automated Twitter Search for Adverse Weather Conditions Based on Geographical Location**

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The National Weather Service (NWS) always aspires to quickly notify the public of significant weather events. The organization's response in the wake of certain events such as Hurricane Sandy, and most recently the tornado in southern Mississippi demonstrated their readiness and commitment to serving the public. However, certain information regarding weather conditions and the damage being experienced by the affected area cannot always be known in real-time. This poses a potential problem when faced with catastrophic weather. The NWS chose to explore a different avenue for monitoring and obtaining real-time data by using social media during adverse weather situations. Within the last five years, social media has become responsible for the way that many people communicate and exchange information. It is also one of the best ways to stay aware of current events as well as learn the thoughts, opinions, and actions of others.

For this project, a social media program was created to allow the NWS to monitor and interact with Twitter, the second-largest social media service in the United States. Along with the rate at which users tweeted, the ability to perform advanced geographical queries would also prove crucial to the efficiency of this tool. Research and extensive program would lead to the production of weather-related Twitter client. As a result, the project demonstrated how to successfully integrate selected features from Twitter into a system designed to improve the organization's effectiveness.

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## **Designing a Curriculum for Communicating Parallel and Distributed Computing Concepts to Underserved Communities**

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The emergence of multi-core and distributed computing has transformed mainstream application areas in industry and has demanded a rise for teaching parallelism and concurrency in computer science curriculum. However, minority serving institutions are at a disadvantage for offering courses in parallel and distributed computing because of the lack of resources and inability to teach those concepts. We argue for teaching these topics incrementally in computer science courses at underserved institutions, and propose a comprehensive approach involving flexible teaching modules with experiential programming exercises and other supplements, support materials for parallel computing resources, and development of an online community of educators and module contributors who support each other.

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## **Exploring the Performance of the iRobot Create for Object Relocation in Outer Space**

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This research explores the performance of the iRobot Create machine for optimizing object relocation in an outer space environment. It is an ultimate goal to have it become a symbol of innovation for robots that are sent into outer space. Functioning as a tool-bot, and an active assistant, this robot aims to assist in small duties and respond to commands. With its arm and color blob recognition capabilities, this robot has the potential to receive a request, register and associate it with existing objects in its line of sight, and maneuver the arm to act accordingly, grabbing the correct object and giving it to a worker or engineer. However, this is only one potential use for a robot of this kind. There is also depth in the flexibility of the robot, and its ability to respond and react accordingly to a number of different commands. A simple, yet responsive assistant can be essential to space repair. This poster and presentation explains current progress and implementation of the iRobot Create for this purpose

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## **Culpepper Rebellion Archaeology Using Radar and Mapping Software**

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The purpose of this study was to reveal whether any remains of earlier structures are currently present in specified locals. Aerial photos of the Elizabeth City area, made prior to and just after World War 2, were examined to determine the location of the original shoreline and any structures that may have contained elements of the original colonial era buildings. Modern Digital Orthographic Quarter Quad (DOQQ) aerial photographs will be used to provide geo-referencing of the early aerial photographs. The geographic coordinates of the structures formerly occupying the Cobbs Point site identified an area that allowed the Ground Penetrating Radar (GPR) survey to be used. Mapping of the area was accomplished using ENVI to find relative ground control points and superimposed the image onto the maps. The features appear to be present within the soil depth probed by GPR, their nature and exact location may be determined by a trained archaeologist using a probing device to penetrate the soil at locations revealed by the GPR survey

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## **RFID Manipulated Multi-robot Coordination Systems**

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**Dr. Monica Anderson**

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A modern approach for multiple robot coordination and task planning can be implemented with the use of radio frequency identification (RFID) technology. In this poster, we describe an experiment on multiple robot coordination which is modeled after the behavior of ant colonies. Ants use scents to differentiate between what tasks are assigned to which ants. In our experiment, this behavior is mimicked using radio frequency identification tags to specify the tasks assigned to the cooperating robots. Through the use of portable, RFID tags the tasks within a system can be easily modified. The original idea for this project was proposed by Dr. Monica Anderson at the University of Alabama whose research group is investigating coordination between multiple robots.

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## **Android Application for Physical Activity**

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The youth today are becoming more interested in sedentary activities over traditional physical activities, resulting in childhood obesity. The current available mobile device applications consist of many different systems that do not require physical activity from the user, even when the software pertains to health. To address this serious health issue, Android mobile devices are equipped with applications that specifically make physical activity more appealing to adolescents. Particularly, an Android arcade interface is designed using scenario-based design and wire framing. A software solution will be developed utilizing Android mobile devices and the features of such



devices that make interaction and monitoring of user activity possible such as Bluetooth and accelerometer technology.

The arcade interface application uses hardware components of the Android device to make the application interactive between the user and device. “Blob Tag” is one of the arcade games that uses Bluetooth and requires the player to chase other players to tag them. As players are tagged, the Blob will continue to grow and the last remaining untagged player wins the game. “My Healthy Best Friend” is a game that resembles a modern day Simon Says game. However, this game prompts the player to do more physical activities such as running and jumping. This game uses the camera and accelerometer of the Android device to make that game interactive and to grasp the attention of youth performing the physical activity. Feedback will be given to the users about their activity level and suggestions made for improvement.

After the implementation of these two games, user testing will be done to evaluate functionality of the arcade. Evaluation of the applications usability will be based on feedback received from users between the age of 7 and 14 years old. A usage manual will be developed for the solution to fight the risk of obesity among children today. This manual will serve as a guide to the type of physical activities that young people can involve themselves that are effective for and appealing to them.

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### **The Key Retriever Robot**

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Simply put, robots have the potential to make life a lot easier as well as a lot more efficient. In this case, robots have the potential to make life more stress-free. Have you ever been in a hurry or running late and couldn't find your keys to save your life? Don't you hate that? What if there was a robot that could find keys for you? This simple idea is the premise of the key retriever robot, a concept that was proven through this research. The key retriever robot is a functional robot that is receptive and is able to find any keys (or similar object) that may be attached to an IR sensor that sends out a signal. The part attached to a key ring continuously delivers a specific IR signal. The robot uses an IR sensor to search for this signal by turning around the room and finally moving toward the found object. This concept robot could prove to be a tremendously useful launch pad for those seeking to seriously create and mass produce an object location robot

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### **A Practical Study of Tracking Laptops and Mobile Devices via Open Sources**

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With the rapidly growing amount of people relying on laptops and mobile devices, it is very imperative that their devices are protected from theft. Unfortunately, not everyone can prevent their devices from becoming lost or stolen, which is why open source software such as, PreyProject is exceptionally beneficial. PreyProject allows users to monitor and track their personal devices by gathering information regarding the missing device's location through Wi-Fi or GPS. This software can also acquire the missing device's current hardware and network status, take a screenshot of the active session if a laptop is stolen, and even sound an alarm that will attract attention. Most importantly, this technology has a no unauthorized access feature that can fully lock down a victim's PC,

making it unusable unless a specific password is entered.

In this poster, an overview for tracking laptops/mobile devices will be given. Advantages of different tracking open-sources software will be shown. In addition, recommendation of tracking software for different operating systems will be presented.

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### **Silent Alert Robot**

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Have you ever missed any important telephone call, especially when it was set on vibrate? Would it be nice to have a robot that can bring a cellphone to you wherever you are in the house? "Silent Alert" is an answer to that. Silent Alert Robot is designed to act like a phone holder with a programmed function to autonomously seek and alert an individual when the phone is indeed ringing or vibrating. We used the Handy Cricket Microcontroller with touch and IR sensors placed on a small 2-wheel car. This poster will show the research ideas as well as design and implementation of the Silent Alert Robot.

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### **A Practical Study of Privacy Issues Location-Based Service**

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When certain applications summarize all those information of one specific person from social networks, it will reveal privacy [1]. In this poster, we will give an overview for the techniques behind those apps revealing personal information. Meantime, this study will attempt to show how private information can be effectively [2]. In addition, one website that will be set up so that any user can check her/his own information by using his picture or name. This website will use various data mining techniques to uncover information that is found about them on the location-based service. In addition, it will also show users various methods to restrict their location-based information so that user can prevent it from being used maliciously by any third-party.

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**Assistive Robotics: Vision, Navigation and Manipulation  
(Comparing Calliope to Kari)**

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In today's society there is an ever growing need to assist the elderly and physically disabled. There was previously a limit on the ways these people can be helped, usually including personal assistants or high priced technology, neither of which are available to all citizens especially those who lack finances to afford them. Robotic technology has progressed to the point where almost any task is obtainable to complete if you have the imagination to create it. Robotics can be used to assist the elderly in simple everyday tasks like, finding a person's medicine and bringing it to the person, or recognizing the person might be in trouble and calling 911. The technology of the robot is only limited to the imagination of the person programming it, therefore almost any task can be achieved. This project implements a Self-Assist Robot called the KARI (Kinect Assistive Robot Innovation). The primary function of the KARI is to perform difficult tasks for people with disabilities. The solution works with the Calliope2SP technology to perform robotics tasks previously relegated to humanoid robots.

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**Mobile Healthcare Informatics: Alzheimer's Music Therapy Mobile Application**

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Alzheimer's is a disease of the brain that causes problems with memory, thinking and behavior. It is not a normal part of aging. It is estimated that as many as 5.4 million people in the United States are living with Alzheimer's (Association 16). In 2050, the number of people in the United States with Alzheimer's could reach 11-16 million. One reason is because 70 percent of the people with Alzheimer's live at home, the disease impacts millions of family members, friends and caregivers (Association 16). Many caregivers have little if any knowledge about the Alzheimer's disease. Surveys have shown that there are many challenges that the caregiver face when caring for an Alzheimer's patient, such as: being overburdened, combining care and paid work, feeling like they are alone when it comes to caring for the patient, feeling unappreciated in their care work, needing for more information and advice on this disease, accessing available support services ("Common Issues Faced by Caregivers" 16). The purpose of this research is to develop a mobile application that will assist caregivers who have little knowledge about the Alzheimer's disease. The application will also serve as a music therapy tool that not only will make it possible for patients to listen to music that appeal to their taste, but also allows caregivers to create little songs to help the patient remember little things about the patient's family (i.e. their children's name(s)). Music serves as a therapy to Alzheimer's patients because it changes the patient's usual grumpy mood, a side effect of having the Alzheimer's disease, to one that is vivacious and joyful. When a patient listens to music the current mood is not only uplifted, but also in some patients that are usually unresponsive to questions asked by a nurse or family member asked are now able to respond (Sacks M.D 2012).

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## A Leap into the World of Visualization Technology

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The field of visualization, along with interaction, has begun to take the world by storm, especially within the personal lives of individuals. The goal set to accomplish was to investigate methods for interacting with large-scale public displays. With the obvious demand and attributes of the smart phone, it would provide a mean for interaction that users would enjoy. The utilization of its camera, along with its convenience, provides users with the opportunity to interface, control, and share data. Therefore, the use of marker-based techniques (e.g. QR Codes) to link mobile devices to custom exhibition applications was the project that would contribute to the interactive world. The overall goal was to allow the user to be able to scan a QR code and then be directed to a webpage with a live interactive interface. After researching previous studies and gaining information, an openFrameworks addon was used to generate the QR code. Microsoft Visual C++ 2010 Express was used to build/test code and run a test server between browsers. Touch events for the server were also attempted to be implemented. Interfaces using web-based standards, such as HTML5 and Javascript, along with communication standards, such as WebSocket, were sought to contribute to the project. The webpage constructed would also help keep track of important data. The LINKS Mediawall in Duke's Perkins Library was the display that would benefit from this project. The mediawall, primarily used for educational purposes, provides individuals with a dynamic and engaging experience that enhances the learning of the individual.

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## Utilizing Data Sets from the CReSIS Data Archives to Visualize Greenland Echograms Information in Google Earth

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Since 1993, the Center for Remote Sensing of Ice Sheets (CReSIS) has been gathering ice thickness data in Greenland. This information was in various formats such as: Postscript Document Format (PDF), Joint Photographer Expert Group (JPEG), Keyhole Markup Language (KML), and Comma Separated Values (CSV). These formats display data in individual visualizations while another format; Matrix Laboratory (MATLAB) will display multiple sources of data, but in the proprietary software application only. The goal of this project was to combine the non-MATLAB visualizations into one window utilizing the PHP Hypertext Preprocessor scripting language and Google Earth. These product files would be simple in their construction, easily adaptable to new

data formats, and provide continued display of newly acquired data. The PHP Hypertext Preprocessor language was used to modify the Keyhole Markup Language files to add description tags in order to display data from other formats. The combined files were displayed in the geographical program Google Earth available as a free download to users.

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## **Dynamics and Interest Rate Control of a Financial System with Time-Delayed Feedback**

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In this presentation, complete analysis is presented to study dynamical behaviors of a financial system with delayed control in interest rates. Sufficient conditions are given so that the characteristic equation at the equilibrium point have a pair of purely imaginary roots, a simple zero root, a double zero root, a triple zero root, a quadruple zero root, and a zero root and a pair of imaginary roots. By choosing proper delayed time and strength of feedback, the chaos of the financial system can be controlled and it has cyclic behaviors. Numerical examples are given to confirm our results.

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## **Optimizing Satellite Based Marine Debris Detection**

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The purpose of this research project is to locate and positively identify marine debris in the Pacific Ocean from the March 2011 Japanese tsunami using ENVI (Environment for Visualizing Images). Subsequently, NOAA will be able to inform both scientist and the general public about the upcoming threat to marine ecosystems, island nations, and US coastal communities. Our assumption was that by examining images we will be able to detect an amount of debris from the March 2011 Japanese tsunami. Our anticipated outcome was to also be able to detect the debris from this same tsunami in the Pacific Ocean before it reaches land.

Our first step was to be able to take high-resolution multispectral satellite imagery and atmospherically and radiometrically correct it in order to obtain the most accurate surface radiance. Imagery was visually enhanced using the pansharpening techniques. Second, multiple target detection algorithms were employed to identify anomalous features in the image. Images were analyzed both near the Japan coast just days after the tsunami and out over the open ocean one year later.

We were able to determine that objects that exist in the satellite imagery had fundamentally different spectral curves than the water around it. We found spectral distribution different from those known to be white caps or clouds. However, it will require further analysis to determine if the objects are actually debris from Japan.

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## **Introductory to CS-EE-ME: A Week Long, High School Curriculum**

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The main research goal was to develop distributed algorithms for multi-robot systems. More specifically the goal was to develop a system of low cost-robots for a classroom curriculum for ENGI 128 - Introduction to Computer Science, Electrical Engineering and Mechanical Engineering course. This course was typically taught over a semester. We had only learned an entire course in four weeks and then re-design the ENGI 128 curriculum into a smaller curriculum that high school students could understand. A semester long was reduced to a week long course. The whole course utilized the programming language Python so we had to learn this language as well. We developed programs, lectures, pre and post-tests, design challenges, and a final project to display the new skills each student acquired. On the last day, parents and professors attended the final challenge to see what skills the students learned.

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## **Application to Teach Machine Learning Concepts in Online Environment**

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In an effort to spread knowledge of machine learning at the undergraduate level a, a web application will be deployed to provide access to a variety of machine learning algorithms. Users will be able to upload data they have gathered from different phenomenon to the system and have that data used for training by one of various machine learning algorithms. The users can then use the trained algorithms to make characterizations or predictions about the data. The application will contain a combination of both supervised and unsupervised learning algorithms including Linear Regression, Neural Networks, KMeans, and Anomaly Detection. For each algorithm, an intuitive scenario will be defined in which that algorithm can be used, along with data to train the algorithm in that particular scenario. This application will be designed to introduce students to machine learning algorithms and concepts and also to provide them with a tool that makes the machine learning algorithms both intuitive and easy to use. Ideally, students will learn about concepts such as supervised, unsupervised, overfitting, bias, training accuracy and test accuracy.

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## PR2 Teleoperation

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For decades the traditional joystick style controllers have hindered the scientific community. By using the Vicon cameras along with the robot operating system (ROS) we were able to build a prototype that has the potential to dexterously control the PR2's gripper. This is done using a system that integrates ROS, the Vicon system, and a mechanical hand motor that allows the user to interact with the PR2 in an innovative way. When an individual is allowed to control a robot using the natural motion of his or her own hand, something special happens; telemanipulation spontaneously becomes unambiguous. Nearly anyone with a properly functioning hand instantly gains the ability to manipulate a previously complex teleoperational system with ease.

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## Documentation of SeaSpace Ground Station Systems at Elizabeth City State University

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On February 7, 2012 a Memorandum of Understanding (MOU) was signed between Elizabeth City State University (ECSU) and SeaSpace Corporation. The memorandum lead to the installation of three direct-broadcast satellite receiving ground stations and a training site at ECSU. The receiving stations included a 3.6m X/L band system, a 3.7m C-band system, and a 5.0m L band system. The MOU defined that once the installation of the various systems completed, ECSU would in turn provide an east-coast training and data center for SeaSpace products. The purpose of this project was to document the installation requirements and internal processes at ECSU for the ground stations, as well as; generate a report of training site physical requirements. Aspects of the MOU including ECSU policy requirements, location engineering findings, location installation requirements, ground station capabilities, and training center needs are addressed.



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**Graphical 2D Webpage**

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The goal of this project is to construct a feel of a Graphical 2D Webpage that will help students or other individuals who are interested 2D graphics. This webpage is to convey a solid foundation of mathematical calculations and the programming skills required to create the graphics. It will entice users' attention and make them understand 2D graphics (such as triangles, circles, fractals, and trees) easily. Since 2D graphics are very beautiful and it is easy to attract viewers' attention, unless users have background on programming languages and basic knowledge of computer graphics, 2D graphics seems complicated to them because it involves lots of mathematics and Java programming. This project is to be designed to serve as a starting point for beginners to understand Java and create 2-Dimensional graphics. The Webpage will provide sample Java code for the various shapes and explanation of mathematics used in the code.

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**Testing of Physical Activity Monitor Systems (PAMS) for Manual Wheelchair Users**

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Research has shown that most people with disability are less active than able bodied people. Recently, researchers are developing software and hardware that will improve the quality of living for people using wheelchair. One of the purposes of this project is to examine the validity/reliability of the Physical Activity Monitoring System Data Logger (PAMS-DL) to measure wheel rotation. Then send collected data to a cell phone as its backup device for data processing and storage, to estimate the distance travelled by a wheelchair with 95% accuracy. Physical Activity Monitoring Systems (PAMS) includes: Wockets, an accelerometers that responds to motion; Data Logger (DL), electronic device that utilizes motion sensor to record data. Android Mobile Phone (Samsung Nexus S) stores and receives data for analyzing. Procedures were designed that can take place in a laboratory environment to measure the accuracy of the PAMS-DLs in estimating the distance travelled by a wheelchair. Data analysis code was written in MATLAB to analyze data. There were errors >5% during the first run of the tests. After the revisions of the MATLAB code, by applying appropriate calibration equations the second data analysis, shows that the PAMS-DL was able to predict very close to 0.53 distance measurement error. The study will lead to the development of an effective tool for people with disability to gauge their physical activity.

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## **Computational Neuropsychology/Neuropsychology with Computational Methods Spatial Working Memory in Ts65Dn Mouse Models using Y-Maze Apparatus**

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The concept of working memory was proposed as a system of limited capacity that temporarily maintains a cache of information and supports the thought process of complex biological species. The LabVIEW programming software was needed for data acquisition when analyzing working memory; as it receives input data from infrared counter sensors attached to the three corridors of the 'Y' shaped apparatus [Y-Maze]. The parameter that has been programmed using LabVIEW and was statistically analyzed is the alternation rate. Ts65Dn (Down Syndrome strain) mice and wild-type mice models, are placed one by one per five minute trial in the Y-Maze to test for any significance in alternation rates. Efficient working memory allows the mouse to enter all three corridors of the Y-Maze, respectively, to only repeat the same respective pathway for the duration of the trial. In conclusion, there was a decrease in the alternation rates of those mice who have the Ts65Dn strain as opposed to the alternation rates of the wild-type, who exhibited increasing alternation rates to approximately 60%.

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## **Utilizing ArcGIS in Education to Map a Glacier and Its Changes Over Time**

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Glaciers are large rivers of ice that slowly move over time in response to the changes in a climate. Scientists study and observe these changes by using remote sensing equipment and imagery from LandSat satellites which can be geo-referenced into ArcGIS. LandSat 1-7 are used to monitor these changes from space. Landsat is a series of satellites started by NASA and USGS. They orbit the Earth frequently and collect terrain data unlike other satellites. Antarctica and Greenland contain the world's largest ice sheets. Future sea level rise depends solely on whether or not they continue to melt and thin. Glaciers are shrinking at a more rapid pace than predicted in previous years. The cause of this is glacial retreat which happens when ice or snow is removed from glaciers through ablation. Ablation is the loss of ice through melting, sublimation, wind erosion, or calving. Ablation can lead to glacial retreat and adds water to oceans which can eventually lead to rising sea levels. Glaciers hold about 69% of the world's fresh water supply. The complete melting of this land ice can affect sea level rise by 70 meters in the next century. This study focused on how the Jakobshavn Glacier has change over the years and includes a development of a high school education module. Using imagery collected from Landsat 1-7 and Google Earth, students will be able to utilize GIS software to visualize and analyze these changes over time in relation to future sea level rise.

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## **Analysis of Breast Cancer Cells Using Parallel Programming**

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Twister Iterative Map-Reduce Programming Model is used to generate large data sets over a cluster of computers (parallel programming) in reasonable time. The data is split into a number of tasks; once those tasks are distributed by the map function, the data is then generated together again by the reduce function to give the final output. K-means cluster algorithm was the application used to find the center points of the breast cancer data.

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## **Evaluating Development and Maintenance of XML-based versus HTML-based Websites**

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HTML (Hyper Text Markup Language) has been the primary tool for designing and developing web pages for a long time. HTML is primarily intended for easily designing and formatting web pages for end users. Web pages developed in HTML are unstructured by its nature. Therefore, it is not easy to update and maintain HTML web pages automatically using a program.

Structured information has uniform format and contains both content and some indication of what role that content plays within the context of a document. XML (Extensible Markup Language) is a markup language for documents containing semi-structured and structured information. XML utilizes the efficient use of richly structured documents over the web. Unlike HTML, XML comes with a family of technologies such as XSLT (XML Stylesheet Language Transformations) to format XML documents and XML Schema to define content rules for XML documents. With its semi-structured nature and accompanying technologies, XML will enable programmatic updates and maintenance of web pages.

In this project, we designed and implemented two experimental websites for WSSU SURE Project using HTML and XML respectively. We ensured that these websites are identical. We recorded our observations and the sizes of code to create both of these websites. We then incrementally updated both websites with the same data and recorded our observations and the change in the sizes of code both for HTML and XML editions. We present our findings in the experimental study and the conclusions.

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## Utilizing Data Sets from the CReSIS Data Archives to Visualize Greenland Echograms Information in Google Earth

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Since 1993, the Center for Remote Sensing of Ice Sheets (CReSIS) has been gathering ice thickness data in Greenland. This information was in various formats such as: Postscript Document Format (PDF), Joint Photographer Expert Group (JPEG), Keyhole Markup Language (KML), and Comma Separated Values (CSV). These formats display data in individual visualizations while another format; Matrix Laboratory (MATLAB) will display multiple sources of data, but in the proprietary software application only. The goal of this project was to combine the non-MATLAB visualizations into one window utilizing the PHP Hypertext Preprocessor scripting language and Google Earth. These product files would be simple in their construction, easily adaptable to new data formats, and provide continued display of newly acquired data. The PHP Hypertext Preprocessor language was used to modify the Keyhole Markup Language files to add description tags in order to display data from other formats. The combined files were displayed in the geographical program Google Earth available as a free download to users.

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## Neptune: Aquatic Search and Rescue Robot

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Robotics is a field that has many facets that make it special. One pivotal aspects of robotics involves aquatic autonomous search and rescue. The traditional means of finding lost individuals is inefficient and time consuming. The research is attempting to change that. A prototype is built from a battery powered motor boat, which is connected to the Handy Cricket Microcontroller board, where other sensors are added, including infra-red (IR) sensor to detect a distance between a boat and an object. Switch sensors are used as a trigger when a human is up on a boat or holding on to a life-tube or lifeline. "Neptune" is a proof-of-concept prototype of a aquatic robot that is able to successfully search and find lost persons at sea.

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## **Using Interactive Storytelling Agents to Broaden Participation in Computing**

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It has been extensively documented the need for increased participation from underrepresented minorities in Science, Technology, Engineering and Mathematics fields. This research aims to address this problem by using Interactive Storytellers. Interactive Storytelling (IS) is a form of digital entertainment in which users create or influence a dramatic storyline through actions, either by issuing commands to the story's primary character, or acting as a general director of events in the narrative. Interactive storytelling is a medium where the story can be influenced in real-time by the user of the system. An interactive storyteller was created to teach users strategies when pursuing a doctoral degree in computing. A pilot study was conducted with five undergraduate computer science majors to collect initial feedback about the tool and their experience. Overall, students enjoyed working with the agent and were more motivated to attend graduate school.

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## **A Practical Investigation of Steganography Detection Tools for Smartphones**

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Steganography is the discipline of creating secret messages so that only the sender and the receiver are aware of the existence of the messages. Although it is always not the case, steganography often aids in some sort of ill manner. The users utilize this tool as a sophisticated technique to making sure the information they are trying to hide remains intact until it reaches its proposed receiver. Throughout the recent years, forensic tools and techniques have been developed in efforts to detect when steganography is being attempted, but not much in the smartphone field [3], being that mobile forensics is relatively new. This poster presents an overview of state-of-the-art apps/tools to detect steganography in smartphones [1, 2], and proposes the approach of creating an application for mobile devices that will alert the user when the images (perhaps via e-mail) has been previously modified and is not currently in its original state.

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