

Fall Conference Proceedings

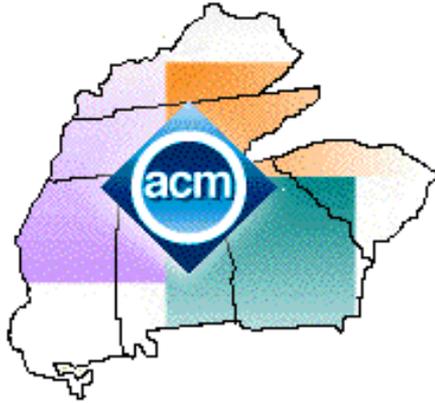
Mid-Southeast Chapter



of the ACM

Gatlinburg, Tennessee
Nov. 14-15, 2013

Mid-Southeast Chapter



of the ACM

For information on the 2014 Fall Conference, select
the conference link from the official chapter website:
www.acmmidsoutheast.org

**A special “thank you” goes to Cengage Learning for
lending financial support to this year’s conference.**

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Message from the Chapter Chair

Welcome to the 2013 Fall Conference of the Mid-Southeast Chapter of the Association for Computing Machinery. On behalf of the officers and members of the ACM Mid-Southeast Chapter, I welcome you to t 55th annual gathering in scenic Gatlinburg, Tennessee.

I remember making my way to my first Fall Conference over 8 years ago and not only did I enjoy listening to all the presentations, but I also appreciated how encouraging everyone was to all the student speakers. Many conferences focus most of the presentations on the research the faculty are doing and too often the incredible research that students are producing gets lost. I think it is wonderful to have a venue for not only graduate level work to be presented, but also to have a place for the undergraduate research to be displayed. I always enjoy seeing so many students having an opportunity to make their first conference presentation. This year we have almost 60 different student presentations being made. I hope that you will support these students by sitting in and listening to the work they have been doing. Talk to them afterwards and ask follow up questions.

I have had the privilege of helping to put on the past several Fall Conferences and know firsthand that it takes a great deal of work to get all the details together. From getting the website up, sending emails, putting together attendee packets, working with the hotel, and producing the program many man hours have been put forth. We really need to thank many people for their hard work. Please look on the following page at the Conference Committee and try to seek out these folks and take the time to thank them for volunteering to put forth the extra hours to make this conference a success.

The other element that makes this conference so wonderful is its location. I hope that you will be able to take the time to not only explore the wonderful town of Gatlinburg, but that you will also have time to drive up into the beautiful Smokey Mountains. Even a short drive or quick hike along the many trails nearby will be well worth it.

Thanks for coming, participating, and I hope you enjoy not only this year, but like myself many more years to come.

Greg Kawell – Samford University

Chapter Officers

Chair

Greg Kawell
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Hospitality Suite

June West
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Student Paper Competition Judges

Chair

Brian Toone, *Samford University*

Undergraduate 2-year

June West, *Spartanburg Community College*

Undergraduate 4-year

Jeffrey Galloway, *Western Kentucky University*

Greg Kawell, *Samford University*

John Nicholson, *Austin Peay State University*

Ariel Smith, *Columbus State University*

Randy Smith, *University of Alabama*

Amber Wagner, *University of Alabama*

June West, *Spartanburg Community College*

Kathy Winters, *University of Tennessee at Chattanooga*

Melissa Wiggins, *Mississippi College*

Nabil Yousif, *Fort Valley State University*

Masters

Rodrigo Sardinas, *Columbus State University*

Varadraj Gurupur, *Louisiana Tech University*

Doctoral

Leong Lee, *Austin Peay State University*

Session Chairs

Azalea

- Session I: Leong Lee, *Austin Peay State University*
Session II: Randy Smith, *University of Alabama*
Session III: Nabil Yousif, *Fort Valley State University*
Session IV: No Session

Dogwood I

- Session I: Rodrigo Sardinas, *Columbus State University*
Session II: Varadraj Gurupur, *Louisiana Tech University*
Session III: Melissa Wiggins, *Mississippi College*
Session IV: Greg Kawell, *Samford University*

Dogwood II

- Session I: Jeffery Galloway, *Western Kentucky University*
Session II: Aurelia Smith, *Columbus State University*
Session III: John Nicholson, *Austin Peay State University*
Session IV: Kathy Winters, *University of Tennessee at Chattanooga*

Highlander I

- Session I: June West, *Spartanburg Community College*
Session II: June West, *Spartanburg Community College*
Session III: Kathy Winters, *University of Tennessee at Chattanooga*
Session IV: Randy Smith, *University of Alabama*

Highlander II

- Session I: Ken Adcock, *Cleveland State Community College*
Session II: Glenn Wiggins, *Mississippi College*
Session III: Denise Williams, *University of Tennessee-Martin*
Session IV: Mellisa Wiggins, *Mississippi College*
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Notes



**ACM Mid-Southeast Chapter
2013 Fall Conference
Gatlinburg, Tennessee
Glenstone Lodge**

Thursday, November 14, 2013

- 4:00 – 6:00 p.m.** **Registration**
- 6:00 – 7:30 p.m.** **Social Meeting, Hospitality Suite**
- 7:30 – 9:00 p.m.** **Dinner — (Individual Arrangements)**
- 9:00 – 11:00 p.m.** **Social Gathering, Hospitality Suite**

Friday, November 15, 2013

- 7:30 – 9:00 a.m.** **Registration**
- 7:30 – 8:00 a.m.** **Morning Coffee Sponsored by
Cengage Learning**
- 8:00 – 8:10 a.m.** **Welcome/Announcements — Azalea**
- Welcome**
Chapter Chair
- Conference Announcements**
Conference Chair
- Program Announcements**
Program Chair
- 8:10 – 9:00 a.m.** **Keynote Address**
- 9:00 – 9:15 a.m.** **Coffee Break Sponsored by Cengage
Learning**
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Session I:	9:15 – 10:35 a.m.
Azalea:	Doctoral Degree Presentations
	Session Chair: Leong Lee
9:15 – 9:35	<i>Searching a Concept Map Based Learning Environment Using Quantum Search Algorithms</i> - Ramaraju Rudraraju, Zheng Zhang, Luai Najim, & Murat M Tanik (Advisor) University of Alabama - Birmingham
9:35 – 9:55	<i>Generic Debugging Facilities for Model-Transformation</i> - Jonathan Corley - University of Alabama
9:55 – 10:15	<i>Evaluation of Modeled versus Traditionally Developed Project Management Tools</i> - Huseyin Ergin - University of Alabama
10:15 – 10:35	<i>Accurate 3D Body Construction from 2D-Photograph for Body Fat Prediction</i> - Ligaj Pradhan - University of Alabama – Birmingham
Dogwood I:	Master Degree Presentations
	Session Chair: Rodrigo Sardinas
9:15 – 9:35	<i>Modeling student success using student demographics and instructional techniques</i> - Touhid Ahmed - Columbus State University
9:35 – 9:55	<i>Topics and Issues in a Modeling and Simulation Curriculum</i> - Charles Turnitsa - Columbus State University
9:55 – 10:15	<i>Developing an Intelligent Schedule Planner</i> - Alex Charles, Nathan Reale, and Anthony Mills - Middle Tennessee State University
10:15 – 10:35	<i>Arduino based Monitoring System</i> - Jose Canedo and Janice Hill - Columbus State University

Dogwood II:	Undergraduate 4 Year Degree Presentations
	Session Chair: Jeffrey Galloway
9:15 – 9:35	<i>Image Steganography</i> - Nicholas Dahl - University of Alabama
9:35 – 9:55	<i>UserCad13</i> - Michael Ruff, Advisor: Alton Coalter University of Tennessee – Martin
9:55 – 10:15	<i>Improving Concept Detection in a Video by Utilizing Temporal Relationships</i> - Christian Weigandt, Khurram Soomro, and Levi Smith - High Point University
10:15 –10:35	<i>From Paper Drawings to Game Levels</i> - Matt Nickell, David Lewellyng, and Jacob Shumate, Advisor: Alton Coalter - University of Tennessee – Martin
Highlander I:	Undergraduate 2 Year Degree Presentations
	Session Chair: June West
9:15 – 9:35	<i>Fluid Penetration into Porous Media During Slot Die Coating</i> - Joshua P. Ebin, Dr. Tequila Harris, Sima Didari, & Xiaoyu Ding - Georgia Perimeter College
9:35 – 9:55	<i>Autonomous Underwater Vehicle (MOLX13) For Biological Research</i> - Joshua Ebin, Gedeon Nyengele, Theophilus Humphrey, Myron King, Abdul Aziz Cisse, and Toheeb Shittu - Georgia Perimeter College
9:55 – 10:15	<i>Gossamer: A Satellite Retrieval System</i> - Sean Stubbs, Gedeon Nyengele, Joshua Ebin, Jeremiah Chase, Brett Etheridge, and Andy Kibria - Georgia Perimeter College
10:15 –10:35	<i>Integrating ASP-based Planning and Diagnosis with POMDPs for Knowledge Representation and Reasoning on Mobile Robots</i> - Olatide Omojaro (Georgia Perimeter College, GA), Patricia Andrews (Colorado College, CO), Mohan Sridharan, Shiqi Zhang, and Sri Harsha Atluri* (Texas Tech University)
Highlander II:	Professional Presentations
	Session Chair: Ken Adcock
9:15 – 9:35	<i>Reconstructing Phylogeny in the Wake of Polyploidy - A Collaborative Research Experience in Mathematics and Biology at Jacksonville State University</i> - Monica Trifas, Jimmy Triplett and Jan Case - Jacksonville State University
9:35 – 9:55	<i>Software Engineering Health Information Systems Using Ontologies Generated from Concept Maps</i> - Varadraj Prabhu Gurupur, PhD - Louisiana Tech University
9:55 – 10:15	<i>Application of Artificial Neural Networks for Predicting Escherichia coli O157:H7 Reduction on Beef Surfaces</i> - Ramana M. Gosukonda, Ajit K. Mahapatra, Xuanli Liu - Fort Valley State University
10:15 –10:35	<i>Pros and Cons of Barrier Synchronization Techniques in Parallel Programming</i> - Srinivasarao Krishnaprasad - Jacksonville State University

Session II: 10:40 – 12:00 p.m.**Azalea: Undergraduate 4 Year Degree Presentations**

Session Chair: Randy Smith

- 10:40 – 11:00 *Why Democracy is not a Total Train Wreck: Instant Runoff Voting Analysis* - Nicholas Zayatz and David Naylor
High Point University
- 11:00 – 11:20 *The Life Butler Project* - Cody Sirk, Brad Barbour, and Joshua McKoon - Advisor: Alton Coalter - University of Tennessee – Martin
- 11:20 – 11:40 *An Arduino Based Model Train Control & Programming System* - Mark Plagge and Brandon Cooper - Columbus State University
- 11:20 – 11:40 *Android Document Translations* - Nick Galewski, Matthew Muncy, and Stephen Smith - Advisor: Alton Coalter - University of Tennessee – Martin

Dogwood I: Master's Degree Presentations

Session Chair: Varadraj Gurupur

- 10:40 – 11:00 *Dynamic Access Control Models for Cross-domain Authentication in Cloud Computing Environments* - Natarajan Meghanathan - Jackson State University
- 11:00 – 11:20 *Mobile Botnet Mitigation* - Trang Nguyen - Columbus State University
- 11:20 – 11:40 *Document Classification: A Study Comparing Key Term Extraction With Subject-Matter Expert Classification* - Brandon Burnett - Advisor: Dr. Randy Smith - University of Alabama
- 11:40 – 12:00 *Standardizing US House Client Names Using Efficient Clustering Techniques* - Rajan Kumar Kharel and Niju Shrestha - University of Alabama - Birmingham
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- Dogwood II: Undergraduate 4 Year Degree Presentations**
Session Chair: Aurelia Smith
- 10:40 – 11:00 *Developing a Utility App for a Growing Campus* - Elizabeth Wright - Tusculum College
- 11:00 – 11:20 *Can Your iPad Host a LAN Party? - Analyzing the Feasibility and Practicality of Portable-Server-Computing Within a Classroom Environment* - Matthew Matze, Reza Moghtaderi Esfahani, and Thomas Douglas - High Point University
- 11:20 – 11:40 *Honey, I Shrank the Server!: Transitioning a Server to an iPad* - Thomas Langford and Christian Weigandt - High Point University
- 11:40 – 12:00 *MaLT: A low cost solution towards tracking metadata in material science experiments* - Joye Nettles, Dr. Tony Fast, and Dr. Surya Kalidindi - College of Charleston
- Highlander I: Undergraduate 2 Year Degree Presentations**
Session Chair: June West
- 10:40 – 11:00 *Student Oriented Distance-Learning Model (SODLM): A Distance-Learning Model from the Perspective of a Student* - Robert King - Chattahoochee Valley Community College
- 11:00 – 11:20 *A Mobile System To Monitor Neonatal Nursing Characteristics* - Gedeon Nyengele & Dr Jay Zemel - Georgia Perimeter College
- 11:20 – 11:40 *Profile-Based Event Management System* - Gedeon Nyengele, Chaeyoung Lee, Yash-Yee Logan, Olatide Omojaro, Aehma Badri, Salwa Ahmed, Ronald Glenn, Roberson Lubin, & Irfan Gabrani - Georgia Perimeter College
- Highlander II: Professional Presentations**
Session Chair: Glen Wiggins
- 10:40 – 11:00 *Computing with Using Computers at Different Levels: A Teaching Module for Undergraduate Computer Architecture Course* - Xuejun Liang - Jacksonville State University
- 11:00 – 11:20 *Simultaneous Multi-Threading Capacity Planning Implications* - Joseph V. Elarde, Ph.D. - Austin Peay State University
- 11:20 – 11:40 *Data Encryption Using Dynamic Transformation Matrices* - Masoud Naqghedolfeizi - Fort Valley State University
- 11:40 – 12:00 *You Have No Right to Privacy Anyway. Get Over It!!!* - Wayne Summers - Columbus State University
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- Dogwood II: Undergraduate 4-year Presentations**
 Session Chair: John Nicholson
- 1:00 - 1:20 *A Visual Programming Language for the Sphero Robotic Ball* - Robert Smyly - University of Alabama
- 1:20 - 1:40 *The Great Moonbuggy Challenge* - Austin Moore
 Contributor: Philip Zeiger - Samford University
- 1:40 - 2:00 *From Impossible to a Split Second: Introducing the Monte Carlo Solution to Endless Iterated Integrals* - Paulana Hall and Dr. Masoud Naghedolfeizi - Fort Valley State University
- 2:00 - 2:20 *Hardware to Software: Creating a Simulator* - Thomas Langford - High Point University
- Highlander I: Undergraduate 4-year Presentations**
 Session Chair: Kathy Winters
- 1:00 - 1:20 *The Cloud Computing Act of 2012: Effects on the C.I.A. Triangle and the Global Environment* - Harold Hansen - University of Tennessee - Chattanooga
- 1:20 - 1:40 *Information Security Risks Awareness Based on Categories: Literature Review* - Tony Jones and Dr. Syed Raza - Talladega College
- 1:40 - 2:00 *The DES Experiment* - Elizabeth Wright - Tusculum College
- 2:00 - 2:30 *An Application of Steganography* - John Dodd, David Verissimo, and Melvin Young - Advisor: Alton Coalter - University of Tennessee – Martin
- Highlander II: Professional Presentations**
 Session Chair: Denise Williams
- 1:00 - 1:20 *Initial Assessment on Hands-on Lab Experiences in an Online Foundation Course in Computer Science* - Angkul Kongmunvattana - Columbus State University
- 1:20 - 1:40 *Reconfiguring the Collegiate Computer Curriculum* - Alton B. Coalter - University of Tennessee - Martin
- 1:40 - 2:00 *Using a Modified Delphi Technique to Revise an Applied BBA Computer Science Curriculum* - Robert A. Fleck, Jr. – Northcentral
- 2:00 - 2:20 *Homework and academic honesty ? the rise of contract cheating* - Shamim Khan - Columbus State University
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Break **Poolside 2:20 – 2:35 p.m.**
Sponsored by Cengage Learning

Session IV **2:35 – 3:55 p.m.**

Azalea: **No Sessions**

Dogwood I: **Undergraduate 4-year Degree**
Session Chair: Greg Kawell

2:35 - 2:55 *A Mobile Interface designed for Safety Verification of
Autonomous Vehicle Trajectories* - Tarif Haque, Joanna De
Los Santos, and Duc Lam - University of Alabama

2:55 - 3:15 *Using C++ to Explore Prime Number Density* - Tyler Bright
- Tusculum College

3:15 - 3:35 *Auto Emergency Alert Android Application For Critical
Incidents Among Colleges* - Kadeem McKenzie, Anthony
Morris, and Mrs. Gladys M. Swain - Talladega College

3:35 - 3:55 *Intelligent Scaling of Zero-Knowledge Trust Propagation in
Aerial Networks.* - Robert Myers, Brandon Allen, and
Ryan Villarreal - University of Tennessee - Chattanooga

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- Dogwood II: Undergraduate 4 Year Degree Presentations**
Session Chair: Kathy Winters
- 2:35 - 2:55 *Choosing an Appropriate Microcontroller for Undergraduate Research* - Mark Plagge - Columbus State University
- 2:55 - 3:15 *The Impact of Using Visual Technologies in CS1* - Kellie Price and Suzanne Smith - East Tennessee State University
- 3:15 - 3:35 *Use Of Mobile Technology To Improve Unspoken Interaction Between Faculty And Students With Android Applications* - Darius Randall, Anthony Morris, and Mrs. Gladys M. Swain - Talladega College
- 3:35 - 3:55 *Programming Robots and Scratch Through a Vocal User Interface* - Thomas Lewallen, Joshua Wolfe, and Amber Wagner - University of Alabama
- Highlander I: Undergraduate 4 Year Degree Presentations**
Session Chair: Randy Smith
- 2:35 - 2:55 *Applications of OPNET Guru Software System in Computer Network Classes* - Masoud Nagedolfeiz, Nabil Yousif, and Xiangyan Zeng - Fort Valley State University
- 2:55 - 3:15 *Space Wars* - Mark Harris, Jacob Schnittjer, and Mahendra Arora - Advisor: Alton Coalter
University of Tennessee - Martin
- 3:15 - 3:35 *You Are Alone* - Kevin Woods, Nathaniel Briggs, and Cassidy Gatewood - Advisor: Alton Coalter - University of Tennessee - Martin
- Highlander II: Professional Presentations**
Session Chair: Mellisa Wiggins
- 2:35 - 2:55 *An email analysis of the website chair for ICSE 2014* - Brian Toone - Samford University
- 2:55 - 3:15 *Data Mining for Hydraulic Geometry* - Leong Lee and Gregory S. Ridenour - Austin Peay State University
- 3:15 - 3:35 *Myers-Briggs Personality Types and Persistent Software Project Problems* - Denise Williams, Melanie Young, Michelle Merwin, and David Williams - University of Tennessee - Martin
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4:30 – 5:00 p.m. Business Meeting, Highlander I

5:00 – 7:00 p.m. Social Gathering, Hospitality Suite

7:00 – 8:30 p.m. Awards Banquet, Azalea

8:30 – 11:00 p.m. Social Gathering, Hospitality Suite

Keynote Address

Dr. Prabir Bhattacharya

IEEE Fellow, AAAS Fellow, IAPR Fellow
Department of Electrical Engineering and Computing Systems
University of Cincinnati, Ohio

Secure Person-Identification Scheme Using Biometric Features Involving Iris Patterns

Abstract

The current focus on security and surveillance has stimulated the growth of automated personal identification systems based on biometrics such as fingerprints, palm prints, iris, face, etc. Iris is considered as one of the most reliable biometric technologies because unlike some other biometric features it does not change with age of the person and even identical twins have different iris patterns. Iris scans are used nowadays in several airports in USA and many other countries for the rapid processing of passengers. It is also used for secure access to buildings and rooms where any highly sensitive information is stored. In this talk, we shall describe our recent work on iris recognition using machine learning and pattern recognition techniques that provide a very high degree of accuracy. We shall describe a feature selection scheme to improve the recognition accuracy and asymmetrical support vector machine for the classification of iris patterns.

About the Speaker

Prabir Bhattacharya received his Ph.D. from the University of Oxford, UK. Since 2009, he has been serving as a Full Professor at the University of Cincinnati, Ohio where he also served as the Head of the School of Computing Sciences and Informatics during 2009-12. Dr. Bhattacharya is a Fellow of the IEEE, a Fellow of the AAAS and a Fellow of the IAPR. He holds 4 US Patents, and has co-authored over 300 publications including 123 journal papers. His research has focused mainly on image understanding, pattern recognition and computer security. His research has been cited as references in 79 US patents. During 2006-07, he served as the Associate Editor-in-Chief of the IEEE Transactions on Systems, Man and Cybernetics, Part B (Cybernetics). He is currently an Associate Editor of four technical journals. In 2008, he received an Outstanding Contributions Award from the IEEE Systems, Man and Cybernetics Society. He has been the Principal Investigator in projects funded by the NSF, AFOSR, BMDO, NIH, NASA and NSERC.

Student Abstracts
Undergraduate Two Year Programs

Fluid Penetration Into Porous Media During Slot Die Coating

Joshua P. Ebin

Georgia Perimeter College

Slot-die coating is a commonly used pre-metered manufacturing process for high precision manufacturing of composites. During this process a coating fluid flows through a slot die assembly and is deposited on a porous media. When coating a porous media, fluid penetration occurs through it. The ability to control fluid penetration through a porous media is helpful in manufacturing composites used in energy, textile, and other industries. This research investigates the effects of processing conditions which play a vital role in the final fluid penetration outcome using MATLAB analytical modeling, ANSYS Fluent simulation, and RFIS experimental validation. The penetration depth of a coating fluid on a porous media can be predicted using analytical and computational fluid dynamic (CFD) modeling approaches based on experimental results under certain constraints following from Darcy's 1D law and lubrication theory. When the capillary effect is ignored for a Newtonian fluid, fluid viscosity (μ) does not affect the penetration depth (h_f); whereas substrate velocity (V), flow rate (Q), permeability (K) and porosity (ϵ) are critical. The models show that the final penetration depth is inversely proportional to the substrate velocity especially at relatively higher substrate velocities of about 5.5mm/s for this study.

Autonomous Underwater Vehicle (Molx13) For Biological Research

Joshua Ebin, Gedeon Nyengele

Georgia Perimeter College

Biological researchers seek to discover and classify unknown underwater species. In order to carry out this task more effectively, researchers use a range of underwater vehicles that are well suited for biological exploration. However, current underwater vehicles in use are large in size and expensive. This therefore restricts the use of these vehicles to well-funded large research organizations. Our autonomous underwater vehicle, (MOL X13) is designed to be relatively smaller in size and less expensive to encourage small scale biological research in the submarine environment.

MOL X13 is intended to offer a holistic method of submarine exploration which includes: analyzing and interacting with the underwater environment through on board processing of motion and still pictures as well as through interfacing with different sensors. The analysis of the environment is followed by recognition and classification of different unknown organisms.

To achieve our goal, MOL X13 will be outfitted with a motion capture device implementing computer vision techniques, a variety of sensors including temperature, depth, pressure, and pH sensors, and an on-board processing unit. The on-board processing unit will be responsible for managing and controlling all the functionalities of the MOL X13 unit and also for managing all the communications between the MOLX13 unit and the receiver unit at the shore. In order to ensure the ability of the MOLX13 vehicle to travel to appropriate depths, the vehicle will contain a reliable on-board power source that will provide sufficient energy for the vehicle to carry out a complete mission in the submarine environment.

A Mobile System To Monitor Neonatal Nursing Characteristics

Gedeon Nyengele

Georgia Perimeter College

Neonatal development is considered a complex process to monitor because, due to the inability of neonates to effectively communicate, the majority of the information about neonatal physiology needs to be extracted by electronic means. A simple mobile monitoring system (Neonur) that is easily connected to standard baby nutrient bottle has been developed at the University of Pennsylvania. Before the development of the Neonur, devices used to monitor neonatal breathing and feeding were costly, bulky, and hard to use. Although the Neonur was a better device for neonatal nursing, the device still needed much improvement on its computer interfacing for safe and fast data transfers. To improve the interfacing, we implemented the USB protocol for both data transfers and power sourcing during transfers and we rewrote both the device firmware and the PC application in a way to minimize the device power consumption. This work resulted in a better user interface for the PC application, guaranteed safe and fast data transfers between the device and the PC application, low device power consumption, and unattended device configuration. We also developed a code library that can be easily used in customized PC applications that communicate with the device.

A Profile-Based Event Management System

Gedeon Nyengele, Chaeyoung Lee, Yash-Yee Logan,
Olatide Omojaro, Aehma Badri, Salwa Ahmed,
Ronald Glenn, Roberson Lubin, & Irfan Gabrani

Georgia Perimeter College

Open source event management systems such as EasyChair, CiviCRM, and OpenConf and other commercial event planning software packages limit the event planner to sending event information only to contacts in their possession. This limitation does not allow event planners to also target interested parties that are not affiliated with the hosting organization. Our proposed event management system will allow coordinators of programs and event planners to target a significantly broader range of interested parties. The system requires an organization to create an account and generate and assign registration keys to their members. Once a member is affiliated with an organization through the system, they will be able to access all events planned by the organization. However, end users are not constrained by a specific organization. They can concurrently register for other organizations and have access to events planned by those organizations. To help event organizers to reach a larger group of interested people for event, the system will provide different event publication settings. The private, local, regional, and national settings will allow the event to be accessible by respectively only members of the organization, only members located in the same city with the organization, only members residing in the same state with the organization, and only members residing in the same country with the organization. Event publication settings are not limited to physical location only. Events can be targeted to people sharing interests in the same areas as those that the event is about. This capability allows students and professionals to be notified of events related to their areas of interest. Also, our system will be available on multiple platforms including PC, MAC, Android, and iOS devices. With this system in use, we expect to see an increase in events awareness and participation.

Integrating ASP-based Planning and Diagnosis with POMDPs for Knowledge Representation and Reasoning on Mobile Robots

Olatide Omojaro

Georgia Perimeter College

Mobile robots operating in real-world domains frequently encounter challenges due to an uncertain and dynamic environment. To successfully accomplish any given task, robots frequently have to generate an effective plan, and deal with non-deterministic action outcomes and unforeseen changes in the environment. Towards this objective, this project adds navigational planning and diagnosis capabilities to an existing architecture that integrates high-level logical inference with low-level probabilistic decision making. Answer Set Programming (ASP), a non-monotonic logic programming paradigm, is used to represent and reason with incomplete domain knowledge, while Partially Observable Markov Decision Processes (POMDPs) are used to probabilistically model the uncertainty in sensing and acting on robots. Robots equipped with this architecture adapt sensing and acting to the tasks at hand, revising existing knowledge based on information extracted from sensors and humans. This architecture is evaluated primarily in simulated domains. Experimental results demonstrate successful planning, diagnosis, default reasoning, and non-monotonic reasoning using ASP for different domains. Experiments also show successful creation of POMDP models, as well as generation of suitable policies for these models. Future work on this project will evaluate this architecture on physical robots.

*This project also investigates (in parallel) the design and use of a mobile robot in the high-throughput phenotyping domain. To support precise navigation and measurement of characteristics of individual plants in the field, sensors such as RTK GPS and LIDAR are explored. Future work will consider the use of the knowledge representation and reasoning architecture for robots in the phenotyping domain.

[* DISCLAIMER: This material is based upon work supported by the National Science Foundation and the Department of Defense under Grant No. CNS-1263183. An opinions, findings, and conclusions or recommendation expressed in this material are those of the authors and do not necessarily reflect the views of the National Science Foundation or the Department of Defense.

Student Oriented Distance-Learning Model (SODLM): A Distance-Learning Model from the Perspective of a Student

Robert King

Chattahoochee Valley Community College

Distance learning dates back to the 1700s, when teachers sent lessons to students through the mail. Today, due to the internet, it is not necessary to learn via mail. According to the Sloan Consortium's 2012 Survey of Online Learning, the number of students taking at least one online course has now surpassed 6.7 million.

I, both as a student and an administrative assistant, have been involved in distance-learning programs since 2009. I began by participating in the first distance-learning programs in my high school. I then continued my involvement with distance learning at Chattahoochee Valley Community College (CVCC) and other institutions. Since then, I have worked with various institutions, including my own, setting up distance-learning labs and operating a help desk to assist students and teachers by troubleshooting technical issues that accompany distance learning.

My research reviewed and assessed the effectiveness of distance learning curricula from the perspective of student participation and oversight. My research highlighted the successes and failures of postsecondary distance learning programs, including programs at the institution with which I am affiliated, CVCC. This research examined which elements work to make a distance learning curriculum effective and which elements are counterproductive to that end. The research reviewed tools and techniques used in both past and present distance learning curricula, what those tools and techniques contributed, as well as how the attitudes of students and instructors impacted the successfulness of the curricula.

I propose the Student Oriented Distance-Learning Model (SODLM). SODLM consists of a combination of elements, such as faculty training, blogs, Web 2.0, etc., which have already been proven successful in other distance-learning curricula when implemented according to the specifications put forth in the model. I conclude by presenting the limitations of SODLM and suggesting some ideas for further research.

Gossamer: A Satellite Retrieval System

Sean Stubbs, Gedeon Nyengele, Joshua Ebin, Jeremiah Chase, Brett Etheridge and Andy Kibria

Georgia Perimeter College

The Gossamer is a device designed to be a viable option to retrieve satellites and other machinery from orbit. The craft is dynamic, reusable, requires low cost for maintenance, has a fast turn-around time, and incorporates existing technologies. It will also have the ability to operate semi or fully autonomously, identify objects and store them within its hull, deorbit, and then land safely.

To achieve this goal, the craft is designed with an unconventional layout that optimizes its aerodynamic capabilities, internal storage, and scaling of the aircraft. With the use of retractable propellers, the orbiter will have the ability to survive re-entry and navigate itself to a safe landing location. Communication with the orbiter will be through user-input devices via a wireless communications relay. Intense programming will be required to let the orbiter autonomously perform its functions of identifying objects of interest, self-storage, and landing.

The implementation of these methods will be done through conventional means. The craft will reach its desired altitude with the aid of rockets and a GPS. A PC will be used to receive and give the input commands. All other sensors will aid the craft through its mission and flight regimes.

The application of these design components should allow the orbiter to complete its mission, predictably and reliably identify objects of interest, relay all gathered information to the users on the ground, and deorbit safely. In addition to completing its tasks, the orbiter is projected to be cheaper and more reliable than any other existing system performing similar tasks.

Student Abstracts
Undergraduate Four-Year Programs

Using Principle Component Analysis to refine the training of an Artificial Neural Network

Aaron Jeter

Columbus State University

The aim of the proposed project is to build upon a previous project using an Artificial Neural Network to predict likely freshmen dropouts. My project will use Principal Component Analysis in order to determine the most significant qualities in determining likely freshmen dropouts, in order to refine the data used to train the Network, with the goal of improving the accuracy of predictions made by the Network.

The Great Moonbuggy Challenge

Austin Moore

Samford University

For the last twenty years, the U.S. Space and Rocket Center in Huntsville, Alabama, has hosted an international competition requiring teams to design and build their own Moonbuggy. These vehicles must address and overcome a series of engineering problems similar to those faced by the original Moonbuggy team. Each team races their cart over a half-mile obstacle course built to simulate a lunar landscape. In addition to the usual engineering requirements, the 2013 race also incorporated a telemetry element. Teams were asked to develop a system for gathering and transmitting live data (e.g. velocity, acceleration, etc.) from their Moonbuggy to an external headquarters. To address this challenge, the Samford University Moonbuggy team used the combined resources of Arduino and Android to acquire and send information to a web server. This live data could then be graphically viewed in a user's web browser or the Android device connected to the Moonbuggy. This presentation will further discuss the design and implementation taken, as well as look into possible improvements for next year's competition.

Stress Propagation in Group Project Social Networks

Bryan Knowles, Rong Yang

Western Kentucky University

Technical Writing (ENG307) is a required course for many science students at Western Kentucky University (WKU). A group project is required in this course. To gain insight into how the social networks between these groups affect individual grades through stress propagation, we obtained anonymous logs from these group projects. We constructed Friend Approximation Networks (FANs) by connecting students if they (1) are in the same project group or (2) have the same major and college year. We adapted sand-pile models to stress test the FANs: we randomly dropped grains of sand (representing stress) onto the network; when a node exceeds its threshold, it divides its sand evenly among its neighbors; an avalanche or cascade typically follows if any of those neighbors subsequently exceeds its threshold. We measured the size and frequency of cascades at different locations to test correlations between stress propagation and individual project grades. With this limited dataset, we have not produced a correlation stronger than $r=0.35$; however, this data has provided ample support for adapting these preliminary methods for larger social networks. Additionally, we note that although these stress tests are closely related to eigenvector centrality measures, they provide further parameter control and insight into behavior. The current research is supported by a WKU FUSE grant and the dataset was provided by Dr. Angela Jones.

Using Communication Models To Share Beliefs, Desires And Intentions

Cedric Searcy and Charles Turnitsa

Columbus State University

Computer simulations based on a belief, desire, intention (BDI) model are quite common for showing how the intent of an individual can be translated into actions. However, there are times when those beliefs, desires and intentions might need to be expressed between individuals, or within a whole population. Relying on a communications model to guide the exchange of those types of information in a computer system is a possible solution. A review of what BDI information is typically included in a computer model is presented. A review of different types of communication models, and their elements are presented. Finally, a merger of the two is presented, along with a description of future research in this area.

Improving Concept Detection in a Video by Utilizing Temporal Relationships

Christian Weigandt

High Point University

Detection of concepts in a video is a complex task in computer vision. Concepts may be thought of as simple actions such as running or bending over. Temporally isolating these concepts is essential in determining important keyframes of a video. The task of concept detection is applicable to many fields, such as security or sports analysis, and aids in reducing the amount of video to only those frames that contain important events. The typical process for detecting concepts in a video is to split the video into a sequence of clips and use machine learning to classify the concept that occurs in each clip. When classifying individual clips within a video, the context for that clip is dismissed, and any beneficial information gained therein is lost. Thus, we aimed to improve concept detection by taking advantage of known temporal relationships between concepts. For example, for an event such as fishing, we expect the concept of casting to always precede the concept of reeling. We use this information to boost the accuracy of our concept detector and correct mistakes that it may make in detection. We will detail the traditional approach to concept detection as well as our method of improving its accuracy.

The Life Butler Project

Cody Sirk, Brad Barbour, Joshua McKoon,
Alton Coalter (Advisor)

University of Tennessee – Martin

The Life Butler project involves research into the creation, application, and execution of voice recognition software in the form of a virtual assistant known as the Life Butler. The Life Butler is a computer program that is able to perform specific actions associated with daily household tasks triggered by user voice input. The Life Butler programs as discussed here are a proof of concept leading toward a mobile application to control functions in such areas as homes, work places, and vehicles.

Use Of Mobile Technology To Improve Unspoken Interaction Between Faculty And Students With Android Applications

Darius Randall, Anthony Morris

Talladega College

Mobile devices are noticeably gaining recognition in today's enlightened society. Students and teachers alike are utilizing mobile devices in the classroom. The fastest developing and rising computing platform within an estimated 1.6 billion mobile device users by 2013 is smart phones, mobile devices, and PDAs (Sarrab, Elgamel, Aldabbas, 2012). Research shows that students in today's society learn most through interactivity (Clarke, 2012). Mobile devices play a role in the potential rise of retention. These devices also help close the gap between students and teachers using different learning methods. Mobile learning (M-Learning) makes education more accessible because it enables students to pursue their studies according to their schedule's (Valk, Rashid, and Elder, 2010). Outcomes of these methods include keeping high interactivity in large classroom settings. Since teachers and students use mobile and electronic devices on an everyday basis, developing an application that would apply these methods would be a great asset to advances in technology and enhance future learning. Developing an application that would apply these methods would be a great asset to our world's technology-based learning.

The DES Experiment

Elizabeth Wright

Tusculum College

The Data Encryption Standard has failed to be the standard for encryption for sixteen years, which is almost as long as it was the standard. I chose to look at the algorithm itself, and determine whether small changes to the algorithm could have a greater effect on its security than is expected. For this experiment I implemented my own version of DES in Python with the standard sixteen rounds. I then changed the code only by changing the number of rounds the algorithm iterated through. My presentation will discuss how this worked and the results I obtained from this experiment.

Developing a Utility App for a Growing Campus

Elizabeth Wright

Tusculum College

Most colleges have mobile applications so that students, faculty, staff, and sometimes even visitors can access what they need from their smartphones. Tusculum College does not provide this type of service. When I started taking the class Mobile Application Development at TC, I had the idea of creating an application for Tusculum College. I decided on some basic features the app would need and then created a survey for my potential audience, which included students, faculty, staff, and even visitors to the Tusculum College campus. My survey was anonymous and included general background questions, such as "Do you have a smartphone," "If yes, what type of smartphone," "Would you use an app for TC," and "What features would you like to see in an app for TC?" The feedback I received from the survey was incredibly helpful in narrowing down what features people wanted and would use most. I was also surprised by the amount of enthusiasm I received when telling people about this project. The main goal of this project is laying the groundwork for a mobile application for Tusculum College that future students in the computer science department can expand on to fill the need that Tusculum College has for a mobile application.

The Cloud Computing Act of 2012: Effects on the C.I.A. Triangle and the Global Environment

Harold Hansen

University of Tennessee – Chattanooga

Cloud computing is a broad and constantly evolving technology; it is considered so sufficiently different that many believe it requires specialized legislation related to criminal activity associated with it. The Cloud Computing Act of 2012 (CCA2012) has that defined purpose. The act is designed to monitor and enforce the criminal activity in relation to cloud computing. It is not a new act; rather, it is an amendment of the Computer Fraud and Abuse Act of 1986 (CFAA1986) with consequences for unauthorized access to sensitive data, equipment, and resources mainly associated with the U.S. Government, large financial institutions, and other similar large institutions. The impacts of the CCA2012 should be similar to those of the CFAA1986. The CCA2012 impacts Information Security (IS), information, and assurance in several ways. This presentation will specifically address three of these: confidentiality, integrity, and availability in the cloud computing environment. Additionally, the impact on the global technological environment and cloud computing will be discussed.

Systematic Development of Evolving Neural Networks and Distributions of their Emergent Properties

Jason Goebel

Samford University

Most evolutionary biologists recognize randomness as a powerful search mechanism in the exploration of evolutionary complexity. Our method uses simulated organisms to represent viable biological models and the processes of evolution. A system of neural networks simulate these organisms that are evolutionarily modified by a genetic algorithm. We used an existing, custom-built simulation environment designed to explore the evolution of neural architectures. A sophisticated and flexible genomic encoding scheme represents our simulated organisms in an evolutionary environment and were purposefully constructed to under specify the phenotype they constitute. Our goal was to employ a system to investigate the role of constrained randomness in the evolution of increasingly sophisticated neural architectures. We collected data that represented the number of generations our neural networks took to reach a fitness that represented a complex system. The data suggests that the evolution of the neural networks has a lognormal distribution under all tested sets of evolutionary operation parameters. We modified our system to more accurately represent evolutionary mechanisms over the course of our investigation. Doing so allows us to more accurately describe how constrained randomness is employed in the process of evolution. The inherent randomness associated with evolution has famously been used as evidence against natural selection. The continuation of our investigation will augment our knowledge on how evolution works. It could also explain how a deity might employ randomness to accomplish a prespecified real-world agenda that humans would classify as natural mechanisms.

An Application of Steganography

John Dodd, David Verissimo, Melvin Young,
Alton Coalter (Advisor)

University of Tennessee – Martin

The field called steganography involves a set of techniques to hide messages inside of pictures. In this project, we have developed a method of hiding a picture within another picture. Using substitution techniques, we do this by analyzing the pixel values for both the stock picture and the hidden picture, replacing least order bits of the pixels of the stock picture. This effectively hides one picture within another picture while changing the latter only by a virtually unnoticeable degree.

Simultaneous Multi-Threading ? Capacity Planning Implications

Joseph V. Elarde, Ph.D.

Austin Peay State University

This paper and associated presentation discusses our experiences with a recently completed IT Capacity Planning project that involved in-depth research into the IBM Power architecture to better explain an observed wide variance in processor utilization statistics captured by the various measurement tools monitoring a shared Logical Partition (LPAR) environment with Simultaneous Multi-Threading (SMT) active. The variance in reported processor utilization raises the question of accuracy with regard to the utilization statistics and therefore limits the ability to forecast capacity requirements based upon this information.

After doing extensive research into the Power 5 and 7 architectures, reviewing every IBM Redbook, blog, and paper on Power performance and capacity planning that we could locate, and completing multiple empirical studies, we believe we have gained an understanding of the issues involved enabling us to develop a methodology to more accurately report processor utilization and thereby improve the precision of the capacity planning forecasts.

Although the ?Processor Utilization Measurement? problem has existed since the inception of multi/hyper threading, impacting Power as well as Intel architectures; we believe that systems that operate at higher utilizations and exploit multi-threading extensively (such as Power 7 with 4 threads per core), are more likely to be impacted by the effects of the processor utilization measurement problem. Based upon our research, it is obvious IBM has taken steps to improve the accuracy of the reported utilization with Power7; nevertheless, given our observations, the problem continues to exist.

In the paper, we review multi-threading, logical partitioning, and other related concepts; we then present and analyze measurement data captured to illustrate the utilization issue; after which, we describe what we consider to be a workable alternative.

We believe that while IBM has designed a magnificent and elegant architecture, capacity planning in a shared LPAR environment, running on a NUMA based system, with SMT active, can be challenging if the operating environment we reviewed is representative.

MaLT: A Low Cost Solution Towards Tracking Metadata In Material Science Experiments

Joye Nettles

College of Charleston

MaLT, or Materials Laboratory Transactions, has been developed to support the Materials Genome Initiative by combining experimental materials science (MatSci) and cyberinfrastructure technology. MaLT is a lightweight mobile application that will attempt to usher in a new quantitative generation of Material Science project management by streamlining the experimental process. In the past, the experimental records of this field have been maintained in lab notebooks, which are "unsearchable" and frequently forgotten, illegible, or poorly annotated. Compared to this traditional method of maintaining records for Materials Science, the project represents a novel idea targeted to the new generation of young, emerging researchers in our labs today. Due to the high level of subjectivity in the field, the goal of MaLT is to standardize experimental protocol across the discipline with a low cost approach. Using something as ubiquitous as the cell phone, MaLT provides data acquisition and management functionality to store and modify experimental information inside of a database. Ultimately, the experiments and data acquired by MaLT will be placed in an infrastructure supported by the Materials Genome Initiative. With this new technology, we can organize Material Science data into searchable resources available to the public for educational and experimental purpose while also beginning to solidify experimental protocols across the country.

Auto Emergency Alert Android Application For Critical Incidents Among Colleges

Kadeem McKenzie and Anthony Morris

Talladega College

As numerous problems arise, in colleges and universities, necessary security is essential in today's society. Security measures are needed for critical incidents such as school shootings, mass murders, bombings and bomb threats. Schools also need security measures for natural disasters, such as tornadoes and snow storms, depending on their location. Security measures are being taken every day to help secure students on school campuses. Preventing and preparing for emergencies can be well worth the effort if schools take the time to invest in their student's safety. Even though we are in the century of technology some students are reluctant to give cell phone numbers to schools because of many reasons including fear of schools using the cell phone number for other reasons than an alert notification, the software company of the alert system selling numbers to a third party company, and mostly a student not able to afford an unlimited text plan to receive these alerts if the alerts occur frequently. Since students are prone to having cell phones in college, an auto emergency alert system (AEAS) utilized through an application was created. The AEAS will be used on campus to help the efforts of maximizing awareness and minimizing outcome risk in events of a security incident or natural disasters.

The Impact of Using Visual Technologies in CS1

Kellie Price and Suzanne Smith

East Tennessee State University

Decreasing enrollments, lower rates of student retention and changes in the learning styles of today's students are all issues that the Computer Science (CS) academic community is currently facing. As a result, CS educators are being challenged to find the right blend of technology and pedagogy for their curriculum in order to help students persist through the major and produce strong graduates.

At the Department of Computing at East Tennessee State University, a multi-semester study was undertaken which introduced visual technologies in the CS1 course. Visual technologies were explored as a way to present difficult programming concepts in a manner that is easier to visualize and simpler to use. The purpose of this study was to determine if visual technologies could make learning programming easier by minimizing the syntax of the programming language being used and providing visual feedback to the students to aid in conceptualization of the programming constructs. The study used the following visual technologies to supplement the established CS1 curriculum: RAPTOR for supporting algorithm development and Alice for supporting object-oriented programming concepts. The impact on student performance in the CS1 course and on student persistence in the major will be presented.

You Are Alone

Kevin Woods, Nathaniel Briggs, Cassidy Gatewood and
Alton Coalter (Advisor)

University of Tennessee – Martin

You are alone. On this planet, nothing and no one will help you. You don't know what has happened, but you are determined to find out. To move the story forward, you will need to battle other players, to battle the monsters, and to battle the crippling loneliness. We have created a game, utilizing Cocos2d in iOS 7, Game Center, and web servers to put together a massively multiplayer online game (MMO) that makes you fight for your survival in a unique setting and with a unique storyline.

Space Wars

Mark Harris, Jacob Schnittjer, Mahendra Arora and
Alton Coalter (Advisor)

University of Tennessee – Martin

Our project covers three specific areas of computer science. The first of the three is networking: we wanted a project that would involve telephones communicating with each other as well as with a web server. The second of the three is the database: we wanted to be able to save our game and to start where we left off, and to do this we need a database to hold the information. The third area is graphics: we wanted to explore different ways to make animations for ships being ?blown up? or ?missed?. All of these are used in the creation of a video game, similar to the game known as Battleship. This presentation discusses our trials and errors and how we accomplished our goals.

Choosing an Appropriate Microcontroller for Undergraduate Research

Mark Plagge

Columbus State University

One of the most interesting emerging fields in Computer Science is ubiquitous computing. Thanks in part to accessible platforms such as the Arduino, embedded programming and systems are now in the reach of almost everyone. From advanced platforms such as the Raspberry PI, to low-level microcontrollers, there is a variety of platforms under development and in use. The huge variety of available controllers today can seem overwhelming, especially when starting out with embedded systems. Since there are so many different controllers available, it has become necessary to carefully research the different systems available when starting a research project.

We approach the wide variety of available platforms from the perspective of undergraduate research and development. We will examine the various types of microcontrollers and embedded systems available to an enterprising student researcher. This will provide an overview of some of the major platforms, and possible applications for each. We then will look at the programming languages and environments offered by several major vendors of these systems. Next, we will have an overview of the specialized style of coding required for embedded systems. We will then look at various types of hardware accessories available for these platforms, and the different types of library support available for each. Finally, we will look at some example projects using different microcontrollers, and how they take advantage of the unique capabilities of each system.

An Arduino Based Model Train Control & Programming System

Mark Plagge & Brandon Cooper

Columbus State University

Microcontrollers are small computers on a chip that allow programmers to build embedded systems. The Arduino brand of controller, as well as the Netduino by Secret Labs, have become popular examples of easy-to-use microcontrollers. This project used an Arduino microcontroller along with an ARM based Netduino microcontroller to allow students to control a model train via a network. The goal was to create a reliable programmable system that allowed students to practice network programming or embedded system programming. We used a novel system of threading on the Netduino that allows for asynchronous communication between the network and train. We were also able to develop a simple communication protocol between the Arduino and Netduino. During this project, we found ways to quickly and cheaply produce custom PCB s, as well as how to effectively isolate electronic systems from noise.

We will look at the challenges we faced in having two dramatically different systems communicate, as well as the major differences in programming languages between them. We will also look at how a small embedded system can support recursive linked lists and other advanced ADTs. We will then examine various ways to handle critical timing issues, and the way that we solved this problem for this project. We will then look at implementing threading and timing within the Netduino architecture, which provides asynchronous communication. Then, we will examine various ways that multiple embedded systems can communicate and our simple communication protocol. Lastly, we will go over the hardware used in this project along with ways to simplify construction of this type of project.

Applications of OPNET Guru Software System in Computer Network Classes

Masoud Naghedolfeiz, Nabil Yousif,
and Xiangyan Zeng

Fort Valley State University

OPNET Guru is a computer network modeling simulation software system from Riverbed Technologies, and is a useful teaching tool to simulate and research computer network traffics in business environments. The software could be utilized to simulate various networks and how they interact with one another around the world, or within a local community.

This paper describes the applications of OPNET Guru in computer network classes. The method of building a typical computer network on the software and creating a simulation environment for the network is discussed. A simulation example of network response time in a multi-story building having approximately a thousand users is presented. Three different simulation scenarios are presented to show the capabilities of the software.

Discussions of site license, software tutorials, suggested laboratory exercises, and training classes for instructors are also presented.

The OPNET Guru software provides hands-on approaches for computer network theories and is capable of modeling and simulating real-world networks. In addition to its classroom applications, the software could be utilized to engage undergraduate students in computer network research projects.

From Paper Drawings to Game Levels

Matt Nickell, David Lewellyng, Jacob Shumate and
Alton Coalter (Advisor)

University of Tennessee – Martin

Have you ever wanted to play video game level that is made from ideas that you have drawn? Well, now you can! First, draw a level on a piece of paper. Next, place the paper on a scanner, which will transform your drawing into an actual level in our game. Afterward, you can now play that level as part of a real game. Finally, you can either save your level for future play or discard it if you do not like it.

Can Your iPad Host a LAN Party? Analyzing the Feasibility and Practicality of Portable-Server-Computing Within a Classroom Environment

Matthew Matze, Reza Moghtaderi Esfahani, and
Thomas Douglas

High Point University

Acknowledging the limitations of traditional client-server connections that require internet or stationary computers as their main processing unit, we believe that the future of app development for educational purposes rests in network connections that leave the responsibilities of the server to a portable device such as a cellphone or a tablet. This portable-server will be controlled by the educator, and handles all the responsibilities of a traditional server. Nonetheless, each of these portable devices have certain computing capacities and networking properties that may or may not allow them to take on this role. This calls into question the practicality, feasibility and scalability of such implementations. In our presentation, we will show the results of numerous testing that can reveal the true potential of an ordinary tablet as the server of an interactive educational application within a classroom environment.

UserCad13

Michael Ruff and
Alton Coalter (Advisor)

University of Tennessee – Martin

This project is a multi-dimensional, multi-window application built in OpenGL with derivations from the C++ programming language. Its primary objective is to allow any user to design the layout of his own home in a simple manner. The program displays two windows, the first being a 2 dimensional plane that allows the user to draw the blueprint to the home and the second being a 3 dimensional view both inside and outside of the home based on the blueprints.

Image Steganography

Nicholas Dahl

University of Alabama

Steganography is the science of hiding a message so that nobody, aside from the sender and recipient, is aware that the message is there. Historically, steganography has had many forms including invisible ink and even messages hidden on messenger's heads beneath their hair. Today, digital steganography allows information to be hidden in digital files, most commonly image, audio, or text files. In image files specifically, the least significant bits of the color values for each pixel can be modified without being noticed by the human eye. The size of image files allows a large amount of information to be encoded in a single image. For JPEG images, the least significant bit of the red, blue, and green value can be modified for each pixel, allowing three bits to be stored in each pixel using this method. In this manner, a standard 640x480 JPEG image has the potential to store 115,200 characters using only the least significant bit of the color values of each pixel. Besides encoding text messages in images, other images can also be hidden in image files. This method is particularly effective for hiding black and white images inside of color images. Image steganography has many potential applications, including sending information only to be seen by selected recipients by posting an image to twitter or other social media. This presentation will show several different techniques that I have investigated in the area of image steganography, along with demonstrations and the technical details of implementation.

Why Democracy is not a Total Train Wreck: Instant Runoff Voting Analysis

Nicholas Zayatz and David Naylor

High Point University

Voting theory is a branch of mathematics that studies different voting methods. It has been proved mathematically that the Instant Runoff Voting (IRV) method violates certain criteria necessary for a fair vote. One particular anomaly is a violation of the Monotonicity Criterion; a voter choosing to increase their preference for a candidate can cause that candidate to do worse overall. A math professor approached us to analyze real-world IRV election data on large data sets in search of monotonicity anomalies, since no such software is readily available. We created the software to mimic the process of running an IRV election, swapped certain voter preferences and re-ran the election to see how it affects the outcome. Our analysis indicates that monotonicity anomalies are rare, if present at all, in the given data.

Android Document Translations

Nick Galewski, Matthew Muncy, Stephen Smith and
Alton Coalter (Advisor)

University of Tennessee – Martin

Optical character recognition (OCR) is the process by which printed characters are identified through the use of imaging devices and computer software. Our optical character recognition application, currently developed for Android, is built with the ability to process an image of printed text converting it into a portable word format document (PDF) after first preprocessing the image to improve the accuracy of the conversion. Our implementation is unique in its ability to export the text to cloud services as an editable document.

From Impossible to a Split Second: Introducing the Monte Carlo Solution to Endless Iterated Integrals

Paulana Hall, Dr. Masoud Naghedolfeizi

Fort Valley State University

The old joke that pedestaled rocket scientists as the most difficult profession might hold less water than one would think. There are more than three times as many rocket scientists as there are nuclear scientists and perhaps rightfully so. Imagine, as a nuclear physicist, facing the task of evaluating a twelve dimensional integral in order solve a problem. By standard methods, a computer capable of nearly a billion calculations per second could take ten million years to calculate a twelve dimensional integral. In other words, it would be completely impossible. By use of the Monte Carlo method, the same calculation could be done in less than a second.

The Monte Carlo method approaches this task using the general, well-known theories of statistics and probability. Easily demonstrated in two dimensions, consider the laws of integration. It is understood that in a xy -plane the integral of a curve can be defined as the area within the bounded region of integration. Imagine a circular dartboard. If one were to throw a million darts, inevitably some will hit the board and some will not. If 800,000 darts hit the board and their average position was calculated, one would have found the approximate area of the board. The a priori hypothesis here states that random sampling of points within a given region of integration, followed by the average of the values within the region, can be used to determine an approximate area of the region, thereby solving the integral.

To demonstrate usability, the Monte Carlo method was applied to single, double, and triple integrals and simulated using Excel. The values were compared to analytical values given by mathematical software and showed a minute margin of error. With little to no coding necessary, this method is accessible on both an educational and professional level.

Application of Artificial Neural Networks for Predicting Escherichia coli O157: H7 Reduction on Beef Surfaces

Ramana M. Gosukonda

Fort Valley State University

The objective of this exploratory study was to develop artificial neural network (ANN) models for predicting inactivation of Escherichia coli O157:H7 on beef surfaces due to low-voltage electric current and to compare them with statistical models for their suitability as a tool for predicting process performance. Improving the prediction accuracy of E. coli reduction on beef would enable to improve the meat quality in the meat industry from a safety perspective. The data were taken from an extensive experimental study on reduction (%) of E. coli (observed output) on beef surface as affected by three levels (inputs) of 1) current (300, 600, and 900 mA), 2) duty cycles (30%, 50%, and 70%), frequency (1, 10, and 100 kHz) for three time level of treatment duration (2, 8, 16 min). Reduction (%) of E. coli was the observed output parameter for these three input data sets. Data from each set was partitioned into training and validation data sets.

Data were subjected to neural networks with back-propagation (BP) and Kalman filter (KF) learning algorithms to develop nonparametric models between input and output data sets. Various statistical indices including R2 between actual and predicted outputs were produced and examined for selecting the best networks. These networks were compared with statistical models. Prediction plots for current, frequencies, duty cycles indicated that ANN models had a better accuracy in predicting unseen patterns when compared with the statistical models. ANN models were able to more robustly generalize and interpolate unseen patterns within the domain of training. Since ANN models have the inherent ability to handle high biological variability and the uncertainty associated with growth of microorganisms, they may be of value for industrial use in meat industry to reduce the hazard associated with E. coli in fresh meat and permit production of consistently safe products.

Intelligent Scaling of Zero-Knowledge Trust Propagation in Aerial Networks

Robert Myers

University of Tennessee – Chattanooga

When using a Zero-Knowledge Proof (ZKP) method of authentication, it is not necessary for the entity seeking authorization into a network to reveal its identity. Rather than providing any credentials or secret information, a rigid protocol is utilized to prove that the entity seeking authorization should be granted access to the network. This protocol is not an absolute proof, but a probabilistic one. If the entity is static, then the length of time it takes to prove authorization is often unimportant; in fact, a more computationally intensive proof, and therefore a more time intensive proof, may be more desirable. However, in the case of an airborne entity seeking authentication into an aerial network, the window of time during which authentication can be established may be very short. In such cases, it is important that enough trust can be established to grant authentication quickly enough without compromising the security of the network. As an effort to reduce the time required for authentication in an aerial network, a majority-vote approach may be implemented to determine authentication. Because the majority-vote approach is dependent upon propagating trust amongst nodes in the network, a critical factor in its efficacy is an algorithm used to appropriately scale propagated trust. This research proposes an innovative approach to ensuring a balance between speed and security for ZKP network authentication through a method of intelligently scaled trust propagation.

Keeping Retention Rates High In The Stem Field By Using An Android Study Guide Application

Robert R. Bryant and Anthony Morris

Talladega College

In today's college environment technology has become more advanced, and students embrace it more than in the past. Even with technology advancements the retention rate of Historically Black College and Universities (HBCUs) are extremely low. Technology has improved in numerous ways, one of which is mobile learning. Retention is the measure of academics progress of a cohort of students from one term or year to the next (2013). Retention is expressed as a percentage of the students who return each term or year (2013). The retention rates of most HBCUs are not at the average retention rate (74.1%). The application "TC Study Guide" enables students to input information and create a study guide services. This app is used to encourage good study habits and also increase the retention rate. Students can take this opportunity to upgrade basic learning techniques, hence, increasing retention rates in the STEM field.

A Visual Programming Language for the Sphero Robotic Ball

Robert Smyly

University of Alabama

The combination of robotics and visual programming languages can provide an introduction to programming that is both engaging and not overwhelming for younger students. Sphero is a low cost robot with enough features to be interesting and simple enough for beginners to master. Many educational programs have already adopted Sphero as a teaching tool and platform for young new programmers. However, all of these programs use textual programming languages, whether they are standard general purpose programming languages or education specific languages. There currently are no visual programming languages for Sphero. This project addresses that need by creating an easy to use and portable visual programming language that works with Sphero. It builds on the Blockly project from Google which provides the components needed to build a web-based graphical programming environment. Like many visual programming languages, it uses blocks to represent statements and expressions. This project provides the blocks needed to interact with Sphero and offers a method for these blocks to communicate with Sphero over its Bluetooth protocol. Because Blockly is limited to being executed in a web browser, it is unable to communicate with Sphero over Bluetooth directly. Instead, this project provides a small web server running locally on the same machine using Blockly that receives AJAX requests from the Sphero blocks, which it then forwards to Sphero through its Bluetooth API.

Women in Computing: An International Profile

Sharon Zeng and Karen Williams

Columbus State University

The computer industry is one of the largest and most rapidly growing industries in America, yet it is not meeting the demand for high paying positions within its workforce. In many cases, companies outsource to meet their need.

One reason this issue exists is due to the extreme gender imbalance in the computing industry. Despite all of the opportunities offered in the industry, there are not enough women seeking computing degrees to fill the positions. To promote balance at the university level, different methods of recruiting and retaining women have been practiced, but the issue still remains.

The purpose of this research is to contribute a stronger foundation and better understanding of why women are deterred from computing. This project gathers an international profile of statistics of women in computing fields from universities outside of the United States. Stepping back to look at this issue from an international perspective will ultimately aid in building a stronger foundation in understanding the reasons for the lack of women in computing fields.

It is hypothesized that there are more women in computing disciplines from universities in developing countries, compared to the amount of women in computing in universities from already well developed countries.

It is believed that, in developing countries, men take the role of physical work, and women occupy the "safer" jobs, i.e. computing jobs. In fully developed countries where there is not much of a demand for physical labor, men are more likely to take the computing roles because that serves as a form of creation role, just like physical labor, but virtual. If women felt less deterred by the idea of working in the computing industry in developed countries, equal representation would be achieved.

A Mobile Interface designed for Safety Verification of Autonomous Vehicle Trajectories

Tarif Haque

University of Alabama

Safety verification of autonomous vehicle (AV) trajectories poses a significant research problem. This presentation introduces a mobile interface that facilitates safe interaction between a human and an autonomous vehicle. This is achieved through a user interface that allows for the specification of a series of waypoints for an AV to follow. To verify the safety of human-input trajectories, a series of runtime checks are performed on the path of points. Specifically, the interface limits the travel distance from an initial location and reduces sharp turns by limiting the heading angle between points on the trajectory. The interface delegates low-level control to the vehicle, while giving the user the ability to control the car safely. MATLAB simulations and tests performed on the Cognitive and Autonomous Test Vehicle (CATVehicle) at the University of Arizona were used to verify the generated trajectories and our safety verification techniques.

Hardware to Software: Creating a Simulator

Thomas Langford

High Point University

There is often the need to virtualize a piece of hardware. This can be advantageous when the actual hardware is not available in person. In creating a simulator, one must test the original hardware to determine how the simulator should act. A communications protocol must be determined and the simulator must replicate the functionality of the hardware. This presentation will cover the testing of a piece of hardware, a barcode scanner; determining the communications protocol; and ensuring the created simulator behaves in the same manner as the original piece of hardware.

Honey, I Shrunk the Server! Transitioning a Server to an iPad

Thomas Langford and Christian Weigandt

High Point University

In creating a peer-to-peer iPad application, maintaining a consistent server-client connection is essential. To this end, generating a unique local area environment for each session circumvents issues such as network congestion and network restrictions. We were commissioned by our university's economics department to develop an educational iPad application to run experimental economics simulations. This application requires many users to be connected to a single server. By moving the server to an iPad, we are able to operate on a closed network and fully isolate each session, removing the need for a centralized server box. We will highlight the pros and cons of this model.

Programming Robots and Scratch Through a Vocal User Interface

Thomas Lewallen and Joshua Wolfe

University of Alabama

In order to spark interest in Computer Science (CS), many teachers in K-12 and Universities are introducing computer programming via an Initial Programming Environment (IPE) (e.g., Scratch, App Inventor, Lego Mindstorms). While these graphical environments make programming easier to use because of the ability to "drag and drop" code snippets onto the screen rather than type syntax, motorically challenged students have difficulty using or are unable to use IPEs due to the dexterity required by the mouse/keyboard. This work contributes toward solving two problems related to accessibility options for IPEs through a tool called Myna. The first problem is focused on how to provide a Vocal User Interface (VUI) for Scratch, which will allow motorically challenged students the opportunity to learn CS fundamentals and programming. The second problem is how to map Myna to other IPEs. In this presentation, we show two examples of how Myna has been extended to work with a newer version of Scratch and with Lego Mindstorms, a completely different program. First, we updated Myna to function with the newest version of Scratch, version 2.0 (compared to version 1.4). Additionally, we have implemented the same source code as a working design for Lego's NXT Mindstorms software. Each environment has its own layout and its own commands; therefore, each application requires a different VUI. This presentation summarizes our results in mapping the existing GUIs to the preexisting VUI in order to support the goals of providing viable functionality to motorically challenged users.

Information Security Risks Awareness Based on Categories: Literature Review

Tony Jones

Talladega College

The increasing utilization of information technology is affecting the status of information security, and is gradually becoming an area that plays an important role in ones everyday life. Information Security is more commonly used to describe the tasks of protecting information that is in a digital format. Information security threats are events and actions that present a danger to information assets. Information security is included in organizations, the general public, sociopolitical, computer ethical and institutional educational dimensions. For this reason information security should be taken very seriously; the rules should be read and abided by. This project involved the collection of various risk factors that could result in great losses, to businesses, industries, institutions and their employees if information is breached.

Using C++ to Explore Prime Number Density

Tyler Bright

Tusculum College

Prime numbers began to be researched and studied thousands of years ago. Mathematicians were forced to complete calculations by hand, significantly increasing the amount of time taken to even study smaller primes. With the advancement of technology, the use of calculators greatly impacted research into mathematics, especially prime numbers, since potential factors no longer had to be checked by hand. More technological improvements yielded programming languages, which are considerably more efficient and effective than calculators for calculating sequences and patterns of numbers. C++ is one of several languages with the necessary capabilities for researching prime numbers. C++ contains useful basic functionalities such as looping statements and libraries used for numerical manipulation.

Using C++, I propose to express the prime numbers in several different numerical bases, comparing them to one another, in an attempt to observe some pattern, if any at all. I will write multiple programs to test my hypotheses, which will include finding how many primes are between a given pair of numbers. Written programs will also include finding the percentage of primes within a given interval. I will record the data from my programs to compare the differing intervals, or possibly similar intervals in differing bases. My goal is to show how C++ can be used to develop and improve mathematical research.

Classification of Remote Sensing Images

Xiangyan Zeng

Fort Valley State University

Satellite images have been the subject of extensive research in a broad range of applications, such as planning and management of public transportation systems and environment investigation. Remote sensing images come in different types, including visible, hyperspectral and others; they differ from each other in the number and the wavelength range of band measurements in each pixel. Visible data consists of pixels composed of three color values of red, green, and blue (RGB). This project explored the classification of ground objects using the RGB color information in remotely sensed images. The classification was conducted using the K-means algorithm, which is an unsupervised learning algorithm for the clustering problem and is popular for many applications. K-means clustering aims to screen n observations into k clusters in which each observation belongs to the cluster with the nearest mean, serving as a prototype of the cluster. We used this method to classify the RGB pixels in a remotely sensed image into a pre-defined number of categories.

We have studied the classification performance from two perspectives. First, we compared the classification results of different color spaces. The image was converted from the original RGB space into another color space and classification was performed in the new space. Second, we incorporated the spatial consistency of neighborhood into K-means. For example, a cement pixel in a parking area could be misclassified by the color information. Considering the spatial consistency in the neighborhood, this pixel is more likely to be a cement pixel than another category. Therefore, a penalty term was added to the distance between the pixel and the other categories in K-means. The incorporation of neighborhood information tended to produce smoother classification maps.

Notes



Student Abstracts
Master's Degree Programs

Developing an Intelligent Schedule Planner

Alex Charles and Nathan Reale

Middle Tennessee State University

Planning a class schedule for a new semester can be complicated for students, especially freshmen. Between the large number of sections for some classes and leaving time for jobs outside of school, students have a lot to consider when creating their schedule. This project aims to simplify the schedule planning process by automatically finding schedules that match a student's needs and preferences and by ranking schedules using a number of criteria.

The web-based frontend is written using modern web development tools such as jQuery and the Ember.js framework. On the site, the user selects their classes using searchable drop-down menus and sets their preferences. The core of the schedule planner is based on a depth first search through the courses which meet the student's criteria. Only courses that are available and that satisfy user-requirements are included in the search. The search results are ranked based on a balanced weekly course load, how strongly it matches the user's preferences, and the amount of time between classes. When displaying the results, the user is presented with small previews of each schedule in order to quickly gauge how the schedules look over the course of a week. Schedules can be filtered by specific section to narrow down the results. The user can also "favorite" a schedule for easier viewing later. Each small preview can be expanded to show the user a large calendar with the full details of the selected schedule.

With the help of the Information Technology Department at our University, much of the information, such as course titles, professors, locations, and meeting times are updated daily. More time-sensitive information such as the number of seats remaining in a particular section is updated in real-time. We will discuss issues encountered during the development and testing of this system.

Document Classification: A Study Comparing Key Term Extraction With Subject-Matter Expert Classification

Brandon Burnett -
Advisor: Dr. Randy Smith

University of Alabama

Document classification is an increasingly important topic for organizations seeking to digitize years of historical paper records. The most accurate approach to document classification usually involves a "human-in-the-middle" process where human subject matter experts review automatically scored documents providing the proper classification. This process is time and labor intensive. Automatic document classification systems have been around for years but have often been hampered by poor performance in terms of accuracy and precision. This study examines an approach to document classification based on domain-expert provided key words and a fast, scalable, extensible, open-source document indexing system.

This study uses the Apache Solr open source search engine combined with domain-expert provided keywords to pre-classify incoming documents and to evaluate the efficacy of user provided classifications. The domain of interest in this study is geo-technical documents used by the Alabama Department of Transportation (ALDOT). The documents are part of a repository, GeoGIS, providing a Geographical Information Systems (GIS) interface as well as fielded search capability. The system serves as a document repository, allowing storage of documents for pre-construction and construction projects in the Geotechnical, Material, and Environmental divisions of ALDOT. Each document is assigned one or more document types by the user which help identify the document as meeting special criteria unique for certain types of documents encountered in each division. Solr, the open-source search server, allows full-text search capabilities for documents across a wide variety of document formats. It is expected that Solr's ability to perform a full-text search of a document will allow GeoGIS to determine a set of keywords associated with specific document types. These sets of keywords are applied to other documents to determine whether they belong in one document type (classification) or another, improving on the accuracy with which document types are assigned.

Topics and Issues in a Modeling and Simulation Curriculum

Charles Turnitsa

Columbus State University

Teaching modeling and simulation is a worthwhile pursuit, but the very broadness of it as an application area, as well as the uniqueness of it as a theoretical area, make it difficult to fit in. Various programs exist within Computer Science, Computer Engineering, Applied Mathematics, and Computational Science curricula. A review of the basic topics is presented, as well as some values to a computer science program, as well as other areas. Finally, open areas of research for graduate students are presented.

Arduino based Monitoring System

Jose Canedo and Janice Hill

Columbus State University

The protection and renewal of natural resources is critical as we start facing resource shortages. Environmental monitoring is important for the necessary research to decrease dependency on and/or find alternatives to some of our dwindling resources. With this being said, the equipment and maintenance costs of the sensors currently being used can be astronomical. Through the use of open source software and low cost hardware we can create a monitoring system that goes beyond GPS location collection. The Arduino platform is a strong starting point for data collection and transmission. A wide variety of sensors are available for the Arduino that allow us to measure GPS location, temperature, humidity, barometric pressure, light and motion. The track-log created by collected and stored GPS data allows the user to monitor the movement of the Arduino through the use of geographic information systems (GIS). A live connection to the Arduino allows the user to track the sensor on a map in real time. In addition it also allows the user to monitor the other sensor information. By using the Arduino this system can be adapted to a wide variety of situations that vary by user needs at a budget friendly cost.

Dynamic Access Control Models for Cross-domain Authentication in Cloud Computing Environments

Natarajan Meghanathan

Jackson State University

The relationship between users and resources is dynamic in the cloud, and service providers and users are typically not in the same security domain or policy enforcement point. Role-based access control models are more scalable than the discretionary and mandatory access control models, and more suitable for use in cloud computing environments, especially when the users of the services cannot be tracked with a fixed identity. In a cloud, users are normally identified by their attributes or characteristics and not by predefined identities. In this pursuit, we propose to develop two variants of dynamic access control models for cloud computing environments: (1) An attribute-driven role-based access control model such that the user-role and role-permission assignments be separately constructed using policies applied on the attributes of users, roles, the objects and the environment; and the attribute-based user-role and role-permission assignment rules be applied in real-time to enforce access control decisions. (2) A location-aware role-based control model incorporated to the Policy Enforcement Point of a cloud (thereby, preventing the disclosure of user's identity, role, or location directly to a remote server in the cloud that may not be fully trusted), and enable/activate the role only when the user is located within the logical positions (computed from real positions by specific mapping functions) that lie within the spatial boundary of a role.

Standardizing US House Client Names Using Efficient Clustering Techniques

Rajan Kumar Kharel, Niju Shrestha

University of Alabama – Birmingham

Similarity measures or distance measures play an important role in fuzzy string clustering. Choosing a right one is crucial for achieving expected clusters and often depends upon the data to be clustered. We dealt with a particular kind of data set (consisting of names of companies, organizations, individuals, etc.) where the string sequences, though intuitively represented a single entity, most of the times seemed to contain a shorthand or even erroneous form of actual representation (e.g., ABC Private Limited is equivalent to ABC Pvt Ltd., ABC Private Ltd.). Even though it is relatively easy for a human to observe the obvious similarity between these representations, the sheer volume of the data prohibits manual cleanup. An automated clustering of similar name strings that represent the same entity is desirable with an appropriate similarity measure. We propose a similarity measure for a two- phase automated clustering of such string sequences. The first phase, preprocessing, temporarily removes special characters, extra spaces, punctuation marks, stop words, and periods and replaces abbreviations and synonyms with a single consistent term in order to reduce data inconsistency prior to the clustering process. The second phase applies the proposed similarity measure in clustering. This phase involves finding a keyword that ought to match exactly in the string being compared in addition to satisfying certain threshold of a standard similarity measure such as Levenshtein's Distance. For example, the keyword in the above example can be the first word "ABC." Adding this restriction of exact match of a keyword on top of a similarity metric gave us improved clusters. The experiments were conducted in a large data set of US House client names collected from lobby registration files. The results outperformed those received by employing standard similarity measures alone.

Modeling Student Success Using Student Demographics And Instructional Techniques

Touhid Ahmed

Columbus State University

Student Retention, Progression and Graduation (RPG) rates have been a prime focus for the higher education institutions. The institutions are constantly revising their strategy for improving RPG rates. Achieving higher RPG requires a comprehensive plan that considers both internal and external factors and is executable. In simple terms, the institutions should be able to attract eligible students and ensure smooth progression so that they graduate. Progression is an important step in overall RPG. This study hypothesizes that student demographics can be a predictor of student success and introductory course design based on students' background can motivate them to continue their studies and take the next course. The introductory computer science course Computer Science 1(CS1) has been selected for this investigation. Numerous approaches have been applied to this course in the past for enhancing student success. However, very little focus has been given to the background and demographics of the students. For example, a class which uses discussion forums heavily might not be suitable for international students with poor English proficiency. For a class where most of the students' prior math course grades are average, math based programming assignments would be inappropriate. Thus, it is essential that course instruction and assessment methods are designed in a way that matches the student demography.

This study aims to analyse historical CS1 student data to find possible relationships between design and techniques adopted over the years in different classes, corresponding class demographics and student academic performance. It will use Artificial Neural Networks (ANN) to model this relationship. Based on the findings, an ANN-based predictive analysis tool will be developed to recommend suitable course design and teaching methods for future cohorts.

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Mobile Botnet Mitigation

Trang Nguyen

Columbus State University

Mobile phones and devices are becoming more sophisticated and powerful every year. These phones present a new and very vulnerable target for those who design malware. As of July, F-Secure reported 405,140 Android application packages (apks) containing malicious code, double the number reported in March, and of these malicious apks over 60% were specifically malware. Using malware-created botnets, a bot herder is able to control large numbers of infected machines and perform malicious activities such as distributed denial of service attacks, spamming, phishing, data stealing, and click fraud, often for personal gain. As mobile botnets become more profitable, and therefore more prevalent, techniques to disrupt these botnets need to be explored. Our focus will be on a particular technique called a Sybil attack. Sybil attacks are a type of response mechanism, and can be used to mitigate the effects of botnets that use the traditional countermeasure-resistant peer-to-peer (P2P) designs. While there are currently no mobile botnets that use P2P, botnet developers may will to use the advantages of a P2P or hybrid-P2P design when data plans for phones become more affordable. In this paper, we will evaluate the feasibility of using response mechanisms to interrupt the activity of mobile based botnets. Specifically, we will look at the use of Sybil attacks against a mobile botnet that uses a P2P architecture based on Kademia.

Student Abstracts
Doctoral Degree Programs

Evaluation of Modeled versus Traditionally Developed Project Management Tools

Huseyin Ergin

University of Alabama

Model driven engineering is gathering quite importance lately. In this project, I developed a modeled tool for project management by only using modeling environments, which means writing minimum amount of code. The modeled tool is compared empirically to Microsoft Project software, which is a professional and mature project management tool, with the help of eight users. Users were given simple tasks to accomplish in both tools and their responses, screens, duration etc. are recorded to improve the modeling environment's capabilities. The results are interesting with respect to the development speed of modeled tool and maturity of Microsoft Project.

Generic Debugging Facilities for Model-Transformation

Jonathan Corley

University of Alabama

Model-Driven Engineering (MDE) has emerged as a software development paradigm that can assist in further removing the developer from the accidental complexities of low-level implementation details by raising the level of abstraction. MDE approaches often use customized domain-specific modeling languages (DSMLs) that capture the intent of a particular group of end users through abstractions and notations that fit a target domain. Like all software systems, evolution also occurs in software models. In MDE, the evolution of models is commonly defined using model transformation languages (MTLs). MTLs can be used to specify the distinct needs of a requirements or engineering change at the software modeling level. Despite the focus on models and model transformations as opposed to general-purpose languages, traditional development concerns such as debugging must still be undertaken by developers adopting MDE practices. Traditional approaches to bug localization have been applied to model transformations to aid software developers. In a recent survey performed by the author, all identified MDE tools that support debugging model transformations implemented step-wise execution. These tools present a range of languages, each seeking to add the same set of debugging facilities. New domain-specific MTLs could also be conceived, and these new MTLs would need to recreate the same facilities. In this presentation, a technique is described which utilizes TCore, a set of primitive elements for building transformation languages, in order to provide common debugging facilities to a range of MTLs. The goal of this work is to encourage adoption of MDE by providing a generic base of tool support for one of the most common software engineering tasks, debugging.

Accurate 3D Body Construction from 2D- Photograph for Body Fat Prediction

Ligaj Pradhan

University of Alabama – Birmingham

Body volume is an important measure in predicting body fat percentage. Siri formula, for example, has $\text{Body fat percentage} = (4.95/\text{body density} - 4.50) \times 100$ where body density is mass/volume. For body density estimation, 3D body volume construction from 2D body profile images can be a low-cost, much more convenient and safer alternative to currently used methods such as Dual energy x-ray absorptiometry (DXA) and commercial 3D scanners. As such, the purpose of our study is to process the back, front and side profile images of subjects and construct accurate 3D body volume for effective estimation of their body fat percentages. We start by normalizing the images so that all the images have relative pixel height based on their actual physical height. We also utilize object segmentation and skin-hair separation for obtaining accurate body contours from the side and front body profile images. Using the key control points detected from the profile images, we segment the back profile image into various body components, including the right and left arms, right and left legs and the main trunk of the body. Combining these 2D components with features from the side profile we generate the 3D volume for each of the components. Finally, 3D trunk, arm and leg slices are constructed and areas under each slice are accumulated to give an accurate measure of the body volume. 3D body volumes generated for different subjects ranging widely in age, gender, race, weight and height were used to predict their body fat percentages. The experiment results on body fat prediction indicate the effectiveness of the proposed method.

Searching a Concept Map Based Learning Environment Using Quantum Search Algorithms

Ramaraju Rudraraju and Zheng Zhang

University of Alabama – Birmingham

In today's digital age a plethora of websites host knowledge related to various professions. Individuals working in different professions in turn consume this knowledge either to advance their skills or to accomplish their professional responsibilities. As this knowledge is continuously evolving, both in terms of size and content, the process in which the knowledge is learned becomes important. Currently the learning that is taking place on the web is not meaningful learning, since no attempt is made by individuals to make a connection between newly gained and existing knowledge. Concept maps are proven to explicitly facilitate meaningful learning for all age groups. In this presentation we propose a new process to facilitate meaningful learning using concept maps and discuss a web application that implements this process. Traversing the concept maps collected by this process to gain useful information to be presented to the users is a challenging problem. The size of a concept map dictate the complexity of the search algorithm needed to peruse it. There are at least two quantum-search algorithms in the literature that have proven worth: Grover's algorithm and Deutsch-Josza. In this presentation, the size of a concept map to be searched with the quantum algorithm is discussed, and also the application of the Deutsch-Josza algorithm to search it.

Notes



Professional Abstracts



Reconfiguring the Collegiate Computer Curriculum

Alton B. Coalter

University of Tennessee – Martin

Over fewer than one hundred years the area of computing has been born and has grown so that today it permeates every section of business and society. It is now time for another evolutionary step in the way the college-level curriculum is structured so that we can accommodate the needs of the discipline both today and in the immediate future. Herein I postulate some changes that I see as beneficial to the educational directions of our field.

Initial Assessment on Hands-on Lab Experiences in an Online Foundation Course in Computer Science

Angkul Kongmunvattana

Columbus State University

Online graduate program in applied computer science at Columbus State University attracts a significant number of applicants with no prior academic background in computer science. A foundation course on principles of computer science is required for these provisionally admitted graduate students. Since its inception in 2006, the focus of student assessments in this course was on the understanding computer science concepts without hands-on lab experiences. A recent revision aimed to improve this aspect of the course by integrating lab experiences into the discussion, assignment, and examination of each concept. These new labs include digital logic circuit design, implementation, and testing with software tools from Altera, OS installation using virtual machines from Oracle and VMware, multithreaded and socket programming on Linux, network monitoring and analysis using Wireshark, and experimenting with data security using OpenSSL, among others. This presentation discusses the results from its first offering in the spring of 2013, including the challenges and course assessments from the perspective on an instructor as well as the feedback from students.

An Email Analysis Of The Website Chair For ICSE 2014

Brian Toone

Samford University

The International Conference on Software Engineering is a major annual conference with many research presentations, workshops, tutorials, and co-located conferences. This year's conference will be held in Hyderabad, India May 31 - June 7, 2014. I have volunteered to be the website chair for the conference. In this presentation I analyze and discuss the email communication prior to the conference and use this analysis to expose the duties of website chair. Several open-source and commercial email classification tools are compared. Additionally, a custom program written specifically for this task is compared to a manually sorted and categorized analysis of the email communication. Results are presented to give future website chairs an insight to the role of website chair.

Myers-Briggs Personality Types and Persistent Software Project Problems

Denise Williams

University of Tennessee – Martin

The purpose of this research is to explore persistent problems that impede software project success using the framework of Myers-Briggs Personality Type Indicators (MTBI). The MBTI utilizes four dimensions of personality dealing with personal preferences. The dimensions are described using dichotomous pairs to express preferences: introvert-extravert, sensor-intuitive, thinker-feeler, and judger-perceiver. The authors examine causes of software project failure in relation to strengths and potential challenges identified with the various MBTI preferences.

Data Mining for Hydraulic Geometry

Leong Lee

Austin Peay State University

Data mining is the process of discovering interesting patterns and knowledge from large amounts of data. Hydraulic geometry refers to a set of established equations that can be applied to describe the functional relationships between the width, mean depth, and mean velocity of a stream and its discharge.

Additional statistical relationships might exist between stream characteristics such as stability, material and evenness, and hydraulic geometry. A

fundamental problem with establishing statistical relationships between environmental variables and hydraulic geometry gives rise to the need for a very large database, in the format suitable for pattern discovery operations.

The U.S. Geological Survey provides online access to water-resources data collected at approximately 1.5 million sites in all 50 States. Data is mined from this website for five southeastern states (KY, TN, MS, AL, GA), and processed for data mining.

The vast amount of data available on this public online database provided unique challenges for the data mining operation. A web scraping program was developed to collect raw data from the USGS website. Automated data cleaning operations were performed to remove noise and erratic data. Data integration, selection and transformation algorithms were applied to merge, choose and consolidate relevant data. A large final dataset was built, and data was classified into stream characteristics, and the ten channel types based on hydraulic geometry. Data patterns of stream characteristics and different channel types were analyzed, evaluated and presented.

Through this data mining operation, it has proven that computational data mining techniques have great potential that could be used to provide large, rapidly assembled datasets and databases of hydraulic geometry to aid the traditional research performed by hydrologists, geomorphologists and ecologists.

Data Encryption Using Dynamic Transformation Matrices

Masoud Naqghedolfeizi

Fort Valley State University

Encryption is the process of encoding messages or information in order to make them secure and protected from unauthorized access.

There are several different methods of data encryption. Some are very simple like additive cipher (Caesar cipher) and some are more complex using better technology like Advanced Encryption Standard with a block size of 128 bits. The encryption by transformation is a relatively complex method of encryption that uses matrix transformation to encrypt data. In this method a transposition matrix is used to encrypt the data. The method becomes very effective when it is combined with substitution cipher.

In this research, instead of using a fixed transposition matrix, a dynamic matrix which could change with every block of message was utilized. The matrix was generated using a pseudo uniform random number generator with a fixed seed number. The matrix was then rounded to generate a matrix with elements 0s and 1s only. Using the above method, a new matrix was generated for every block size of data. To demonstrate the technique, 5 by 5 matrices were used to encrypt block sizes of 5 characters. MATLAB software system was employed to implement both encryption and decryption algorithms.

The application of dynamic matrices resulted in encrypted messages that are more random making it more difficult to crack without the decryption key.

Reconstructing Phylogeny in the Wake of Polyploidy - A Collaborative Research Experience in Mathematics and Biology at Jacksonville State University

Monica Trifas

Jacksonville State University

A partnership was formed in July 2012 at Jacksonville State University between a molecular biologist, a computer scientist, and a statistician who were interested in creating a course and ultimately a major in bioinformatics. Inspired by an MAA Professional Enhancement Program (PREP) Workshop and partially supported by a Collaborative Research Experience for Undergraduates (CREU) grant, six students majoring either in Computer Science/Math or Biology have participated in the initial stages of the collaboration. The task driving the first installation of the project is the integration of plant genetics and computational methods to analyze DNA sequences of major lineages of bamboos.

After a survey of the current literature, the programs MEGA, PAUP*, Mr. Bayes, BEAUTi, and BEAST were selected for extensive phylogenetic analyses. We also investigated a program called Tracer that is able to run diagnostics on the Markov chain Monte Carlo output from the BEAST analysis. Molecular clock analyses utilized a reversible time, gamma plus invariant sites model, Yule process speciation and a relaxed lognormal clock. Tree Annotator was used to summarize the Markov chain Monte Carlo simulation output from BEAST, and Fig Tree was used to create a graphic representation of the phylogenetic trees. The data confirmed that ancestral bamboos experienced several episodes of hybridization and genome duplication, resulting in independent origins of major groups (temperate, tropical, and herbaceous bamboos) approximately 40 million years ago. The analysis also supported the hypothesis that subsequent diversification occurred at the polyploid level. Moreover, the data confirmed that new species have been produced by ongoing hybridization among allopolyploids. This new evidence, combined with previous studies using chloroplast DNA data, reveals that hybridization and polyploidy have had important and recurrent roles in the evolution of the bamboos.

The students have been initiated in DNA lab techniques, created a project website, and learned to work with others from different academic backgrounds to pool complementary skills sets aimed toward future research in mathematical biology. This presentation outlines the obstacles and successes of the project.

Using a Modified Delphi Technique to Revise an Applied BBA Computer Science Curriculum

Robert A. Fleck, Jr.

Northcentral

A number of curriculum models have been proposed by professional groups such as ACM, AIS, AITP, and IEEE. These models provide excellent guidance but cannot address local markets and curriculum constraints. To help overcome these issues, a modified Delphi Technique was used to query a group of practicing IT professionals. The Delphi technique use consisted of two independent curriculum related queries. Each query began with an open-ended question that was summarized by the facilitator and then returned to the group for refinement. Complete consensus was not required.

The panel consisted of four senior professionals: a manager at an electronic payment processor, a systems development in a large supplemental insurance company, a senior IT manager for a manufacturing company, a vice-president and engineer from a company specializing in agile programming.

The first query was: "What seven important, but broad, trends do you see in the Information Technology area in the next five years?" The team was asked to rank-order their responses. The collated responses were returned to the team for comment. The primary purpose of this opening query was to familiarize the team with the process and to have them beginning to consider the impact of future developments on the profession.

The second query asked the team to list the skill sets they would expect a BBA Applied Computer Science graduate to possess on the first day of work. This list was condensed and submitted to the team with instructions to assign a total of 35 points across all categories. If they wished to add another category, they could still do so. Interestingly, some of the skills suggested in the first round did not receive any points, an indication that the Delphi Technique was providing useful results. These final results are presented and discussed.

Homework and academic honesty ? The rise of contract cheating

Shamim Khan

Columbus State University

Homework and academic honesty ? the rise of contract cheating
Academic honesty, or rather the lack of it, is an issue that surfaces on an almost regular basis. However, there does not appear to be a lot of public discussion on this topic ? particularly in the computing sciences. Despite reported evidence to the contrary, in the opinion of many, academic dishonesty is not widespread. Apart from the issues of ethics and fairness, dishonesty deprives students of the opportunity to learn and causes them long-term harm in return for a short-term gain.

There are broadly two categories of academic dishonesty ? Cheating involving tests and cheating in homework, with the latter being much more widespread. Students also appear to have different views on these two categories and regard cheating in homework less seriously. Cheating in homework can take different forms. One relatively recent type that appears to be on the rise is contract cheating, which involves students getting others to complete the homework for them by putting it out to tender. It is a form of plagiarism where the original author allows someone to take credit for their work in return for a payment. Originating as websites that offer coders for hire for businesses looking for one-off programming solutions, many such sites now operate as brokers to facilitate contracts between students looking for help with homework and freelancers offering their skills for money. Contract cheating is also more difficult to deal with compared with the conventional form of plagiarism. This study focuses on this most recent form of academic dishonesty and attempts to address the difficult question of how best to handle it.

Pros and Cons of Barrier Synchronization Techniques in Parallel Programming

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With multi-core processing platforms becoming commonplace, it is critical to learn and teach parallel and concurrent programming techniques. One aspect of many parallel computations is the need for all the concurrent tasks in the current iteration to finish before one can begin the next iteration. This requirement is called Barrier Synchronization. Researchers in parallel computing field have suggested different techniques to realize barrier synchronization. In this presentation we will describe both the technique and its pros and cons for the following: centralized barrier, distributed barrier, tree-structured barrier and symmetric barrier. These techniques differ in the way they implement how participating tasks arrive at the barrier and wait there until they are released.

Java provides built-in support for concurrent programming via multithreading and synchronization primitives. Barrier synchronization may be realized using Java's low-level synchronization tools such as synchronized methods, `wait()` and `notify()`. Also, the `Thread` class provides a `join()` method that can be used to realize barrier synchronization although this may result in excessive thread creations and destructions. Java also provides two classes in `java.util.concurrent`, namely, `CyclicBarrier` and `CountDownLatch`. The `CyclicBarrier` allows for a set of threads to wait for each other at the barrier via `await()` method. After all the waiting threads are released, the barrier can be reused and hence the prefix `Cyclic`. Unlike the `CyclicBarrier`, a `CountDownLatch` allows for one or more threads to wait until a bunch of other threads finish. A `CountDownLatch` object can be initialized with a count value and used for synchronization situations using `countDown()` and `await()` methods.

Software Engineering Health Information Systems Using Ontologies Generated from Concept Maps

Varadraj Prabhu Gurupur, PhD

Louisiana Tech University

Development of Personal Health Information Systems has involved the use of relational databases and other traditional tools and techniques in the past. However, with the advent of semantic web technologies and their associated ontologies, there has been a perceived shift in developing Personal Health Information Systems. Our research focuses on developing these systems using concept maps and ontologies they generate. This provides us with two distinct advantages: a) allowing clinicians to develop concept maps, and b) using the ontology generated from these concept maps to develop the required software. The ontologies generated are parsed by a suitable parser to achieve machine-actability. This allows us change the behavior of the systems developed by only changing concept maps. Based on this technique, we have successfully developed a prototype of a Personal Health Information System for educating patients suffering from lung cancer.

You Have No Right to Privacy Anyway. Get Over It!!!

Wayne Summers

Columbus State University

“Edward Snowden NSA files: secret surveillance and our revelations so far”¹, “Congress Begins Investigation of NSA Domestic Surveillance Program”², “Protecting Your Privacy Could Make You the Bad Guy”³, are just a few of the headlines in response to the release of classified NSA surveillance documents to the media this year. Do we have a right to privacy? Does the U.S. Constitution guarantee us this right? This presentation explores the background for privacy in the United States, focusing specifically on the U.S. intelligence community and the “right to privacy.” The presentation also reflects on personal privacy issues in our daily lives and safeguards to protect our privacy.

The presentation looks at the technologies used by the intelligence community and the commercial sector to conduct surveillance as well as technologies to secure our communications from intrusions. The presentation will conclude with recommendations for securing our privacy.

Computing with Using Computers at Different Levels: A Teaching Module for Undergraduate Computer Architecture Course

Xuejun Liang

Jacksonville State University

Computing with using computers can be carried out at different levels. At the application level, computer users can use any computer software for their application. For example, users can use the Microsoft Office Excel to organize and compute their data. At the high-level programming language level, computer programmers can use high-level programming languages, such as C, C++, Java, Python, etc., to write a computer program to solve their problems. At the low-level programming language level, programmers can use different machine assembly programming languages, such as MIPS, IA-32, Accumulator, etc., to write an assembly language program for the corresponding computer.

In this teaching module, we will use some simple computing examples to illustrate how to solve these same problems using different computer programming languages. This work will expose students with varieties of computer architectures and programming languages. It will show the similarities and differences among these architectures and languages, and different ways to solve the same problems when using different programming languages. So, it will help students to get a better understanding of computer architectures and programming languages, and to enhance their problem solving skills with using computers.

In this teaching module, five computer architectures (or assembly languages) are considered: (1) MIPS, (2) IA-32, (3) Accumulator-based, (4) Stack-Based, and (5) Two-address machine, and three high-level programming languages are used: (1) Python, (2) C++, and (3) Java. Eclipse is used for both C++ and Java programming. Real assembly languages are used for MIPS and IA-32 architectures, while the Accumulator-based, Stacked based, and Two-address machines are simulated by using Python, C++, and Java.

Conference at a Glance



Azalea		Dogwood I
7:30 AM	Morning Coffee–Poolside	
8:00 AM	Welcome and Keynote Address	
9:00 AM	Coffee Break–Poolside	
	Session I–Doctoral	Session I–Masters
	Chair: Leong Lee	Chair: Rodrigo Sardinas
9:15 AM	Rudraraju, Zhang, Najim, Tanik	Ahmed
9:35 AM	Corley	Turnitsa
9:55 AM	Ergin	Reale, Mills
10:15 AM	Pradhan	Hill
	Session II–Undergraduate 4	Session II–Masters
	Chair: Randy Smith	Chair: Varadraj Gurupur
10:40 AM	Zayatz, Naylor	Meghanathan
11:00 AM	Sirk, Barbour, McKoon, Coalter	Nguyen
11:20 AM	Plagge, Cooper	Burnett, Smith
11:40 AM	Galewski, Muncy, Smith	Kharel, Shrestha
12:00 PM	Lunch–Patio Restaurant	
	Session III–Undergraduate 4	Session III–Undergraduate 4
	Chair: Nabil Yousif	Chair: Melissa Wiggins
1:00 PM	Jeter	Bryant, Morris, Swain
1:20 PM	Goebel, Donaldson	Zeng, Williams
1:40 PM	Zeng, Whitfield	Knowles, Yang
2:00 PM	Searcy, Turnitsa	
2:20 PM	Break–Poolside	
	Session IV– None	Session IV– Undergraduate 4
		Chair: Greg Kawell
2:35 PM		Hague, Santos, Lam
2:55 PM		Bright
3:15 PM		McKenzie, Morris, Swain
3:35 PM		Myers, Allen, Villarreal
4:30 PM	Business Meeting–Highlander I	
7:00 PM	Awards Banquet–Azalea	

	Dogwood II	Highlander I	Highlander II
7:30 AM	Morning Coffee–Poolside		
8:00 AM	Welcome and Keynote Address		
9:00 AM	Coffee Break–Poolside		
	Session I - Undergraduate 4	Session I– Undergraduate 2	Session I– Professional
	Chair: Jeffrey Galloway	Chair: June West	Chair: Ken Adcock
9:15 AM	Dahl	Ebin, Shittu, et al.	Trifas, Triplett, Chase
9:35 AM	Ruff, Coalter	Ebin, Harris, et al.	Gurupur
9:55 AM	Weigandt, et al.	Stubbs, et al.	Gosukonda, et al.
10:15 AM	Nickell, et al.	Omojaro, et al.	Krishnaprasad
	Session II– Undergraduate 4	Session II– Undergraduate 2	Session II– Professional
	Chair: Aurelia Smith	Chair: June West	Chair: Glen Wiggins
10:40 AM	Wright	King	Liang
11:00 AM	Matze, Esfahani,	Nyengele, Zemel	Elarde
11:20 AM	Langford, Weigandt	Gyengele, et al.	Naqghedolfeizi
11:40 AM	Nettles, Fast, Kalidindi	Gyengele, et al	Summers
12:00 PM	Lunch–Patio Restaurant		
	Session III– Undergraduate 4	Session III– Undergraduate 2	Session III– Professional
	Chair: John Nicholson	Chair: Kathy Winters	Chair: Denise Williams
1:00 PM	Smyly	Hansen	Kongmunvattana
1:20 PM	Moore, Zeiger	Jones, Raza	Coalter
1:40 PM	Hall, Naghedolfeizi	Wright	Fleck
2:00 PM	Langford	Verissimo, Yound	Khan
2:20 PM	Break–Poolside		
	Session IV– Undergraduate 4	Session IV– Undergraduate 4	Session IV– Professional
	Chair: Kathy Winters	Chair: Randy Smith	Chair: Melissa Wiggins
2:35 PM	Plagge	Naghedolfeiz, et al	Toone
2:55 PM	Smith	Harris, et. al	Ridenour
3:15 PM	Randall, Morris, Swain	Briggs, et. al	Williams, et. al
3:35 PM	Lewallen, et. al		
4:30 PM	Business Meeting–Highlander I		
7:00 PM	Awards Banquet–Azalea		

Glenstone Floor Plan

