



Consortium for Computing Sciences in Colleges

Eastern
Region

26th Annual
**CCSC Eastern
Conference**



Huntingdon, Pa

Friday and Saturday, October 15-16, 2010

"Getting There is Half the Fun"

Table of Contents

Welcome	2
Program	3
Friday	3
Saturday	6
Speaker Abstracts.....	9
Workshop and Tutorial Abstracts.....	10
Nifty Ideas and Lightning Talks Abstracts.....	15
Poster Abstracts	16
Faculty Posters	16
Student Posters	18
Programming Teams	22
CCSC Eastern Conference Committee.....	23
CCSC Eastern Steering Committee.....	23
CCSC Eastern 2011 Conference	23
Acknowledgements	24
Campus/Building Map.....	Back Cover

Welcome from the Chairs

Welcome to the 26th Eastern Regional Conference of the Consortium for Computing Sciences in College. The conference Steering committee welcomes you to Huntingdon, Pennsylvania, the home of Juniata College. The theme for this year’s conference is “Getting There is Half the Fun,” which is appropriate for both the conference program as well as the beautiful central Pennsylvania surroundings.

The conference program is highlighted with a variety of sessions, such as pre-conference workshops, guest speakers, tutorials, panels, lightning talks, posters, and many sessions for papers. Two exciting activities are designed specifically for students, a poster session and an undergraduate programming competition, with prizes for the top finishers in each.

We especially would like to thank the faculty, staff, and students of Juniata College for their help in organizing this conference. We have also troubled a number of others who have been our guides on this journey, so many thanks go to Don Goelman, John Lewis, Elizabeth Chang, Gary Gillard, and Sister Jane Fritz, all previous conference chairs. Liz Adams’ unwavering support has kept us on track throughout, so many thanks go to her as well as to the CCSC Board, the Regional Steering Committee, and to a wonderful Conference Committee. Thank you all so much for your time and energies.

We also need to send our deepest appreciation to our partners, sponsors, and vendors. Please take the time to go up to them and thank them for their contributions and support for computing sciences education.

CCSCE National Partners:



Panasonic ideas for life USA

Sponsoring Organizations: CCSC, ACM, ACM-SIGCSE, Upsilon Pi Epsilon, Minitab, Digital Solutions/Inmate Telephone, Inc., and Juniata College

We hope you enjoy the journey as much as we did.

John Wright
Conference Co-Chair
Juniata College

Bill Thomas
Conference Co-Chair
Juniata College

Gerald Kruse
Conference Co-Chair
Juniata College

Peter DePasquale
Papers Chair
The College of New Jersey

26th Annual CCSC Eastern Conference

Friday Morning, 9:00 AM – 12:00 Noon, Workshops

Pre-Con A: Brumbaugh Academic Center, C102

Workshop: Let's Get Ready for a Unit in Alice 2.2 – Introduction

Presenter: Eileen M. Peluso, Lycoming College

Pre-Con B: Brumbaugh Academic Center, Technology Solutions Center Lab

Workshop: Teach Scheme, Reach Java: Introducing Object-Oriented Programming Without Drowning in Syntax

Presenter: Stephen Bloch, Adelphi University

Pre-Con C: Brumbaugh Academic Center, B201

Workshop: Cloud Computing with Windows Azure™

Presenter: Lindsay Lindstrom, Academic Developer Evangelist, Microsoft Corporation

Friday Afternoon, 12:00 PM – 1:00 PM, Lunch

Lunch is “on your own”. Café a la Carte will be open in the Brumbaugh Academic Center, where the conference is being held. Jitters coffee shop is in the Von Leibig Center for Science. In Ellis Hall, Baker Refectory, the campus dining facility, is located on the first floor, and the Eagles' Landing food court is on the second floor. There are also many places to eat downtown.

Friday Afternoon, 1:00 PM – 2:15 PM, Welcome/Keynote

Welcome: Jerry Kruse, Bill Thomas, John Wright, Conference Co-Chairs

Welcome: Dr. James Lakso, Provost

Introduction: Donna Schaeffer, Marymount University

Keynote: David J. Molchany, Deputy County Executive, Fairfax County Government, VA
“Technology-enabled Public Engagement”

Location: Brumbaugh Academic Center A100, Alumni Hall

Friday Afternoon, 2:15 PM – 2:45 PM, Break/Vendors

Brumbaugh Academic Center, Dale Hall Entrance.

Friday Afternoon, 2:15 PM – 3:45 PM, Posters

There are student and faculty posters available for viewing and discussion at this time. For more information, see Posters below.

Brumbaugh Academic Center, Dale Hall, First Floor.

Friday Afternoon, 2:45 PM – 4:00 PM, Concurrent Session 1

Session 1A: Brumbaugh Academic Center, C102

Workshop: Let's Get Ready for a Unit in Alice 2.2 – Advanced, Part 1

Presenter: Eileen M. Peluso, Lycoming College

Session 1B: Brumbaugh Academic Center, C109

Workshop: How to Run a Programming Competition, Part 1

Presenter: Michael Black, American University

Session 1C: Brumbaugh Academic Center, C232

Papers: Hands-On

Session Chair: Loren Rhodes, Juniata College

Paper 1: Hands-On Education in Robotics for Talented Youth in Developing Countries
Aleksander Stefanovski, Rhys Price Jones, The George Washington University

Paper 2: A CS0 Course Using Scratch
Mona Rizvi, Thorna Humphries, Norfolk State University
Debra Major, Meghan Jones, Heather Lauzun, Old Dominion University

Paper 3: Programming Contests for Assessing Problem-Solving Ability
Drue Coles, Curt Jones, Erik Wynters, Bloomsburg University of Pennsylvania

Friday Afternoon, 4:00 PM – 4:30 PM, Break/Vendors

Brumbaugh Academic Center, Dale Hall Entrance.

Friday Afternoon, 4:30 PM – 5:45 PM, Concurrent Session 2

Session 2A: Brumbaugh Academic Center, C102

Workshop: Let's Get Ready for a Unit in Alice 2.2 – Advanced, Part 2

Presenter: Eileen M. Peluso, Lycoming College

Session 2B: Brumbaugh Academic Center, C109

Workshop: How to Run a Programming Competition, Part 2

Presenter: Michael Black, American University

Session 2C: Brumbaugh Academic Center, C232

Papers: Computing Social Issues

Session Chair: Loren Rhodes, Juniata College

Paper 1: **No speaker attended; Not presented**
A Survey of First-Year College Students' Perceptions of Privacy in Social
Networking

James P. Lawler, John C. Molluzzo, Pace University
Paper 2: A Deficit of Women in Computer Science: A Student's Perspective
Anna Mikesell, George Rinard, Frostburg State University

Paper 3: **No speaker attended; Not presented**
Sexting: Crime and Punishment
Brooke Sullivan, East Tennessee State University

Session 2D: Brumbaugh Academic Center, Technology Solutions Center Lab
Tutorial: Creating & Selling Apps for the New Windows Phone 7
Presenter: Lindsay Lindstrom, Academic Developer Evangelist, Microsoft Corporation

Friday Evening, 5:45 PM – 6:30 PM, Reception

Reception at Eagles' Landing, Ellis Hall, Second Floor.

Friday Evening, 6:30 PM – 8:00 PM, Banquet

Banquet in the Ballroom, Ellis Hall, Second Floor.

Friday Evening, 8:00 PM, Banquet Speaker

Ken Navarro, Musician

“Music and Computer Technology”

Saturday Morning, 7:30 AM – 8:30 AM, Continental Breakfast

Brumbaugh Academic Center, Dale Hall Entrance.

Saturday Morning, 8:00 AM – 1:30 PM, Programming Competition

Brumbaugh Academic Center, C116, Technology Solutions Center Lab, C102. Meet in C116 at 8:00am for orientation.

Saturday Morning, 8:30 AM – 9:45 AM, Concurrent Session 3

Session 3A: Brumbaugh Academic Center, C225

Workshop: Bringing Creative Web 2.0 Programming into CS1 – Part 1

Presenter: Stephen H. Edwards, Godmar Back, Virginia Tech

Session 3B: Brumbaugh Academic Center, B201

Tutorial: Digital Storytelling: A Computer Science Approach

Presenter: Jennifer Polack-Wahl, Karen Anewalt, University of Mary Washington

Session 3C: Brumbaugh Academic Center, C210

Papers: Upper-level Course Approaches

Session Chair: Grant Braught, Dickinson College

Paper 1: Parallel Processing on Nvidia Graphics Processing Units Using CUDA
Erik Wynters, Bloomsburg University of Pennsylvania

Paper 2: Dynamic Programming and Branch-And-Bound Algorithm Animations Using a PEAV Format
Chuck Leska, Randolph-Macon College

Paper 3: Teaching Emerging Technology: Challenges, Outcomes, and Options
Theresa M. Vitolo, Gannon University

Saturday Morning, 9:45 AM – 10:15 AM, Break/Vendors

Brumbaugh Academic Center, Dale Hall Entrance.

Saturday Morning, 10:15 AM – 11:30 AM, Concurrent Session 4

Session 4A: Brumbaugh Academic Center, C225

Workshop: Bringing Creative Web 2.0 Programming into CS1 – Part 2

Presenter: Stephen H. Edwards, Godmar Back, Virginia Tech

Session 4B: Brumbaugh Academic Center, B201

Tutorial: Process-Oriented Guided Inquiry Learning (POGIL) in Computer Science

Presenter: Clif Kussmaul, Muhlenberg College

Session 4C: Brumbaugh Academic Center, C210

Papers: Database Courses & CS Education Research

Session Chair: Elizabeth Adams, James Madison University

Paper 1: An Analysis of Computer Science Education Publication Using Lotka's Law
Christopher R. Merlo, Nassau Community College, Joan M. Merlo, Molloy
College, Lori Hoeffner, Adelphi University, Richard Moscatelli, Nassau
Community College

Paper 2: **No speaker attended; Not presented**
Utilizing the Ado.Net Entity Framework in Database Courses
Ramon Mata-Toledo, James Madison University, Morgan Monger, Datatel, Inc.

Paper 3: Adding the Web to Database Class
Donna M. Schaeffer, Marymount University, Patrick C. Olson, National
University

Session 4D: Brumbaugh Academic Center, C232

Special Session: Nifty Ideas and Lightning Talks

Session Chair: Heather Amthauer, Frostburg State University

Lightning Talk: Databases as an Outreach Topic to Non-majors
Don Goelman, Villanova University, Suzanne W. Dietrich, Arizona State
University

Nifty Idea: An Animation for Motivating the Study of Relational Databases
Don Goelman, Villanova University, Suzanne W. Dietrich, Arizona State
University

Lightning Talk: dLife: A Java Library for AI, Robotics and Computer Vision
Grant Braught, Dickinson College

Saturday Morning, 11:30 AM – 12:00 PM, Break/Vendors

Brumbaugh Academic Center, Dale Hall Entrance.

Saturday Afternoon, 12:00 PM – 1:15 AM, Concurrent Session 5

Session 5A: Brumbaugh Academic Center, C225

Tutorial: Scratch as the First Programming Language

Presenter: Mohsen Chitsaz, Frostburg State University

Session 5B: Brumbaugh Academic Center, B201

Tutorial: Teaching Embedded Systems Using AVR Microcontrollers

Presenter: David Hovemeyer, Greg Link, York College of Pennsylvania

Session 5C: Brumbaugh Academic Center, C210

Papers: Curriculum Change

Session Chair: Theresa M. Vitolo, Gannon University

Paper 1: Responding to the Global Crisis: Developing an Undergraduate Program in Health Information Management

Alyson Eisenhardt, Michelle (Xiang) Liu, Diane Murphy, Marymount University

Paper 2: Moving Away from Programming and Towards Computer Science in the CS First Year

James Heliotis, Richard Zanibbi, Rochester Institute of Technology

Saturday Afternoon, 1:30 PM – 2:30 PM, Conference Luncheon

Luncheon, Awards, and Conference Conclusion in the Ballroom, Ellis Hall, Second Floor

CCSCE 2010 Speakers

Keynote Address - Friday Afternoon, 1:00 PM – 2:15 PM, A100 - Alumni Hall
David J. Molchany, Deputy County Executive, Fairfax County Government,
Virginia

Technology-enabled Public Engagement

Most governments are expanding efforts to use information technology to improve access to government information and services and feedback from constituents and stakeholders. Social Media platforms are employed to redefine communication beyond traditional news releases. Mr. Molchany will describe the county's efforts to engage in community interaction through the use of the Web 2.0 tools. The end result of this multi-channel public engagement effort was a great deal of public input to help the County Executive and County staff create a proposed FY2010 budget and ultimately to guide the decisions of the County's Board of Supervisors in approving the final FY2010 budget plan for the County.

Mr. Molchany is responsible for information related areas including: the Fairfax County Public Library & Archives, the Department of Information Technology (DIT) and the County's Cable Communications and Mail Services Divisions; compliance related areas including: the Department of Human Rights and Equity Programs, the Countywide HIPAA Compliance Program and the County's Consumer Services Division; and Environmental and Energy Programs. He works directly with the Office of Public Affairs and the Fairfax County Economic Development Agency.

Mr. Molchany was the Executive sponsor for the County-wide Communications Strategy, which won a gold medal in the 2005 MarCom Creative Awards international competition. In 2009 the Virginia Coalition for Open Government selected the County for its Freedom of Information (FOI) award for government. His technology leadership has been recognized by Governing Magazine, Federal Computer Week Magazine, and Computerworld.

Banquet Address - Friday Evening, 8:00, Ellis Hall Ballroom

Ken Navarro, Musician

Music and Computer Technology

Mr. Navarro will cover the numerous ways in which computers and computer related technology have affected and changed the composing and recording of music as well as the business of distributing and selling music.

Top charting, award winning and Grammy nominated contemporary jazz guitarist and composer Ken Navarro is recognized as one of today's leading musicians. His impressive discography of 19 top charting albums showcase his appeal to a wide range of listeners with inspiring compositions and superb guitar performances.

Navarro's brand new CD *Dreaming of Trains* was released internationally on March 16, 2010. Ken's nine new compositions and his signature acoustic and electric guitar work are supported by world class musicians including drummer Joel Rosenblatt (Spyro Gyra, Manhattan Transfer), acoustic and electric bassist Tom Kennedy (Dave Weckl, Al DiMeola), and keyboardist Jay Rowe (Special EFX, Marion Meadows).

This is Ken's 19th CD release and is the follow up to his landmark release of 2008, *The Grace of Summer Light* which was named the #1 Contemporary Jazz CD of 2008 by Jazz Times magazine.

CCSCE 2010 Workshops and Tutorials

Workshops are intended to provide an in-depth review of a topic of interest, designed to be immediately useful in the classroom. We are offering several workshops throughout the conference, beginning with the pre-conference workshops on Friday morning. Workshop attendance is free this year and does not require registration, but seating is limited, so try to arrive at workshops early to guarantee that you will get a seat.

Friday Morning - 9:00 AM to 12:00 PM

Pre-Conference Workshop A: Let's Get Ready for a Unit in Alice 2.2 - Introduction

Eileen M. Peluso, Lycoming College
Brumbaugh Academic Center, C102

Carnegie Mellon's *Alice* is a teaching tool that uses 3D graphics to create a fun and engaging first programming experience. Incorporating a unit using *Alice* in an applications, graphical art, or web design course will introduce students to fundamental programming concepts and hopefully interest a diverse group of students in taking additional coursework in computing. Participants in this hands-on workshop who have no *Alice* experience will learn the *Alice 2.2* environment, and all participants will leave with materials for a 2-week instructional unit in *Alice 2.2*. As participants work through the unit materials, pedagogical considerations will be presented and discussed.

Pre-Conference Workshop B: Teach Scheme, Reach Java: Introducing Object-Oriented Programming Without Drowning in Syntax

Stephen Bloch, Adelphi University
Brumbaugh Academic Center, Technology Solutions Center Lab

Participants will use the DrScheme platform to solve CS0/CS1 problems in Scheme, e.g. function composition and re-use, conditionals, structures, recursion on linked lists, and event-driven interactive graphic programming. We'll then demonstrate how the same topics can be covered in a more mainstream, but more complex, language such as Java. Participants are invited to a week-long, NSF-funded workshop in summer 2011, which goes into much more depth on technical, classroom, and curriculum issues.

Pre-Conference Workshop C: Cloud Computing with Windows Azure™

Lindsay Lindstrom, Microsoft Corporation
Brumbaugh Academic Center, B201

Every few years, a revolution changes the way we use computers. Think of huge mainframes in the 1960s, minicomputers in the 1970s, personal computers in the 1980s and smartphones over

the last decade. Cloud computing is poised to be the next big paradigm shift in the computing landscape by bringing together advances in technologies like Virtualization, massive scale computing, communication formats and flexible data protocols. With advances by Microsoft, Amazon and other leaders in computing, this field is slated as the fastest growing segment of the technology industry in terms of investment, development and recruitment.

Join us in this workshop to learn more about this exciting development and about Windows Azure – Microsoft’s internet-scale cloud services platform, which provides an operating system and a rich set of developer services that allow you to build new applications to run from the cloud or enhance existing applications with cloud-based capabilities. Please feel free to bring your laptops and download the tools, so you can follow along:

<http://www.microsoft.com/windowsazure/getstarted/>.

Friday Afternoon - 2:45 PM to 4:00 PM

Session 1A, Workshop: Let’s Get Ready for a Unit in Alice 2.2 – Advanced, Part 1

Eileen M. Peluso, Lycoming College

Brumbaugh Academic Center, C102

See Abstract from Above, Pre-Conference Workshop A.

Session 1B, Workshop: How to Run a Programming Competition, Part 1

Michael Black, American University

Brumbaugh Academic Center, C109

In addition to the well-known ACM ICPC Programming Competition, many small student programming competitions are held each year at schools and conferences. This workshop teaches participants how to set up and manage a programming competition. Participants will learn how to install and administer the PC2 programming competition management software, and will construct a miniature sample competition on their own computers. Tips will be given on designing test problems, setting up a site, obtaining volunteers and resources, and running a hassle-free competition.

Friday Afternoon - 4:30 PM to 5:45 PM

Session 2A, Workshop: Let’s Get Ready for a Unit in Alice 2.2 – Advanced, Part 2

Eileen M. Peluso, Lycoming College

Brumbaugh Academic Center, C102

See description from above, Pre-Conference Workshop A. This is a continuation of the workshop begun in Concurrent Session 1.

Session 2B, Workshop: How to Run a Programming Competition, Part 2

Michael Black, American University

Brumbaugh Academic Center, C109

See description from above, Session 1B. This is a continuation of the workshop begun in Concurrent Session 1.

Session 2D, Tutorial: Creating & Selling Apps for the New Windows Phone 7

Lindsay Lindstrom, Microsoft Corporation

Brumbaugh Academic Center, Technology Solutions Center Lab

The new Windows Phone 7 will be hitting the market this holiday season. With this brand new platform comes the opportunity to create games and applications for the marketplace. In this

session we will talk about the development platforms (XNA and Silverlight) and free tools, and how to sell your creations in the marketplace for some extra cash. We'll also discuss the Imagine Cup (<http://www.imaginecup.com>) and how you can help solve world problems.

Saturday Morning - 8:30 AM to 9:45 AM

Session 3A, Workshop: Bringing Creative Web 2.0 Programming into CS1, Part 1

Stephen H. Edwards, Virginia Tech
Brumbaugh Academic Center, C225

Improving recruitment and retention depends on linking activities to **real-world contexts** that illustrate the **social and societal impact** of computer science. The sleek interaction and underlying technologies that define Web 2.0 applications offer a unique opportunity to teach CS concepts in a real-world context. Learn how students can create engaging Web 2.0 applications using simple Java programming and basic XHTML, *without* learning JavaScript or AJAX. See a full set of CS1 assignments leveraging this strategy. See how students can write a personal "Facebook-lite" they can show to friends. Play with live demos yourself. Leave with new assignment ideas.

Session 3B, Tutorial: Digital Storytelling: A Computer Science Approach

Jennifer Polack-Wahl, Karen Anewalt, University of Mary Washington
Brumbaugh Academic Center, B201

The current generation of college students is intrigued by digital tools that allow them to create interesting digital video and audio media. A digital storytelling course is a new approach to introducing non-majors to the computer science discipline, and can be tailored to meet general education requirements at many institutions. Such a course can be taught emphasizing algorithmic processes and other essential computer science concepts. By grounding the course in the computer science discipline, students are introduced to problem solving and computer science in an interesting and relevant way.

In this tutorial, we will introduce participants to several popular open source or free software products that can be leveraged in a digital storytelling or other digital media course. Tools that facilitate a variety of digital story formats will be covered. A high-level overview of the following tools will be provided, along with ideas demonstrating how the tools can be used to emphasize computer science concepts.

Video Spin <http://www.videospin.com/Redesign/>

Video Spin is a video creation and editing tool that includes features for creating videos and slideshows along with audio. Users are introduced to the process of algorithm development as they plan to combine different digital components to create a final project.

Audacity <http://audacity.sourceforge.net/>

Audacity is tool for recording live audio. Additional features include editing sounds, mixing sounds, creating multi-track recordings, and converting files to various popular formats. Audacity is a free, open source tool and provides an opportunity to talk about the open-source software development movement.

GIMP <http://www.gimp.org/>

GIMP, the GNU Image Manipulation Program, allows users to enhance and edit photographs. It also facilitates image composition and authoring. Exploring the features of GIMP opens the door for discussions of simple computer graphics and image processing concepts.

Storytelling Alice <http://www.alice.org/kelleher/storytelling/>

Storytelling Alice is related to the Alice 2.0 programming platform, but contains features to depict social interactions between characters and has a gallery of 3D characters with story starting ideas. Storytelling Alice can be used to lead in to more general purpose programming constructs included in Alice 2.0.

Picasa <http://picasaweb.google.com/home>

Picasa users can upload, edit, and organize photos and create slideshows with captions. Picasa is just one of many Google tools that can be used in a digital storytelling course. Picasa integrates well with other Google tools, which allows users to perform sophisticated tasks, such as geotagging photographs in Google Earth. While covering Picasa, instructors can discuss Web hosting software.

Blabberize <http://www.blabberize.com/>

Introducing students to tools that spark their creativity is part of what makes teaching a digital media course enjoyable. Blabberize is an entertaining tool that allows users to turn an image into a “talking” image by making the image’s mouth movable and adding an audio track. This tool is sure to grab students’ attention and spark some creative project ideas.

Saturday Morning - 10:15 AM to 10:30 AM

Session 4A, Workshop: Bringing Creative Web 2.0 Programming into CS1, Part 2

Stephen H. Edwards, Virginia Tech

Brumbaugh Academic Center, C225

See description from above, Session 3A. This is a continuation of the workshop begun in Concurrent Session 3.

Session 4B, Tutorial: Process-Oriented Guided Inquiry Learning (POGIL) in Computer Science

Clif Kussmaul, Muhlenberg College

Brumbaugh Academic Center, B201

This tutorial will introduce participants to process-oriented guided inquiry learning (POGIL) in computer science. POGIL has been developed, and validated over the last 15 years, primarily in chemistry education. In POGIL, teams of learners (typically 3-5) work on scripted inquiry activities and investigations designed to help them construct their own knowledge, often by modeling the original processes of discovery and research. Teams follow processes with specific roles, steps, and reports that encourage individual responsibility and meta-cognition. Multiple studies have examined the effectiveness of POGIL, and generally find that POGIL significantly improves student performance, particularly for average and below-average students.

The tutorial will be organized as follows. First, we will introduce ourselves and briefly review some relevant background (10 min). Second, participants will work through a sample POGIL activity (20 min) to understand how it works. Third, we will review POGIL’s key concepts, history, and supporting research (10 min). Fourth, participants will begin to draft their own

POGIL activities to better understand the opportunities and challenges (20 min). If time permits, we will review and discuss each other's activities. Fifth, we will conclude with pointers to additional information and general discussion (10 min).

Saturday Afternoon - 12:00 PM to 1:15 PM

Session 5A, Tutorial: Scratch as the First Programming Language

Mohsen Chitsaz, Frostburg State University

Brumbaugh Academic Center, C225

This Tutorial is designed for instructors teaching K-12, introductory IT, or Computer Science courses. Participants will learn how to build computer programs using Scratch.

Tech fluency (digital fluency) is a required part of academics. Earlier computer programming languages such as Basic, Logo, and other computer programming was taught in school systems. Lately, students are familiar with sending and manipulating text messages, browsing the web, and manage their social networks. They learn how to create effective documents and digital presentations as well as use a variety of applications. Therefore computer programming is not viewed by the majority of students as a skill they need.

Scratch is an educational (not a career) object oriented graphic programming language developed by Lifelong Kindergarten Group at MIT Media Lab in collaboration with Yasmin Kafai's Group at UCLA. Scratch allows students to build meaningful and fun projects that are important to the programmers. Easily accessible objects can fit together naturally. User objects may also be imported and incorporated into the structure to create a personal project. In such an environment, programmers are willing to meet the mathematical and computational challenges related to their project.

Language, syntax, and punctuation barriers are eliminated from programming in Scratch allowing students to be creative and focus on problem solving. Students can easily create a game, make an animation, simulate a concept, make stories, create an interactive tutorial, and make digital documents.

Scratch offers the basic concepts of computer programming such as loop, conditional statements, variables, arrays, threads, event handling, and user interface. One may construct projects that incorporate animation, graphics, sounds, and music using 2D graphic objects.

Since 2007, Scratch has been used as a formal teaching tool in introductory classes as well as informal groups for specialized projects.

Session 5B, Tutorial: Teaching Embedded Systems Using AVR Microcontrollers

David Hovemeyer, Greg Link, York College of Pennsylvania

Brumbaugh Academic Center, B201

As computing becomes more ubiquitous in everyday life, exposing CS students to embedded systems is increasingly relevant. The AVR family of 8bit microcontrollers is a simple and inexpensive way to introduce students to embedded systems development. AVR microcontrollers are designed to be programmed in C. They work well for applications such as robotics, data acquisition, and embedded control. Because they are both simple and powerful, AVR microcontrollers can be used in a wide range of courses, from CS1 to upper level courses. The tutorial will cover the basics of embedded development using AVR microcontrollers, including

building a circuit, installing and using the open source AVR development tools, writing programs, and interfacing with external hardware such as I/O devices, sensors, etc. No knowledge of electronics or embedded systems development is assumed.

CCSCE 2010 Nifty Ideas and Lightning Talks

A Nifty Idea is a teaching strategy, tool or assignment that conference attendees may find useful and incorporate into their courses. Lightning Talks are short presentations about something found to be helpful in the classroom. It may also include a topic, technology, or technique that did not work effectively and why that was true or suggestions for improvement.

Saturday Morning - 10:15 AM to 11:30 AM

Concurrent Session 4 - Brumbaugh Academic Center, C232

Databases as an Outreach Topic to Non-Majors

Don Goelman, Villanova University, Suzanne W. Dietrich, Arizona State University
Lightning Talk: The importance of computer literacy has been widely accepted for years now (e.g., National Research Council, "Being Fluent with Information Technology," National Academics Press, 1999). Computer science educators and departments have as a result been developing and assessing various vehicles for reaching out to students of all majors. Until recently, however, databases has not been one of those outreach vehicles. Rather, database courses are generally considered to be upper-level offerings or, at least to have as prerequisites some programming maturity, as well as discrete structures. The authors nevertheless argue that it is reasonable to teach database concepts to non-computer science majors. For one thing, databases are ubiquitous in their experience and are also of substantive use in nearly every discipline. Further, the fact that Microsoft Access offers a familiar environment to virtually all students and a simple user interface makes introductory applications accessible to non-majors. This talk briefly describes experiences with using databases as a topic for outreach, which also forms the basis of a funded NSF grant.

An Animation for Motivating the Study of Relational Databases

Don Goelman, Villanova University, Suzanne W. Dietrich, Arizona State University
Nifty Idea: Databases are ubiquitous, and their use is interdisciplinary, extending beyond computer science majors. In an effort to engage non-majors in the study of databases, a FLASH animation has been developed to introduce relational databases. An intuitive spreadsheet example first illustrates the difficulty of answering certain types of questions, and then highlights the redundancies in the spreadsheet that lead to problems when inserting, updating, or deleting data. The spreadsheet is then broken down into several tables, introducing the concepts of primary and foreign keys. This relational design is then used in an example to introduce how the relationship between foreign and primary keys facilitates querying. This is a first draft of the animation developed as part of an NSF-funded grant to introduce students of many majors to databases using a student-centered approach.

dLife: A Java Library for AI, Robotics and Computer Vision

Grant Braught, Dickinson College

Lightning Talk: dLife is a Java library designed to support teaching and research in the fields of Artificial Intelligence, Artificial Life, Robotics and Computer Vision. dLife has been designed

to be appropriate for beginning students while also being powerful enough for use in upper level courses and research projects.

dLife includes packages for neural networks, genetic algorithms, computer vision and robot control. The neural network package includes feedforward, backpropagation, Elman and CMAC neural networks. The genetic algorithms package provides a generational genetic algorithm with a variety of selection mechanisms and reproduction operators. The robotics packages support the following robots: MobileRobots Pioneer 3DX; K-Team Hemisson, Khepera 3 and (coming soon) Khepera 2; and Sony Aibo. Robot simulations are supported through the Player/Stage system. The computer vision package provides a collection of basic image filters: color matching; blobification; blurring; edge detection; etc. Images for processing can come from a variety of sources: image file (jpg, gif, etc.); sequence of image files (e.g. img1.jpg, img2.jpg, ...); streaming video from the Aibo; and streaming video from any V4L device (Linux box required). All of dLife's packages have been designed with extensibility in mind facilitating the creation of new types of neural networks, genetic algorithms, robots, robot devices, image filters and image sources.

The dLife ControlCenter is a GUI application that provides a convenient means of experimenting with the robotics and computer vision features of dLife. Using the ControlCenter, users can see the values of robot sensors, manipulate robot effectors and observe and modify the effects of image filters without writing any code. The ControlCenter also allows users to load a user defined Controller object (a Java class) that can interact with robots and computer vision features programmatically. Typically the ControlCenter is run on a workstation and commands are sent wirelessly to the robot. dLife has been developed and fully tested on Mac OS X and is in the process of being tested under Linux.

CCSCE 2010 Posters

We invite faculty and students to submit posters on relevant topics or current research. An abstract, of not more than 300 words, is required for consideration. Accepted posters that were submitted prior to the early deadline are shown below.

Friday Afternoon – 2:15 AM to 3:45 PM

Faculty Posters

A Mobile Network Laboratory with the Use of Open Source Applications

Authors: Dongqing Yuan, Jiling Zhong

In the past decade, with the development of wireless and other mobile technologies, including mobile computer, cellular phone, and GPS, educational practitioners have had the opportunity to develop a ubiquitous learning environment. This paper provides a detailed account of developing a mobile network laboratory with a set of open source software that allows students to conduct the labs either as an individual or as a group at anytime and anywhere.

The mobile open source lab is composed by mobile hard drives and laptops with a suite of open source software that, in aggregate, provide students with a means to experiment what they have learned in the lecture and at the same time to allow them gain real world hands-on skills. In this paper, we will describe the requirements for developing and implementing such a mobile open

source network lab. The design process, focusing particularly on the mobility, usability and affordability issues, will be addressed. We also discuss the impact provided by the mobile open source lab, such as how the labs will enhance practical experience, engage active learning, and promote collaboration among students.

The paper will start with a review of the related work, followed by a description of the mobile open source network lab including objectives, lab components, design, and implementation of the lab. Particular attentions will be paid towards the use of OSS applications on the mobile lab. Finally, the evaluation of mobile open source network will be presented, and future work will be discussed.

Teaching Introductory Computing Through Creative Story Telling

Authors: Mary Elizabeth Jones, Melanie Kisthardt

Seizing and retaining student interest in computer programming is a difficult task. Many students find programming to be a dry and tedious task doable only by students gifted with strong analytical skills.

Teaching introductory programming via creative story telling begins by connecting the planning, organizing, and detailing of writing a story to the programming process. Creative concepts are taught first and then connected to an equivalent programming concept. Group-oriented activities using art, “Mad-Libs”, “Potato Heads”, and “Legos” allow students to actively make the connections among the creative concepts, analytical concepts, and programming skills.

Students work in pairs. Student pairings are assigned by matching a student with analytical tendencies (mathematics, information technology, and science majors) with a student majoring in one of the humanities disciplines. The pairs apply the concepts and skills by creating stories, designing an animation, and implementing the animation using the Alice programming system.

This research recognizes the creative nature of programming, invites students who would not consider studying programming to potentially identify an unrecognized talent, and attempts to develop a new approach for teaching introductory programming.

This research and teaching is sponsored by NSF Grant.

Python By Design: Using Design as a Teaching Method in CS1

Author: Robert Willhoft

Students in Introduction to Programming (CS1) courses often struggle with what is called the blank paper syndrome. They have been given a program to write, but really have no idea how to start. This poster presents a method of helping the students get over the blank paper syndrome through focusing on ways to design a program.

Almost all CS1 classes introduce the waterfall or some more agile method of developing programs. In almost all methodologies the importance of design is emphasized. However, in CS1 courses, design is often presented as something that will be discussed in more advanced CS courses. Python by Design helps the student design their program, or parts of it, using documented designs that are provided to the student as a supplement to the text book.

For example, the student is given a design for a simple Python program in one of the first lectures. The design provided, and most of them that follow, have simple questions for the student to answer about the program they want to design. The student answers the questions and the design worksheet helps them with the construction of the program implementation based on the information that they have written. In this they learn a reusable design that can be applied to every program they write. With practice, this design becomes a normal part of how they think about creating computer programs.

The fifteen designs presented on this poster are given to the students during the semester. Each is used either in a lecture or class exercise when introduced to the student the first time. The student then has to use the design in the associated lab. The students keep all the designs, lecture examples, in-class exercises, and labs in one notebook which they use throughout the course.

Student Posters

Non-metric Distances in Nanoscale Image Mining

Author: Daniel Jackowitz

In the field of image mining, it is very important to be able to quickly and accurately learn a distance function for use in comparisons and similarity searches. Much success has been achieved learning this function for (geo)metric distances, but the question of whether these approaches and techniques can be extended to non-(geo)metric distances is an important issue. Of particular interest is the LearnMet algorithm, developed by Varde et al. as a way to learn metric distances from graphical plots. This paper describes the results achieved when applying this non-metric extension to the LearnMet algorithm.

The overall goal of this research project is to investigate the feasibility of using non-(geo)metric distances for image mining. While a human examiner can frequently detect striking visual similarities between images without much trouble, it is often the case that these similarities are difficult to capture in a way that is computationally useful. It has been shown in the literature that good results can be achieved using metric distances, and the goal of this investigation is to determine whether similar success can be had using non-metric distances.

A key component to the approach is the LearnMet algorithm, which was developed by Varde et al. as a way to learn metric distances from graphical plots. Thus far, LearnMet had only been applied to metric distance functions. The major goal of this research is to determine whether LearnMet can be effectively extended to non-metric distances as well.

Unsupervised Face Recognition Using Hyperspectral Images and Spectral Angle

Author: Nisha D'Amico

One piece of information that can be extracted from a hyperspectral image is a spectrum that plots one pixel extracted from the image bands. This spectrum shows the value of the pixel in each band. It is predicted that this spectrum is unique enough that it can be used to differentiate from one person to another. Part of our experiment was to see if this prediction was correct.

Our work has focused on a set of hyperspectral face images collected over two years. It included 17 subjects, each with five facial expressions and viewing angles. Each hyperspectral image is 640x640 pixels, 120 bands/images (5nm wide) covering the 400 to 1000 nanometers interval.

The images were cropped during the data collection to 200x200 pixels. The images were collected using a Surface Optics (SOC) 700 instrument available at the host institution (Montclair State University).

Two distinct steps were employed: face detection, and spectral angle based face recognition. In face detection, a simple skin texture detection algorithm was employed to delimitate the face area and the enclosing rectangle was created. For face recognition we have extracted the spectra of the pixel located in the center of each rectangle. The assumption here is that such spectra will correspond to the center of the face and thus provide a good characterization of the spectral properties of the subject's face. The spectra for any two images are next compared using Spectral Angle. Two faces are considered to belong to the same person if the angle between the corresponding spectra is the smallest among all possible pairings.

Our work was implemented in Matlab. To test the approach we have randomly selected one face for each subject as test and considered the other four faces as training data. To ensure a generalization of the results, the experiment was repeated several times and the recognition values. The overall recognition accuracy for the uncropped photos was 34% increasing to 45% when face detection and cropping was used. This work was supported by the National Science Foundation's REU Program under Grant Number IIS-1004447.

Testing the Stability of an Inverse Scattering Seismic Imaging Algorithm Against Noisy Data

Author: Chris Smith

Inverse scattering theory is a mathematical method for determining the characteristics of a target from measurement data of radiation or particles scattered from the target. There are many examples of this in the medical imaging, military and geology fields such as: MRI, CAT scan, x-ray, ultrasound, radar, sonar, deep Earth seismology and seismic exploration.

In seismic applications, translating the raw collected data into something usable typically involves four discrete steps, which must be performed on the data sequentially. In order the four steps: removal of free surface multiple reflections, removal of internal multiple reflections (or reverberations), imaging primary reflections to correct spatial location and inversion or amplitude determination. With the algorithm we are reviewing, it is assumed that the first two steps have been performed, leaving our algorithm to perform steps three and four (imaging and inversion) simultaneously.

This Seismic Imaging and Inversion (SII) algorithm was presented by Dr. Nita in a previous paper. The SII algorithm is derived from the inverse scattering theory and is able to perform the imaging and inversion steps without any knowledge of the subsurface for a 1-dimensional, acoustic, one parameter medium. So far the algorithm has only been tested with full frequency spectrum and band limited data, data that is from a continuous function and contains no noise. This type of data would practically never be collected in the field so it is vital that the SII algorithm be proven useful against noisy data.

Although derived originally as a series, the algorithm has a closed form (the limit of the series) for all types of 1-dimensional media. The algorithm is non-linear and treats the data much more actively than previous methods. This removes the reliance on a velocity model, allowing the algorithm to be applied without prior knowledge of the subsurface.

Congestion Control in Wireless Sensor Networks

Authors: Brian Lim, Michael Bruckel

Wireless sensor networks (WSNs) consist of a collection of small wireless devices known as nodes that perform data collection about the surrounding environment. The data gathered from the node's on-board sensor is then transmitted over several hops (routed through other sensor nodes) until it reaches a wireless device known as a sink, which aggregates the data.

Our project specifically focuses on the research and creation of a WSN congestion control protocol. Congestion in networks is caused by a node receiving more data than it can forward, and congestion can not only cause loss of data, but can also result in wasted energy by transmitting data that is never received. Our aim is to create a protocol that not only accurately detects congestion in a sensor network, but can then control data transfer rates in a manner that is efficient with respect to both energy consumed and data throughput. We are conducting our research using the ns-2 network simulation program. In the first phase of our work we have gathered data about typical congestion scenarios during the operation of WSN nodes in a randomly-generated topologies and in topologies designed to cause congestion. We have focused our attention on the routing queues of individual nodes and studied through the simulation the impact of increasing traffic on these queue sizes. In this poster, we will present our simulation results and derive some conclusions that hint to a possible congestion control strategy. As part of our ongoing work, we hope to use this data to design our own congestion detection algorithm and congestion control scheme.

Fault Tolerance of HyperNEAT

Author: Drew Wicke

My research was to quantify the fault tolerance of the CPPN in HyperNEAT based on the XOR problem and the predator-prey game. I explored HyperNEAT's inherent and learned fault tolerance in order to help define whether HyperNEAT is a good candidate for use in fault-prone situations.

In order to understand HyperNEAT's fault tolerance, the CPPN was subjected to various types of faults in two experiments. In each experiment, HyperNEAT was first exposed to faults without being trained to deal with them. Then, HyperNEAT was trained to deal with these types of faults and the experiments were repeated. The results of these experiments provide a better understanding of how well HyperNEAT adapts to faults to the CPPN.

An Implementation of the Ω Failure Detector for a Restricted Crash-Recovery Model

Author: Jason Ginther

In distributed systems, consensus cannot be implemented on a failure detector that is fully asynchronous and tolerates crash failures. In order to create such an algorithm it is necessary to restrict either the asynchrony or the crash model or both. This work produces an algorithm that implements the Ω failure detector in a way that is fully asynchronous but assumes that all processes that crash will eventually rejoin the computation. Being able to implement such an algorithm suggests that the difficulty of creating strong guarantees like consensus comes from processes that crash and do not recover as opposed to asynchrony or processes that do recover after crashing.

Developing Semantic Web Technologies for Biological Data Representation

Authors: Alison Nolan, Ryan Lehman

The Semantic Web is the next generation of the World Wide Web, created to enable users to search for information based on the meaning of their search terms rather than the syntax. This is achieved through the creation of ontologies - a formal specification of the concepts and their relationships in a domain, which allow a machine to understand the information at a deeper level. Representing information formally in an ontology also allows inferences to be made about facts that are implicit to the knowledge base. Our research involved applying these semantic modeling techniques to biological data and developing a smart interface with which to access it. Our poster will include a general overview of the Semantic Web, descriptions and diagrams of the ontologies used and developed in the study, and screenshots of the user interface we developed.

CCSCE 2010 Programming Competition

The CCSCE-2010 Collegiate Programming Competition is a competition for undergraduate student programming teams of two or three members each.

American University
Advisor: Michael Black

Bloomsburg University
Brandon McKenzie
Tom Crouse
Shane Levensgood
Advisor: Robert Montante

Bloomsburg University
Zach Rothweiler
Ryan Kelly
Dustin Jones
Robert Montante

Fairmont State University
Michael Sink
Clinton Murphy
Gustavo Fernandes
Advisor: Mahmood Hossain

La Salle University
Tim Gallen
Justin Bourgeois
Chris Grontkowski
Advisor: Timothy Highley

La Salle University
Kyle Bretz
Christian Lombard
Keyona Polk
Advisor: Timothy Highley

Mansfield University
Jennifer Weinman
Mark Burger
Clete Blackwell
Advisor: Chadd Hogg

Mansfield University
Cliff Torpy
Vinnie Cuda
Dave Sargeant
Advisor: Chadd Hogg

McDaniel College
Michael Donders
Rebecca Putnam
Fenghao Wang
Advisor: Sara More

Moravian College
Bekah Overdorf
Takumi Bolte
James Moore
Advisor: Matthew Lang

Moravian College
Jason Ginther
Evan Altemose
Peter Baio
Advisor: Matthew Lang

Mount St. Mary's University
Kevin Hamilton
Joaquin Rodriquez
Seth Wheeler
Advisor: Scott Weiss

Mount St. Mary's University
Joey Gannon
John Martin
Mike Mugno
Advisor: Scott Weiss

Shippensburg University
Phil Diffenderfer
Emily Bruckart
David Kelly
Advisor: Carol Wellington

St. Mary's College of Maryland
Gary Beverungen
Alex Roca
Greg Herpel
Advisor: Lindsay Jamieson

Suffolk County Community College
Anthony Garcia
Brian Hufsmith
Andrew Puleo
Advisor: Bruce Barton

Ursinus College
Ted Brandston
Brian Lim
Dan Devlin
Advisor: April Kontostathis

Ursinus College
Sam Snodgrass
Andy Garron
Neal Shukla
Advisor: April Kontostathis

Widener University
Louis Szgalsky
Andrew Burns
Phil Marlin
Advisor: Adam Fischbach

York College of Pennsylvania
David Thornton
Darrell DeFreitas
Andy Eyster, Brian Peters
Advisor: David Hovemeyer

CCSC Eastern Conference Committee

Co-Chairs

Jerry Kruse, Juniata College
Bill Thomas, Juniata College
John Wright, Juniata College

Registration

Barbara Williams, Juniata College

Local Arrangements

Lorri Shideler and Juniata College
Conferences and Events

Papers

Pete DePasquale, The College of NJ

Panels, Workshops, and Tutorials

Karen Watt, Mount Aloysius College
T.J. Highley, La Salle University

Nifty Ideas and Lightning Talks

Mohsen Chitsaz, Frostburg State
University
Michael Flinn, Frostburg State University
Heather Amthauer, Frostburg State
University

Student and Faculty Posters

Dave Hovemeyer, York College of PA

Undergraduate Programming Contest

Michael Black, American University
Joel Pheasant, Juniata College

Vendors

Jerry Kruse, Juniata College

Web Site

John Wright, Juniata College

K-12

Kathleen Jones, Juniata College

CCSC Eastern Steering Committee

Elizabeth Adams, James Madison
University

Steven Andrianoff, St. Bonaventure
University

Karen Anewalt, University of Mary
Washington

Jack Beidler, University of Scranton

George Benjamin, Muhlenberg College

Elizabeth Chang, Hood College

Dorothy Deremer, Montclair State
University

S. Jane Fritz, St. Joseph's College

Don Goelman, Villanova University

Amruth Kumar, Ramapo College

John Meinke, University of Maryland
University College

Jennifer Polack-Wahl, University of Mary
Washington

James R. Sidbury, University of Scranton

Onkar Sharma, Marist College

Pat Woodworth, Ithaca College

CCSC Eastern 2011 Conference

October 2011

Marymount University, Arlington, VA

Co-Chairs

Diane Murphy, Marymount University
Donna Schaeffer, Marymount University
Michelle Liu, Marymount University

Future Conference Locations:

Richard Stockton College of New Jersey
American University

Acknowledgements

There are many, many people involved in putting together a conference. We are very sorry if we have missed anyone. A great deal of thanks goes to the following, in no particular order:

Liz Adams

Don Goelman

John Lewis

Gary Gillard

Elizabeth Chang

Sister Jane Fritz

Barbara Williams

The Conference Committee

Edward Stoddard, Huntingdon County Visitors Bureau

CCSC, ACM SIGCSE, UPE, and the National Partners

Juniata College,

Ken Navarro

Dave Molchany

Dave Nelson, Minitab

Jim Lakso, Juniata College Provost

Jim Rokosky, Digital Solutions/Inmate Telephone, Inc.

Juniata College Dining Services, Print Shop, Marketing, and Maintenance

Michael Baker, who helped make online registration possible

Lorri Shideler and the Juniata College Office of Camps, Conferences and Events

Student Volunteers: Aimee Reinaker, Arianne Waddington, Eric Hill, Travis Raup

Session Chairs: Loren Rhodes, Grant Braught, Elizabeth Adams, Heather Amthauer

Loren Rhodes and the Juniata College Dept. of Information Technology and Computer Science

The multitude of presenters, without whom we would just be having a big party right now instead of a conference.

Thank you!