Welcome to Orlando!

We are happy to welcome you to the 13th Annual Conference on Information Technology Education and the 2nd Annual Research in IT Conference, hosted by the University of South Florida. This year continues our IT Research conference, which was introduced last year to significant interest and participation. Those of you who attended last year’s conference in Calgary may remember a questionnaire you were asked to complete about the 2013 conference. Well, we listened. The most noticeable change from last year is the addition of a third parallel session track, providing more flexibility and, in future years, an increased number of papers at the conferences. For this year, its chief effect has been an increase in the time allotted to each paper presentation. Many of you said you might bring the family, which certainly affected our choice of conference city as well as our selection of an all-suite conference hotel that provides free shuttle service to Disney theme parks.

This year’s SIGITE theme is making lemonade from the lemon grove that is our collective, resource-constrained education enterprise – in short, doing more with less. As higher education is increasingly challenged financially – a trend that shows no signs of abating – we need to open the door to economies of scale and collaborative ventures. Entrepreneurism is no longer simply something to be taught, but must be an approach to maximizing our resources and squeezing every drop of lemonade out of each lemon. And (I can’t resist asking) where better to talk about lemons and lemonade than central Florida, the heart of the citrus industry?

SIGITE/RIIT 2013 kicks off with a provocative keynote by Sam Esfahani, CIO of PSCU, the leading service organization in the credit union industry. Sam is a turnaround specialist who blends innovative thinking with an uncommon ability to build high performing teams, and has been instrumental in leading PSCU’s transformation as a technology leader in the credit union industry. Titled “Digit Shift: Leverage or Get Leveled,” Sam’s talk focuses on industry/academia collaboration, why it is so essential for the future health for both, and ways it can be cost-effectively implemented.

SIGITE/RIIT 2013 is a true team effort, and we would like to acknowledge and thank the people who have made this year’s conferences possible. Rob Friedman and Ken Baker served as Program Co-Chairs, and successfully dealt with the many challenges that program chairs must. Rob, of course, also serves as SIG Chair, so had to handle twice as many questions! Conferences are expensive events, and registration fees do not cover everything. The critically important job of garnering external support for our conferences was accomplished in great form by Sponsorship Co-Chairs Amber Settle and Terry Steinbach. To the sponsors that Amber and Terry signed up go our thanks for their generous support. Essential support has also been provided by the host for the conference, the University of South Florida, including financial support for program printing provided by the College of Engineering and audio-visual and computing support provided by Information Technology. Behind the scenes are many others whose efforts are essential for a successful event. These people deserve special thanks, and include Abdel Ejnioui as Treasurer, Phil DuMas as Registration Chair, Colin Arnold as Local Sponsorship Chair, April Mosqus at ACM for assistance with overall planning, Lisa Tolles at Sheridan Printing for organizing the proceedings, Steven Houston for putting up all authors and presentations on our conference website, and Janet Gillis and Ryan Wakefield for design and producing our printed conference program. Randy Connolly, last year’s conference chair and the SIG’s Information Director, also assisted with website matters at critical points.

Over the years, we have found our conference to be both a wellspring of ideas to address current issues and a much-needed opportunity to network and bond with fellow IT educators. We hope you find this year’s conference as beneficial and rewarding as the many we have attended in the past.

Dave Armitage
General Chair, SIGITE/RIIT 2013
SIGITE/RIIT 2013 Program Chairs’ Message

There’s been a lot of change for SIGITE over the years – growth in membership, increased cooperation with other SIGs, sponsorship of affiliated conferences, and new IT programs from around the world contributing to a steadily enhanced stature for IT as a computing subarea, just to name a few. Last year’s inauguration of the Research in Information Technology (RIIT) conference as a co-located event with the annual SIGITE conference is one change that has proved warranted, given the number and quality of the submissions we received this year and last. The RIIT thread complements the more widely known and more heavily subscribed SIGITE conference, given the increased interest industry continues to show in partnering with academia to address collaboratively applied research advances in areas related to our five curricular pillars. As Dave Armitage and Jeff Brewer wrote in last year’s Program Chairs’ message, “With a hands-on flavor and stronger connections with industry, [research in IT] is clearly differentiating itself from research in more traditional computing disciplines, and is deserving of its own conference venue.”

As authors and reviewers no doubt noticed, we changed conference management systems this year. Several years ago, Grinnell University’s Henry Walker was kind enough to mirror his databases and web forms used to organize SIGCSE to accommodate SIGITE, and we appreciate his consistent support. This year, however, we opted for change in this area, too. Colleagues in SIGKDD developed and manage the Microsoft CMT application we selected to use. Although there were a few bumps in the transition, most of our contributors and volunteers found it to be an easy-to-use system. 12 RIIT reviewers made recommendations on 24 submissions to RIIT, and 64 peer reviewers scored and commented on 70 submissions to SIGITE.

The number and substance of these submissions, in relation to the venue of this year’s conferences, provided yet other opportunities for change in the conferences. These include providing more panel discussions, more workshops and more time allotted for individual paper presentations. As interest grows in SIGITE/RIIT, we’re able to be more selective and more inclusive at the same time. 28 technical papers will be presented at SIGITE, which will significantly reduce our acceptance rate from a 6-year average of 54% to 40% this year, while RIIT’s acceptance rate came in at 50%. We are able to provide inclusivity by offering 24 authors – a four-fold increase over last year – the opportunity to present their work as poster papers that are included in the ACM Digital Library. We would like to thank a highly responsive group of 76 peer reviewers, several of whom got tagged late in the process to review more papers than they bargained for.

Perhaps the most significant change to the proceedings is that they are available for download to conference registrants for a period of time, thus providing more opportunity for conversation among authors and attendees. From a community building perspective, this is a tremendous opportunity for advancement provided by the ACM Publications Board. Go to our conference website [http://sigite2013.sigite.org/] and find the Proceedings link near the top of the page.

As you look through the schedule of events, you’ll notice that we have doubled the panel session time from 30 to 60 minutes, and these panels will run concurrently and not opposite any technical papers, so you can participate and contribute to the topic that is most important to you. We have also moved the workshops to Saturday morning in an attempt to make the best use of a time block that in the past has not been well attended. We know that Orlando attractions beckon, but please consider taking advantage of the workshops.

All of us on the organizing committees would like to hear from you about these changes so that we can continue to innovate and provide SIGITE/RIIT attendees with the best experience possible.

We welcome you to SIGITE 2013 and RIIT 2013. Engage the panels and the paper and poster authors, meet new colleagues and reengage with old friends. Thanks for attending!

Ken Baker and Rob Friedman
SIGITE/RIIT Program Co-Chairs
SIGITE and RIIT are conferences highlighting strong connections between academics and practitioners, and one of the most visible manifestations of this cooperation is the support provided to the conferences by our generous sponsors. Our conferences would not be the same without the companies and institutions who see the value in bringing together the SIGITE and RIIT communities every year. Our most generous sponsors are at the platinum level, and this year EMC Corporation, NetApp, and Oracle joined us in making that strong commitment to our community. Joining us at the silver level this year is ABET, and we are excited to see them here in Florida. We are also grateful to the Foundation for Information Technology Education for underwriting our wireless access and providing one of the coffee breaks. We hope that you’ll visit the sponsors at their booths, attend their presentations on Friday, and let them know how much you appreciate their support of the SIGITE and RIIT community. This conference would not be possible without their generosity!

Amber Settle and Terry Steinbach, Sponsorship Co-Chairs, SIGITE/RIIT 2013
We acknowledge with thanks the contribution made by the Foundation for Information Technology Education in support of conference wireless access and coffee breaks.
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James Woolen, Ferris State University
Nima Zahadat, The George Washington University
Chi Zhang, Southern Polytechnic State University
October 9, 2013

IT Department Chairs Meeting .................................................. 2:00 pm - 5:00 pm
IT Chairs Meeting: An annual gathering of chairs of IT and related departments. All chairs and others with similar responsibilities are welcome. Please contact Rob Friedman at rsfit@u.washington.edu for further details.
Room: Martinique 1

October 10, 2013

SIGITE Executive Committee Meeting ............................................. 9:00 am - 11:30 am
Room: Cayman

Opening Session & Keynote Address ............................................. 12:00 pm - 12:45 pm
Room: Martinique 1

Welcome
Conference and Program Chairs

Keynote Address
Sam Esfahani, Chief Information Officer, PSCU

Paper Session A1 ................................ Cyber .................................. 1:00 pm - 2:15 pm
Room: Martinique 1
Session Chair: Xinli Wang, Michigan Technological University

Training Cyber-Defense and Securing Information Assets Using Student Blue Teams
Dale Rowe, Brigham Young University
Scott Pack, Brigham Young University

In this paper, we discuss the creation of a student Blue Team to assist campus organizations with security incident response. We also explore approaches for establishing a relationship with university information technology staff, informing blue team members of professional and ethical responsibilities, and aiding system administrators with incident response and system hardening. Finally, we discuss the benefits to students taking part in these activities, as well as their contributions to improving an organizations security posture

Cyber-Physical System Concepts for IT Students
Richard Helps, Brigham Young University
Scott Pack, Brigham Young University

Cyber-Physical Systems (CPS), a.k.a. embedded systems, are becoming increasingly important within Information Technology. As the “Internet of Things” and ubiquitous mobile devices impact an ever-increasing segment of IT so it becomes imperative for IT students and professionals to appreciate the key concepts of CPS so that they can design IT systems which include CPS elements, with appropriate consideration for the networking, security and HCI aspects of these systems.

This report presents an introductory experience, targeted at first-year students in IT, to help them understand the key concepts of CPS that are relevant to IT professionals. The experience is offered within the context of a first-year class where a single lecture and a single short lab experience are assigned to introduce CPS concepts to IT students. The lecture and lab are designed to engage the students, help them understand the relevance of this discipline to IT professionals and
give to them a taste of designing and working with CPS. The lab was designed as a combination demonstration and development experience. Students developed a working system within the one-hour lab available and explored several CPS and related IT concepts. Student learning was assessed and learning results and student responses are presented.

Paper Session A2.................... Mobile ........................................ 1:00 pm - 2:15 pm
Room: Martinique 2
Session Chair: Carl Carlson, Illinois Institute of Technology

Leveraging HCI in Teaching Mobile, “Anywhere and Everywhere” IT
Rich Halstead-Nussloch, Southern Polytechnic State University
Han Reichgelt, Southern Polytechnic State University

Within our IT program, we have been working on constructive ways to teach HCI for the past five years; so, when the mobile revolution caught fire, we already had been working on better ways to incorporate HCI-related learning outcomes in our curricula. In the course of this activity, we have identified leverage points to meaningfully teach the important HCI concepts and skills listed below. These points provide a means for those interested in effective IT administration, accreditation and teaching to manage the increasing importance, complexity, and methodological diffusion of HCI in the mobile environment. This paper compiles and assesses the top seven of these leverage points.

HCI topics required in the curriculum include:
• Human Factors
• HCI Aspects of Application Domains
• Human-Centered Evaluation
• Developing Effective Interfaces
• Accessibility
• Emerging Technologies
• Human-Centered Computing

Flipping the Classroom - Is It For You?
Rebecca Rutherfoord, Southern Polytechnic State University
James Rutherfoord, Chattahoochee Technical College

Technology is being used to enhance all types of educational experiences. Several new pedagogical methods have been developed that use technology to assist students in learning. This paper will discuss one of these methods—the flipped classroom. The flipped classroom is not necessarily a new idea, in fact, it developed from such things as hybrid or blended classrooms. But flipping the classroom does have different pedagogical implications for student learning. The paper will describe the history of the flipped classroom, mechanisms of flipping the classroom, pros and cons for this method, give examples of how this has worked, and discuss how to get started creating a flipped classroom environment.

Paper Session A3...................... Defining IT ............................. 1:00 pm - 2:15 pm
Room: Barbados
Session Chair: Barry Lunt, Brigham Young University Provo

Termediator: Early Studies in Terminological Mediation Between Disciplines
Jessica Richards, Brigham Young University
Owen Riley, Brigham Young University
Joseph Ekstrom, Brigham Young University
Kevin Tew, Brigham Young University

A glossary is a terminological document that typically binds terms to concepts to illuminate the meaning of the term within in a specific domain. Many of the same terms are bound to different concepts within different domains, which often leads to miscommunications in interdisciplinary projects. How can terminology management tools facilitate communication between domains? Would an application that performs similarity measures between terms in glossaries from different domains provide useful insights? This paper provides a status report on the “Termediator” application that begins this effort in terminology management. Termediator uses a web interface to list the terms, concepts, and
similarity measures for thousands of terms compiled from 198 different glossaries. Termediator’s results include obvious synonym matches and accurate relevance rankings between non-synonym terms. These results leave us optimistic about the future of terminology management tools that augment interdisciplinary communication through natural language processing.

Advancing the IT Research Agenda
William Agresti, Johns Hopkins University

The potential benefits of pursuing an intentional community-wide development of a research agenda for IT are discussed. Motivation to undertake this task arises from the continuing evolution of IT as a distinct discipline. There is an opportunity to mark progress by developing an IT research agenda that has broad involvement from the community. Alternative formats for an agenda are discussed and potential research topic areas are proposed, drawing upon prior contributions. To help inform the discussion, 24 other research agendas are profiled, providing useful examples of agenda-development processes and alternative formats for the recommended IT research agenda.

Student Perspective on an Online Asynchronous Introduction to Linux Based on User-First Pedagogy
Alessio Gaspar, University of South Florida
Sarah Langevin, University of South Florida
Naomi Boyer, Polk State College
Cliff Bennett, Polk State College

An introduction to Linux is used to survey students’ perception of required effort levels, suitability of tools, pedagogies of contents & instruction. The relevance of various cognitive skills, along with the evaluation of how well the teaching material supports their acquisition, supplements previous findings on the educational nature of an introduction to Linux. Survey results are interpreted in terms of the impact of the misalignment of students’ perceptions about the relevance of specific cognitive skills with both academic & industry perspectives. We also review what results teach us on the appropriateness of both pedagogies of contents & instruction. We then discuss observations which highlight potential issues but require further specific studies to allow us to design interventions to address them.

The Changing Face of Information Technology
Daniel Bogaard, Rochester Institute of Technology
Stephen Zilora, Rochester Institute of Technology
Jim Leone, Rochester Institute of Technology

Information technology as an academic discipline began in the early 90’s. Since then, there have been many changes in how industry views the discipline. Today, information technology is about large-scale operations. This may be manifested as supporting enterprise services, working with big data, or supporting massive multi-user systems. In this paper, we describe a new curriculum that is based upon the original work in the “2008 Curriculum Guidelines for Undergraduate Degree Programs in Information Technology” document, but addresses modern information technology demands. We discuss a new curricular model for teaching information technology and also the addition of analytics as an overarching theme for the curriculum.

Demographics
Karen Patten, University of South Carolina
Correlation of Grade Prediction Performance and Validity of Self-Evaluation Comments
Kazumasa Goda, Kyushu University
Sachio Hirokawa, Kyushu University
Tsunenori Mine, Kyushu University

To grasp a student’s lesson attitude and learning situation and to give feedback for each student are educational foundations. Goda et al 2011 proposed the PCN method to presume a learning situation from a comment freely written by students. The PCN method categorizes comments into three items of P(previous), C(current) and N(next). Item P is learning activities for preparation of a lesson. Item C is understanding of the lesson and learning attitudes to the lesson. Item N is the learning plan and goal by the next lesson. They pointed out a correlation between the student’s final results and the validity of a descriptive content of item C.

A problem left in Goda et al 2011 is the negative performance in prediction for upper grade students. One of the reasons is the difficulty in assessing the validity by humans. Another reason is the diversity of quality of freely written comments. Some students wrote their comments that have nothing to do with their understanding or learning attitudes in item C.

The present paper applied multiple regression analysis to calculate the PCN scores that determine the validity level with respect to each viewpoint. The students who wrote comments with high PCN score are considered as those who describe their learning attitude appropriately. The present paper applied a machine learning method SVM (support vector machine) to student comments for predicting the students’ final result in five grades of S,A,B,C and D. It is confirmed that the prediction performance of student grades is high for the students with high PCN scores.

Demographics of Undergraduate Students in Game Degree Programs in the United States and United Kingdom
Monica McGill, Bradley University
Amber Settle, DePaul University
Adrienne Decker, Rochester Institute of Technology

Over the last decade, there has been a growth in the video game industry and, at the same time, game degree programs at post-secondary institutions worldwide have grown in quantity and quality. One current topic of interest is the representation of gender and race in games as well as in the game industry workforce. We explore this topic in our research, providing an overview of the demographics of undergraduate students in game degree programs in the United States and the United Kingdom. This includes a look at race, gender, ethnicity, political preferences, sexual orientation and more. Gender results indicate that males make up the significant majority in undergraduate game programs. Women are significantly more likely to think that the gaming industry, programs at the university, and project teams at the university are not as diverse as men think they are. Women are also significantly more likely to report that their programs would benefit from more diversity than men.

Using Agent Technologies to Correlate and Compare Anti-Malware Software
Kellie Kercher, Brigham Young University
Haley Dennis, Brigham Young University
Dale Rowe, Brigham Young University

Malware is a fast growing threat that consists software used to disrupt, or impact the confidentiality, availability or integrity of a user’s computer experience. Antivirus software can help protect a user against these threats. There are numerous vendors users can choose from for their antivirus protection, each with their own set of virus definitions and various resources that are capable of recognizing new threats. However, there is no established system or process to measure and display data on the performance of antivirus vendors to new malware over an ongoing time period in real time. Such a mechanism would better inform end users of their security options in addition to informing organizations of prevalent threats occurring in networks. In this paper, we propose a cloud sourced malware reporting system that uses distributed agents to assess the performance of antivirus software based on malware signatures.
Five years have passed since the final publication of the ACM-IEEE information technology (IT) four-year curricula recommendations, if any. In this panel the group members will report on its current progress and will solicit input from Information Technology Education (SIGITE) to determine the efficacy of the current IT curricula guidelines and to suggest (IT2008) [1]. In September of 2012, the ACM Education Board initiated an exploratory invitation to Special Interest Group for Technology-mediated learning, learning management systems, learning object repositories, ensuring quality control and accreditation, and how to departments can leverage these changes. Each panel participant addresses a specific area, including technology-mediated learning, learning management systems, learning object repositories, ensuring quality control and accreditation, and how to successfully administer and manage these suggested changes.

MP3 Files As A Steganography Medium

Mikhail Zaturenskiy, Illinois Institute of Technology

There is a lot of work done on hiding information inside picture files in formats such as JPEG, however not much has been done to date on hiding information inside MP3 audio files. This paper looks at ways to hide information inside MP3 files and proposes four largely unexplored techniques: unused header bit stuffing, unused side information bit stuffing, empty frame stuffing, and ancillary bit stuffing.

Panel C1 .................................................................................4:00 pm - 5:30 pm
Room: Martinique 1

Change in IT Education: New Educational Learning Environments: Riding the Wave of Change Instead of Having It Crash Upon Us

Jon Preston, Southern Polytechnic State University
Han Reichgelt, Southern Polytechnic State University
Rebecca Rutherford, Southern Polytechnic State University
Chi Zhang, Southern Polytechnic State University
Guangzhi Zheng, Southern Polytechnic State University

The environment of higher education is changing; we have new challenges and opportunities created by social media, streaming technology, access to learning materials, and pathways of acquiring and assessing knowledge and skills. This panel discusses forces of change and disruption to existing models of higher education and suggests means by which IT departments can leverage these changes. Each panel participant addresses a specific area, including technology-mediated learning, learning management systems, learning object repositories, ensuring quality control and accreditation, and how to successfully administer and manage these suggested changes.

Should IT2008 be Revised?

Bill Paterson (Moderator), Mt. Royal University
Mary Granger, George Washington University
John Impagliazzo, Emeritus, Hofstra University
Edward Sobiesiek, United States Military Academy
Mark Stockman, University of Cincinnati
Ming Zhang, Peking University

Five years have passed since the final publication of the ACM-IEEE information technology (IT) four-year curricula guidelines (IT2008) [1]. In September of 2012, the ACM Education Board initiated an exploratory invitation to Special Interest Group for Information Technology Education (SIGITE) to determine the efficacy of the current IT curricula guidelines and to suggest recommendations, if any. In this panel the group members will report on its current progress and will solicit input from participants on what aspects of the model curriculum need to be revisited.

Identifying Information Technology Graduate-Level Programs

Barry Lunt, Brigham Young University Provo

This paper is a follow-on to one presented at SIGITE 2012, in which 4-year IT degree programs were identified in the USA and given a compliance score relative to the IT Model Curriculum. This paper studies those 220 4-year IT programs and finds both master’s-level and doctorate-level IT programs at those institutions.

Reception ...........................................................................5:30 pm - 7:00 pm
Attirrium East
Keeping Up with Web Development Trends
Craig Miller, DePaul University
Guangzhi Zheng, Southern Polytechnic State University
Randy Connolly, Mount Royal University
Amos Olagunju, St. Cloud State University

Web use continues its remarkable growth, not just in the diversity of applications and the devices that deliver them, but also in the technologies for developing new applications. How well have IT programs kept pace with the emerging trends and requirements of web applications? Do current IT learning outcomes address the needed web development skills? Which development methodologies and frameworks are best for achieving the IT web development learning goals?

This panel proposal addresses these questions by presenting experiences with diverse goals and constraints of web development in IT curriculums, including:

1. Role of web development curriculum in alternative models of IT programs.
2. Primary learning outcomes and choice of possible technologies for realizing web development goals.
3. Projects and essential topics for accomplishing web development goals.

Girls in IT: How to Develop Talent and Leverage Support
Mihaela Sabin, University of New Hampshire
Deborah LaBelle, Nazareth College
Hiranya Mir, Embry-Riddle Aeronautical University
Karen Patten, University of South Carolina
Suzanne Poirier, Skillsoft
Seth Reichelson, Lake Brantley High School

The objectives of this panel are to inform the audience about national and regional initiatives developed by the National Center for Women & Information Technology (NCWIT) to reach out to middle and high school girls; learn from promising experiences in which the panelists have been directly involved; and discuss venues to scale and sustain efforts to increase women’s participation in technology careers. Panelists will describe their particular experiences and discuss ways to utilize the Aspirations in Computing program to increase enrollment and retention of females in computing. A minimum of 30 minutes will be set aside for questions and answers.

The Emergence of IT as a “Profession”
Joseph Ekstrom, Brigham Young University Provo
Charlene “Chuck” Walrad, IEEE-CS PAB-IT
Han Reichgelt, Southern Polytechnic State University
Gregory Hislop, Drexel University
William Agresti, John Hopkins University

Whenever society comes to depend on the services of a group of skilled individuals, society demands a way to recognize if a particular individual has the skills needed to support that dependency. Doctors, lawyers, engineers, dentists, plumbers, construction contractors, and even hairdressers are certified or licensed. Information and communication practitioners
have arrived at the point where society is demanding certification of their skills. More and more organizations are requiring certifications for people to fill certain roles. Once sanctioned by government, an official organization is formed to assure integrity of practice by establishing codes of ethics, standards of practice, and in relevant areas, technical standards.

The United Kingdom, Canada, Australia, New Zealand, and many others have already “chartered” organizations to govern the IT profession. In 2009 the British Computer Society rebranded itself by changing its logo and marketing materials to “BCS-the chartered organization for IT”. This action is symbolic of the times. The BCS is no longer an association of people interested in computing; rather, it is the body officially recognized by the British government to police the IT profession. The Australian Computer Society(ACS) and the Canadian Information Processing Society (CIPS) have similar status in their respective countries.

Questions for discussion:
1. What is a profession?
2. What is the current status of the Profession of IT in the United States?
3. Why is IT recognized as profession in other parts of the world?
4. What role should certifications play in the profession of IT?
5. Are the areas of IT practice that already emerging as professions?
6. What role should SIGITE play in the process?

AM Break ................................................................. 9:45 am – 10:00 am
Martinique Foyer

Paper Session E1........Programming............. 10:00 am - 11:15 am
Room: Martinique 1
Session Chair: Art Gowan, Georgia Southern University

Using a Low-Cost Open Source Hardware Development Platform in Teaching Young Students Programming Skills
Lawrence Hill, Rochester Institute of Technology
Steven Ciccarelli, Rochester Institute of Technology

The teaching of programming skills to young students is often described by those educators involved as problematic at best. Student issues like mathematical maturity, readiness for complex thought, basic problem solving skills, short attention span especially related to the boredom of traditional programming teaching methodologies, and the lack of exciting problems and their solutions with respect to programming assignments contribute to the angst of many a programming instructor. A small fraction of students who “were just made for programming” always seem to succeed at whatever programming problem is given to them. However, a majority of students, especially pre-college and college freshmen tend to have difficulty in overcoming these issues. It is with that observation that something new, in terms of programming pedagogy, needed to be investigated by this paper’s authors.

An ideal opportunity requiring successful programming instruction for 7-12 graders in the local metropolitan area presented itself in the winter of 2012. The students were involved in a statewide competition where groups of students self-selected into project options offered by various sponsoring institutions. Under the “Technology” choice heading of the state program, the student team and the instructor agreed to program a microprocessor to send messages in International Morse Code. The object of the exercise was to learn basic programming skills and to apply them to solving a problem. The hook was to do something brand new the students had never engaged in, keeping their attention on the end goal, and to see the immediate real-time results of some programming effort along the development cycle as the completed final program took form. The effort was a resounding success; the students learned in a few Saturday morning sessions more about programming than the authors have experienced over weeks of effort in traditional programming classes at the college freshman level.

Reaching the ‘Aha!’ Moment: Web Development as a Motivator for Recursion
Amber Settle, DePaul University

One of the topics within programming that has remained a challenge for both educators and students is recursion. A large body of work on programming pedagogy is dedicated to the subject of teaching recursion, and yet relatively little attention in the literature is paid to motivating students to tackle this technique. We present an approach to teaching recursion that has the potential to increase the motivation of students to master recursion. While the approach follows many of the best
practices found in the literature, it is novel in its focus on file system and web search, problems that are directly relevant to all computing students and particularly of interest for those in the area of information technology.

Paper Session E2: \underline{Gaming} \hspace{1cm} 10:00 am - 11:15 am
Room: Martinique 2
Session Chair: Haixia Liu, Uppsala University

Using Video Game Development to Engage Undergraduate Students of Assembly Language Programming
Jalal Kawash, University of Calgary
Robert Collier, University of Calgary

It is widely accepted that the instruction of programming in assembly language is often a challenging and frustrating experience, both to educators and undergraduate students. Although little can be done to simplify the curriculum, it is absolutely crucial that frustration not compel students to abandon the subject. Our use of game development in a second-year course affords a unique opportunity to present this complex subject, without omission, in such a way as to create an experience that most students find entertaining. The results of a class survey indicated that 65% of participants agree or strongly agree that the experience was enjoyable (with only 11% in disagreement). We conclude that this, in turn, ensures a sufficiently engaging experience that offsets the tedium inherent to the subject. The consensus of most students was that the complexity of video game design does not detract from their enjoyment of the course and, contrarily, actually has a positive impact on their learning overall. This position is supported by additional survey results.

COR: A New Course Framework Based on Elements of Game Design
Thomas Gibbons, The College of St. Scholastica

Taking cues from the root causes of anxiety and poor student performance, a new course framework is developed using three key elements of game play. These game play elements are abstracted into an integrated teaching framework that gives students a choice in actions, options for cooperation and competition, and allows for revisions of work.

Two case studies are examined that demonstrate how this framework can be implemented. One shows how this framework can be incorporated in the final project of a systems analysis and design course. The other shows how the framework can be used in a game design course to prepare students for different career paths.

Paper Session E3: \underline{Software Development} \hspace{1cm} 10:00 am - 11:15 am
Room: Barbados
Session Chair: Amos Olagunju, St Cloud State University

ChronoZoom: Travel Through Time for Education, Exploration, and Information Technology Research
Robert Walter, University of Washington
Sergey Berezin, Lomonosov Moscow State University
Ankur Teredesai, University of Washington

In this paper, we describe the architecture, infrastructure requirements, and technical evolution of ChronoZoom, a unique infinite-zoom, temporal-data-visualization open-source platform. With ChronoZoom, it is possible to browse through time and history and fill the browser with events that span from 13.8 billion years to a single day. ChronoZoom, originally a tool to teach Big History, offers significant information technology challenges for integrating IT best practices in HCI (browser based zoomable interfaces), Cloud Computing (client-server architectures) and Big data (storage and retrieval) infrastructure technologies. This paper offers an overview of the ChronoZoom platform, outlines the technical issues we encountered, and the corresponding design decisions that enable scaling the server to support rendering millions of timelines for thousands of concurrent, interactive users. This paper is also a testament to how a distributed team of IT developers across two continents successfully collaborated to ship an open-source, online, educational tool that is set to have tremendous impact on how we view and interact with history.
Design Patterns as First-Class Connectors
Sargon Hasso, Wolterskluwer
Carl Carlson, Illinois Institute of Technology

We propose a technique using design patterns as an abstract modeling construct to connect software components built individually by software developers. Given a set of requirements structured as design problems, we can solve each problem individually by selecting appropriate design pattern in the intended traditional way of using it. Much of the published literature on design patterns spends much effort in describing this problem–design pattern association; however, there is no systematic and practical way that shows how to integrate those individual solutions together.

Our compositional model is based on design patterns by abstracting their behavioral model using role modeling constructs. This approach describes how to transform a design pattern into a role model that can be used to assemble a software application. Our approach offers a complete practical design and implementation strategies, adapted from DCI (Data, Context, and Interaction) architecture. We demonstrate our technique by presenting a simple case study complete with design and implementation code. We also present our approach in a simple to follow software composition process that provides guidelines of what to do and how to do it.

Embedding Virtual Meeting Technology in Classrooms: Two Case Studies
Ye Wang, George Mason University
Seungwon Lee, George Mason University

Innovative Internet applications coupled with improved videoconferencing capabilities have led to the proliferation of virtual meeting technology (VMT) in recent years. This paper aims to bring to light VMT as an effective classroom instructional tool, especially for IT education, and the possible ways to embed this technology in classroom settings in the form of two case studies of IT courses. The paper makes a unique contribution to the research by providing empirical evidence and indicative support for the successful application of VMT in different classroom settings and exemplifying the use of VMT as an effective instructional technology and an enabler of active learning.

Using Virtual Machines to Improve Learning and Save Resources in an Introductory IT Course
Paul Maxwell, United States Military Academy
Geoff Stoker, United States Military Academy
Todd Arnold, United States Military Academy

Information technology courses often require the use of software and hardware to support classroom learning. These systems can assist in achieving the learning objectives for a course through classroom problems and laboratory exercises. The procurement and maintenance of these systems can be a challenge even for well resourced organizations. In this paper we discuss how virtual machines can relieve organizations of some of their resource burdens while effectively achieving course learning objectives and provide examples of how that is currently done at the United States Military Academy.
Learning Agile Software Engineering Practices Using Coding Dojo

Kenny Heinonen, University of Helsinki
Kasper Hirvikoski, University of Helsinki
Matti Luukkainen, University of Helsinki
Arto Vihavainen, University of Helsinki

Information technology and computer science educators are experiencing an industry-driven change from plan-based software engineering development processes to more people oriented Agile software engineering approaches. While plan based software engineering practices have traditionally been taught by lectures, Agile practices can often be best learned by experiencing them in a realistic situation. One approach for bringing Agile practices to the learning community is a coding dojo, where a group of participants solve a programming task together using e.g. test-driven development and pair programming. Coding dojo is a form of learning which values concrete experience in a realistic context. In our experiment, we embedded a coding dojo into the Agile practices part of our undergraduate software engineering course. The participating students considered the coding dojo as a useful experience, and most of them (82%) would recommend participation to coding dojos for their fellow students as well.

QuizPower: A Mobile App with App Inventor and XAMPP Service Integration

Mihaela Sabin, University of New Hampshire
David Meehan, University of New Hampshire

This paper details the development of a mobile app developed for the Android Operating System using MIT App Inventor language and development platform. The app, Quiz Power, provides students a way to study course material in an easy and effective manner. At its current stage the app is intended strictly for use in an mobile app with App Inventor course, although it provides the facility to be adapted for other courses by simply changing the web data store. Development occurred during the spring semester of 2013. Students in the course played a vital role in providing feedback on course material which would be the basis for the structure of the quiz as well as the questions. The significant of the project was the integration of the MIT App Inventor service with a web service implemented and managed by the department.

Improving Service Continuity: IT Disaster Prevention and Mitigation for Data Centers

Louis Turnbull, Georgia Southern University
Henry Ochieng, Georgia Southern University
Christopher Kadlec, Georgia Southern University
Jordan Shropshire, Georgia Southern University

Data centers provide highly-scalable and reliable computing for enterprise services such as web hosting, email, applications, and file storage. Because they integrate a range of different systems, data center administration is a complex process. Managing the risk of IT disaster is especially difficult. Layers of interrelated infrastructure multiply the effect of system malfunctions. Seemingly-small problems can turn into major disasters and take entire data centers offline. To cope with the myriad risks, this research develops a matrix of IT disaster prevention and mitigation techniques for data centers. The matrix is organized along two dimensions: attributes of data center infrastructure and elements of the IT disaster recovery process. It includes 134 specific techniques which were clustered into 49 cells within the matrix. An expert panel assessed the validity of the matrix and ranked the techniques within each cell. The result is a comprehensive tool for improving the resilience of data centers.
Administrative Evaluation of Intrusion Detection System

Xinli Wang, Michigan Technological University

Due to the complexity of intrusion detection systems and their applications in a security architecture, there is a need to objectively assess intrusion detection systems in the perspective of system and network administration in order to select a right product which is a good fit to a specific design. In this research, we have developed a methodology to evaluate intrusion detection systems in a simulated environment. The environment is built with a combination of physical and virtual machines. Network traffic is simulated with baseline activities, which is characterized with web browsing and normal user activities, benchmark and actual intrusion attacks. Different tools are employed to measure CPU load, memory need, bandwidth constraint and computer memory input/output. Results show considerable differences among tested intrusion detection systems.

Paper Session G1..........................Student Perceptions..........................3:10 pm - 4:25 pm
Room: Martinique 1
Session Chair: Joel Larson, University of Washington Tacoma

A Preliminary Review of Undergraduate Programming Students’ Perspectives on Writing Tests, Working with Others, & Using Peer Testing

Alessio Gaspar, University of South Florida
Sarah Langevin, University of South Florida
Naomi Boyer, Polk State College
Ralph Tindell, University of South Florida

Techniques such as Pair Programming, or allowing students to run their programs against a reference test harness, have demonstrated their effectiveness in improving grades or retention rates. This paper proposes to supplement the existing literature by investigating students’ perceptions of the benefits of writing tests, working with other students and using Peer Testing. Responses to an online anonymous survey cast new light on the relation between testing and programming and confirm previously postulated limitations of collaborative approaches; i.e. the unbalanced nature of contributions and lack of didactic interactions in student groups. We then examine how Peer Testing is perceived and discuss its relation to both collaboration and test-based pedagogies.

Computing is Not a Rock Band: Student Understanding of the Computing Disciplines

Faith-Michael Uzoka, Mount Royal University
Randy Connolly, Mount Royal University
Marc Schroeder, Mount Royal University
Namrata Khemka, Mount Royal University
Janet Miller, Mount Royal University

This paper reports the initial findings of a multi-year study that is surveying major and non-major students’ understanding of the different computing disciplines. This study is based on work originally conducted by Courte and Bishop-Clark from 2009 and then repeated by Battig and Shariq in 2011, but which uses a broadened study instrument that provided additional forms of analysis. Data was collected from 199 students from a single institution who were computer science, information systems/information technology and non-major students taking a variety of introductory computing courses. Results show that undergraduate computing students are more likely to rate tasks as being better fits to computer disciplines than are their non-major (NM) peers. Uncertainty among respondents did play a large role in the results and is discussed alongside implications for teaching and further research.

Paper Session G2..........................Interdisciplinarity..........................3:10 pm - 4:25 pm
Room: Martinique 2
Session Chair: J Ekstrom, Brigham Young University Provo
Infusing Social Science into Cybersecurity Education
Mark Stockman, University of Cincinnati

Cybersecurity, while definitively categorized as a sub-discipline of computing, is widely considered multidisciplinary in nature. This paper documents two attempts to adopt non-computing ideas and approaches in two undergraduate cybersecurity courses for information technology majors. Specifically, the author uses the social sciences (criminal justice and political science) to elicit a deeper understanding of cybersecurity problems and to present interdisciplinary methodological approaches to students who, in their careers, will be tasked with defending against cyberthreats.

Performing Robots: Innovative Interdisciplinary Projects
Debra Smarkusky, Pennsylvania State University
Sharon Toman, Pennsylvania State University
Peter Sutor, Jr., Pennsylvania State University
Christopher Hunt, Pennsylvania State University

By challenging and engaging students in interdisciplinary projects, we provide a learning platform to enhance creativity, critical thinking and problem-solving skills, while promoting an innovation-oriented culture in academia. In this paper, we summarize interdisciplinary and undergraduate research projects in music and animation that integrate technologies from both disciplines to create unique and innovative projects. Iterative development coupled with various forms of visual and audio feedback enhanced the student learning experience with positive feedback from students. These efforts have resulted in the awarding of internal grant funding, interest in additional undergraduate research projects, and enhanced awareness of the application of technology to other disciplines.

Design and Evaluation of Face Tracking User Interfaces for Accessibility
Norman Villaroman, Brigham Young University Provo
Dale Rowe, Brigham Young University Provo
Richard Helps, Brigham Young University Provo

Some individuals have difficulty using standard hand-manipulated computer input devices such as a mouse and a keyboard effectively. However, if these users have sufficient control over their face and head movement, a robust face tracking user interface can bring significant usability benefits. Using consumer-grade computer vision devices and signal processing techniques, a robust user interface can be made readily available at low cost, and can provide a number of benefits, including non-intrusive usage. Designing and implementing this type of user interface presents many challenges particularly with regards to accuracy and usability.

Continuing previously published research, we now present results based on an analysis and comparison of different options for face tracking user interfaces. Five different options are evaluated each with different architectural stages of a face tracking user interface — namely user input, capture technology, feature retrieval, feature processing, and pointer behavior. Usability factors were also included in the evaluation. A prototype system that can be configured to use different options was created and compared with existing similar solutions. Tests were created that ran on a browser platform and a quantitative evaluation was done. The results and findings can serve as a precursor to a full-scale usability study, various improvements, and future deployment for public use.

Formalizing Sequence Diagrams Into Abstract State Machines
Abdel Ejnioui, University of South Florida
Carlos Otero, Florida Institute of Technology
Abrar A. Qureshi, University of Virginia’s College at Wise

The latest specification of the Unified Modeling Language (UML) 2.x revised completely the structure and elements of sequence diagrams by expanding their modularity via interaction fragments. These fragments are based on a set of operators that can simplify the diagram’s structure or alter the order of events in the diagram. Unfortunately, the new revision introduced a significant degree of ambiguity in the interpretation of these diagrams. This ambiguity is exacerbated by the fact that different styles of sequence diagrams can be used for different purposes of modeling and analysis. To address this ambiguity, this paper presents a formal model in operational semantics based on Abstract State Machines.
(ASM) to define the semantics of sequence diagrams. Specifically, update rules are devised for ASMs to handle the alt, par and opt operators. The approach in this paper assumes that lifeline processes in a sequence diagram act as autonomous agents that communicate by exchanging messages among each other in asynchronous and distributed manner. This formal model can be readily extended to define the semantics of the remaining operators including information about time intervals and constraints.

**Group Note Taking in MediaWiki, a Collaborative Approach**

*Michael Jonas, University of New Hampshire*

In this paper we introduce a group note taking project designed to improve student learning. Getting students to actively participate in class can dramatically increase learning outcomes. Traditional lecture methods, where students passively take notes, are not the most effective ways for understanding new material in class. We organized students into groups to record weekly lectures and motivated them through various class based incentives resulting in a living document that captured a semester’s worth of class material which helped improve student understanding of the material. We develop the infrastructure to capture these notes using the MediaWiki platform, an easy to use wiki environment. At the University of New Hampshire at Manchester (UNH-M), a commuter college in an urban setting, students tend to be older with their time split between classes and work, sometimes spending close to 80 hours a week on some type of activity. For these students, optimally utilizing class time is an important element for success and incorporating active learning methods applied in this work will help develop those skills.

**Partially Flipped: Experiences Using POGIL**

*S. Jeff Cold, Utah Valley University*

Process Oriented Group Instruction Learning (POGIL) is a pedagogical technique that is an inquiry-based, student-centered approach being sponsored by the National Science Foundation (NSF). IT students tend to resist reading the textbook and sometimes zone out during traditional lectures. An attempt was made during the 2012-2013 academic year to use POGIL to partially flip an upper-division IT course. Some evidence suggests that students perform better when interacting with their peers in a discovery learning environment. The author will share what worked and what didn’t work when trying to flip the classroom using POGIL, as well as on-going strategies to continue the process completely abandoning the traditional classroom framework.

**An Early Introduction to Android App Development for CS1 Using Sofia**

*Evelyn Brannock, Georgia Gwinnett College  
Nannette Napier, Georgia Gwinnett College*

An engaging context has been shown to improve student motivation and performance in introductory programming courses (CS1). Therefore, we incorporated a self-contained, one-week learning module on mobile app development into a CS1 course using Eclipse and Sofia (the Simplified Open Framework for Innovative Android Applications). The module was conducted in 2 CS1 sections for a total of 44 students. Overall, students responded positively, with all successfully modifying the provided app and running it on an emulator. In future semesters, the authors plan to repeat the study, conducting surveys to gather student perspectives on Eclipse and the Sofia module. The poster will describe the module, initial results, and future plans.

**A Virtual Environment for Teaching Technical Aspects of Privacy**

*Svetlana Peltsverger, Southern Polytechnic State University  
Guangzi Zheng, Southern Polytechnic State University*

Most of Information Technology and Information Systems courses teach students about possible invasion of privacy as a result of poor information system security, not about privacy as an essential principle in information systems. Moreover students must know not only policy and compliance aspects of privacy, but also technical safeguards, so they can develop/configure systems to prevent/avoid privacy violations. Laboratory exercises are crucial in understanding technical aspects.
of privacy. This paper describes a virtual environment we have developed for “hands-on” laboratory exercises that allow students to recognize what happens “behind the scene” when they interact with information systems. Two example modules are developed and presented.

**Developing HFOSS Projects Using Integrated Teams Across Levels and Institutions**

*Heidi Ellis, Western New England University*
*Stoney Jackson, Western New England University*
*Gregory Hislop, Drexel University*
*Darci Burdge, Nassau Community College*
*Joanmarie Diggs, Igalia*

Studies have shown that the “near peer” experience where students of various levels are jointly involved in co-learning activities can motivate students and support wide learning. Humanitarian Free and Open Source Software (HFOSS) projects have shown promise for educating students using real-world projects within a global, professional community. Leveraging the near peer experience within an HFOSS project allows beginning students to get earlier exposure to large, complex systems while providing the more advanced students the opportunity to practice communication, coordination, and leadership skills. This poster describes initial steps towards the development of an HFOSS project by a mixed team of students of various levels and from three different institutions.

**The 2+2 Bachelor of Applied Science in Health Information Technology (BAS-HIT) – Continuation of the 2+2 BASIT Program**

*Chi Zhang, Southern Polytechnic State University*
*Rebecca Rutherfoord, Southern Polytechnic State University*
*Han Reichgelt, Southern Polytechnic State University*
*Ming Yang, Southern Polytechnic State University*

The need for programs in Health Information Technology has led Southern Polytechnic State University Information Technology Department to start a Bachelor of Applied Science in Health Information Technology (BAS-HIT). The program will allow students who have earned an Associate of Applied Science degree in Health Information Technology from an accredited technical college to enroll at Southern Polytechnic State University and obtain a bachelor’s qualification with two years of additional study and no loss of credit. Students who graduate from this program should contribute in assisting the Atlanta Metro Area as the hub of Health Information Technology. This paper introduces the program development of a Bachelor of Applied Science in Health Information Technology. This follows the successful established 2+2 Bachelor of Applied Science in Information Technology (BASIT) program format, creates the credit to transfer evaluation credit and creates a tailored curriculum for the BAS-HIT students.

**A Transition Community for Deaf and Hard of Hearing Students in Information Technology Programs**

*Raja Kushalnagar, Rochester Institute of Technology*
*David Lawrence, Rochester Institute of Technology*
*Elissa Olsen, Rochester Institute of Technology*

Within Information Technology and related programs, Deaf and hard of hearing (DHH) students are underrepresented and less successful compared to their hearing counterparts, as they tend to have less academic readiness. They also generally have lower ACT scores and lower content knowledge for introductory courses. DHH students face difficult adjustments in handling the demands and expectations of college level classes and specifically introductory programming courses. As a result, without appropriate support, most DHH students fail to succeed in introductory programming courses in their first year. For this group of underprepared students, a transitional community and transitional programming course has been shown to significantly improve their academic success. This paper describes 1) how the establishment of a community of peers with an appropriate academic support structure improves graduation persistence, 2) how a transition programming course with an appropriate support structure improves success in completing a programming sequence and 3) resources available for instructors who have DHH students in the classroom.
Coordinating Artifacts in an Online Course Delivery System

Marguerite Doman, Winthrop University
David Burlinson, Winthrop University
Nick Grossoehme, Winthrop University

Development of electronic educational artifacts for online instruction has become a major goal of many universities. These materials include question/answers (data), lecture (video), problems (textual input), and others. The instructional delivery of an online course can overlap many of these artifact types. These artifacts, designed to heighten student involvement, can clutter the screen adding distraction. There is a challenge in concurrently presenting similar concepts of different artifacts in a meaningful way. The temporal constraint of stored or streamed video is managed differently than the retrieval of data for question/answer data type. To address this concern, we propose an ontological coordination of various and complementary course content artifacts in the online delivery.

CAN YOU HEAR ME NOW? – An Empirical Study on Using Social Media to Improve Student-Instructor Communication

Lei Li, Southern Polytechnic State University

Social media, one of the preferred methods of communication for young generations, has widely used in the higher education to engage in students. There are extensive research on the usage and effectiveness of social media in the classrooms. Many of those studies use questionnaires as main research methods. This paper conducts an empirical study on using social media, specifically Facebook and text messaging, to improve student-instructor communication in a distance learning environment. This study records the actual usage of social media tool for a treatment group and compares the students’ performance of the treatment group with a control group. This study is a research-in-progress. The research design and implication of the study are discussed in details.

Teaching in Amazon EC2

Carlos Gonzalez, Rochester Institute of Technology
Charles Border, Rochester Institute of Technology
Tae Oh, Rochester Institute of Technology

As the trend of IT service consolidation continues to rise organizations are now looking at hosting their services in the cloud to cut back on the costs of hosting their information systems locally. This presents an opportunity and challenge for higher learning institutions to prepare their students for the technology skills that are going to be in demand upon their graduation. In many aspects universities are already using virtual environments to teach many laboratory courses for distance students. However there is the need to introduce students to industry standard services that will better acquaint them with what is currently being used in the real world. This project takes a look at the course ‘Principles of System Administration’ from the Networking Security and System Administration Department at Rochester institute of Technology and creates a foundation for moving the course over to the cloud using Amazon Web Services.

To test the effectiveness of the lab guides created and the usability of Amazon Web Services student volunteers were used to follow the guides and feedback was gathered about their experience. The results highlight issues and benefits of the system and potential solutions are discussed to better shape the system for instructional use.

Supporting Adult Learning: Facilitators, Barriers, and Practices

Chi Zhang, Southern Polytechnic State University
Guangzi Zheng, Southern Polytechnic State University

Adult learners are a large group for higher education including the computing and information technology programs. This paper provides a structured analysis of facilitators and barriers to adult learning based on their characteristics and learning preferences. The paper proposes a general operational framework to support adult learners at different levels in educational institutions. The framework can be used as a guide for organizing adult learning support programs. Implications to IT education for adult learners are also discussed.
Designing and Building Mobile Pharmacy Apps in a Healthcare IT Course
Bonnie MacKellar, St. John’s University
Maria Leibfried, St. John’s University

An important skill for students in information technology (IT) programs is that of collaborating with domain specialists while designing IT solutions. This is particularly true in healthcare IT, where usability errors can impact patients’ health. Here, we describe a course project in which healthcare IT students collaborated with pharmacy students in a task analysis session aimed at specifying the steps in two common pharmacy scenarios. The healthcare IT students then went on to design and implement mobile apps, using AppInventor that were based on the two scenarios. The process benefited both groups of students; the pharmacy students learned about the IT design process, and the healthcare IT students learned about pharmacy workflow as well as communicating with healthcare specialists.

DNS (Do Not Suspect)
Fernando Seror Garcia, Illinois Institute of Technology

The purpose of this project is to see if it would be possible for an attacker to use the DNS protocol to communicate with a bot of his own in an infected host in order to avoid being detected. Right now this communication is usually made through the IRC protocol, which is used for chatrooms with a known port easily blocked with a firewall and a pattern that raises a lot of alerts on any IDS available. This does not happen with DNS, which is a protocol used for the well functioning of the whole Internet, so if somebody is able to communicate through DNS packets it would result almost invisible and harder to block that IRC. The purpose of this project is to address if it would be possible to do this and if so, to investigate how to make the protocol safer.

Securing Insurance Reimbursements with RFID Technologies
Charles Hopkins, East Carolina University

As RFID enhances many realms of the functional world including: retail, pharmaceutical, aerospace, and defense, it is beginning to show great promise in healthcare. Insurance companies constantly battle fraud among health care providers and new technologies need to be adopted to ensure a lean service-to-reimbursement relationship. This paper will investigate the current state of RFID in health care and demonstrate possible solutions pertaining to not only asset tracking and medication with RFID, but patient tracking and billing reimbursements exchange between insurance companies and practitioners. Fraudulent or not, billing errors among practitioners has continued to be on the rise creating an opportunity for RFID to better structure and secure the health care patient flow.

Resource Utilization Prediction: Long Term Network Web Service Traffic
Daniel Yoas, Penn College of Technology
Greg Simco, Nova Southeastern University

Short-term prediction has been established in computing as a mechanism for improving services. Long-term prediction has not been pursued because attempts to use multiple steps to extend the short-term predictions have been shown to become less accurate the further into the future the prediction is extended. In each case the researchers used fine grained sampling for the analysis. This study used course sampling of ten second intervals and then aggregated them into periods of minutes, fifteen-minutes, and hours. Each of the aggregates was used to calculate the predictions for Hourly, Daily, and Weekly cycles, determine the error rate of the prediction, and establish a confidence interval of 80%. The results then were evaluated to identify the effectiveness of long term prediction and the best cycle at predicting the resource utilization most accurately.

Security Mechanisms for Multi-User Collaborative CAx
Francis Mensah, Brigham Young University
Chia-Chi Teng, Brigham Young University

Computer Aided Applications (CAx) have historically been implemented based on single user architectures. These architectures meant that design projects involving teams with multiple designers would have to work in a carefully
coordinated serialized design process, where designers and engineers work on their own part of the design individually and then later bring together the separate design parts. These architectures typically do not promote a parallel design process where several designers can work on the same part at the same time. Although the single user architecture has worked sufficiently well in the past, it does have many drawbacks such as time inefficiency especially when it involves geographically dispersed designers.

Advances in computer networking technologies, especially relating to the Internet, have provided the needed tools to transform these current single user CAx applications to a multi-user based CAx architecture where several users can simultaneously modify design models from one or more networked computers regardless of the location of the user. This new paradigm is expected to greatly reduce product design times and consequently reduce cost and improve productivity. The multi-user architecture will, however, also require reliable security mechanisms to ensure protection of intellectual property when design data is shared among multiple users.

In this paper we propose mechanisms for securing communications in a collaborative multi-user CAD software system. The proposed security solution is currently under development and is being tested on a collaborative multi-user version of a popular commercial CAD application.

A Grounded Theory Analysis of Modern Web Applications - Knowledge, Skills, and Abilities for DevOps

Soon Bang, University of Washington Tacoma
Sam Chung, University of Washington Tacoma
Young Choh, University of Washington Tacoma
Marc Dupuis, University of Washington Tacoma

Since 2009, DevOps, the combination of development and operation, has been adopted within organizations in industry, such as Netflix, Flickr, and Fotopedia. Configuration management tools have been used to support DevOps. However, in this paper, we investigate which Knowledge, Skills, and Abilities have been employed in developing and deploying modern web applications and how these KSAs support DevOps. By applying a qualitative analysis approach, namely grounded theory, to three web application development projects, we discover that the KSAs for both Software Development and IT Operator practitioners support the four perspectives of DevOps: collaboration culture, automation, measurement, and sharing.

Sitemap Explorer: Browser Integrated Web Navigation

Guangzhi Zheng, Southern Polytechnic State University

A fundamental issue is still not addressed in current web navigation designs: the consistency of navigation models across different websites. In addition, almost all of the current designs are static and passive; users have to adapt their navigation behaviors to each model and follow it all the time on a particular website. This research presents a new browser integrated web navigation model which features a browser add-on called Sitemap Explorer to dynamically discover and load sitemap files and visualized them to users in a model familiar to them. The proposed solution provides a consistent and personalizable client interface for the complex and unpredictable web, and offers rich functionalities and flexibility for users to easily manage and adapt web navigation to their needs.

For more information, visit https://code.google.com/p/sitemap-explorer.

October 12, 2013

Continental Breakfast ........................................... 7:00 am - 8:00 am
Atrium East

Workshop 1 .......................................................... 8:00 am – 9:50 am
Room: Martinique 1

Project Selection for Student Participation in Humanitarian FOSS

Heidi Ellis, Western New England University
Gregory Hislop, Drexel University
The EMC Academic Alliance offers colleges and universities around the globe unique ‘open’ curriculum-based education, such as information storage and management, cloud computing and big data analytics. The courses focus on technology concepts and principles applicable to any vendor environment. Our goal is to prepare graduates to fully leverage enhanced and emerging technologies in virtualized and cloud environments.

There is no cost to institutions to join the EMC Academic Alliance and members receive numerous benefits including: faculty training, course materials, and secure web portals for faculty and students.

For more information visit [http://education.emc.com/academicalliance](http://education.emc.com/academicalliance) or contact us at Academic_Alliance_Program_Office@emc.com.
Many faculty members are excited by the learning potential inherent in student participation in a Free and Open Source Software (FOSS) project. Student learning can range from software development to technical writing to team skills to professionalism and more. The altruistic nature of humanitarian FOSS provides additional appeal to students by providing the ability to do some social good. However, selection of an appropriate project can be difficult due to the large number of humanitarian FOSS projects available, and the wide range of size, complexity, domains, and communities in those projects. We have developed an approach to FOSS project selection [1] based on several years of experience involving students in humanitarian FOSS projects. This workshop will provide participants with a hands-on experience in selecting such a project. Participants will understand the key aspects of FOSS projects that are important when evaluating a project for use in the classroom. Participants will also be guided through the process of identifying and evaluating candidate projects for their classes.

Workshop 2 ............................................................. 8:00 am – 9:50 am
Room: Martinique 2

Enhancing Information Technology Education (ITE) with the Use of 3D Printer Technology
Robert Lutz, Georgia Gwinnett College

This workshop provides an introduction to three dimensional (3D) printing. This tutorial will: cover the general background of 3D printing, summarize popular software tools, describe associated challenges and offer suggestions for application in information technology (IT) coursework. Attendees will get hands-on experience with 3D printing tools and will be able to print a limited number of items during the workshop. The workshop will also describe the author’s experience integrating this authentic learning into several IT courses.

Host Showcase........................................................................ 8:00 am – 9:50 am
Room: Barbados

Disseminating & Evaluating Innovations in Introductory Programming
Alessio Gaspar, University of South Florida
Amruth N. Kumar, Ramapo College

This showcase’s focus is on introducing tools & practices, which have been developed to address the needs of introductory programming courses, while building opportunities for collaborations to sustain adoption and to evaluate the impact on students’ learning.

Two projects will be discussed:

- CLUE – educational material & software tools to support the teaching & learning of the C Programming Language. http://cereal.forest.usf.edu/clue/

Organizers will introduce their respective projects; motivation, underlying educational frameworks, results of evaluations conducted so far. Demonstrations will illustrate use-cases to provide attendees with a perspective on available features’ usability. Additionally, time will be allotted for focused discussions with the audience on two important aspects of successfully leveraging both tools;

First, we will identify adoption barriers among attendees & use the feedback to discuss strategies to facilitate unobtrusive adoption.

Second, we will review evaluation practices used in each project and discuss potential benefits for adopters to engage in a formal evaluation process to seed a model of research-focused collaboration between tools developers & adopters.

The organizers are thankful to the National Science Foundation for its support to the “PI Forum” initiative which made this event possible, and for funding the various projects participating to it.

AM Break........................................................................... 9:50 am - 10:05 am
Martinique Foyer
Investigating the Effectiveness of Early Programming-Centric Models for IT Education

Edward Holden, Rochester Institute of Technology
Thomas Borrelli, Rochester Institute of Technology

Computer Science and Information Technology education offers significant challenges for both educators and students. Oftentimes students may not have much experience with logic, math and reasoning which may inhibit the transfer of knowledge in early stages. If, on the other hand, students have some prior experience, it may facilitate the understanding of early and mid-term concepts and will hopefully produce a more gradual learning curve for students to follow. This paper discusses a boot camp that was offered to incoming IT students and provides the results.

Does Language Choice Influence the Effectiveness of Online Introductory Programming Courses?

Waleed Farag, Indiana University of Pennsylvania
Debzani Deb, Winston-Salem State University

The growing introduction of online courses and degrees places high emphasis on the need for thorough assessment of these offerings. This paper focusses on researching a reliable answer to whether changing the programming language used in online introductory programming courses will have an impact on their effectiveness or not. The paper uses four distinct data sets and implements an experimental, in-depth analysis procedure to come up with an answer to the posed research question. The data collected from classes, using C++, constitute the control group while data collected when Java was used constitute the experimental group. The first set uses data collected from students that express their perception of the effectiveness of various online course parameters. The second set directly measures students’ achievement of course outcomes and compares the measured levels across the studied groups. The third set compares a number of students’ success and interactivity indicators while the last set measures the student satisfaction with the course and the instructor. The obtained results for all studied performance measures asserted that there were no statistically significant differences between the control and experimental groups. Such findings can be deemed significant for IT-programs in which they need to focus on addressing other factors that might significantly affect the effectiveness of online programming courses.

Diversity in the Game Industry: Is Outreach the Solution?

Amber Settle, DePaul University
Monica McGill, Bradley University
Adrienne Decker, Rochester Institute of Technology

Over the last decade, the International Game Developers Association (IGDA) has considered the lack of diversity in the game industry workforce a quality of life issue. Using the results of our recent study on demographics of undergraduate students in game degree programs, we compare our data against data reported in the 2005 IGDA Quality of Life survey. The most significant result of this study is that gender diversity in the current group of undergraduate students studying games is statistically the same as that reported within the industry seven years ago, with an approximate
9 to 1 ratio of males to females. The number of black and Asian students was higher than in the industry survey, and the number of Hispanic and other ethnic and racial groups was only slightly lower. Our data shows that there is a greater diversity in sexual orientation and of reported disabilities than in the industry survey results. We describe effective initiatives for recruiting and retaining women in related fields, with a discussion of how similar efforts might address the imbalance in the game industry.

**MOOC as a University Entrance Exam**

Arto Vihavainen, University of Helsinki  
Matti Luukkainen, University of Helsinki  
Jaakko Kurhila, University of Helsinki

MOOCs (massive open online courses) became a hugely popular topic in both academic and non-academic discussions in 2012. Many of the offered MOOCs are somewhat “watered-down versions” of the actual courses given by the MOOC professors at their home universities. At the University of Helsinki, Department of Computer Science, our MOOC on introductory programming is exactly the same course as our first programming course on campus. Our MOOC uses the Extreme Apprenticeship (XA) model for programming education, thus ensuring that students are proceeding step-by-step in the desired direction. As an additional twist, we have used our MOOC as a entrance exam to studies in Helsinki University. In this paper, we compare the student achievement after one year of studies between the MOOC intake (n=38) and the intake that started their studies during the fall (n=68). The results indicate that student achievement is at least as good on the MOOC intake when compared to the normal intake. An additional benefit is that students admitted via MOOC are less likely to drop out from their studies when compared to the traditional intake.

**Automated Webpage Evaluation**

Ryan Tate, United States Military Academy  
Edward Sobiesk, United States Military Academy  
Gregory Conti, United States Military Academy

Webpage evaluation and metrics have historically focused on page-level characteristics or on key words. We introduce an automated technique for graphically measuring specific elements on a webpage. Our technique provides a means to increase the fidelity of webpage analysis and introduces a novel metric focused on the number of pixels that certain elements occupy in a browser window. We implemented the technique as a Firefox extension and successfully tested it on Alexa’s top 25 U.S. websites. The technique is fully automatable and consistently measures a customizable set of elements as they appear to users in the Firefox web browser. Importantly, the application allows for communication with and the incorporation of other browser-based tools or extensions. We discuss design considerations and creative solutions to technical implementation challenges. The application provides for a wide range of research opportunities that may require a new level of fidelity in webpage analysis and comparison.

**Implementation of SHA-1 and ECDSA for Vehicular Ad-Hoc Network Using NS-3**

Jim Leone, Rochester Institute of Technology  
Tae Oh, Rochester Institute of Technology  
Sinan Nacy, Rochester Institute of Technology

VANET, the Vehicular Ad-Hoc Network, treats cars as nodes in a mobile network. Not surprisingly, VANET must be very secured since one of the network characteristics allows the network to be open to public. The digital signature used in VANET is the standard, ECDSA, or Elliptic Curve Digital Signature Algorithms. ECDSA provides network security by employing a digital signature for messages being transmitted over the network. An ECDSA developed in C++ is described here. VANET messages were sent using the NS-3 network simulator. Two scenarios were created to test the code and the differences before and after implementing the digital signature.
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Incorporating an Entrepreneurship Concentration into the Undergraduate IT Curriculum

Jeff Crawford, Lipscomb University
Ken Mayer, Lipscomb University
Fortune Mhlanga, Lipscomb University

This paper presents our approach to implementing structures that encourage innovation and entrepreneurship behaviors within the Lipscomb University student population. An early step in this process is presented in this paper: extending our undergraduate Information Technology (IT) curriculum with a concentration on entrepreneurship. Specifically, the paper clarifies where our IT courses address specific dimensions of innovation (a precursor to entrepreneurship), how the curriculum can be extended to effectively incorporate entrepreneurship, and where facilitating conditions can be implemented to reinforce entrepreneurial behavior in our student population. The curriculum changes and ideas presented here have a number of long- and short-term benefits for Lipscomb University as a whole and our IT program in particular. The paper ends by soliciting input on several issues that can maximize the effectiveness of this innovative program.

Migrating A Voice Communications Laboratory To A Virtualized Environment

Ronny Bull, SUNY Institute Of Technology

Due to a recent surge of student interest in the field of Voice over IP (VoIP) communications, new and innovative methods were required to be employed in order to keep pace with the increasing enrollment in the Voice Communications course offered at the State University of New York Institute of Technology. The traditional Voice Communications laboratory setup was obsolete and created a bottleneck hindering the students’ capability to learn due to increasing class sizes. Under the previous setting, students were required to work in large groups on two shared servers in order to gain hands-on experience. This inevitably caused students to receive unequal portions of hands-on time with the allocated resources. To remedy the aforementioned issues, a centralized virtualization approach was proposed and implemented.

Paper Session J2........................................Program Change........................................1:30 am - 12:45 pm
Room: Martinique 2
Session Chair: Craig Miller, DePaul University

Integrating Authentic Learning into a Software Development Course: An Experience Report

Evelyn Brannock, Georgia Gwinnett College
Robert Lutz, Georgia Gwinnett College
Nannette Napier, Georgia Gwinnett College

This paper describes our experience integrating an authentic learning project into a junior-level software development course. During the course, students applied full software development life cycle processes to meet a campus need – providing classroom clicker support without purchasing additional hardware. The paper provides the motivation for this approach, summarizes relevant developments in classroom response systems, details the design of the class project, and shares our results. Finally, we offer reflections describing both intended and unintended outcomes of this experiment.

Winds of Change: Toward Systemic Improvement of a Computer Science Program

Arisoa Randrianasolo, Lipscomb University
Eddy Borera, Lipscomb University
Fortune Mhlanga, Lipscomb University

Computer science programs at small, liberal arts universities often have difficulty with effectively managing change, and attracting and retaining top students and faculty. They also sometimes struggle to provide a relevant and appealing curriculum while maintaining an appropriate level of academic rigor. This paper presents a restructuring of our department and computer science degree program, identifies several key areas of our curriculum which needed attention, outlines our improvement areas, and proposes a self-assessment strategy for gauging the effectiveness of the program changes over time.

Closing Plenary........................................12:50 pm - 1:00 pm
Martinique 1

SIGITE/RIIT Post-Mortem................................1:00 pm - 2:30 pm
Chairs, Executive Committee and future hosts/chairs
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