ISEC 2012

IEEE Integrated STEM Education Conference

at the Trenton Computer Festival
The College of New Jersey
Friday, March 9, 2012

Program Book

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IEEE Princeton – Central Jersey Section
IEEE Region 1

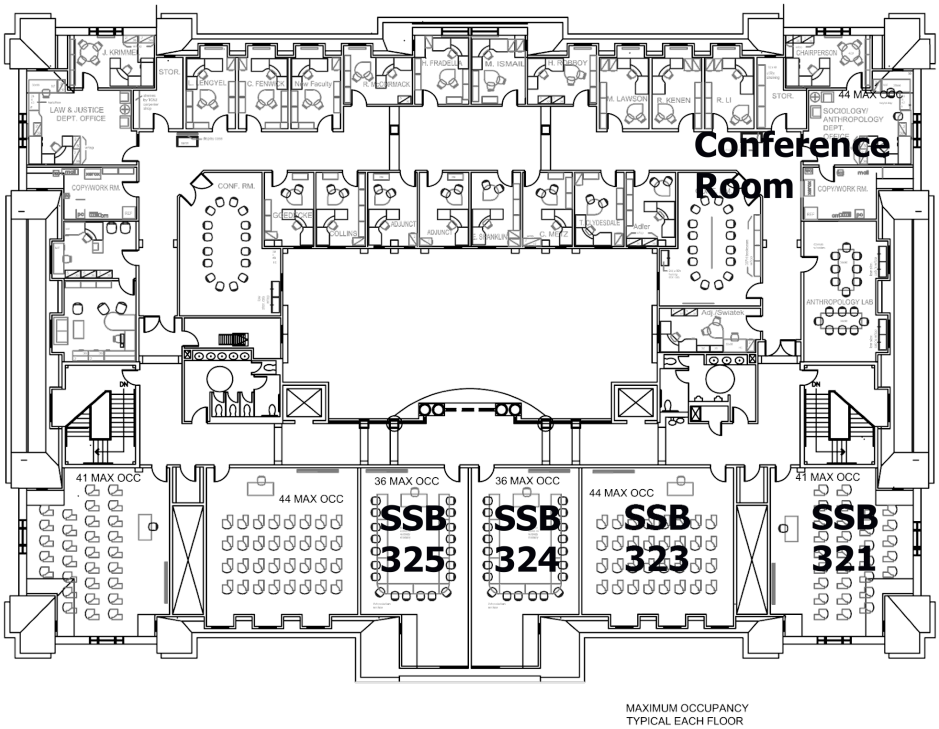
PRESENTATION SCHEDULE

	SSB 321 Undergraduate Education Track	**SSB 324** K-12 Track	**SSB 325** From STEM to STEAMD Track
8 am - 3 pm	Registration in the Atrium and Speaker Prep in SSB 323		
9 am	Integrating Entrepreneurship Education into the Electrical Engineering Curriculum *D. Ilea, University "Transilvania," Brasov, Romania*	9:15 STEM Imperatives at the Secondary Level *Arvind Mathur, Bristol-Myers Squibb and Bridgewater-Raritan School Board Member* _____ Programming Without Code (an ITPC talk through 9:55) *P. Palmer, Harbor Mist, LLC*	Debugems and Other Deconstruction Kits for STEM Learning *J. Griffin, E. Kaplan, and Q. Burke, University of Pennsylvania*
9:30 am	Active Engagement and Cooperative Learning in Physics at the US Coast Guard Academy *B. Stutzman, E. Page, and B. Jewczyn, USCGA*	Cybersecurity: An Integral Part of STEM *S. Dutta and R. Mathur, Bridgewater-Raritan Regional HS*	BioMEMS Summer Bioengineering Institute: Integrating Engineering and Biology Education through BioMEMS Design, Fabrication, and Test *R. Perez-Castillejos, W.C. Hunter, B. Mantilla, and D. Ivanov, NJIT*
10 am	Keynote in SSB 324 The Engineering Crisis: Five Things We Should and Can All Be Doing to Inspire STEM *Suzanne Deffree, UBM Electronics*		
10 am - 3:30 pm	Exhibit in the Atrium: Computers, Cosmology, and STEM *Aram Friedman, Ansible Technologies*		
10:30 am	Keynote in SSB 324 The Importance of Mentoring in STEM *Naomi Eigner Price, UBM Electronics*		
11 am	Redesigning Teaching Approaches for Undergraduate Engineering Classrooms *H. Bajwa and P. Mulcahy-Ernt, University of Bridgeport*	Future STEM Careers Begin in the Primary Grades *L. Morana, J. Bombardier, and C. Ippolito, Red Bank Borough School District; and R. Wyndrum, Jr., Rutgers University*	From STEAM Research to Education: An Integrated Art and Engineering Course at Georgia Tech *J. Fantauzzacoffin, J.D. Rogers, and J.D. Bolter, Georgia Institute of Technology*

	SSB 321 Undergraduate Education Track	**SSB 324** K-12 Track	**SSB 325** From STEM to STEAMD Track
11:30 am	Integrating Mobile Culture into Computing Education *S. Kurkovsky, CCSU*	Redefining Success: Design of Short-Format Engineering Contests for Maximal Learning *D. Kruger, CIJE and D. Aviv, Solomon-Schechter Westchester*	Encouraging Teachers to Adopt Inquiry-Based Learning by Engaging in Participatory Design *D. Hannon, E. Danahy, L. Schneider, and E. Coopey, Tufts University; and G. Garber, the Boston University Academy*
noon - 1:30 pm	Lunch and Networking in the 1855 Room, Eickhoff Hall		
1:30 pm	How Connections Matter: Factors Affecting Student Performance in STEM Disciplines *R. Ptucha and A. Savakis, RIT*	LYCEE: A Pathway for High School Students Towards STEM Majors *N. Mosina, A. Belkharraz, and D. Chebanov, LaGuardia Community College of the City University of New York*	The Integration of STEM Design Activities at the Earliest Stages of Education: Perspectives of a Non-Educator *B. Wysocki Full Spectrum Research, Inc.*
2 pm	Foreign Currency Trading as an Inter-Disciplinary Teaching Pathway to STEM Initiatives *R. Colombo and D. Colombo, CEREBRONIX and The Granite School*	Accelerated Project-Based Introduction to EECS for High School Students *J. Steinmeyer, MIT*	A Robotics Based Design Activity to Teach the Doppler Effect *J. Ashdown and D. Doria, RPI*
2:30 pm	Mobile Security Labware with Smart Devices for Cybersecurity Education *K. Qian and C-T. Dan Lo, SPSU; M. Guo and P. Bhattacharya, University of Cincinnati; and L. Yang, UT-Chattanooga*	Strategies to Overcome Barriers to Women and Minorities in STEM *A. Ilumoka, University of Hartford*	Scrapyard Challenge Jr., Adapting an Art and Design Workshop to Support STEM to STEAM Learning Experiences *K. Moriwaki, J. Brucker-Cohen, L. Campbell, J. Saaevdra, L. Stark, and L. Taylor, School of Art, Media, and Technology, Parsons The New School for Design*

PRESENTATION SCHEDULE

	SSB 321 Undergraduate Education Track	**SSB 324** K-12 Track	**SSB 325** From STEM to STEAMD Track
3 pm	The Use of Low Cost Portable Microcontrollers in Teaching Undergraduate Computer Architecture and Organization *C-T. Dan Lo and K. Qian, SPSU; and L. Hong, TSU*	Achieving Creativity and Innovation through IEEE Pre-University Divisions *S. Pruthi, D. Fishman, and N. Pruthi, Montgomery HS*	Design to Manufacture - Integrating STEM Principles for Advanced Manufacturing Education *E. Flynn, Gateway CC*
3:30 pm	Keynote in SSB 324 Bridging the Disciplines in Teaching and Research *H. Vincent Poor, PhD Michael Henry Strater University Professor of Electrical Engineering and Dean of SEAS, Princeton University*		
4:30 - 5:30 pm	Reception in the Atrium		



SOCIAL SCIENCES BUILDING

THIRD FLOOR

9 – 9:30 am

SSB-321: Integrating Entrepreneurship Education into the Electrical Engineering Curriculum

Danut Ilea, University "Transilvania," Brasov, Romania

In accordance with the Lisbon European Council 2000, entrepreneurship has been identified as one of the "new basic skills" for the knowledge-based economy. This paper presents an interdisciplinary approach concerned the e-entrepreneurship education highlights introduced in the academic curriculum for the students of Electrical Engineering & Computer Science Department (EED) from "Transilvania" University of Brasov, Romania during the last ten years.

SSB-225: Programming Without Code (through 9:55 am)

Pat Palmer, Harbor Mist LLC

The approaching maturity of web services technology and growth of free tools, de facto standards and services on the world wide web has enabled a new type of "software development" to spring up in which a minimum of actual code needs to be written, and the bulk of the complexity is handled by the (often remote) third-party software. This talk will explore examples of feeding data to web services to create graphs, charts, mashups, musical scores or even sound files. This new type of "software development" is good for teachers, who can use this type of programming to illustrate concepts quickly. And it is good for students of science and technology fields, who can to explore their subject area in new ways with such services.

SSB-325: Debugems and Other Deconstruction Kits for STEM Learning

Jean Griffin, Eliot Kaplan, and Quinn Burke, University of Pennsylvania

A variety of promising new educational technologies are geared toward enticing novice learners to explore computing through creative design. From the viewpoint of Constructionist learning theory, they appear to be effective in engaging novices through personal and participatory expression. However, many teachers of rigorous undergraduate computer science courses dismiss the use of creative design based upon the difficulty of assessing learning when students are creatively engaged. Meanwhile on the K-12 level, outside of a few elite schools, computer science courses are scarce, computational learning within other STEM courses is a rarity, and core subject teachers lack accessible computational activities with which to engage students. This concept paper presents deconstruction kits as a potential solution to these concerns. Designed to promote learning while being taken apart, they provide an assessable complement to Constructionist learning. Their users aren't the only beneficiaries. Their designers – teachers and students – hone their own metacognitive skills and reap the benefits of Constructionist learning as they create such kits to target STEM concepts in engaging ways.

9:30 – 10 am

SSB-321: Active Engagement and Cooperative Learning in Physics at the US Coast Guard Academy

Brooke Stutzman, Eric Page, and Briana Jewczyn, US Coast Guard Academy

The United States Coast Guard Academy, one of the smallest of the United States military academies, provides a unique environment where all cadets, regardless of major, receive rigorous training in STEM disciplines. Each cadet takes a scientific, engineering, managerial, liberal arts and nautical science curriculum, in addition to their specialized training in one of eight majors. This core curriculum includes two semesters of calculus-based physics. This provides the faculty with the unique opportunity and challenge of teaching majors ranging from Government to Electrical Engineering in the same calculus-based class.

The USCGA's Physics department has employed active learning since 2002. While students have showed gains in both diagnostic scores and end of course grades, faculty feel that we can further improve student understanding by focusing on cooperative learning and leadership aspects of group work.

SSB-324: Cybersecurity: An Integral Part of STEM

Srijoy Dutta and Rohan Mathur, Bridgewater-Raritan Regional High School

As technology advances in society, the number of those who threaten its security also has increased. As devices gradually contain more sensitive information, they must be protected from unauthorized access. Cybercriminals are constantly finding new exploits and threats to get around the operating system's innermost workings and steal sensitive data, and potentially make that piece of technology insecure. Since technology is an integral part of a STEM education, we must secure our cyberspace for the future by integrating cyber security with K-12 STEM education. This paper aims to educate the public about the general lack of emphasis on cybersecurity-related education at the K-12 level, possible ways to solve it, the architectures of major operating systems, built-in security defense mechanisms, and the most vulnerable parts of the operating system. As technology continues to advance, we must educate ourselves in order to protect our systems against unauthorized access.

SSB-325: BioMEMS Summer Bioengineering Institute: Integrating Engineering and Biology Education through BioMEMS Design, Fabrication, and Test

Raquel Perez-Castillejos, William C. Hunter, Bruno Mantilla, and Dentcho Ivanov, New Jersey Institute of Technology

The Department of Biomedical Engineering at the New Jersey Institute of Technology (NJIT) developed a BioMEMS Summer Bioengineering Institute. The focus on BioMEMS was supported by both didactic and research activities planned for the students. The research experience consisted on (i) designing and (Ii) fabricating a BioMEMS device in the Class-10 Cleanroom of the Microelectronics Facility at the New Jersey Institute of Technology, and finally (iii) testing their device in a host biomedical research lab either in the University Heights (Newark, NJ) academic community, the metropolitan New York community (an easy commute), or at their home university. The students' research experience was complemented by four formal courses: three on biomedical engineering (bioelectrical signals, physiologic modeling, and imaging; biomechanics, tissue engineering, and biomaterials; biochemistry and cell biology from an engineering point of view) and a fourth one on BioMEMS.

10:00 – 10:30 am – Keynote 1

SSB 324: The Engineering Crisis: Five Things We Should and Can All Be Doing to Inspire STEM

Suzanne Deffree, *EDN* Online Manager, UBM Electronics

10 am – 3:30 am – Atrium Exhibit

Computers, Cosmology, and STEM

Aram Friedman, Ansible Technologies

10:30 – 11 am – Keynote 2

SSB 324: The Importance of Mentoring in STEM

Naomi Eigner Price, *Innovation Generation* Online Brand Manager and *DFI* Online Content Manager, UBM Electronics

11 – 11:30 am

SSB-321: Redesigning Teaching Approaches for Undergraduate Engineering Classrooms

Hassan Bajwa and Patricia Mulcahy-Ernt, University of Bridgeport

Teaching pedagogies are continuously evolving as technology transforms education practices by empowering students not only in the classrooms but also in research laboratories. This paper focuses on the implementation of a constructivist educational approach in engineering classrooms. In addition to engineering approaches, we will also discuss pedagogies of engagement, such as problem-based (inquiry-based) learning and team projects. Recommendations for implementing a problem-based learning (PBL) approach for electrical engineering classrooms provide for active student learning. An example of hands-on lab experiments that could be integrated in microwave and antenna design courses is provided to demonstrate the application of real-life applications for inquiry-based learning.

SSB-324: Future STEM Careers Begin in the Primary Grades

Laura Morana, John Bombardier, and Christopher Ippolito, Red Bank Borough School District; and Ralph Wyndrum, Jr., Rutgers University

The reality we face in the United States is that globalization and modern communication are driving STEM technologies which will be the underpinning of the arriving "Knowledge Economy." From our current experience in the education process, it is clear that STEM education is complex in content, and requires that we, as educators, not only perfect a successful curriculum, but also lay the groundwork for attitudinal changes of the student population beginning with K-3 and possibly in the pre-K years. More than ever, this calls for parental involvement and skilled, informed communication from the educational community to and with the parents and their children. In the future, with the mushrooming of knowledge and informational content to be acquired, new tools and emphasis on the process of acquiring knowledge may be at least as vital as the knowledge itself. Collaborative design in the future world will become the norm, supported by ever more sophisticated computer based tools.

SSB-325: From STEAM Research to Education: An Integrated Art and Engineering Course at Georgia Tech

Jill Fatauzzacoffin, Juan D. Rogers, and Jay D. Bolter, Georgia Institute of Technology

We describe an experimental, project-based, integrated art and engineering course for undergraduate students currently taking place at Georgia Institute of Technology. The course is informed by our research study on the creative work practices of artists and engineers. A summary of this research and a description of the course are presented here. This work can inform K-16 STEM education, particularly with respect to giving students skills to participate in the creative innovation economy.

11:30 am – noon

SSB-321: Integrating Mobile Culture into Computing Education

Stan Kurkovsky, Central Connecticut State University

The term 'mobile culture' describes the ever-growing influence that mobile devices, media and communication have on our day-to-day activities. Current generation of young people is often considered as one of the primary forces helping sustain the evolution of mobile technology, because young people represent a very substantial portion of early adopters and active users of mobile devices,

applications, and games. For most college students, electronic gadgets and computer games have always been an integral part of their lives. Consequently, they may perceive mobile devices as true exemplars of the current technology, instead of the desktops that dominate most computer labs. This paper attempts to illustrate the reasons and the possibility of using mobile devices and mobile game development as a learning context and a motivational tool in the computing curriculum.

SSB-324: Redefining Success: Design of Short-Format Engineering Contests for Maximal Learning

Dov Kruger, CIJE, and Daniel Aviv, Solomon-Schechter School of Westchester

Engineering contests are a popular way to make Science, Technology, Engineering and Mathematics (STEM) classes exciting. However, care must be taken to maximize learning. Subtle changes can mean the difference between a contest that spurs a great deal of learning and one that does not. The authors are currently teaching an innovative hands-on high school engineering program in the metropolitan New York area at seven pilot schools. The authors have run a number of short-form contests as part of this curriculum, and a number of others in the past. We analyze different features of engineering contests we have used and discuss which features maximize educational impact and understanding.

SSB-325: Encouraging Teachers to Adopt Inquiry-Based Learning by Engaging in Participatory Design

Daniel Hannon, Ethan Danahy, Leslie Schneider, and Eric Coopey, Tufts University; and Gary Garber, Boston University Academy

Inquiry-based methods are effective for STEM education, but they are perceived as difficult to implement. Often teachers have not experienced inquiry-based learning themselves, which limits their appreciation of their value of these methods. Changing this requires modifications at the classroom level to simplify implementation of inquiry-based methods and implementing professional development for teachers to encourage adoption. A participatory design project is described that is part of a multi-year program in which five high school physics teachers are collaborating with researchers at Tufts University to develop classroom educational technology tools for promoting collaborative inquiry-based learning. By participating in a technology- design project, teachers are experiencing the inquiry process as well as developing tools that will facilitate using inquiry-based methods in their classrooms. The research and design effort to date has led to requirements for (and a prototype of) a classroom tool that promotes student collaboration and sharing of their ideas. An overview of the design process is provided along with a discussion of the activities planned for the implementation phase.

Noon – 1:30 pm

ISEC-ITPC CAFÉ AND NETWORKING

Lunch will be served in the 1855 Room, located in Eickhoff Hall; please see the campus map on the back cover.

1:30 – 2 pm

SSB-321: How Connections Matter: Factors Affecting Student Performance in STEM Disciplines

Raymond Ptucha and Andreas Savakis, Rochester Institute of Technology

The weakening academic performance of U.S. high school students and the declining influence of the U.S. economy have been studied extensively. Several studies have pointed to the declining interest of U.S. high school students in Science, Technology, Engineering, or Math (STEM) disciplines. This paper investigates the connectivity aspects that affect a high school student's ability to excel academically. Using data from the National Center for Education Statistics (NCES), this paper analyzes the connections students have with their families, schools, friends, and community. Using these connections, this paper introduces an optimal prediction model named the Kalman-based Student Connectivity Model. By asking a student specific questions, this model can predict his/her cognitive reading and math performance on standardized exams. Further, this model can be used as a predictor on how modifying lifestyle choices or environmental factors may affect a student's performance in the STEM disciplines.

SSB-324: LYCEE: A Pathway for High School Students Towards STEM Majors

Natalia Mosina, Abderrazak Belkharraz, and Dmitriy Chebanov, LaGuardia Community College of the City University of New York

LaGuardia Youth Center for Engineering Excellence (LYCEE) is established in order to address a problem of growing demand for STEM professionals in the U.S. and the issue of underrepresentation of minorities in STEM pathways. The Center's activities, including innovative hands-on engineering projects and STEM-related tutoring, are designed to promote high school students interest in choosing STEM-related majors in college and exploring STEM career possibilities in the future. During its first three years of existence, the Center has successfully served 9-12 grade students from twelve high schools in Queens. As the need for LYCEE programs arises, the Center comes forward with new initiatives to incorporate in its practices hybrid models including face-to-face and online learning modes with some unique features.

SSB-325: The Integration of STEM Design Activities at the Earliest Stages of Education: Perspectives of a Non-Educator

Bryant Wysocki, Full Spectrum Research, Inc.

This paper outlines the importance of hands- on design activities towards the cultivation of future

leaders in science, technology, engineering, and mathematics (STEM) as viewed through the perspective of a research scientist and non-educator. Today's unparalleled access to data and information has begun to undermine the discipline required to solve tough design problems independently so that when students later encounter real research they are ill prepared for the process. Design activities offer the means to inspire and motivate young K-12 students while immersing them into the exciting action of science discovery. Simple guidelines for the strategy and execution of design activities are presented as well as the observed benefits of such implementation.

2 – 2:30 pm

SSB-321: Foreign Currency Trading as an Inter-Disciplinary Teaching Pathway to STEM Initiatives

Robert Colombo, CEREBRONIX and Debora Colombo, The Granite School

Successful members of tomorrow's workforce must not only be demand learners, but must also be capable of continually reinventing themselves, while addressing, pondering and successfully resolving complex inter-disciplinary problems. Critical to developing these sustainable career capabilities and fluid thinking skills is the introduction at earlier and earlier ages, of learning environments that challenge students to process real-time information, from multiple sources and in a variety of display formats, while coaches help them to seamlessly think across multiple disciplines. Using commodity trading within the foreign currency market as a rich platform to introduce students to such challenges, while helping them integrate knowledge from the disciplines of geography, sociology, economics, signal processing, modeling, finance, statistics, politics and world trade is the core of this initiative.

SSB-324: Accelerated Project-Based Introduction to EECS for High School Students

Joseph Steinmeyer, Massachusetts Institute of Technology

Introducing students to Electrical Engineering and Computer Science (EECS) can be difficult to implement within the limited time constraints often encountered in high school summer programs because of the large amount instruction and theory needed to enable suitably complex projects. Projects of meaningful complexity require carefully balancing how much theory and design is left to the students or provided by the instructor. Here we present a short one-week project- based course developed in the summer of 2011 that introduced rising high school seniors to core concepts in EECS. Three days of instruction and teaching labs were followed by two days where students designed and constructed devices used in creating a solar-powered mobile health clinic. A carefully balanced environment enabled students to progress steadily through the entire process of designing, constructing, and testing their projects. Students then presented their work in a conference-style talk. Details of the course outline, methodology, projects, and results, are presented.

SSB-325: A Robotics Based Design Activity to Teach the Doppler Effect

Jonathan Ashdown and David Doria, Rensselaer Polytechnic Institute

This paper presents a STEM design activity for use by primary and secondary school teachers to effectively teach the Doppler effect to students. First, the phenomenon is presented in an intriguing way. Once the initial concept is grasped, we cover the science of what is happening by describing the concept and definition of frequency, wavelength, and velocity. Several applications are then presented as well as some supplemental concepts that may be studied in more advanced classes. Finally, the students are instructed to think creatively about how to set up an experiment that utilizes robotics technology to adequately demonstrate the fundamentals of the Doppler effect. The students are required to fulfill of several learning objectives during the design activity. The design activity was presented to several high school teachers in the Northeastern region of the United States who in turn conducted the activity in their classrooms.

2:30 – 3 pm

SSB-321: Mobile Security Labware with Smart Devices for Cybersecurity Education

Kai Qian and Chia-Tien Dan Lo, Southern Polytechnic State University; Minzhe Guo and Prabir Bhattacharya, University of Cincinnati; and Li Yang, University of Tennessee – Chattanooga

Smart mobile devices such as smartphones and tablets have become an integral part of our society. However, it also becomes a prime target for attackers with malicious intents. There have been a number of efforts on developing innovative courseware to promote cybersecurity education and to improve student learning; however, hands-on labs are not well developed for smart mobile devices and for mobile security topics. In this paper, we propose to design and develop a mobile security labware with smart mobile devices to promote the cybersecurity education. The integration of mobile computing technologies and smart devices into cybersecurity education will connect the education to leading-edge information technologies, motivate and engage students in security learning, fill in the gap with IT industry need, and help faculties build expertise on mobile computing. In addition, the hands-on experience with mobile app development will promote student learning and supply them with a better understanding of security knowledge not only in classical security domains but also in the emerging mobile security areas.

SSB-324: Strategies to Overcome Barriers to Women and Minorities in STEM

Abby Ilumoka, University of Hartford

Integration of STEM education into middle and high school curricula for women and minorities poses important challenges. First the average female or minority teenager is exposed to less than 3 hours/week of STEM-related material in popular media as compared to over 100 hours/week of non-STEM content such as sports, entertainment, music, movies, legal/medical TV soaps and dramas. As a result, STEM issues are barely on their radar screens. Second, STEM curricula in most middle and high schools is not always presented in the context of real world applications and everyday needs of society that would interest this population. Third, there are very few role models available. The STEM research effort reported here attempts to find ways to diversify the STEM workforce through identification of pedagogical strategies for recruitment and retention of women and minorities into STEM classrooms and ultimately into the STEM workforce.

SSB-325: Scrapyard Challenge Jr., Adapting an Art and Design Workshop to Support STEM to STEAM Learning Experiences

Katherine Moriwaki, Jonah Brucker-Cohen, Louisa Campbell, Joe Saaevdra, Liza Stark, and Liz Taylor, School of Art, Media, and Technology, Parsons The New School for Design

We present an informal learning experience for youth ages four through eleven and their families utilizing the integration of art, design, and technology to deliver STEM concepts. The workshop, titled Scrapyard Challenge Jr. 1.0 (SCJ 1.0), was developed from modifications made to an interaction design workshop oriented towards adults, in which participants build novel and expressive electronic objects using found materials and junk. Tapping into the momentum surrounding the maker and tinkerer movements, the learning experience introduces basic principles of electricity and systems thinking using hands-on activities that encourage personal and creative self-expression. Through detailing our experience we suggest that current trends in art, design, and technology practice can provide fertile ground for developing STEM learning. Indeed, we argue that this triangulated space is the logical starting ground for the development of a wide variety of STEAMD initiatives.

3 – 3:30 pm

SSB-321: The Use of Low Cost Portable Microcontrollers in Teaching Undergraduate Computer Architecture and Organization

Chia-Tien Dan Lo and Kai Qian, Southern Polytechnic State University; and Liang Hong, Tennessee State University

This paper presents our experiences in teaching undergraduate Computer Architecture and Organization using a low cost portable microcontroller, MSP 430 manufactured by Texas Instrument Inc. This microcontroller is hosted on a USB dongle along with necessary hardware interfaces for system configuration. The microcontroller, though simple, covers basic fundamentals of computer systems, and indeed is a great platform for beginners to start with. This low cost portable device makes it possible for students to conduct labs and projects at anytime and anywhere.

SSB-324: Achieving Creativity and Innovation through IEEE Pre-University Divisions

Sanil Pruthi, Daniel Fishman, and Nikheel Pruthi, Montgomery High School

At last year's IEEE Sections Congress, a recommendation was made to encourage and support the participation of high school students in engineering- based activities. The authors discuss their experience founding a new club at Montgomery High School, in Skillman, New Jersey. There was considerable enthusiasm for the club, which currently has twenty-five members. Students meet once a week to work on open-ended problems, developing their interest in engineering and intellectual pursuits in general.

SSB-325: Design to Manufacture – Integrating STEM Principles for Advanced Manufacturing Education

Eric Flynn, Gateway Community College

The community and technical college systems possess unique opportunities to showcase the integration of Science, Technology, Engineering, (Art), and Math (STE(A)M) programs into cohesive, collective, and collaborative learning environments. It will be shown that involvement from separate disciplines within STEM fields facilitates a learning environment greater than the sum of its individual parts. The essential challenge to take theory shown in class, to a fully realizable product, produced in a college laboratory will be explored. A distinction between classical and modern manufacturing engineering processes will be defined. In a design study, we will look at the fundamental engineering principles of an internal combustion intake manifold system to showcase the central integration of design within STEM education. Computational fluid dynamics (CFD) simulation software will showcase that artistic design can improve the dynamics of a component. Finally, it will be shown that STEM project/product design need to be developed around advanced manufacturing techniques, ignoring the limitations of conventional machining.

3:30 – 4:30 pm – Keynote 3

SSB 324: Bridging the Disciplines in Teaching and Research

H. Vincent Poor, PhD, Michael Henry Strater University Professor of Electrical Engineering and Dean of the School of Engineering and Applied Science, Princeton University

RECEPTION FOLLOWING
SSB ATRIUM

ISEC/ITPC @TCNJ

1. Lot 2A
2. Social Science Building
3. 1855 Room

Route 31 = Pennington Road

Your ISEC registration includes admission to Information Technology Professional Conference (Fri/Sat) and Trenton Computer Festival (Sat) events!

ITPC Friday	Development Room 225	Management & Systems Analysis Room 226	Professional Development and Technology Room 227
8:00 AM	REGISTRATION		
9:00 AM	Programming without Code Pat Palmer	Take Two Beads and Call Me in the Morning – Managing Software Development Projects Better Howard Deiner	Planning for Retirement Prof. Dr. B. D. Shinde
10:00 AM	Flexible Codeless Applications Gary Clayton	Use Cases Dennis Mancl	Manufacturing & Distribution Technology: New Horizons for 2012 & Beyond Joseph Flesch
11:00 AM	Building within Frameworks Robert Gezelter	Intellectual Property - Protecting the fruits of your labor Joel Miller	The Black Swan and Information Security Rebecca Mercuri, Ph.D.
12:00 PM	LUNCH & FACILITATED NETWORKING SESSION		
1:30 PM	Getting the Most from Parawise Testing George Sherwood	Demystifying Cloud Computing – A Guide for Mid-Career IT Developers Eeraj J. Qaisar	Learning a New Programming Language? Why not C# .NET Programming? Don Hsu
2:30 PM	Getting Started with Clojure Michael Redlich	Web Site Accessibility Mike Barlow	An Introduction to X3D Charles Lamb
3:30 PM	Instrumented Agile Templates Satish Thatte, Ph. D.	Legal Issues in Information Technology Fred Wilf	