csta Voice

INNOVATIVE TEACHING

The Voice of K–12 Computer Science Education and its Educators

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CS for Everyone

Ethical Challenges Overseas

Actions Speak Louder than Words

Sean T. Moroney, M.Ed

International schools and overseas teachers face significant ethical challenges in order to obtain the tools of technology necessary to achieve their pedagogical goals. From a cultural perspective however, the meaning and importance of intellectual property laws do not always translate the same around the world. This is evident when it comes to the distribution and use of software.

During five years of international teaching, I've learned that in many overseas schools—especially smaller private start-up institutions—the use of counterfeit software is an institutional norm. An educator accepting a position overseas may likely find that pirated software in their workplace is the rule, and legal software—from operating systems to instructional applications—is the exception. Reasons for this seem to be less about institutional ethical weakness and more about overlapping economic constraints and utilitarian demands. Whatever the causes, the use of illegitimate software overseas is perpetuated by an epidemic lack of awareness about ethically and technologically sound alternatives.

Many international schools are privately-owned and like schools everywhere, international schools showcase computing facilities as a measure of their strength and quality. Technology budgets, if available at all, encourage those responsible for equipping computer labs to cut costs where ever possible.

School hardware and software is generally obtained from local vendors where the best prices reign but piracy is ubiquitous. The dominant software titles include products from Microsoft and Adobe, whose name-brand value and price hold huge marketing appeal to both end-user clients and counterfeiters. Locally purchased educational technology products may be deployed into schools with such pirated operating systems and bogus applications pre-installed. Ethical questions, if they arise at all, center around vendor-customer relationships and accountability, not software licensing.

Out of utility, teachers are compelled to work with existing resources which are frequently buggy, cracked versions of commercial software. School budget limitations often mean that teachers personally supplement for classroom needs. Consequently, teachers may find the priorities of equipping their computer lab at the front of the queue, even if it means elbowing ethical considerations of copyright law and code integrity to the side. They may have to make do with what they have or provision with whatever can be found for little or nothing over the Web or in the local street markets. If Warez sites or peer-to-peer clients don't yield needed titles, pirated copies are readily found in kiosks at a fraction of retail prices. In Asia particularly, a wide variety of pirated software titles are far easier to find than the OEM versions. An opportunity to own a $500 graphics development suite for a mere $15 or $20 can be an

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Volunteer Power

CSTA wishes to thank:

Linda Martinez
John Osbourne
Joyce Paisley
Richard Worcester

for their work on the CSTA *Imagine Your Future in Computing* brochure!

ETHICAL CHALLENGES OVERSEAS

continued

ethically challenging temptation.

Underlying these common overseas scenarios is a surprising lack of knowledge about alternatives to using illegitimate software. Many people in developing nations, where access to information technology is only beginning to emerge, remain largely uninformed about the countless open source, GNU public domain software alternatives available.

My experience as a teacher in developing countries has taught me to consider the cultural context in which to effectively promulgate change. In these cases it is often better to offer workable solutions which make things "righter" than to point out the "wrongness" of a situation. For example, modeling the use of such products as the free OpenOffice productivity suite as a "right" solution to the wrongness of being deprived of such computing staples will likely have greater impact ethically than condemnation of, or indifference to, illegitimate software use. Presenting GNU-based, open source, freeware, and shareware as economically attractive options which work as well as, or better than, counterfeited commercial software, may help diminish software piracy's attractiveness, and perhaps also, the ethos that forbidding costs make it justifiable.

… it is often better to offer workable solutions which make things "righter" than to point out the "wrongness" of a situation.

Issues surrounding copyrighted software will likely present ethical challenges to international educators. However, while overseas we have a unique opportunity to give technology education in our global society an ethical boost by modeling "the right thing" by promoting the use of ethically and technology sound alternatives to pirated commercial software. Awareness and understanding are key, and at home or away, in any language, actions speak louder than words.

Over-Qualified, Under-Certified

CS Certification in North Carolina

Jane S. Whitehurst

Editor's note: *A snapshot of teacher certifications for computer science (CS) in the U.S. shows a confusing array of requirements and standards that dramatically vary from state to state. The following is the story of one teacher's journey toward doing what she loves: teaching high school CS.*

Students deserve to have the most qualified teachers and teacher qualification should be the basis of granting teacher licenses. Over the course of 10 years I've discovered that this is not universally true.

In the spring of 1997, as a senior at

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CSTA Voice is a quarterly publication for members of the Computer Science Teachers Association. It provides analysis and commentary on issues relating to K–12 computer science education, resources for educators, and information for members. The publication supports CSTA's mission to promote the teaching of computer science and other computing disciplines.

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Clemson University majoring in CS with a minor in education, I discovered that my education minor was not going to be enough to teach in the public school systems near my home in South Carolina, North Carolina, or Virginia. After extensive research, schools in Vermont, Illinois, Wisconsin, and Washington all said, "Come here. We'll certify you to be a CS teacher. Better yet, we'll help you get a master's degree in CS education." I chose Cardinal Stritch University in Milwaukee.

In the spring of 2000, I finished my master's degree, received my secondary education certification, and became a full-time high school teacher of Advanced Placement Computer Science (AP CS) and algebra. I was ready to go back home to North Carolina and thought that surely the CS certification situation there had been resolved, but it had not. The school system said, "We don't have a certification for CS. Do you have a degree in something else? Business? Math?" The same was still true in Virginia and South Carolina. I continued teaching in Wisconsin while Chris, my fiancé, finished his Master's at UW-Milwaukee.

During the summer of 2001, my husband was accepted into a Ph.D. program at North Carolina State University, and we were actually moving home. North Carolina had no standards for assigning CS into a specific secondary school department. Depending upon the school, CS could be found in math, business, or specialized technology departments. Broughton High School in Raleigh, with all of its CS courses in the math department, gave me a chance. *No Child Left Behind* didn't exist yet, so the school system had the Department of Public Instruction (DPI) create a math license for me by accepting the computer classes on my transcript and giving them math status.

In the spring of 2003 I moved to Apex High—a more technical school. However, CS courses at Apex were in the business department. I did not have a business license, so I was granted a one-year provisional license under the assumption that the DPI would see the dilemma of the situation and rectify it. After all, Apex was in the same school district as Broughton, and the courses I was teaching in the math department at Broughton were the same as those being taught in the business education department at Apex.

By the spring of 2004, after countless meetings with representative of the DPI, state educational committees, the North Carolina School Board, the Wake County Public School System, and Apex High, nothing had changed. I was still a CS teacher with a math license and no way to switch to a business license without more course work and an exam, all for which I would have to pay.

Depending upon the school, CS could be found in math, business, or specialized technology departments.

My provisional business license expired at the end of the year, and I was replaced. I had an undergraduate degree in CS, a graduate degree in CS education, a Wisconsin license to teach CS, 3 years experience teaching high school AP CS in Wisconsin, 2 years teaching computers at the college level, 4 years teaching high school CS in North Carolina, and I was a paid Pacing guide/curriculum designer for CS in Wake County, North Carolina. With all those qualifications, I am not certified to teach CS in North Carolina.

Now in the spring of 2007, I still teach at Apex High School in Wake County. I teach math and stand by while a business-licensed teacher, with no Java or C++ experience, teaches the CS courses. The DPI and the school board have been informed of this situation but no action has been taken. I recently contacted Georgia and Virginia, which since 2000, have adopted a license in CS education.

Dated records since 2004 of communication about CS certification can be found on my personal Webpage at *justthinkfirst.blogspot.com*.

Contribute to the CSTA Voice

The editorial board of the ***CSTA Voice*** is dedicated to ensuring that this publication reflects the interests, needs and talents of the CSTA membership. Please consider sharing your expertise and love for computer science education by contributing newsletter content.

Potential writers for the ***CSTA Voice*** should send a brief description of the proposed article, estimated word count, statement of value to members, author's name and brief bio/background info, and suggested title to the editor at: *cstapubs@csta.acm.org*. The final length, due date and title will be negotiated for chosen articles. Please share your knowledge.

Volunteer today!

The *CSTA Voice* welcomes your comments.

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Letters to the Editor are limited to 200 words and may be edited for clarification.

CSTA Election Results

Welcome newly-elected members of the CSTA Board of Directors

K–8 Representative:
Dave Burkhart

9–12 Representatives:
Myra Deister
Brian Scarbeau

College Faculty Representative:
Anita Verno

At-Large Representative:
Debbie Carter

Next meeting of the CSTA Board June 30, 2007 in Atlanta

SeeING GENDER

Tools for Change

Jacqueline D. Spears, Linda P. Thurston, and Diane McGrath

The number of women pursuing science, technology, engineering, and mathematics (STEM) careers still lags behind that of men, most notably in engineering and computing, creating a need for new teaching tools that will help teachers and students "see" gender in a new way.

No teacher intends to treat males and females differently—most tell their students they can become anything they choose to work hard at becoming. Yet research documents subtle differences between how many teachers treat males and females. Students themselves hold each other accountable to their own definitions of how males and females should behave and in what fields they should excel. Moreover, STEM fields in which women were historically denied access have understandably come to reflect masculine values and behavioral norms.

SeeING GENDER: Tools for Change is an interactive CD-ROM developed for preservice and in-service teachers and teacher education and college faculty involved in STEM fields. *SeeING GENDER* focuses on three goals.

- Introduce educators to research on gender and gender socialization.
- Sensitize users to the gender bias that operates in STEM classrooms.
- Expose users to strategies and interventions designed to reduce gender bias.

What research suggests is that relatively small differences in how we interact with males and females, based largely on gender schemas, lead to an accumulated disadvantage for women interested in pursuing STEM fields.

This project grew out of my experience in teaching gender issues in education to classroom teachers for more than a decade. Psychologists suggest that we all develop cognitive schemas organized around gender, so it really shouldn't surprise us to learn that we unconsciously apply what we learned about gender as children to our interactions with others. What research suggests is that relatively small differences in how we interact with males and females, based largely on gender schemas, lead to an accumulated disadvantage for women interested in pursuing STEM fields.

SeeING GENDER provides modules that examine gender schema, girls, boys, teachers, and undoing accumulated disadvantage. The modules can be explored in any order. Each module presents research in the field as well as suggestions for making changes in the classroom environment.

SeeING GENDER was designed to be used in a number of different ways. Teachers can work through the program independently. It can be used in an afterschool in-service program (either half-day or day-long staff development training). Or, it can be used as a major component of a district/organization multi-session educational training.

An outline for various staff development training sessions is contained in a second CD-ROM included in this package. This staff development CD-ROM also includes supplemental articles and other resources on the topic of STEM education. Supplemental material includes evaluation tools that districts can use to meet *NCLB Title II* requirements.

The *SeeING GENDER* CD-ROM set is available through the Midwest Equity Assistance Program at *www.meac.org/Resources/ed_services/SG_WEB/SeeingGender/*. If you have questions, you can also contact a MEAC staff member at 785-532-6408.

SeeING GENDER was developed with support from the National Science Foundation.

Technology Leadership Institute

Tonya R. Groover

As an African American computer science (CS) student at the University of Pittsburgh, I observed my peers withdraw or become discouraged from taking CS courses. Personal research and reflection convinced me that the solution lies in high school preparation and guidance. This realization motivated me to develop the Technology Leadership Institute (TLI), a free pre-college program that brings minority high school students to the University of Pittsburgh for six weeks in the summer to learn about CS.

African Americans make up the largest minority population in the Pittsburgh metropolitan area with 27.1%. In comparison to the 50 largest metropolitan areas, African American children and youth in the Pittsburgh area are also among the most disadvantaged in America. The poverty rate for African American children is 42.1% compared to 10.7% for White children.

Despite the fact that CS is one of the fastest growing and most lucrative careers of the 21st century, African Americans earn only 2-3% of the CS degrees awarded annually in the U.S. My goal was to design a pre-college CS program that would be age and knowledge-level appropriate, engaging, and demonstrate the vast scope of CS for these students, in hopes of better preparing them for university CS programs.

TLI is a program in the Department of Computer Science, with support from the School of Arts and Sciences and the School of Information Sciences at the University of Pittsburgh. During the summer of 2006, 24 students explored CS concepts, educational opportunities, and technology careers through TLI. The pilot program included 10 young men and 14 young women from 16 public, private, and charter schools.

Each student participated in approximately 70 hours of classroom instruction and supplemental activities that included job shadowing at FedEx Ground, a fieldtrip to the Supercomputing Center, building and networking a computer, a robotics workshop, and a variety of other activities to build enthusiasm and encourage students to enter a CS or technology program at the university level. With new skills, the TLI students also helped local organizations with over 100 hours of free technical support, web design services, and computer lab set-ups. The students provided very positive feedback on their participation; "This was a great time for us to get a head start … [TLI] opened so many opportunities."

With new skills, the TLI students also helped local organizations with over 100 hours of free technical support, web design services, and computer lab set-ups.

While we have not completely mastered the design, we did learn several lessons to guide future program initiatives. These include integrating proven teaching and learning strategies into the curriculum and instructor training, recruiting an enthusiastic and dedicated teaching team, networking with local schools and communities, and ensuring that students are aware of both the benefits and commitments of participation in TLI.

A one-time, 6-week summer program is not sufficient to appropriately prepare a student to pursue a CS degree. For that reason, we hope to obtain funding to provide high school students with a four-year experience to include university-level courses, participation in a technical internship, and relevant competitions.

To learn more about the program, please email me at *trg4@cs.pitt.edu* or visit our website at *www.cs.pitt.edu/tli.*

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Assistant Dean, College of Education, Kansas State Univ.
Linda studies gender issues and focuses on rural sex equity and computer literacy.

Anita Verno
Assistant Professor, Academic Program Coordinator of IT, Bergen Community College, NJ
Anita is an author of *the ACM Model Curriculum for K-12 CS* and *The New Educational Imperative*.

Jane S. Whitehurst
CS Educator
Jane has taught math and computers in North Carolina since 2001.

Classroom Tools

Serious Learning Through Game Design

Terrel Smith

Like teachers across the country, teachers in Oregon are investigating new ways to engage students in computing courses and at Sherwood High School, we have significantly increased student enrollment in computer science (CS) by building our course around computer game development,

The enrollment in the first trimester programming course at our high school nearly doubled when we included game design and changed the title to "Introduction to Computer Science through Gaming." Our class size jumped from 45 students in 2005-2006 to 88 students in 2006-2007 and 75% percent of the students reported taking the class because of the gaming content. Enrollments in the second and third trimester CS courses are also up from the previous year.

The reinvention of this course was not so much about gaming as it was about catching students' attention, giving them early success, and showing them the relationship between design and outcome.

I used the program *Gamemaker* as the vehicle to introduce programming concepts to these first-year programming students (*www.gamemaker.nl*). After five weeks studying game design, students transitioned into *Visual Basic.Net* for the remaining seven weeks of the trimester. The students were engaged and enthusiastic about their programming success in projects such as maze games, driving and flying games, Mario-type games, shooting and explosion games, hide and seek two player games, factory simulations, and brick games. The CS content in this course is strong in design, variables, objects, event procedures, decision structures, counters, accumulators, documentation, event handling, functions, and scope of variables.

Focusing a CS course around game development is not without challenges, however. Gender balance remains problematic, with girls comprising about 18% of the class. Managing curriculum time can also be a challenge. To recapture some of the time lost during the transition from game introduction activities to the actual development projects, I will be using *Phrogram* (*www.phrogram.com*) as a gaming gateway for the 2007-2008 school year. The interface and code window resembles the *Visual Basic* Integrated Development Environment (IDE) and will ease the transition.

I am confident we can increase the numbers of students in CS programs using the motivation of game design. The enjoyment, challenge, and success of game development may encourage more students to pursue other CS courses in high school and college, and to consider high-tech careers.

Our efforts to increase enrollment in our school parallels similar efforts throughout Oregon secondary schools, colleges, and universities. The Oregon affiliate of Computer Science Teachers Association (with financial support from the Software Associates of Oregon Foundation) provides workshops on CS topics such as gaming, Lego Robotics, and Java programming (*www.superquest.org*). The Oregon Pre-engineering and Applied Sciences Initiative (OPAS) includes secondary, university, and industry representatives who are busy creating strategies for promoting CS in Oregon secondary schools (*opas.ous.edu*). The Engineering and Technology Industry Council (ETIC) is also a valuable resource on CS and engineering careers (*getreal.ous.edu/*) .

For a list of other programs that can be used to integrate game development into high school CS curriculum visit: *www.gamediscovery.com/game-design/game-design-software.asp*.

SHOW ME THE NUMBERS
Looming Crisis

1,000,000 Number of IT jobs expected to be added to the U.S. workforce by 2014

500,000 Number of qualified candidates U.S. universities will graduate for these jobs (50%)

SOURCE: *Revolutionizing the Face of Technology*
National Center for Women & Information Technology
www.ncwit.org/pdf/2006_NCWIT_Statistics.pdf

Career Corner

Encouraging Youth to STEM Through Collaboration

Angela M. Klein, Assistant Professor of Computer Information Systems, William Jewell College

From July 2006 through July 2007, the Midwest Rural-Urban (MRU) Girls collaborative Project will be awarding forty $1000 mini-grants to activities and organizations in Missouri, Kansas, and Oklahoma.

The purpose of this grants program, co-sponsored by Missouri State University, Drury University, and the National Science Foundation (NSF), is to generate collaborative efforts among similar organizations that can bring talents and resources together to develop young women's enthusiasm for STEM studies and careers.

According to Paula Kemp, Principal Investigator of the MRU Project and Professor at Drury University, "many organizations are after the same girls and it is a 'win- win' situation for everyone to share their resources and their expertise."

Kemp estimates that the 40 funded projects, which began in the summer of 2006, will reach 1500 young women, and possibly young men. Participating organizations include 80 non-profit institutions, K-12 educators, colleges, and universities across the three state region. The projects are diverse in size and activities and include after school science programs with hands-on experiences, field trips to colleges/universities to discover STEM research projects, and one-day conferences with professional mentors.

One project, organized by Students in Free Enterprise (SIFE) of William Jewell College and Girl Scouts of Mid-Continent Council Kansas City, brought 52 young women (grades 6-12), 26 parents, and 9 professional women together to celebrate women in technology. The activities included women sharing their experience in the computing field as well as hands-on activities in robotics, Alice programming, and web design.

Participants learned that women have no boundaries, technology is a good career choice, and there are many doors to be opened. The participants also learned about teamwork, planning future careers, and the importance of education.

Following the event, 94% of the participants believed their skill level with computers had increased and 21% had a greater interest in computer technology.

"If our initiative inspires a few young women to venture into the computer science field it will prove to be a success. Computer science is woven into every aspect of our lives and the importance of inspiring our youth to become interested in the subject is immeasurable," reflected Nikki Kraft, William Jewell SIFE student and co-coordinator of the event.

For more information on the MRU project, visit *www.mru.missouristate.edu*. For information on collaborative STEM efforts in your state, visit National Girls Collaborative Project at *www.pugetsoundcenter.org/ngcp/map_regions.html*.

Committee News

ISTE Refreshes Standards

Anita Verno, CSTA Curriculum Chair

Over the last year the International Society for Technology in Education (ISTE) has been carrying out a review and renewal of its *National Educational Technology Standards (NETS).* Early indications are that the results will be positive for educators concerned about ensuring that students have the skills they need to thrive in an increasingly technological world.

The newly released *ISTE NETS for Students Draft* document (*www.iste.org/nets-refresh/draft*) (1/4/2007) is a move towards inclusion of computer science topics as well as technology topics under one standard. I applaud ISTE for suggesting a broader base of computing studies than in previous standards.

While I believe the draft represents a step toward better computing preparation for K-8 students in the U.S., the one-page draft does not provide sufficient detail as to the anticipated level of student understanding expected. For example, Section "VI.A. Technology Operations and Concepts, understand and use technology systems" does not indicate the type of technology systems. I can reasonably imagine this as anything from connecting and using a DVD player or MP3 player, to connecting and using a computer system.

Unfortunately, "IV.B. Critical Thinking, Problem-Solving and Decision-Making, plan and manage activities to develop solutions and complete projects" also fails to state specifically that students should use algorithmic thinking as a means to develop solutions. Trial and error is a great place to start, but eventually standard algorithms need to be introduced and modified in the approach to a solution.

I am not alone in the belief that the *Standards Refresh* is only one step of the journey that is needed to update computing education in our schools. The sentiment seems to be echoed by elementary teachers in the trenches. For example, Barbara Topps, an elementary computer teacher at the Taft School in Washingtonville, NY notes, "the new draft of ISTE standards again does not specify any outcomes related to algorithmic thinking. I am afraid that this omission will negatively affect the curriculum that administrators will expect us to cover." Barbara further notes her concern, "foundations that students need to be successful in our technological world will not be covered."

CSTA applauds ISTE for moving technology standards forward and for introducing concepts that are suggested in the *ACM Model Curriculum for K-12 Computer Science Education* (*csta.acm.org/Curriculum/sub/ACMK12CSModel.html*) . While not perfect, the revised NETS are moving students toward knowledge and skills necessary for success in today's digital world.

We encourage ISTE, however, to take a more comprehensive approach to the future needs of U.S. students by including the outcomes relating to algorithmic thinking in the *ACM Model Curriculum*. This will enable all computer educators to review and update their curriculum, resulting in more stability in computing education.

Promoting CS Education

Computing for Communication

Mark Guzdial

We have a wonderful problem at Georgia Institute of Technology (Georgia Tech)—there is a demand for more computing courses with a focus on communications! The new "Introduction to Media Computation" course has excited students and dramatically improved student success and gender balance.

The new course is aimed at liberal arts, management, and architecture majors who are required to take an introductory computing course, but who were not succeeding in our traditional course. Less than half of management majors, for example, earned a passing grade in our standard course. In the "Introduction to Media Computation" course, 88% of management majors pass each semester. While Georgia Tech is only 27% female, the population of this course has been 51% female.

"Introduction to Media Computation" reflects the fact that communication is the most common use of computers today. Most people who own a computer, including our students, use instant messaging and email, prepare presentations, manipulate their photos, and perhaps even produce movies or animations. For the last four years, we have been teaching courses at Georgia Tech that introduce computing as a tool for creating and manipulating digital media: images, sounds, HTML pages, and video.

Students learn the same introductory concepts and skills recommended by standards, but with a focus on media. In any introductory course students are taught to iterate across an array, perhaps in order to compute a sum or an average. In the media computation approach, students iterate across the pixels in a picture to create a negative or grayscale image. More specific array processing techniques are mastered as students iterate across only the pixels around a person's eyes in a photo in order to correct for "red eye." We teach students to reverse the elements in an array using sound files so that the results can be heard. String processing is taught by generating HTML pages from a program with explanations of how Amazon and E-Bay work. Students learn digital video special effects and discover the same techniques used in their programs are employed in movies. The course is taught in Python, a programming language that is particularly easy to learn and is used by companies like Google and Industrial Light & Magic.

The second course—"Media Computation Data Structures"—uses simulations such as *The Lion King* to teach traditional data structures content in Java. Students make the transition from Python to Java easily, and within a couple of weeks they are creating image collages and digital sound compositions. Animating characters requires linked lists and trees, and simulating them requires stacks and queues. To learn about linked lists, students create woven and repeating patterns of nodes containing MIDI notes; traversing the list plays the music. Students learn about trees through scene graphs, a common data structure in computer animation.

Student projects can also be used to address serious issues such as the spread of disease through a simulation of a pandemic and the implementation of public health policies used to stem the infection rate. "Media Computation Data Structures" has been available for 2 years and has had a 90% student success rate.

Summer workshops have brought the media computation approach to high school teachers. Barbara Ericson, the Director of CS Outreach for the College of Computing, developed Java versions of the introductory course materials including object-oriented design. Because of her workshops, there are several AP CS classes in the Atlanta area using the media computation approach in Java. The approach is being adopted in other schools nationwide.

Much of computing is about communications. The media computation approach works because it teaches CS in a context that makes sense to students.

Editor's note: *Mark will be presenting at the CS & IT Symposium.*

csta Voice

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We're on the Web! *csta.acm.org*

MARK YOUR CALENDAR

National Educational Computing Conference (NECC)
June 24-27 in Atlanta, Georgia
center.uoregon.edu/ISTE/NECC2006/about_NECC/future_NECCs.php

CSTA sessions:
CS as Analysis and Design with Online Resources (Debbie Carter & Anita Verno)

Using Animation to Teach Computing Concepts (Steve Cooper & Barbara Ericson)

Computing Curriculum Revision: Incorporating the ACM Model (Barbara Ericson)

Introduction to Computing and Programming: A Multimedia Approach (Barbara Ericson)

Web Reports for Science Learning (Michelle Hutton)

Using Graphical Languages to Teach Programming (Michelle Hutton)

Computational thinking: Problem solving for Every Classroom (Pat Phillips)

Gender Equity from Multiple Perspectives (Chris Stephenson)

Innovation and Technology in Computer Science Education (ITiCSE2007)
June 25-27, 2007 in Dundee, Scotland
iticse2007.computing.dundee.ac.uk/

CSTA session:
Fundamental Concepts of CS1: Procedural vs. Object Oriented Paradigm - A Case Study (Judith Gal-Ezer)

OCSTA Superquest
June 25-29, 2007 in Hillsboro, Oregon
July 23-27, 2007 in Monmouth, Oregon
www.superquest.org

Computer Science and Information Technology (CS & IT) Symposium
June 28, 2007 in Atlanta, GA
www.iste.org/profdev/symposia/cs/2007/

Advanced Placement (AP) Annual Conference
July 11-15 in Las Vegas, Nevada
www.collegeboard.com/apac/2006/2007/index.html

CS4HS: Explorations in Computer Science for High School Teachers
July, 3-6 at Carnegie Mellon University in Pittsburgh, Pennsylvania

Frontiers in Education Conference 2007
October 10 -13 in Milwaukee, Wisconsin
www.fie-conference.org/fie07/

Consortium for Computing Sciences in Colleges (CCSC-Rocky Mountain)
October 19-20, 2007, in Orem, Utah
www.ccsc.org/regions/regions.htm

For the current TECS workshop schedule visit
tecs.acm.org/

The complete ACM Calendar of Events is available at
campus.acm.org/calendar/

RESOURCES

Here's more information on topics covered in this issue of the *CSTA Voice*.

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Page 1: SchoolForge *www.schoolforge.net/*
Page 1: SourceForge sourceforge.net/
Page 2: North Carolina Professional Teaching Standards *www.ncptsc.org*
Page 4: Gender, Diversities & Technology Institute *www2.edc.org/gdi/*
Page 4: Gender Equity for Educators *www.josanders.com/genderequity.html*
Page 4: Tutorials for Change: Gender Schemas and Science Careers *www.hunter.cuny.edu/gendertutorial/*
Page 4: Girls in Science and Engineering *www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf03207*
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