

KEEPING CS
RELEVANT



Voice

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

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Improving Life with CS

Socially Relevant Computing

Michael Buckley

The Center for Socially Relevant Computing, at the University of Buffalo, is an undergraduate student lab tasked with one goal: improve the quality of life of any group or individual through computing and creative energy. The number and range of student-generated ideas is amazing.

Some of our students' projects include:

- a speech replacement device for a 43-year-old stroke victim;
- a working prototype for a cell phone controlled wheel chair for a 5-year-old boy with cerebral palsy;
- a video conferencing system for homebound and hospital-bound children;
- a light and sound system (called DISCO) that helps teach cause and effect and choice making to the developmentally disabled;
- a system to monitor the location and vital signs of first-responders and present a 3-D image of the disaster scene (built with the help of a company in nearby Rochester);
- an ultra-creative way for quadriplegics to surf the Internet (think about it) as well as control their appliances and entertainment systems; and
- an award-winning teaching aid for speech and occupation therapists to teach language and reading.

We also have a 180-degree flight simulator with a platform to accommodate a wheelchair, so that children who have never run can experience the feeling of

flight and motion.

The students who developed these systems are startlingly normal: fraternity and sorority members, athletes, firefighters and police officers, nurses, shy types, popular types, mostly average students, and average high school performers. What drives them is the motivation of working for a cause. This is a normal trait of computer scientists but a characteristic of CS that is virtually unrecognized by individuals outside of the field. The students in the Socially Relevant Computing lab already have decided on careers in computing, but I wish I could tell the story to students who haven't yet decided, or the high school teachers who educate them.

Far more students enter careers in social sciences and even sports medicine than pursue CS. I believe that this is because students have no real understanding of the discipline or its impact. We are not doing a good job of conveying what a career in computing actually looks like or what it can accomplish.

CS is badly portrayed in popular culture and this portrayal impacts the aspirations and choices of incoming college freshman. The popular impression of computer scientists is hopelessly unattractive and is driven by advertising rather than actual events. For every "Geek Squad" as portrayed in an advertisement, students should get to see a real software team. I know that a single visit into a high school classroom by working engineers can change that perception, because I've been that guest and given those talks.

CSTA
wishes to thank
Dan Frost

for his leadership on the
**ACM K–12 CS Model
Curriculum Level I
project.**

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IMPROVING LIFE WITH CS

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And a demonstration of relevant and life-changing applications can do even more; demonstrate the computing power behind an MRI machine, or a wind turbine, or satellite photography, and the “I’m a PC/I’m a Mac” debate (which plays to the nerd as worker, hipster as artist stereotype) goes away. Computer scientists are normal people—as creative as artists, as crafty as carpenters, as interesting as authors, and as dedicated as public servants. CS is a career choice that should not be left to “only” the ultra smart and unhip.

My field is the application of computing to socially relevant problems, and each college semester I address the second concern: impact. High school and freshman college students largely have no idea of the problems to which computing can effectively be applied. If they did, they might better see it as a social science, or akin to law and medicine. And they might be inclined to sign on to it as a career by virtue of its doing good. It is a helping profession. And what’s more, computing is in its relative infancy and the potential for changing lives with computing is unlimited.

CSTA Video Collection

Professional Development at Your Fingertips

Chris Stephenson

In an effort to continually expand the number and variety of resources available for computer science (CS) educators, CSTA has added a number of videos for both K–12 teachers and university faculty to its website.

Over this past year, CSTA has provided a number of professional development events for both teachers and faculty. But in reality it is not always possible for all of our members to attend, so we have captured a number of these key events in videos which are available for viewing from the CSTA website at *csta.acm.org/Communications/sub/Videos.html*.

THE VIDEO COLLECTION INCLUDES:

Stuck in the Shallow End: Education, Race, and Computing

Jane Margolis and Joanna Goode discuss their research on why so few African-American, Latino/a, and female high

school students are studying CS. They argue that their study of CS education reveals how inequality is reproduced in this country, despite the national hope and wish for technology to be a great equalizer. Margolis and Goode describe the building of a K–12/university interdisciplinary partnership with administrators and teachers of the Los Angeles Unified School District and the several interventions that have resulted.

Bridging the Great Divide Between University and K–12: Why Everyone Matters

Debra Richardson illustrates how bridging the divide between K–12 and higher education is our collective responsibility. Understanding this three-part divide—Knowledge, Information, Digital—helps to develop the tools required to build the bridge from both ends to meet in the

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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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middle. Bridging the knowledge divide attempts to educate K–12 educators about what students need in their toolbox in preparation for higher education. Bridging the information divide seeks to encourage two-way communications between the different levels in education. Bridging the digital divide addresses how to hurdle the challenges such as gender, race, culture, and economics.

5from5

This video features presenters from five exemplary K–12 CS outreach programs giving a brief synopsis of their outreach programs and presentations. The presenters include Carol Frieze (Carnegie Mellon), Bill Hogan (Cornell University), Katie Siek (University of Colorado Boulder), Sonya Harris (University of Illinois), and Suzanne Menzel (Indiana University).

5 Minute Madness: Part One

Three panelists answer three key questions that every Roadshow organizer must answer. The questions include: “Why should we do a Roadshow?”, “How do you find teachers and students?”, and “What kind of outreach activities and materials do you need?”

5 Minute Madness: Part Two

Three panelists answer three additional key questions that every Roadshow

organizer must answer. The questions include: “How do you find funding for start up and maintenance?”, “How do you manage Roadshow programs for the long term?”, and “How do you build long term relationships?”

What Research Tells Us

Lecia Barker (National Center for Women in Information Technology) discusses research on best practices for outreach to young women and minority students. Lecia looks at the research evidence underlying the choices required when preparing a Roadshow presentation, specifically why you choose the messages and the activities that you choose.

Google Tools

Gabriel Cohen (Product Manager, Google Apps Education Division) demonstrates a number of tools that Roadshow organizers (and in fact all educators) can use to make their work much easier. These tools include: Google Spreadsheets, TinyURL, Google Groups, Google Apps, Google Sites, Google Calendar, Google Docs, and App Engine.

We hope that you will have an opportunity to view and learn from these videos and from the growing number and variety of resources available from the CSTA website.

Relevant Assignments

Using the Legacy Cycle

Mark Gonyea

Too often students are presented with small, meaningless, and unchallenging problems that do not allow them to piece together and apply computer science (CS) principles. Encouraging our students to become the computer scientists who will develop new technologies in the future requires us to motivate them and to help them learn to use CS concepts to solve relevant problems now.

I began using a game-based curriculum in order to quickly engage my students in a medium with which they were already familiar and were excited about. I learned however, that this led them to believe that CS and game programming

were synonymous and did not allow them to appreciate the larger potential of the discipline. This led me to spend a summer of research at Vanderbilt University under the direction of Dr. Stacy Klein in the National Science Foundation (NSF) RET (Research Experience for Teachers) program.

During that summer, I spent four weeks in a biomedical engineering lab researching bioluminescence. What does this have to do with your CS course? I asked myself the same question at the start of the program. However, as I spent more time in the lab, I slowly began to see the possibilities for incorporating my



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RELEVANT ASSIGNMENTS

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research into my teaching by making my CS class into the ultimate cross-curricular course.

After the research portion of the RET program was complete, I worked with the other teachers in the group to develop curriculum units for our classes using the six phases of the Legacy Cycle (Schwartz, Brophy, Lin, & Bransford).

- The **Challenge Question** is designed to capture the students' interest and provide a purpose for learning.
- In the **Generate Ideas** phase, students brainstorm the ideas, concepts, and knowledge for solving the challenge.
- Next, students revise their ideas as they seek out **Multiple Perspectives**. During this phase of the cycle, students learn from experts on the topic through videos, interviews, or research. Students recognize the need for new learning and the teacher can begin teaching the topics that had no relevance to students earlier.
- During the **Research and Revise** phase, teachers help students to learn the skills they need to solve the challenge question and students work on the solution.
- In the next phase, **Test Your Mettle**, teachers monitor student progress. Teachers and students will move back and forth between this phase and the Research and Revise phase until students have mastered the materials and solved the challenge.
- The **Go Public** phase provides opportunities for students to present their answer to the "Challenge Question" in some form of presentation.

While game programming was a fantastic way for me to initially engage students, the Legacy Cycle helped me keep them engaged. My students rose to the occasion and grew as young computer scientists while working on relevant projects.

Reference: Schwartz, D. L., Brophy, S., Lin, X., & Bransford, J. D. (1999). Software for managing complex learning: Examples from an educational psychology course. *Educational Technology Research and Development*, 47, 39-59.

An Inter-disciplinary Lesson Plan Using the Legacy Cycle: CS and Bioluminescence

CS Topics: Two-dimensional arrays and color composition

Challenge Question: Set the stage of a relevant, real-world problem. I gave students a letter from a fictitious company asking them to develop a program to identify the light intensity of images taken with a new bioluminescence imaging device.

Generate Ideas: Guide brainstorming about what students might need to know to solve this challenge. My students identified ideas such as needing to know what defines light intensity, what makes up colors, and how the computer stores color information. This was the great majority of what I wanted to teach and students are now telling me that this is what they need to learn!

Multiple Perspectives: Locate related resources on the topics uncovered during brainstorming. I used an interview with Dr. Charles Manning with whom I had worked during my summer research. He pointed my students in the right direction with his explanation of the properties of color and light. Next, I asked my students to find out how a computer represents and store colors. Amazingly, my students discovered the details they needed. The stage was set to teach my objectives on arrays and color.

Research and Revise: Conduct lessons on topics identified by students during brainstorming. Concepts that used to be mundane and unappealing to my students became interesting because they were relevant. I taught RGB composition, two-dimensional arrays, nested loops, and many other CS principles which students incorporated into their solution.

Test Your Mettle Analyze student work. I saw better results from quizzes and tests than ever before. I was actually talking to student programmers who could apply CS concepts to problems. I felt renewed and enthusiastic.

Go Public Students present their solution to the challenge. I asked another teacher to role-play an executive of the fictitious company. Students presented their programs to the "executive" and defended their solution. In addition, they created documentation that explained the functions of their software. After the presentations I provided assessment of the projects and gave students time to fine-tune their work.

CSTA Partners with the Empowering Leadership Alliance

Opportunities for Teachers and Students

Phoebe E. Lenear

CSTA is partnering with the National Science Foundation-sponsored Empowering Leadership: Computing Scholars of Tomorrow Alliance (EL Alliance) to provide mentoring opportunities for students from groups that have been underrepresented in the computing disciplines.

The EL Alliance is a supportive network composed of people from leading universities, professional societies, laboratories, research centers, and corporations, all committed to the success of minority scholars. It was established in 2007 with a

Protégés and mentors are matched based on the protégés' preferences as well as on the experience and qualities of the mentor.

grant from the National Science Foundation's Broadening Participation in Computing (BPC) program, to offer a range of professional development, mentoring programs, conference participation, research opportunities, and support for underrepresented minority students at majority institutions. There are currently more than 500 students from 175 institutions that belong to the EL Alliance.

CSTA teachers along with high school seniors who are from underrepresented groups and plan to major in a computational or computer science related discipline in college, are invited to join the EL Alliance at www.empoweringleadership.org.

As a member of the EL Alliance, teachers will receive information about professional development opportunities. Student members of the EL Alliance will receive information on career development, conference attendance, and interning and mentoring opportunities.

At the university level, an important part of the EL Alliance is the mentoring program, directed by Dr. Phoebe Lenear of the University of Illinois. The EL Alliance Mentoring Program is designed to connect undergraduate and graduate minority

students from research universities across the country with experienced and caring national leaders in computing fields. Protégés and mentors are matched based on the protégés' preferences as well as on the experience and qualities of the mentor. Among other things, leaders advise protégés on college courses, careers, and scholarship opportunities.

In September 2009, the EL Alliance launched a virtual mentoring community portal. Future plans include a partnership with MentorNet to meet the needs of a growing number of students requesting mentors.

The leadership of the EL Alliance is committed to providing tailored programs for all of its members, particularly in the area of mentoring. A Student Advisory Board, comprised of undergraduate and graduate students, provides vital input into the EL Alliance program plans.

Meet the Authors

Michael Buckley

University at Buffalo, NY

Michael is a faculty member in the CS Department and Director of the Center for Socially Relevant Computing, which brings undergraduate creative energy to community groups in need.

Debbie Carter

Educator, Mt. Olive High School, NJ

Debbie teaches CS and math in New Jersey. She is a College Board consultant for AP CS and has served on the CSTA Board of Directors.

Susan Fisher

Center for Advanced Research and Technology (CART), CA

Susan served on the design team for the CART high school program. She was the Dean of Curriculum for five years and is now the Chief Operating Officer.

Mark Gonyea

Educator, Murfreesboro, TN

Mark Gonyea has taught at both the middle school and high school level over the past 15 years. He currently teaches advanced algebra and CS with goals for making these topics both exciting and relevant.

Phoebe E. Lenear

Coordinator of Instructor Services, University of Illinois Global Campus

Phoebe oversees the recruitment, hiring, and evaluation of online instructors. She is co-Principal Investigator of the NSD grant, Empowering Leadership: Computing Scholars of Tomorrow Alliance. She serves on the Executive Leadership Team and directs the eMentoring Program.

Chris Stephenson

Executive Director, CSTA

Chris has been the Executive Director of CSTA since it began in 2005. She joined ACM after 16 years at the University of Toronto's Computer Systems Research Institute and the University of Waterloo's Mathematics and Computing Department, where she designed instructional and professional development resources.

CSTA Member in the News: Elizabeth Frederick Recipient of the IMPACT! Award

Frederick was recently recognized by the New Mexico Network for Women in Science and Engineering (NMNWSE), in cooperation with the NM Commission on the Status of Women, with the Second Annual IMPACT! Award.

The award is given to a New Mexico woman for her extraordinary efforts in encouraging and helping women enter and succeed in science, technology, engineering, and math, as well as promoting networking and communication among women in these careers.

Research Review

New Trends Revealed in CSTA Teacher Survey

Debbie Carter

In response to rapid technological changes in today's world, computer science (CS) education is constantly evolving to meet the changing needs of our students. In an effort to measure these changes, CSTA's Research Committee periodically surveys high school CS teachers. The most recent survey, conducted in the spring of 2008, revealed much about our changing discipline. The previous survey was conducted in 2007.

Some of the findings are particularly remarkable. More schools now require a CS course for graduation. Game programming increased, reflecting its new legitimacy in CS education. And we just might have begun reversing the decline in the percentage of females in CS courses.

In this survey CS courses were classified as introductory or pre-Advanced Placement (AP) CS, AP CS, or other CS, and we saw a decline in the percentages of schools that offer each type of course. However, significantly more teachers reported that an introductory CS course is now required by their districts (44%, vs. 33% in 2007). Not surprisingly (given the requirement), the number of schools that now have over 100 students in an introductory CS course nearly doubled (from 18% to 30%) since the previous year. As in the 2007 survey, approximately 42% of teachers reported that their district or state requires a specific curriculum for CS. However, enforcement of these requirements has declined from 75% to 66%.

Many schools have moved from granting general elective credit for introductory CS courses to granting more specific CS or technology credit. Since our 2005 survey, far more schools now include CS courses in a technology department (from 32% to 45%), with offsetting declines of inclusion in computing or math departments.

CS course content was also examined in the survey. Problem-solving, programming, hardware, and ethics and social issues were still included in at least half of the introductory CS courses. Computer security significantly increased (from 38% to 47%), while there was a decline in the reported percentage of courses that include graphics as a topic (58% to 49%). However, game programming (a new topic in this survey) was reported in 19% of introductory courses, so perhaps some teachers who were already teaching game programming selected "graphics" in the previous survey as the closest match. Productivity software also dropped significantly (from 47% to 39%), but this might reflect some appropriate reclassification of such courses (outside the CS discipline).

The majority of "other" computing courses involved Web design and/or computer graphics; communications and programming are other common topics. Networking courses had a significant decline (24% to 17%). Game programming was offered in 10% of schools (up from less than 1% a year earlier).

The percentage of females in CS classes has increased slightly, suggesting that perhaps we're reversing a disturbing downward trend. The percentages of ethnic minority and ESL students haven't changed significantly, but there was a slight increase in the percentages of teachers in all ethnic minority categories. The average age of CS teachers increased slightly, as contrasted with a slight decrease in the average number of years of experience teaching CS.

Teaching CS has some unique challenges and needs, but these stayed fairly consistent in the year between surveys. Rapidly changing technology was the most commonly mentioned challenge, and finding time for training was

reported to be the greatest professional development need. Workshops, seminars, and networking with other educators are still considered to be the most effective methods for delivering professional development.

The survey results are based on the 1094 usable responses from the 1153 self-described CS, computer programming, or AP CS teachers who replied. The complete results from this survey, along with a comparison to both the 2005 and 2007 survey results, are available on the CSTA website at csta.acm.org/Research/sub/CSTARResearch.html.

SHOW ME THE NUMBERS

CS Courses Beyond Introductory CS and AP CS

	2007	2009
Schools offering additional CS courses	89%	74%
Web design	76	68
Computer graphics	53	51
Communications	43	41
Programming	41	39
Networking	24	17
Applications	17	11
Game design	0.6	10

Percentages of schools based upon reporting CSTA teachers

Source: CSTA National Secondary CS Survey: Comparison of 2005, 2007, 2009 Results csta.acm.org/Research/sub/CSTARResearch.html

Curriculum in Action

A Community-School Partnership Creates Opportunities

Susan Fisher

Teachers at the Center for Advanced Research and Technology (CART) know that connecting high school students with their curriculum is the key to student success. CART, a career-focused college-prep program that serves 1400 students from the Fresno and Clovis, CA, school districts, utilizes an integrated approach that infuses technology into all courses.

The 14 CART career focus areas are broad in scope and specific in the computing fields. They include topics such as multimedia, game development, network management, and robotics. The CART Advanced Communications Cluster includes courses in multi-media, networking, Web applications, and game design.

Mentors or advisors typically work with groups of students on specific projects that last 6 to 8 weeks. These mentors come to the school or meet students at sites off campus. The mentors are the link with the "real world" and help reinforce the academic skills that students need to be successful.

"One of the keys to CART's success is offering students choice about career focus study and choice about the projects that direct their study. When students are interested in their class work they perform," explains Susan Fisher, Chief Operating Officer.

CART depends on community partnerships to fill in the gaps between what students are interested in and what a teacher feels comfortable teaching. Community partnerships give teachers the ability to adapt to student interest and to expose students to a wide range of research projects. The game design program, for example, is a partnership with DeVry University.

Students benefit from industry-standard learning experiences, visits to the local university campus, and personal contact with individuals engaged in game design and computing fields. They also have opportunities for scholarships offered exclusively to CART students. Their experiences create realistic expectations for a variety of CS careers and a path for achieving their career goals.

DeVry University, in turn, benefits from a pool of highly-qualified students ready to move to the next step in their education and career path because they have had an opportunity to deeply explore career options.

John Saechao, Interactive Game Design teacher, points out, “A partnership between a school and another community organization such as DeVry University, creates bridges for students. Students see how their high school experiences connect to, and build a path to their future.”

CART depends on business partners to help refine curriculum, to develop projects for students, to provide field trip locations, and to identify guest speakers—all an integral part of the quest to keep students engaged in school. In addition, community partners have been instrumental in donating needed equipment, making monetary contributions to offset program costs, and providing internship opportunities for students. Community partners hire our students for summer jobs—a tangible reward that inspires many of our students during the school year.

College Connection

Bemidji State University

Editor's note: *This dialog with Marty J. Wolf of the Math and Computer Science Department at Bemidji State University (BSU) is a continuation of our series of interviews with CSTA institutional members. Please share with your students these details about the computer science (CS) programs at Bemidji State University.*

Bemidji State University is located on the western shore of Lake Bemidji in Bemidji, Minnesota, just 60 miles from the headwaters of the Mississippi River.

BSU has an enrollment of about 4000 students. Students can earn a Bachelor of Science degree in Computer Science or Computer Information Systems—or both! The CS degree has two emphases. One is the Professional Emphasis, which is a traditional CS degree designed for students planning to enter graduate school or to work in the computing industry. The Integrated Emphasis is designed for the student interested in combining CS with another interest and area of study.

CSTA: What draws students to your program and what keeps them there?

Wolf: We make our program accessible to all students, regardless of how much experience they have had with computing. Our program begins with the Problem Solving and CS course which prepares students to understand the problem-solving process. Students continue in our program because it is small and the faculty is interested in helping each student. In addition to traditional CS topics, students are challenged to think deeply about the social and ethical implications of computing technology and to push themselves to excel.

CSTA: What skills can students acquire before college that will help them succeed in your program?

Wolf: As obvious as it might seem, students who can read and follow a set of directions have a real advantage. In addition,

students who are curious, willing to explore ideas, and able to work on teams are successful in our program. Students also find that a solid background in high school mathematics, as well as knowledge of a variety of topics outside of computing, helps them on their path to success.

CSTA: What cool careers are your graduates prepared for?

Wolf: While most of our students take jobs where they are developing software, many are employed in industries they would not have initially expected. Some of our graduates work for big name companies in the software field. We also have graduates working in insurance, education, medicine, energy, manufacturing, and geographic information systems.

CSTA: What topics will students study?

Wolf: Students study JavaScript, Python, and C++ in their first three semesters. In addition to a variety of programming languages, students study computer organization, software engineering, as well as social and ethical issues in computing. Students also select courses about databases, networking, graphics, Web programming, operating systems, and compilers. View the complete list at www.bemidjistate.edu/academics/catalog/0910upcatalog/CS/bscs.html.

CSTA: Tell us a bit about the social environment of the program.

Wolf: A great feature of the social environment at BSU is our CS Club. The club is very active, engaging in activities that range from wing-eating contests and gaming to presentations from alumni and industry experts. An activity that demonstrates the character of our CS Club, is the weekly visit to the Boys and Girls Club where members teach students to program with Alice and Scratch. Another big social event is an annual regional programming contest in which several teams put their problem-solving and programming abilities to the test.

CSTA: What distinguishes your school and program from others?

Wolf: We have a small, tight-knit school and program. All of our students are on a first-name basis with the faculty. Our CS labs provide a cooperative learning atmosphere and a place for both formal and informal learning.

Classroom Tools

Culturally Relevant Computing

Ron Eglash, associate professor of science and technology studies at Rensselaer Polytechnic Institute, developed a series of interactive, Web-based teaching tools that are capturing the interest of students by connecting math and computing concepts to their heritage and contemporary culture.

The suite of 11 computer software programs focus on individual facets of African American, Native American, or Latin American culture, where math plays a role in design. The applications, called “culturally situated design tools,” enable students to apply complex concepts to traditional designs found in cornrow hairstyles, Mangbetu art, Navajo rugs, Yupik parka patterns, Pre-Columbian pyramids, Latin music, and others.

Research suggests that these tools can raise math achievement and may improve technological career aspirations for ethnic minority students. Explore the design tools and accompanying teaching resources at www.rpi.edu/~eglash/csdt.html. Listen to Ron’s experiences with cultural computing in a CSTA Snippets Podcast at csta.acm.org/Communications/sub/Podcasts.html.



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

MARK YOUR CALENDAR

Consortium for Computing Sciences in Colleges (CCSC: Southeastern)

November 13–14, 2009 in Salem, Virginia
cs.furman.edu/ccscse/conference.php?year=23rd

NCWIT Award for Aspirations in Computing

October 1–November 15, 2009 applications accepted
www.ncwit.org/award

African-American Women in Computer Science Scholarship

December 1, 2009 submission deadline
www.cis.famu.edu/~aawcs

Christa McAuliffe Technology Conference

December 1–3, 2009 in Nashua, New Hampshire
www.nhcmtc.org

FETC Florida Educational Technology Conference

January 12–15, 2010 in Orlando, Florida
www.fetc.org

ISSEP (Int. Conference on Informatics in Secondary Schools)

January 13–16, 2010 in Zurich, Switzerland
www.issep2010.org

TCEA (Texas Computer Education Association)

February 8–12, 2010 in Austin, Texas
www.tcea.org/convention/2010

SIGCSE

March 10–13, 2010 in Milwaukee, Wisconsin
www.sigcse.org/sigcse2010

Consortium for Computing Sciences in Colleges (CCSC: Southwestern)

March 26–27, 2010 in Thousand Oaks, California
www.ccsc.org/southwestern

Consortium for Computing Sciences in Colleges (CCSC: Mid-South)

March 26–27, 2010 in Searcy, Arkansas
www.ccsc-ms.org

Consortium for Computing Sciences in Colleges (CCSC: Central Plains)

April 9–10, 2010 in Parkville, Missouri
www.ccsc.org/centralplains

Consortium for Computing Sciences in Colleges (CCSC: Northeastern)

April 16–17, 2010 in West Hartford, Connecticut
uhaweb.hartford.edu/ccscne

Consortium for Computing Sciences in Colleges (CCSC: South Central)

April 23–24, 2010 in Austin, Texas
www.sci.tamucc.edu/ccsc

NECC (National Educational Computing Conference)

June 27–30, 2010 in Denver, Colorado
center.uoregon.edu/ISTE/2010

RESOURCES

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

Page 1: The Center for Socially Relevant Computing www.cse.buffalo.edu/~mikeb

Page 1: Socially Relevant Computing: Our Health, Our Knowledge, Our Planet
research.microsoft.com/en-us/collaboration/about/socially_relevant_computing_brochure.pdf

Page 2: ACM K-12 CS Model Curriculum csta.acm.org/Curriculum/sub/Implementation.html

Page 2: CSTA Videos csta.acm.org/Communications/sub/Videos.html

Page 3: National Science Foundation RET www.nsf.gov/funding/pgm_summ.jsp?pims_id=5736

Page 3: Vanderbilt RET www.retnetwork.org/ret_programs_detail.php?p=308

Page 3: Legacy Cycle www.edb.utexas.edu/per/legacy.htm

Page 5: EL Alliance www.empoweringleadership.org

Page 5: EL Alliance registration my.rice.edu/survey/entry.jsp?id=1253019089914

Page 5: NM Network for Women in Science and Engineering nmnwse.org

Page 5: NMNWCE Impact! Award nmnwse.org/ImpactAward/winners/index.php

Page 6: Center for Advanced Research and Technology (CART) www.cart.org

Page 6: CSTA Teacher Survey csta.acm.org/Research/sub/CSTARResearch.html

Page 7: Bemidji State University www.bemidjistate.edu

Page 7: Culturally Situated Design Tools www.rpi.edu/~eglash/csdt.html

Page 8: CCSC (Consortium for Computing Sciences in Colleges) www.ccsc.org/