Voice

csta

CSEd Week

IN THE NEXT ISSUE OF THE *VOICE*

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Equity

Get on the Map!

Computer Science Fuels the Future

Ruthe Farmer

COMPUTER SCIENCE FUELS THE FUTURE! This theme for CSEdWeek 2012 (December 9–15) offers a tremendous opportunity to raise awareness about the impact of computing, the richness of computing careers, and the critical need for computer science (CS) education. Our goal is to help you to inspire young people about CS, to employ new and exciting ways to engage students, and to communicate with parents and the broader community about the value of CS education.

Last year, CSEdWeek was a smashing success with more than 3,360 pledges of support and over 550 events and activities engaging students, parents, teachers, and the computing community around the world. An amazing feat when noting that both of these numbers doubled compared to 2010. We are hoping for even more participation this year and believe—with your support—we can build more excitement and show the world that CS does indeed fuel the future.

So, get on the map! The best place to start is the CSEdWeek website (*www.csedweek.org*). You can view the events and activities pledged last year and select from the wide variety of resources available to showcase computing and CS education. On the website you will find plenty of ideas and resources for students, parents, administrators, counselors, higher education, and businesses to get involved in CSEdWeek also. (And if you need even more inspiration, other ideas are located elsewhere in this issue of the *Voice*.)

Here's a step-by-step for getting started:
- Go to *www.csedweek.org*
- Click on "Sign the Pledge"
- Enter the information requested and click "Submit"
- Choose to "Host an event" or "Carry out an activity" (or both)
- Provide the event or activity details, click "Submit," and you are on the map!

Next encourage your peers, students, and their families to sign the CSEdWeek pledge. Tap the resources available to you on the website—especially the Event Planning Toolkit—to craft your event or activity and encourage your fellow CSTA members to get on the map.

CSEdWeek is successful because of educators just like you: people who are passionate about CS education. Add your ideas, skills, and dedication to build awareness of and celebrate the essential role of CS education. And remember to add your success stories from this year's activities after they are completed. Your stories can inspire many others and help build the momentum.

Thank you to all who pledged for CSEdWeek 2011. If you have not already told us about last year's activities, please share the details using the same e-mail address you used when you pledged (*www.csedweek.org/forms/sign/pledge-step3*).

Pledge your CSEdWeek 2012 plans at *www.csedweek.org* today. Contact Ammi Ludwick, CSEdWeek Project Manager, for further information at *info@CSEdWeek.org*.

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CS Principles

Pilot Updates

Owen Astrachan

THE COMPUTER SCIENCE PRINCIPLES (CSP) course is making great strides toward becoming a widely-adopted Advanced Placement (AP) course.

Following a successful first-year pilot in five colleges, nine high schools and eight colleges have recently completed Pilot II. Students in these schools used new learning materials and took a prototype exam designed to enable students and teachers to explore the content and possible assessment tools that will be part of CSP as it moves toward becoming an AP course.

Pilot II schools are listed below. An asterisk indicates that the school is also participating in Pilot III this academic year.

The Pilot II high school pilots have participated through a variety of scenarios. Some high schools were loosely partnered with their collaborating university, and others were more closely coupled. Perhaps because CSP is a full academic year course, rather than just a semester, there was often less emphasis on programming. More than half of the courses used App Inventor, typically integrating CSP activities rather than simply focusing on programming.

Many of the high school teachers and students reflected about their experiences. Rebecca Dovi kept a blog at *supercomputerscience.blogspot.com*. Her students explored both C++ and graphical drag-and-drop programming as well as traditional and home-brewed CS

HIGH SCHOOL	PARTNERED COLLEGE/ UNIVERSITY	TEACHERS/INSTRUCTORS
North Gwinnett*, GA	Georgia Tech	Deepa Muralidhar, Christina Garder-McCune
Chicago Univ. Lab and Northside Preparatory	Illinois Institute of Technology	Dan Yanek, Baker Franke, Matt Bauer
Greater Hartford Academy of Math and Science*, CT	Trinity College	Chinma Uche, Ralph Morelli
Booker T. Washington Magnet, AL	Univ. of Alabama*	Bill Cowles, Jeff Gray
Springdale, AR	Univ. of Arkansas, Little Rock	Marilyn Sue Carrell, Remzi Seker
South Philadelphia*, PA	Univ. of Pennsylvania	Anne Urevich, Jean Griffin
Madison West, WI	Univ. of Wisconsin, Madison*	Andrew Kuemmel, Andrea Arpaci-Dusseau
Patrick Henry HS, VA	Virginia Tech	Rebecca Dovi, Dwight Barnette
Newbury Park HS*, CA		Rich Kick

Unplugged activities, such as modeling the Internet with tin cans and string.

Four of the high school instructors are part of the CSTA Leadership Cohort: Deepa Muralidhar, Don Yanek, Baker Franke, and Rebecca Dovi. They have helped ensure that the CS Principles project is aligned and integrated with CSTA efforts.

The AP assessment for the CSP course is moving away from free-response questions (FRQs) and towards a portfolio-based exam, although multiple-choice and objectively-scored questions will still be a component of the planned exam.

In the 2012–2013 school year, six schools in Pilot III will test out a new exam format. The AP assessment for the CSP course is moving away from free-response questions (FRQs) and towards a portfolio-based exam, although multiple-choice and objectively-scored questions will still be components of the planned exam. The instructors will be submitting student work that responds to three portfolio tasks. The tasks are designed to assess specific learning objectives of the CSP curriculum, while encouraging both open-ended explorations and collaboration. The portfolio tasks are designed to be used again and again with only minimal modifications between academic years.

These are very exciting developments and the CSP team looks forward to sharing both the portfolio tasks and the assessment rubrics after the exams are scored. In the next phase of the project we will be piloting the portfolio exam with fifty schools in 2013–2014. There will be an open call for participation in that pilot.

The collection of information about the project will continue to grow on the CSP website and will be presented at national and local events including SIGCSE, CS & IT, and CSTA chapter gatherings. The CSP team is eager to hear from teachers about how it can help the CS education community succeed with the new CSP course. Share your ideas and gather more details regarding the course design, teaching materials, and student work *csprinciples.org.*

Collaboration with Computational Thinking

Phil Wagner

COMPUTATIONAL THINKING (CT) skills have been used throughout history to make incredible discoveries. Galileo's insight on falling objects was an abstraction of the data he collected in his small-scale experiments. Gregor Mendel developed laws of inheritance after seven years of collecting data (an experiment that today one can reproduce programmatically in seconds). Interdisciplinary collaboration provides the perfect scenario for applying CT skills in rich and meaningful ways that empower students.

The *Common Core Standards (CCS) for Mathematics* calls for modeling to be applied throughout the math curriculum. The *Next Generation Science Standards* (NGSS) refers to modeling as well as analyzing data. The NGSS even refer to CT as a part of the best practices of science and engineering. While it is excellent that the standards are being rewritten to encourage more higher-order thinking, the question is, who is going to help educators implement this?

The need for data analysis and abstract thinking in math, science, and humanities classrooms presents an ideal opportunity for computer science (CS) educators to work with colleagues on interdisciplinary curricula and professional development. CS educators already have experience in the tools and skills that are needed in every classroom. Many already teach another subject, making collaboration with other teachers convenient.

COLLABORATION WITH COMPUTATIONAL THINKING
continued from page 3

Early in my teaching career, I developed software as a hobby but did not include CS content in my teaching until a fellow math teacher, who also taught the Advanced Placement CS course, began discussing with me ways in which we could integrate CS into my math and science courses. When I began to include CS content, my classroom was transformed and my students began to ask questions and make connections like never before.

CT enhances every curriculum by giving students the skills necessary to explore a problem in detail. It allows them to analyze how technology can be applied to problem solving in a way that relegates time-consuming tasks to the computer. For example, a projectile simulation using kinematic equations enables students to instantly see the results of the equations. Using a tool such as Geogebra enables students to spend more time finding patterns and seeing the bigger picture than drawing points meticulously on a piece of graph paper in hopes of seeing a pattern.

The CSTA CS Standards provide more detail on what students should be able to do. By coupling standards like, "Use the basic steps in algorithmic problem solving to design solutions" (CT.L2-1) or "Represent data in a variety of ways..." (CT.L2-7) with the CCS and NGSS, educators can create a strong interdisciplinary curriculum.

> Using a tool such as Geogebra enables students to spend more time finding patterns and seeing the bigger picture than drawing points meticulously on a piece of graph paper in hopes of seeing a pattern.

This presents a holistic view of the world to students in which they can discover how CT concepts and skills apply to all domains.

Implementing successful cross-curricular collaboration requires careful planning and open communication.

1. Start simple.
2. Begin with a topic educators are already teaching and enhance it using CT.
3. Provide lots of scaffolding with step-by-step instructions. This might be the educator's and the students' first exposures to CT and you don't want it to be their last because of unnecessary frustration.
4. Give educators something they can teach with into the future and provide time for them to play with it.
5. It may be more beneficial to begin with recipe-like instructions or pseudocode rather than jumping right into the technology.

As their skills and understanding develop, students will experiment on their own, look for additional opportunities for employing CT and collaboration, and develop the confidence necessary to succeed. Sharing examples within your school or showcasing student work can generate interest among your colleagues. Sharing through social networks and conferences can spread your reach into the community beyond.

LEARN MORE:
Exploring Computational Thinking project *www.google.com/edu/ect*

CSEdWeek

Ideas to Fit Your Schedule

CSEdWeek is quickly approaching and it's likely that you already have some great projects planned for the week of December 9–15. But if not, here are a few ideas, small to large, to fit the time you have.

You will find many more ideas and resources at *csedweek.org/resources* and *csta.acm.org*. Great projects can be used any time of the year so don't limit your CS education promotion ideas to just one week in December.

Pledge your support for CSEdWeek, start planning how you will fuel the future, and put your project on map at *csedweek.org*.

15 MINUTES	30 MINUTES
Use CSTA video and audio announcements to make students aware of opportunities in *CS.csta.acm.org/Advocacy_Outreach/sub/CSEdWeek.html*	Assign students to ask their families to spend an entire day without using any computing technology and record their experiences. Discuss their findings in class the next day and relate to CS careers.
Add the CS History Gadget to your website. *csta.acm.org/includes/Gadget.html*	Prepare a showcase of student computing projects.
Assign students to view the Why CSE? videos and discuss the stories they most identify with. *www.cs.washington.edu/WhyCSE*	Offer a lunch break "CS Escape" once a week or once a month to invite non-CS students to "play" with CS concepts and tools such as CS Unplugged, Scratch, AppInventor, or Kodu.
Go prepared with CSTA brochures to talk with your administrators or counselors about the value of CS education.	Schedule your students to take turns in the cafeteria or student commons to demonstrate cool CS projects from your class.
Make CSTA career brochures available in your counselors' offices.	Learn a few "magic tricks" to spark up your introduction to CS concepts. *www.cs4fn.org/magic*
Make your classroom inviting. Stand outside the door between classes and greet students as a friendly computer scientist.	Send a message to all of your colleagues to announce CSEdWeek. Invite them to stop by your classroom to witness the magic.
Download the CSTA Member Badge and add it to your e-mail signature and display it on your website.	
Celebrate your students' CS successes via school and community news channels.	

1 HOUR	3+ HOURS
Invite former students who are college CS majors to visit your classroom to tell about the exciting things they are learning.	Arrange a fieldtrip to a high-tech company or IT department; invite parents also.
Assign cross-curricular projects. Ask other teachers to allow your student to "show off" their computing version of the assignment.	Host a parents' night that showcases the fun, exciting, and meaningful career opportunities in computing and debunks the myths about the dwindled IT job market.
Submit proposals to share your innovative CS teaching strategies at conferences.	Plan a CS exploration day for potential students and parents. Gather ideas from programs such as Computer Mania. *www.computer-mania.info*
Plan CS projects that involve "social causes." Recruit community members to serve as "clients" for your students.	Look for technology contests to showcase your students' ideas such as the CSTA poster contest (*csta.acm.org/Resources/sub/CSEventsforKids.html*), ACSL (*www.acsl.org*), or Imagine Cup (*www.imaginecup.us*).
Encourage your CS students to host an open house for other students.	Sponsor your own contest.
Contact your local government representative to ask for support in having December 9–15 proclaimed CSEdWeek.	Form an advisory team of students, parents, other teachers and administrators, business leaders, and others to plan CS promotion projects in your community year round.
Use the complete set of resources in the Event Planning Toolkit. *www.csedweek.org/site/page/event-planning-toolkit*	

Meet the Authors

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Torsten has been the technical architect of enterprise-level web applications including Red CMS, Red C Event Booking System, and AppShed.

Phil Wagner
Google
Phil taught high school math, science, and robotics before coming to Google to work on the Exploring Computational Thinking project and Computer and Programming Experience (CAPE).

Michael Walmsley
New Zealand
Michael developed software in his Ph.D. program that helps people learning to read Spanish. He is developing CodeAvengers as a side project.

![csta Voice]

Student Poster Contest

We are the Faces of Computing Poster Contest

Engage your students to create posters that reflect their lives, interests, and experiences with computing. By participating in the CSTA *We are the Faces of Computing* poster contest, (*csta.acm.org/Resources/sub/CSEventsforKids.html*) your students could win an iPad for your classroom and be published on the CSTA website. What a wonderful way to celebrate CS education! But hurry—the deadline is November 1.

Poster Contest Guidelines:
- The poster must include an image of students.
- The theme, "We are the Face of Computing," must be clearly visible.
- The poster should include creative images that reflect students' lives, interests, and experiences with computing.
- Poster file must be submitted in PDF format (no larger than 5 MB).
- Winners of elementary, middle, and high school competitions will receive an iPad for their classroom and have their posters published on the CSTA website.
- Winners will be notified by e-mail and announced during CSEdWeek.
- Submit final poster, along with student names, teacher/advisor name and e-mail address, school, city, and grade-level, to *FacesofComputing@gmail.com* by November 1, 2012.

Membership News

ACM Inroads Goes Digital

Amber Settle and Joe Kmoch

ACM SIGCSE members have long valued the *ACM Inroads* magazine as a wealth of information for computer science (CS) educators. And now *Inroads* is available electronically in the ACM Digital Library. This is an excellent time to take a look. The June 2012 issue was dedicated to exciting initiatives in K–12 CS. Articles by Owen Astrachan, Amy Briggs, Jan Cuny, Chris Stephenson, Lawrence Synder, Cameron Wilson, and others discussed projects underway to transform high school computing, the CS 10K initiative, and the CS Principles project and its pilots.

Inroads is a quarterly magazine with the aim of advancing computing education. Through editorial pieces and summaries of original research, *ACM Inroads* authors examine and advance current research and practice. *Inroads* provides regular columns of interest, including academic integrity, lifelong learning, mathematical reasoning, and connections between CS and information systems. There are regular columns about community colleges and a popular "Math Counts" column. Originally created through the support of the Special Interest Group for Computer Science Education (SIGCSE), the magazine now includes many computing communities that have an education focus.

Recently, the online presence of *Inroads* has been expanded. The magazine now has a website (*inroads.acm.org*) and a blog (*inroads.acm.org/blog*). The website contains excerpts of articles from the current and past issues, upcoming community events, and information about special interest groups and ACM. Complementing the new website is the new digital edition of *Inroads*, which provides enhanced navigation, search, linking, and browsing features. Full access to the magazine

requires access to the ACM Digital Library; those without digital library access can get access to *Inroads* by subscribing to the magazine or by joining SIGCSE, which costs $25 a year.

Please visit the *ACM Inroads* website. We want the content to be as inclusive as possible and K–12 educators make up a crucially important audience. If you think of something that could improve the site or you would like to contribute to the blog, please contact Amber Settle (*asettle@cdm.depaul.edu*) with suggestions.

Promoting CS

Resources for CSEdWeek and Beyond

You will find a wealth of resources on the *CSEdWeek* website for every aspect of your CSEdWeek activities. Visit the *www.csedweek.org/resources* to download these items and browse through the growing collection of lessons, projects, and articles gathered specially for CSEdWeek. You will find resources for working with colleagues; promoting CS to students; or recognizing the successes of computer scientists, your students, or the CS program in your school.

Event Planning Toolkit
A collection of resources with templates and guides to tailor for your CSEdWeek needs (*www.csedweek.org/site/page/event-planning-toolkit*).

CSEdWeek Daily Videos
These videos, ideal for morning announcements or in the classroom, are intended to make students aware of the many CS career opportunities.

CS in Sports Poster
This engaging classroom poster invites students to make connections between CS and their favorite sports and games.

Imagine Your Future in Computing Brochure
Help students make connections between the technologies they use every day and the courses and the career opportunities available to them. Also available in Spanish.

CS Unplugged Demos
YouTube videos demonstrate CS Unplugged activities.

How can I prepare for a computing major?
This card gives computing-specific advice regarding steps to take on the path from high school to college.

Communicating for Change: Persuade Colleagues to Get On Board
Effective persuasion is a long-term process that involves four distinct and necessary steps. This resource outlines those steps and provides ideas for applying them.

Counselors for Computing (C4C)
C4C empowers school counselors to increase student interest in and preparedness for computing and technology jobs.

Moving Beyond Computer Literacy: Why schools should teach CS
Use this handy resource to inform policy makers about the importance of quality CS education.

Computing Jobs Data by State: Computing Education and Future Jobs
See NCWIT's interactive map of computing education and workforce data to see what the story is where you live.

Classroom Tools

App Development – a Catalyst for CS

Torsten Stauch

App development has proven itself to be a catalyst for renewed interest in computer science among today's "app generation." AppShed (*appshed.com*) is a smartphone app-development platform that enables students to create their own smartphone apps. Features range from basic building blocks (suitable for primary school and beyond) to web services and database programming (for high school and college students).

For entry level students, AppShed provides an intuitive online environment where apps are constructed using a variety of building blocks. These can be used to teach about key concepts such as design, communication, and data. Behind each block lies the code (client and server-side) and of course, a database. The blocks can be used by aspiring programmers in exciting ways, literally putting code in the palm of their hands.

An introductory course will have students publishing their first app within the very first lesson. Students who might not be interested in technology may be excited to make an app that is pertinent to their love of fashion, sports, or a favorite band or actor. Once students realize that they have become creators of technology, they are typically motivated towards experimentation and further discovery.

AppShed is a free, browser-based platform for HTML5 web-app development and does not require any downloads or installs. It has been used in schools since 2010, with flagship projects at the Digital Schoolhouse at Langley Grammar School (*www.digitalschoolhouse.org.uk*), for Hackday at Dorothy Stringer School (*cfkbooks.com*), and the "Apps for Good" competition (*appsforgood.org*).

AppShed Academy (*appshed.com*) provides a growing collection of online resources to help educators teach app building using nothing more than a web browser. The Academy is a subscription-based online resource area providing training materials and lesson plans.

Curriculum in Action

Teaching CS in a Theme Park

Mark Dorling

The Thorpe Park Educational Center, located at one of the UK's best-loved theme parks, has launched a new workshop program to support computing education.

Each year, the Thorpe Park Educational Center delivers over 500 presentations on physics, math, information and communications technology (ICT), and business topics to more than 20,000 students in its dedicated educational facilities. Recently, the Thorpe Park (*www.thorpepark.com*) education team visited the BETT Exhibition (*www.bettshow.com*) in London and was struck by two things:

• The volume of costly and confusing resources available for technology teachers.
• The growing support for introducing computing into primary and secondary education.

The visit informed the team's decision to develop new materials to support teachers with the challenges they face in delivering a computing curriculum. New workshops will explain the basics of computing from binary math through to roller coaster control while building stronger relationships with schools.

Thorpe Park had already included Ride control using Data Harvest and K'Nex software. Workshop leaders gained new uses for this equipment, however, when they teamed up with The Digital Schoolhouse (DSH) at Langley Grammar School. With DSH's help, they are now developing stimulating activities that help communicate key learning objectives during students' visits to the park and in the free post-lesson activities they distribute to teachers.

The vision is to combine the theory from the KS4 (age 14–16) Computing at School curriculum with a real-life hook of learning how roller coasters work. Using a mixture of activities from the DSH project and CS Unplugged, they are now using the computer control equipment to demonstrate how algorithms, flow charts, programming code, and binary relate to interpreters, compilers, and a modern day roller coaster.

Thorpe Park has also invested in a small Mitsubishi Programmable Logic Controller, which is the same type used to control simpler aspects of the rides, and are collaborating with the electrical engineering team who will be including this aspect of computing in their engineering workshop program.

Thorpe Park and DSH have arranged to share these resources with the Times Educational Supplement (TES) to make them freely available to everyone. For more details about the range of workshops available and the pre- and post-lesson resources to use with your class, visit *thorpepark.com/groups/school-visits.aspx* or contact Chris Chedzey (*chris.chedzey@thorpe-park.co.uk*).

LEARN MORE:

The Digital Schoolhouse *www.resources.digitalschoolhouse.org.uk*
Data Harvest *www.dataharvest.co.uk*
K'Nex *www.knex.com*
TES *www.tes.co.uk*

More Classroom Tools

Learn App Development with Code Avengers

Michael Walmsley

Code Avengers (*codeavengers.com*) is an interactive online resource that teaches mobile web app development to high school students in a fun and effective way. Lessons include short coding challenges, games, quizzes, and projects that contain minimal text, so students learn the "what" and "why" by completing carefully sequenced tasks, rather than by reading lengthy explanations.

SHOW ME THE NUMBERS
CSEdWeek Impact Growing

	CHANGE	2011	2010
Pledges	+98%	3363	1700
Events & activities	+100%	558	279
Web page visitors	+56%	11,768	7,535
Facebook fans	+51%	3,180	2,100
Twitter followers	+77%	1,239	700
High-level press	+181%	59	21

Source: *CSEdWeek 2011 Evaluation Report*

LEARN APP DEVELOPMENT WITH Code Avengers
continued from page 7

Code Avengers is web-based and no software installation is required. This makes it easy to use the resource in or out of class. It offers a game-like learning environment with points, badges, and themed lessons to keep the attention of teenagers who struggle to find time for homework, but easily make time for computer games. Teachers can receive live updates of student progress to more easily identify topics requiring additional practice as well as the individuals who need extra help.

My motivation for creating Code Avengers came from my experiences teaching HTML to my teenage brother and my awareness of the lack of quality teaching resources available when, in 2011, the New Zealand (NZ) Ministry of Education initiated a new CS curriculum. The Code Avenger tutorials are specifically tailored to the NZ high school curriculum and have received positive feedback from thousands of learners and teachers in NZ and the UK. Currently, Code Avengers contains two "Level 1" courses that cover the NZ year 11 (U.S. grade 10) web and programming curriculum.

In the Level 1 HTML/CSS course (*www.codeavengers.com/web*), students create their own superhero profile as they learn the basics of web page creation through 20 lessons. For each task, students read brief instructions, write HTML and CSS code, and then view their results in an embedded mobile phone emulator. Students are provided with a unique URL to view their profile on their mobile phone and share with their friends. In later lessons, students collaborate with friends to create a Code Avengers team page. Topics in the 40 lessons of the Level 1 JavaScript course include data types, variables, conditionals, string manipulation, and loops.

Level 2 courses will require students to integrate their knowledge of HTML and JavaScript to create simple mobile games. The lessons in these courses will be released incrementally beginning in December 2012.
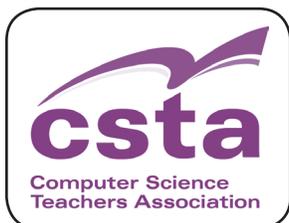
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Download your CSTA Member Badge.
Add it to your e-mail signature.
Display it on your website.

csta.acm.org/Membership/sub/MyMemberInfo.html

MARK YOUR CALENDAR

We are the Faces of Computing Poster Contest
Deadline: November 1, 2012
csta.acm.org/Resources/sub/CSEventsforKids.html

Consortium for Computing Sciences in Colleges (Eastern)
November 2–3, 2012, Galloway, New Jersey
www.ccsc-eastern.org

Consortium for Computing Sciences in Colleges (Southeastern)
November 2–3, 2012, Marietta, Georgia
www.ccscse.org

CSTA Florida CS Education Workshop
November 8, 2012, Orlando, Florida
jbarrettsrq@gmail.com

Workshop in Primary and Secondary Computing Education (WiPSCE)
November 8–9, 2012, Hamburg, Germany
wipsce.org

China International Conference on Information Security and Cryptology (Inscrypt'2012)
November 28–December 1, 2012, Beijing, China
www.iacr.org

Indocrypt 2012
December 9–12, 2012, Kolkata, India
www.isical.ac.in/~indocrypt

CSEdWeek
December 9–15, 2012, your community
www.csedweek.org

FETC
January 28–31, 2013, Orlando, Florida
fetc.org

TCEA
February 4–8, 2013, Austin, Texas
tceaconvention.org

SIGCSE 2012
March 6–9, 2013, Raleigh, North Carolina
www.sigcse.org/sigcse2013

Check the most recent CSTA events on the CSTA website

csta.acm.org/ProfessionalDevelopment/sub/TeacherWorkshops.html

List your CSTA event by contacting *l.clayborn@hq.acm.org*