

Voice

The voice
of K-12
computer
science
education
and its
educators

Volume 14
Issue 3

September
2018

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Welcome to the future with CSTA+

JAKE BASKIN

Wow, it's been quite a summer for CSTA! It feels like it was just a couple of weeks ago that I was introducing myself in February's issue of the Voice. Since then, we:

- Held CSTA's first ever sold-out annual conference.
- Hosted chapter leaders from across the US to learn from each other.
- Announced a new grant program coming this fall, specifically to support local CSTA chapters providing professional development.
- Created a new membership tier, CSTA+, to provide even more support, resources, and opportunities for computer science (CS) teachers.

Out of all of these, I'm most excited about our new CSTA+ membership and the opportunities it provides to members. **At the end of August, I joined a group of CSTA+ members to see Nobel Laureate Malala Yousafzai speak at the Pluralsight Live conference in Salt Lake City!**

On top of getting to see such an amazing speaker, we interacted with leaders from the tech industry and saw how CS content connects to real world applications. A huge thank you to our partners at Pluralsight who made this possible (and who made their awesome online software development courses available for free to CSTA+ members).

This is just the first of many valuable opportunities we are working to make available to the CSTA community members, and CSTA+ members will always be the first to know.

To be completely honest, what's most important about CSTA+ for me is that it gives us the opportunity to ensure CSTA's continued independence and financial stability. We're a community built for teachers, by teachers. The simple truth is that it costs money to do things like develop and maintain standards, provide professional development and advocate for CS education; we need to sustain our operations long-term so we can continue offer those services. By growing a strong paid-membership base, we will ensure that CSTA will continue to be 100% focused on the needs of CS teachers. **Plus, at least half of the funds raised through CSTA+ membership will go back into the chapters!**

Join me and **become a member now**, and know that you've done your part to make sure CSTA continues to be the voice for CS teachers for years to come. And if that isn't enough, take a look at the amazing benefits—I think you'll find CSTA+ is really a tremendous value.

CSTA Thanks...

CSTA thanks the Conference Presenters and Volunteers for their significant contributions in making the 2018 CSTA Conference the very best professional development event for CSTA members.

CSTA 2018 BY THE NUMBERS

2 Receptions

4 Keynotes

6 Birds-of-a-feather meetings

Presenters from 7 countries

9 Mini-sessions

22 Workshops

24 Attendees in one emoji chain

Presenters from 25 states

35 Door prizes

46 Exhibitors

50 Sessions

305 New CSTA+ members

637 App installs

#CSTA 2018

DANIEL MOIX AND TAMMY PIRMANN

The 2018 CSTA Conference was a hit! Nearly 700 attendees converged in Omaha, Nebraska, for the BEST annual gathering of K–12 computer science (CS) teachers!

The conference keeps growing, both in the number of attendees and in professional development offerings. This year there were 50 sessions, 22 workshops, 9 mini-sessions, 6 birds-of-a-feather meetings, 2 receptions, and several informal after-hours meetups in various locations. The PD topics ranged from elementary through high school and from beginner through advanced. Here is a sampling of what attendees said:

- *"This was outstanding! It pushed my thinking further and I'm excited to take this back and change things up."*
- *"It was fun sharing ideas and experiences with others from around the world."*
- *"Nice to interact with others on common issues facing CS teachers."*
- *"Everyone was so generous sharing ideas and knowledge."*

Top-notch keynote speakers inspired us all. Andrea Gonzales, one of the authors of *Girl Code* and co-developer of the viral game, *Tampon Run*, shared her journey and specifically how CS educators, formally and informally, have influenced her.

- *"Andy was fabulous, and I upgraded my CSTA membership to get her book—I can't wait to share it with my students and my daughter."*
- *"Andy's was one of the most amazing keynotes I've heard."*

Michelle Friend was an early president of the Board of Directors of CSTA and has since gone on to earn her Ph.D. from Stanford. She shared practical and research-based ideas for CS teachers to improve their classroom management styles. Michelle G. Lee came from San Francisco to share her first-year experiences with us. Her energetic and positive message was a great way to end the conference.

- *"The closing speaker brought a high level of energy. I enjoyed it that a teacher with only one year of experience in CS can share so much."*

Over 40 exhibitors filled the exhibit hall this year. The companies and organizations were exceptionally pleased with the great conversations they had with attendees. The attendees really valued the wide variety vendors and opportunities to ask questions.

- *"The exhibitors were great! I found many valuable resources."*

Many of the conference presentations and supporting materials are posted on the CSTA conference program [website](#). Take another look at your favorite sessions or find something new from the sessions you couldn't attend. Or if you weren't there, see what you missed! Click on the session you're interested in; at the bottom of the popup description, you will find the "Presentation Link."

Were you inspired by a session or a workshop to think, "Hey, I have something to share with the community"? If so, watch for a CSTA announcement of the "call for session proposals." Expect a relatively fast turnaround time—proposals are due in early October.

Contact Daniel Moix (daniel.moix@gmail.com), Program Chair, and Tammy Pirmann (tpirmann@gmail.com), Workshop Chair, with your suggestions for the 2019 conference. See you next summer in Phoenix!

CSTA Voice ISSN: 1555-2128 / CSTA Voice is a publication of the Computer Science Teachers Association. 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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Meet CSTA's New COO

MICHELLE PAGE

I'm so excited to join CSTA as Chief Operating Officer, working with Jake and the Board of Directors to execute on efforts to revitalize CSTA to carry on and expand our important work with, and on behalf of, computer science (CS) teachers. I bring to CSTA extensive experience in nonprofit management, fundraising, finance, and people operations. I'm a person who loves to tackle hard problems using creative solutions, to build and grow great organizations that support teachers and students, and to develop systems that support the work of effective teams.

There is a very special place in my heart for teachers. As a mom, employee, consultant, and longtime community volunteer, I've spent over 25 years supporting teachers, schools and community organizations, working in classrooms, leading troops, managing events, raising money for programs and equipment, and serving on PTAs, committees, campaigns, and boards to support opportunities for youth and families. As you can tell, this work is both my profession and my personal passion, and I'm thrilled for the opportunity to use my skills and experience to help support CSTA as we:

- Explore new ways to meet the needs of our members and chapters, including increasing opportunities for ongoing professional development for both members and chapter leaders.



- Establish a new level of value to members through their CSTA+ membership.
- Redouble our efforts to build a strong, distributed network of CSTA chapters that foster community, engagement, and support at the local level.
- Extend CSTA's tax-exempt status to US-based chapters and provide resources to support chapter financial success.
- Become a more active policy advocate for the CS teaching community.
- Enhance the annual conference experience for attendees, exhibitors, and presenters through streamlined processes and new features.
- Develop a long-term funding runway to sustain CSTA operations.
- Build an experienced team to execute on CSTA's mission and vision.

We've got big plans for the coming year and we're excited to share our progress with you!

SHARE YOUR PLANS FOR CSED WEEK

CSEd Week will be here before you know it! The next issue of the Voice will focus on CSEd Week and we want to share your story.

We're sure you have many successes and learning experiences to share with CSTA members through an article in the Voice.

What do you have planned for this year? What did you do last year?

Do you have something special planned for in your classroom or in the community that other CS teachers would like to hear about?

What's happening in your CSTA Chapter? Could you tell CSTA members about your plans for CSEd Week, an interesting project, or PD event?

Email publications@csteachers.org to learn more about the easy process of submitting an article.

Engaging Students in CS with Service Learning

SANDY CZAJKA

Editor's note: At the 2018 CSTA Annual Conference, Sandy Czajka received a CSTA/Infosys Foundation USA Award for Teaching Excellence.

As a computer science (CS) teacher, I'm continuously searching for ways to engage my students with the power of programming. I want students to leave my class understanding the material and realizing CS provides the tools necessary to make positive impacts in the world. Three years ago, I learned about a new program to incorporate service learning into Advanced Placement (AP) courses. I worked with the College Board to co-author Service Learning modules for the APCS A course called *AP with WE*. **WE** is a movement that brings people together and gives them the tools to change the world. *AP with WE* provides the opportunity for teachers and students to apply classroom learning to real-world situations and discover their power to change the world.

The goal of the modules is to engage students to explore issues in education and healthcare at both local and global levels. The *AP with WE* service learning project was piloted by teachers over the past two years and is now open to both APCS A and APCS Principles courses for the 2018-19 school year.

Helping students understand how their contributions can make a difference was crucial to the success of the program. Students also need time and examples to inspire ideas for their projects. My student teams tackled the problems

they learned about in a variety of ways and used what they had learned in class to create apps and programs to:

- Teach people about the lack of access to education that exists in some places around the world.
- Focus on educational issues in the Chicago area.
- Analyze the supply and demand of the baked goods in a fundraiser to determine what should be made for the next day's sale.
- Analyze the nutritional data of the school cafeteria food choices so users can make healthier choices.
- Create teams with an equitable distribution of talent for a charity flag football tournament.
- Help elementary students practice math skills.
- Assist individuals who suffer anxiety attacks to communicate with those around them during an attack.

The students' ideas were much more creative than anything I originally envisioned. After their projects were completed, we held an open house during which students displayed their work and celebrated with teachers, administrators, and fellow students. We also discussed service projects they would like to do in the future if they continue to study CS. I believe this project will encourage all students, especially young women, to pursue careers in CS because it allows them to make a difference in the world with what they learn in class.

To prepare for writing the curriculum, I traveled to Kenya and Ecuador to visit communities, schools, and healthcare clinics to see the work being done by WE. I visited the Mara Elephant Project to see technology being used to reduce human/elephant conflicts and keep elephants from dangerous areas. Observing and hearing the stories from the local people about the need for clean water, education, and healthcare was life-changing. I am very proud of the work I have done on *AP with WE* and I believe this is one of the most important projects of my teaching career.

Additional resources:
[WE Movement](#)
[APCS with WE](#)

SEPTEMBER AUTHORS

DOUG BERGMAN
9-12 REPRESENTATIVE
CSTA BOARD

Doug is head of CS at the Porter-Gaud School in Charleston, SC, and has been in CS education for over 20 years.

MILES BERRY
INTERNATIONAL REPRESENTATIVE
CSTA BOARD

Miles is a principal lecturer in computing education at the University of Roehampton, UK. He serves on the boards of Computing At School and the British Computer Society's Academy.

SANDY CZAJKA
RIVERSIDE BROOKFIELD HS, IL

Sandy teaches CS and was recognized with a CSTA/Infosys Foundation USA Award for Teaching Excellence. She is a College Board Consultant for APCS Principles.

PEGGY FISHER
LINKEDIN LEARNING SOLUTIONS

Peggy is a content manager, specializing content for programming languages and Microsoft development products. She taught high school CS for several years.

DANIEL MOIX
CSTA ARKANSAS
VICE-PRESIDENT

Daniel was the Program Chair of the 2018 CSTA Conference Committee and served as the 9-12 grade-level lead for the 2017 CSTA Standards.

TAMMY PIRMANN
DREXEL UNIVERSITY

Tammy was the Workshop Chair of the 2018 CSTA Conference Committee and will be the Program Chair for 2019. She is an Assistant Professor of CS at Drexel University following a 14-year career as a CS teacher.

RYAN ROBIDOUX
SOMERSET BERKLEY
REGIONAL HS, MA

Ryan is a CS teacher and was recognized with a CSTA/Infosys Foundation USA Award for Teaching Excellence. He is a member of the Southeastern MA STEM Network.

Hour of Code Student Ambassadors

RYAN ROBIDOUX

Editor's note: At the 2018 CSTA Annual Conference, Ryan Robidoux received a CSTA/Infosys Foundation USA Award for Teaching Excellence.

Increasingly, computer science (CS) skills are becoming gateways to success in the global job market. As educators, one of our goals is to make students aware of these career opportunities. Through community partnerships, educators can create learning opportunities to raise that awareness.

Because engaging an entire community is a daunting task, it's wise to begin with partnerships and small steps. In December 2017, my CS students at Old Colony Regional Vocational Technical High School organized "Hour of Code" events in three local middle schools. Through these events, my students created a cascade of community awareness and engagement in CS.

Old Colony Hour of Code Event

Over the course of three days, my 10th and 12th grade CS students visited Ford Middle School (Acushnet, MA), Freetown-Lakeville Middle School (Lakeville, MA), and Old Rochester Regional Junior High School (Rochester, MA) to run CS activities with over 500 students in grades 5 through 8. Our primary goal was to promote CS to students who had limited CS experience. A secondary goal, however, was to build partnerships with our middle schools to increase student awareness of both CS careers and the opportunities in Old Colony's Career Technical Education CS program.

While I focused on the logistics of the school visits, my students planned a wide range of CS activities, both online and unplugged. The activities ranged from Blockly coding to creating an algorithm for stacking cups, professional development. They were genuinely surprised at their own abilities to successfully plan and execute activities for the middle school students.

Creating Student Leaders

Reaching over 500 students during the "Hour of Code" events was an amazing accomplishment. However, success is best measured through the interactions between the high school and middle school students. An activity based on

the CS Fundamentals lesson, "My Robotic Friends" (Course E, Lesson 1) exemplified this success. In this activity, the younger students create an algorithm by giving instructions to a "robot" to construct a pyramid of cups. My students had anticipated that some groups would complete the challenge quickly and prepared extra challenges (e.g., increasing number of cups, reversing the stacking).

However, they did not anticipate that several groups would complete the extra challenges as well. My students' responses to these groups were brilliant and only possible because they truly "owned" the activities. They created multiple robot testing stations, introduced new symbols to represent iterations, and added colored cups into the pyramid designs. It was difficult for me to hold back and let my students solve this problem on their own. However, their resourcefulness modeled that "doing" CS doesn't need an advanced degree; CS is for everyone.

A Cascading Affect

Creating widespread community change is not easy. It involves planning, teamwork, and support. Most importantly, however, it begins with one step. Our "Hour of Code" project lasted just three days, but it created a cascade of community involvement in CS education.

The very next week I was invited to exhibit a CS activity at a community "STEM Night" event and one middle school teacher began an afterschool coding club. In January, I consulted with Old Rochester Regional Junior High School on the creation of a new CS course to begin this fall. In May 2018, Ford Middle School students presented their NASA exploration program to local businesses, parents, and state government officials at a STEM Partnerships event hosted by Old Colony.

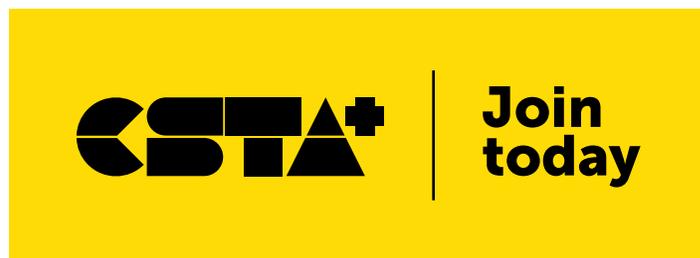
While the partnerships we developed created CS learning opportunities for our students, they also built CS awareness throughout the community. The Old Colony Hour of Code events were the result of partnerships between four local schools and 13 motivated student leaders. From those partnerships, hundreds of community members—students, parents, business leaders, and government officials—learned more about CS and the value of CS education.

More resources:

[CS Event Planning Template](#)

[CS Fundamentals Course](#)

[Family Code Night](#)



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The 2018 CSTA Conference Partners, our sponsors and exhibitors, that enrich this premier event for so many educators.

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Tanoshi

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Unilearn

Union College/ACM-W

Workbench

Where are all the students? Computer Science Qualifications in England

MILES BERRY

Editor's note: Miles Berry is the International Representative on the CSTA Board of Directors.

England introduced computer science (CS) to its national curriculum back in 2014, ensuring that all pupils from age 5 to 16 would be taught to program and introduced to computational thinking. As well as this change to the curriculum, there are also a couple of qualifications (exams) in CS: a General Certificate of Secondary Education (GCSE) exam taken at age 16, which I think is broadly comparable to APCS Principles (although the programming project currently doesn't carry any marks), and an A Level, taken at age 18, and similar to APCS A (although the choice of language is left to schools). While the National Curriculum computing in England is about CS (and IT and digital literacy) for all, these exams are, at least at present, CS for only some.

As these are public exams, the results for each student taking these are reported to the UK government's Department for Education, who then make an anonymized set of the results available to bona fide researchers. My Roehampton colleague Pete Kemp, assisted by me and Dr. Billy Wong of the University of Reading, has done the number crunching on this data, allowing us to produce The Roehampton Annual Computing Education Report (TRACER). We published our analysis of the 2017 results (i.e., those from the exams taken last summer) in June 2018. You can download a copy [here](#). It's our hope that the analysis can provide some insight into how well CS education is going in English

schools, at least in terms of students taking these optional, elective qualifications.

At the GCSE level, more than half of English schools are offering CS as an option. As these are typically larger schools, this means that a random 16-year-old has a 76% chance of being in a school where CS is offered. Considering how recently this qualification was introduced, this is quite some achievement. However, less than 12% of students take the qualification; these students are more likely than not to be male, academically strong, white, and from affluent homes. There's much that we still need to do to address diversity in CS education in the UK. Students are typically getting lower grades in CS than they are in their other subjects; I don't think this is surprising, as they've not studied it for as long. For this cohort, it had only been on the national curriculum for a year before they started their GCSE course.

At A Level, CS still seems a niche subject, despite being directly relevant to academic study across the STEM disciplines and to many routes into employment. The qualification was only offered by 36% of schools and colleges, with under 3% of students taking the subject. The class size in these schools and colleges (averaging just seven students) might not be financially viable in the long run. Diversity is a big issue for this qualification. Across the country, there were only 816 entries from girls (i.e., less than 10%). Again, students are likely to come from relatively affluent homes, but unlike GCSE, many of those taking the A Level are not academically strong candidates, judging by their overall performance. Interestingly, a disproportionate number of these students are registered as having special educational needs.

The full report goes into some of the variation between school types and localities that these overall figures match. I've no doubt that if all schools could learn from the practices in the best schools, we'd soon see increases in both uptake and achievement in CS. On the website, you'll find some cool, interactive maps showing how uptake and achievement at GCSE varies across the country.

This summer saw the last students taking the old "ICT" qualifications exam, which was really quite different in scope and ambition from those for CS. The removal of these qualifications might well result in fewer 14- to 18-year old students studying aspects of computing. Personally, I'd rather see a broad, inclusive qualification in all aspects of computing at age 16+ rather than the narrow focus on CS, which seems to be what we have now.

Innovative Computer Science

DOUG BERGMAN

Editor's note: Doug Bergman is the 9–12 Teacher Representative on the CSTA Board of Directors.

What a great time to be at the forefront of computer science (CS) education! A wave of CS is no longer just coming at us... it's HERE! With the tremendous success of initiatives such as the APCS Principles course, we're seeing record numbers of students enrolled in CS classes. We're seeing more high schools offering CS. It's especially exciting to see middle and elementary schools investing in CS education as well. Teachers, administrators, schools, districts, board members, states, and politicians are recognizing that CS is an important part of our students' education.

As we go down this road, we have some interesting opportunities in not just what we teach in our classrooms, but how we teach. Technology is interactive, dynamic, and engaging. We must make sure that our classrooms are interactive, dynamic, and engaging, as well. I am not talking about just making CS classes fun—I am talking about classes that are rigorous, classes that fills every seat every semester, and classes that appeal to all students. To achieve this, educators must provide learning environments that are relevant, student-centered, and filled with real-world experiences.

These characteristics describe a project-based CS classroom—and the focus of my book, *Computer Science K–12: Imagining the Possibilities*. It includes ideas and strategies that can be used to create a new CS program at your school, or by veteran CS teachers.

What does this type of classroom look like? One of the most important elements is for the teacher to get out from in front of the classroom and let learning happen through the projects—as opposed to the learning being “delivered” by the teacher. The technology and the students should drive the classroom experiences. There should be time to explore and experiment. Students should be figuring out how to use technologies to help address the issues that matter to them. These don't have to be earth-changing ideas, although they might be.

For most of their life, students have been told what to do, what to learn, what to think, and how to think. What if in the CS classroom, they had the chance to tell the technology what to do, the chance to choose the topics of their projects, the chance to explore solutions without the fear of failure?

You, as the teacher, set the parameters under which the project topics will fall. You still set the requirements and expectations for the project. Your wisdom will be crucial in guiding students through their projects. But the choice, the opportunity to pick what they will spend their time on, is crucial to student buy-in. What you will find is that most of your students will exceed not only your, but also their own, expectations. They will work hard, put in extra time and energy because they want to see their own ideas come to life.

And so, as you explore the tools, programming languages, and technologies to use in your classroom, know that there is no wrong choice. There are exceptional CS classrooms across the country that use many different technologies, programming languages, and strategies. But you will find that the most innovative teachers set up learning environments that are student-centered and hands-on. They emphasize doing over knowing, set high expectations, give students some choice in what they are learning, and make room for making mistakes.

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A Hidden Gem for Your Toolbox – LinkedIn Learning

PEGGY FISHER

Shortly after starting my teaching career, I was asked to teach the computer programming courses in my school. This was a dream come true! Everyone loves programming, right? Well, I quickly realized that was not the case and some of my students struggled with more challenging concepts, such as *call by reference* and *call by value*. It was an extra difficult situation because we had only a limited amount of time each day to work on these problems.

At about this same time, one of my students discovered that he had a flat tire when leaving a Tang Soo Do lesson. He could not figure out how to get the spare out from its storage spot under the car. When my son came out of the building and saw his friend struggling, can you guess what he did? He went right to his phone. I had suggested that we find the user's manual in the car—silly me! He immediately opened YouTube and found several helpful videos for changing a tire on that specific type of vehicle. This was a light-bulb moment! Why couldn't I create videos for some of the difficult concepts my students struggle to understand?

So, I painted one wall in our spare room with blackboard paint, got out my camera, and I started creating videos. I shared the videos with my students and I even had strangers comment on them in YouTube. I think the videos worked because students are used to learning in this medium.

Shortly after that, I started working part-time for a company called Lynda.com, a video-based tutorial website. It was perfect. I created courses designed to work alongside my teaching in the classroom. Students could

watch, pause, rewind, watch again, and learn at their own pace on their own time.

Recently, LinkedIn acquired Lynda.com and now it offers an even greater number of video resources under the umbrella of LinkedIn Learning Solutions. You will find a growing collection of relevant video content in the constantly changing landscapes of business, creativity, and technology. If you have a premium subscription to LinkedIn, you can find the [LinkedIn Learning Library](#) from the main menu... just choose "Learning" from the "Work" dropdown menu.

I know first-hand from working at Pennsylvania State University that many universities have a site license for their students and staff which is severely underutilized. Many students don't realize that this resource exists nor recognize how it might fit their preferred learning styles.

My recommendation is to find out if your organization has a site license. And if it does, explore how the videos might fit your curriculum and your students' learning needs. Here are a few of the videos that I think you might find useful.

- **Computer Science Principles: Programming with Doug Winnie**
- **Computer Science Principles: The Internet with Doug Winnie**
- **Computer Science Principles Lab: C#, Java, JavaScript with Doug Winnie**
- **Computer Science Principles: Digital Information with Doug Winnie**
- **Java Essential Training for Students with Peggy Fisher**
- **Programming Foundations: Discrete Mathematics with Peggy Fisher**

The courses were designed with Advanced Placement Computer Science standards in mind. Both instructors, Doug Winnie and I, were high school CS teachers and we know how hard it is to find resources for students. Video learning can be an awesome supplement to classroom teaching. You'll be happy to know that we're working to include assessments and we're planning more interactive elements to accompany the videos.

What's Coming Up

Find more upcoming CS events on the CSTA [website](#).

List your CSTA event by contacting: customerservice@csteachers.org



Computing at School (CAS)

Upcoming events in the UK

[More Info](#)

Code.org/ CSTA State CS Policy Forum

September 27-28, 2018
Denver, Colorado

[More Info](#)

CCSC (Midwestern)

September 28-29, 2018
Muncie, IN

[More Info](#)

CCSC (Northwestern)

October 12-13, 2018
Bothell, WA

[More Info](#)

CCSC (Rocky Mountain)

October 12-13, 2018
Socorro, NM

[More Info](#)

CCSC (Eastern)

October 19-20, 2018
Arlington, VA

[More Info](#)

Massachusetts STEM Week

October 22-26, 2018

[More Info](#)

CSTA Regional Conference

October 27, 2018
Providence, RI

[More Info](#)

CCSC (Southeastern)

November 2-3, 2018
Salem, VA

[More Info](#)

CSEdWeek

December 3-9, 2018
In your community

[More Info](#)

College Board Webex Meetings

Various dates and times

[More Info](#)

Save the Date! 2019 CSTA Annual Conference

July 7-10, 2019
Phoenix, Arizona

2019 CSTA Annual Conference call for proposals coming soon!

cstaconference.org