A Welcome from the President

Michelle Hutton

It is hard to believe CSTA is nearly five years old. Five years ago, CSTA was just an idea and now we are a maturing organization with over 5,000 members. I’m very proud to serve you as the second CSTA president. I have exciting plans and goals for us to work toward.

Supporting all of our members in their various roles as computer science (CS) educators, at the various stages of their careers, and in their growth as professionals is my most important goal.

Some members are new to teaching or new to CS. Others are seasoned veterans. CSTA recognizes your unique needs and contributions as members. We are dedicated to supporting you in your career and helping you grow as a CS educator.

CSTA is also playing an important role as an advocate for CS education. Our goal is to help people understand the critical role that CS plays in our society and the importance of providing opportunities for students to study and work in this critical field.

The CS teachers I meet who are not already CSTA members are eager to join when I tell them about our organization. But I need your help to continue building our community. Please introduce the CS teachers you meet to the benefits of a CSTA membership and encourage them to join.

Economic sustainability is critical to the success of CSTA. With it comes strength and potential for making a lasting impact on CS education. Meeting this goal will ensure continued success in serving the needs of our members and building a bright future for CS education.

I welcome your ideas and suggestions.

Computer Science Segregation

Missed Opportunities

Jane Margolis and Joanna Goode

Editor’s Note: This is the first of a two-part series on the diversity research of Jane Margolis and Joanna Goode in the Los Angeles Unified School District (LAUSD) that led to the book Stuck in the Shallow End: Education, Race, and Computing (MIT Press, 2008). Part 1 focuses on the research. Part 2 will present effective strategies for improving diversity in computer science.

Computer science (CS) is a field that is increasingly intertwined with today’s economic and educational opportunities and yet, we are missing the participation of large segments of our population. This is worrisome both in terms of individual opportunities and the health of the field. The fact that few African Americans, Latino/as, and females are learning the knowledge necessary to enter and excel in the growing number of computing-intensive disciplines and careers is a critical educational and equity issue.

From 2001 to 2004 we conducted
Specifically, too often, in low-resourced schools with high numbers of students of color, the CS learning opportunities are scarce.
Road Show Success

Planning is Key

Suzanne Menzel

There will be many successful computer science (CS) road shows "on the road" thanks to the Road Show Workshop held in May at Google’s Mountain View, California, facility.

Google partnered with CSTA and SIGCSE to sponsor the two-day workshop for 40 outreach veterans and beginners from post-secondary schools across the country to share ideas and to develop plans for executing K-12 CS road show programs that successfully engage students who are traditionally underrepresented in CS.

Successful road shows have similar characteristics. The message focuses on the people in CS: the people who have computing careers, the people who work on teams, the people who are working to solve big, important problems, and the people who support the work being done in other fields like inventing new medicine, designing safer transportation, improving education, and feeding the world. Images and video help tell the story and audience participation is powerful. In a typical road show presentation, college students share their experiences with younger students by describing their classes and college life as a CS student.

The CS road show concept originated with the Women@SCS group at Carnegie Mellon University, and then spread to other schools including Indiana University, Cornell University, University of Illinois at Urbana-Champaign, and the University of Colorado at Boulder. Representatives from these five schools delivered mini versions of their respective road shows to provide a sampling of what works.

Lecia Barker, Senior Research Scientist at NCWIT, shared research-based strategies for recruiting girls to computing. She recommends tapping into specific interests of target audiences; veterinary medicine, environmental conservation, and health related jobs are high on the list of expressed career goals for middle-school girls.

Workshop participants launching new programs created a road show prototype to take home with advice from some of veteran road show producers. Michelle Hutton from the Girls’ Middle School shared tips on connecting with K-12 teachers, and Gabriel Cohen from Google demonstrated new ingenious tools for managing program content, building community repositories, and promoting cooperation over competition.

Watch the Voice for news of road shows coming to a school near you.

GridWorld

A Tool for All Year

Stacey Armstrong

Teachers agree that a single teaching and learning tool that enables students to reach multiple learning objectives throughout a course is immensely valuable. The Advanced Placement Computer Science (AP CS) GridWorld case study is just such a tool. Teachers can use it from day-one to introduce new topics, enhance prior lessons, engage students, and meet learning objectives.

On the very first day, GridWorld can be used to demonstrate objects and method calls without ever dealing with the complexity of writing a single line of code. Due to GridWorld’s interactive nature, manipulating the world is as easy as clicking a mouse. Students quickly learn that methods are important and useful as they observe the changing appearance and behavior of the objects they add to the world.

Learning to write code to create objects using Actor and Location classes comes next. It takes very little code to add actors to the world and to store their position. Students gain confidence quickly because
method calling and parameter passing come naturally in GridWorld.

The Actor class can be used to teach inheritance with a simple override of the ACT method. Students enjoy making new Actors move around the grid and creating new methods that cause events such as explosions. Constructors and instance variables are not yet necessary; students simply focus on mastering a single concept—inheritance.

Decision making is the next concept taught in GridWorld. Students learn to use IF statements to check boundaries and to make Actors “know” how to navigate the grid more effectively. The process is very visual and engaging.

Bug enters GridWorld at this point, bringing new methods and building upon the students’ fundamental understanding of inheritance and decision-making. Bug moves around the grid very much like the Actors created in previous units. Students find the movement and action of Bug pretty straightforward because of their experiences with Actors, inheritance, and overriding methods.

The concept of looping is easy to formalize because students have been routinely, and almost without thought, using the “step button” of the GridWorld environment to call the ACT method of each Actor. Creating loops to solve problems in GridWorld is easier than in some other programming environments because the graphical interface allows students to immediately see the results of their efforts.

Students learn to use if-statements to check boundaries and to make Actors “know” how to navigate the grid more effectively.

Using GridWorld from day-one and throughout the entire school year enables students to develop a solid understanding of basic object instantiation, method calling, inheritance, and decision making in small incremental steps, based upon their personal experiences interacting with a grid, creating Actors, and manipulating elements in a world. The GridWorld case study builds a great foundation for students in the AP CS class and is a wonderful tool that can be used all year long to enhance the learning of all CS students.
late interest in computer science (CS).
Since the Alice 3D Authoring System
received funding from the NSF, like
Scratch it is available free of charge. Alice
has also garnered a whole host of corpo-
rate sponsors, including such technology
luminaries as Intel, Microsoft, and
Electronic Arts. These companies have a
vested interest in seeing more students
entering CS as their degree field, and the
corporations see Alice as a venue promot-
ing that choice. Alice is popular as a
freshman CS component among several
universities. Some of the research sur-
rounding the use of Alice has indeed
shown an increase of interest in the field
among targeted student groups.
Several textbooks have been written
on using Alice, and the program is cur-
rently available in its 2.0 version.
Although popular on college campuses,
the program was designed to be used
starting with middle school students.
Whereas Scratch has a package of images
available from the Lego toy company,
Alice has a package of images available
from The Sims 2 thanks to software giant
Electronic Arts. The Sims has long been
the highest selling video game series, and
its popularity among girls and women
makes including images from this game a
smart move that is in line with the STEM
agenda underlying Alice. The Alice
Gallery also has a wide variety of pre-
made three-dimensional objects that
users can place in their programs.
Whereas Logo focuses on understand-
ing geometrical concepts and mathemati-
cal problems, and Scratch focuses on
building up two-dimensional movies or
games, Alice focuses more on providing
the tools for creating three-dimensional
worlds (e.g., The Sims). A few projects are
linked on the main Alice site from particip-
ing universities where students have
built their own 3D environments, although the purpose of the site remains
primarily a destination for downloading
the code rather than showcasing projects.
To learn more about Alice and down-
load version 2.0 of the program, as well as
various images available for use in Alice
projects, visit www.alice.org.

Conclusion
Since Sputnik, the United States has had
an interest in promoting STEM through
schools. Although that interest has waxed
and waned over the last half century, it
is currently high on the radar at state and
federal levels. Technology companies are
likewise pushing schools and universities
to promote STEM courses, as the ongoing
need for engineers, programmers and
scientists shows no sign of abating.
Fortunately, many of these companies
along with the NSF and other government
and higher education entities have funded
a variety of projects that can be distrib-
uted to schools free of charge. The three
programming languages discussed in this
series of articles (Logo, Scratch and Alice)
are suitable for middle and high school
use. All three have excellent support net-
works and freely available resources as
well. Check them out, and see if one of
them might be suitable for your school.

John Rice serves as technology director for
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Fall 2007 issue of the TechEdge magazine.

CSTA Member in the News: Carpenter Rookie of the Year
Congratulations, LUCINDA A. CARPENTER!

Lucinda Carpenter was recently awarded the Secondary “Rookie” Business Teacher of the Year Award at the annual Mountain-Plains Business Education Association Conference.

Carpenter is a secondary business educator at Creede School District in Creede, CO, and has qualified to compete for a national-level award.

The Mountain-Plains Business Education Association represents business educators from a nine-state region which includes Colorado, Kansas, Nebraska, New Mexico, North Dakota, Oklahoma, South Dakota, Texas, and Wyoming in the U.S., and in the Canadian provinces of Saskatchewan and Manitoba.

Meet the Authors

Stacey Armstrong
Cypress Woods High School, Texas
Stacey teaches AP CS and is an endorsed AP consultant. He serves as an AP table leader at the AP reading each summer.

Dr. Joanna Goode
College of Education,
University of Oregon
Joanna is an assistant professor and previously worked as a mathematics
and CS teacher at an urban Los Angeles
area high school. Her research exam-
ines why so few females and students
of color study CS.

Michelle Hutton
CSTA President
Michelle is the new president of CSTA.
She was previously CSTA vice presi-
dent and equity chair. She is the
Director of Technology and 8th grade
CS teacher at The Girls’ Middle School
in Mountain View, California.

Jane Margolis
Graduate School of Education and
Information Studies, UCLA
Jane is a social science researcher. She
focuses her research on social inequities
in education and for the last fifteen
years has concentrated on the gender
and race gap in CS education.

Suzanne Menzel
Indiana University
Suzanne is a Senior Lecturer in CS
and the faculty advisor for Indiana
University’s road show, Just Be. She is
also a member of the ACM-W working
committee.

John Rice
John Rice is an author and speaker
specializing in educational technology
and instructional gaming. He serves
as technology director for a school dis-
trict in Texas.

Chris Stephenson
CSTA Executive Director
Chris has been the Executive Director
of CSTA since it began in 2005.
Podcast Snipits

Listen and Share

PODCAST
Definition: A Web-based audio broadcast
Etymology: iPod + broadcast
Example: There are over 30 podcasts in the CS Snipits collection on the CSTA Web site on a wide range of topics of interest to computer science (CS) educators.

Editor's note: In an effort to provide additional opportunities for members to keep tuned-in and up-to-date, we have assembled a collection of podcasts we call CS Snipits. Each Snipit provides a brief overview of an interesting topic or a quick chat with an interesting person. We urge you to visit the CS Snipits, download a file, and share it with your colleagues and students. And we welcome your suggestions for future podcast topics.

Michelle Hutton, CSTA President, has several goals for improving diversity in CS and technology and knows that CSTA members have the skills and knowledge to take on the challenge. Listen to her plans for CSTA and her ideas for increasing diversity in the CS classroom.

Richard Tapia from Rice University is the namesake of the Tapia Celebration of Diversity in Computing Conference and is widely recognized for his work in encouraging and supporting underrepresented groups in math, science, and engineering. In our conversation he offers suggestions for building classroom diversity with strategies for making everyone feel welcome.

Take a look at the entire collection. Listen on your computer or download and save to an mp3 player. (csta.acm.org/Resources/sub/Podcasts.html)

Membership News

CS & IT Symposium a Texas-Sized Success
Chris Stephenson

They say that everything is bigger in Texas, and that certainly was the case for the eighth annual Computer Science and Information Technology (CS & IT) Symposium held in San Antonio, June 28, 2008.

This year’s CS & IT Symposium attracted 187 educators for a full day of professional development focused on K-12 CS and information technology topics and issues. Teachers came from across the U.S., Canada, and Mexico to connect with their peers, share ideas, explore new interest areas, and learn new and better ways to engage all students in computing.

The Symposium, held just prior to the National Educational Computing Conference (NECC), featured 22 sessions on a variety of topics including diversity in computing, culture in the classroom, innovative teaching, computational thinking, the AP GridWorld case study, game development, and computing in the K-8 classroom. Sessions to introduce teachers to tools such as Google, Alice, Python, and open source were also well attended.

A panel discussion on the diverse pathways that lead individuals into CS was chaired by CSTA President, Michelle Hutton. Panel members included Harold Javid (Microsoft Research), Nina Kim (Google), and Debra Richardson from the Donald Bren School of ICS at the University of California-Irvine.

“The panelists made it very clear that there are many educational options and job opportunities in CS for individuals with diverse interests and skills,” said Hutton. “This panel emphasized that it is important for teachers to think outside the box when it comes to identifying and encouraging students who can succeed in CS.”

Closing keynote speaker, Maria Klawe, President of Harvey Mudd College in Claremont, California, summed up many of the messages of the day by noting the importance of bringing diverse perspectives and skills to the work of CS. She also suggested that in order to solve the pressing problems of the world, computer scientists must become leaders and leaders must become computer scientists.

The CS & IT Symposium is hosted by CSTA and was generously sponsored by Google, the Intel Foundation, and Microsoft Research. For information regarding sponsorship for next year’s event in Washington, DC, contact Chris Stephenson at cstephenson@csta.acm.org.

Details on the symposium and speaker presentations are available at www.csitsymposium.org.

The College Connection

Auburn University, Auburn, Alabama
Pat Phillips

Editor's note: This interview with James Cross, Professor of Computer Science and Software Engineering at Auburn University, is the first in a series of interviews with CSTA institutional members. Please share these details about the computer science (CS) programs at Auburn University with your students.

Auburn University is located in Auburn, Alabama, and has an enrollment of about 30,000. Students can earn a Bachelor of Science degree in CS, a Bachelor of Wireless Engineering degree, and a Bachelor of Software Engineering degree. At the graduate level students can earn a Master of Science and a Master of Software Engineering degree, as well as a Doctorate of Philosophy degree.

CSTA: What draws students to your program and what keeps them there?
Cross: Auburn is a very friendly environment, and we have some of the best faculty and facilities in the Southeast. Our department just moved into the new Shelby Center with state-of-the-art classrooms, teaching labs, and research labs.

CSTA: What skills can students acquire before college that will help them succeed in your program?
Cross: Since we are in a Samuel Ginn College of Engineering and our degree programs are accredited by the Accreditation Board for Engineering and Technology (ABET), our students are required to take the traditional mathematics and science sequences that are required for engineers. Hence, we urge high school students to acquire a solid background in mathematics and science.

A background in programming is always helpful, too. However, we do not assume entering students have had a programming course. Our CS1 and CS2 courses are taught in Java, and we use the jGRASP IDE which was developed and is maintained here at Auburn. It’s extremely easy to use and has features that make learning to program an enjoyable experience.

CSTA: What cool careers are your graduates prepared for?
Cross: The types and categories of jobs that Auburn graduates are prepared for are very broad and range from aerospace and defense software development to game development, from network administrator to database administrator, from staff programmer to consult-
ant, and many more. Companies and agencies who hire our graduates include Boeing, Harris, Lockheed, IBM, Microsoft, NASA, NSA, CIA, Northrop Grumman, Raytheon, and many others.

**CSTA:** What topics will students study?

**Cross:** The CS curriculum, which leads to the Bachelor of Science in CS degree, provides an excellent preparation for students seeking careers as software professionals and in computing-related fields, as well as for those planning to pursue graduate study. The curriculum builds on a strong foundation in science, mathematics, social sciences, humanities, and CS, with advanced course work in theoretical CS, human-computer interaction, and net-centric computing. Course work ensures that students receive hands-on exposure to a variety of computer systems, tools, and techniques.

Elective courses allow students to specialize in core areas of CS such as networking, database systems, computer security, and artificial intelligence.

The focus of the Software Engineering curriculum, which leads to the Bachelor of Software Engineering degree, focuses on the analysis, design, verification, validation, construction, application, and maintenance of software systems.

For more information visit www.eng.auburn.edu/programs/csse. Contact: Dr. James Cross crossjh@auburn.edu

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**Bits and Bytes**

*Celebrating Diversity*

**The Grace Hopper Celebration**

The 2008 Grace Hopper Celebration of Women in Computing will be held October 1-4, 2008, in Keystone, Colorado. The conference is designed to recognize and celebrate the research and career interests of women in computing. Presenters are leaders in their respective fields, representing industrial, academic and government communities. Leading researchers present their current work, while special sessions focus on the role of women in today’s technology fields, including computer science, information technology, research, and engineering.

This year’s conference celebrates with the theme of “We Build a Better World.” Fran Allen, IBM Fellow Emerita and 2006 Turing Award Winner, and Mary Lou Jepsen, Founder and CTO of One Laptop Per Child, will be keynote speakers.

The event is named for Rear Admiral Grace Hopper, known for her work on compilers and for making machines understand ordinary language instructions that led to the development of the business language, COBOL. Learn more about the Grace Hopper Celebration at gracehopper.org/2008/.

**The Tapia Conference**

The Richard Tapia Celebration of Diversity in Computing Conference will be held April 1-4, 2009, in Portland, Oregon. The gathering creates a supportive networking environment for under-represented will be held April 1-4, 2009, in Portland, Oregon. The gathering creates a supportive networking environment for under-represented students and academic and government communities. Leading researchers present their current work, while special sessions focus on the role of women in today’s technology fields, including computer science, information technology, research, and engineering.

The event is named for Rear Admiral Grace Hopper, known for her work on compilers and for making machines understand ordinary language instructions that led to the development of the business language, COBOL. Learn more about the Grace Hopper Celebration at gracehopper.org/2008/.

**Welcome CSTA Oregon**

CSTA Oregon, a long-standing local organization supporting K-12 computer science (CS), became the first official CSTA chapter last year and is already setting a high standards for meeting the needs of local teachers and students.

There has actually been a CSTA in Oregon for more than 20 years, but when CSTA was launched at the national level, CSTA OR joined the national organization first as an affiliate and then as an official chapter.

CSTA Oregon President, Ronald Tenison, has ambitious plans for the new chapter. “We are creating opportunities for computer science teachers at all levels to make connections and work together to improve CS education,” says Tenison. “This includes providing new curriculum materials, training opportunities, and relationships with other professional organizations.”

A CSTA chapter is designed to facilitate discussion of local issues, provide member services at the local level, and promote CSTA membership on the national level. Tenison notes chapter status will add value by helping to build interrelationships with other chapters. He also notes that CSTA OR will be able to use that national voice to help inform and advise local principals, boards, and legislators about CS education policies.

Status as a CSTA chapter provides a number of benefits. CSTA chapters’ events are listed in the Voice and CSTA can help chapters identify and contact local CS teachers and university and college CS faculty. A CSTA Chapter Liaison is also available to offer advice and support.

Newly-formed chapters should ideally include local CS teachers and an educational site willing to host regular meetings. Obligations of chapters include having a minimum of 5 members, holding regular membership meetings, a leadership structure, ongoing communication with members, and a formal set of bylaws meeting CSTA requirements. Chapter applications are submitted in writing and chapter status is subject to approval by the CSTA Board of Directors, based on the recommendation of the CSTA Chapter Liaison and Executive Director.

For more information on forming a CSTA Chapter visit csta.acm.org/About/sub/CSTACHapters.html.

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**Ethnicity of U.S. and Canadian CS&CE Ph.D. Recipients 2006-07**

<table>
<thead>
<tr>
<th>Ethnicity</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Nonresident Alien</td>
<td>56%</td>
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<tr>
<td>African-American</td>
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<td>Native American</td>
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<tr>
<td>Asian or Pacific Islander</td>
<td>13%</td>
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<tr>
<td>Hispanic</td>
<td>1%</td>
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<td>White, Non-Hispanic</td>
<td>27%</td>
</tr>
<tr>
<td>Other</td>
<td>3%</td>
</tr>
</tbody>
</table>

SOURCE: www.cra.org/info/taulbee/ethnicity.html
MARK YOUR CALENDAR

Consortium for Computing Sciences in Colleges (CCSC: Midwest)
September 26-27, 2008 in Holland, Michigan
www.ccsc.org/midwest

CSTA sessions:
September 26 Chris Stephenson,
Keynote: The Political Landscape - Advocating for CS
September 27, Fran Trees
Toys and Techniques for Teaching CS

Grace Hopper Celebration of Women in Computing
October 1-4, 2008 in Keystone, Colorado
gracehopper.org/2008/

Consortium for Computing Sciences in Colleges (CCSC: Northwestern)
October 10-11, 2008 in Ashland, Oregon
www.ccsc.org/northwest2008/

Consortium for Computing Sciences in Colleges (CCSC: Eastern)
October 10-11, 2008 in Frederick, Maryland
cs.hood.edu/ccsce08/

Consortium for Computing Sciences in Colleges (CCSC: Rocky Mountain)
October 17-18, 2008 in Colorado Springs, Colorado
www.ccsc.org/rockymt/

National Women of Color Technology Awards Conference
October 23-25, 2008 in Dallas, TX
www.womenofcolor.net/v2/index.php

RESOURCES
Here’s more information on topics covered in this issue of the CSTA Voice.

Page 1: Computer Science Teachers Association csta.acm.org
Page 1: Road Show Group groups.google.com/group/roadshowworkshop?hl=en
Page 1: Bring It On! www.cs.indiana.edu/bringiton
Page 2: Computer Science Equity Alliance www.apcsla.org/
Page 2: Teaching to Change LA tcla.gseis.ucla.edu/divide/about/index.html
Page 2: Unlocking the Clubhouse tcla.gseis.ucla.edu/divide/politics/margolis.html
Page 2: UCLA Graduate School of Education and Information Studies www.gseis.ucla.edu/
Page 3: Gridworld www.collegeboard.com/student/testing/ap/compsci_a/case.html
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Page 7: Tapia Conference tapiaconference.org/2009/