

Chapter Mini Grants

Project Overviews

Lissa Clayborn
October 2014



Agenda

- Overview: Chapter Mini Grants
- Project Summaries
- Next Steps

Overview:

Chapter Mini Grants

In 2014, the SIG Governing Board allocated \$60,000 to CSTA chapters to:

- Perform Leadership and Advocacy Training
- Provide Professional Development for Chapter Members
- Promote CSTA Chapter as Leaders in K–12 CS Education
- Build Community

Connecticut Community Outreach Programs

- Will host four community-level workshops where parents and other members of the community engage with hands-on programming experience
- Workshops followed by writing letters to Congress in support of the *CS Education Act HR 2536* and the *CS Education and Jobs Act S1407*
- Planned for December 2015



Georgia Poster Project

Computational Thinking
A computer is a tool which is made useful by the creative thought of a human



DATA & INFORMATION



2014
2010
2006

ABSTRACTION



CREATIVITY



PROGRAMMING

```
public static void main(String[] args)
{
    System.out.println("Hello world");
}
```

ALGORITHM

RECIPE

Cake

Put 2.5 cups of flour in a bowl
Add 2 cups of sugar

INTERNET & GLOBAL IMPACT



Maryland Conference, Event Website, and Apparel



TAC

Home About Pictures FAQ Registration Contact Us

Athena Conference

Thank you to all the participants, parents, volunteers and other helpful hands at the conference! We are so glad you were able to make it. Please check out the pictures from the Conference under the Pictures Tab! We also put together a manual documenting the conference. Check it out [here!](#)

The Athena Conference (TAC) is an initiative to introduce high school girls to technology and engineering fields. Inspired by The Artemis Project, a five-week technology program for high school girls, TAC has the goal of informing and encouraging girls to consider a career in these areas.

TAC aims to increase exposure in fields such as computer science and engineering to the underrepresented female population. By learning new concepts, connecting with peers and college students, and receiving mentoring from industry professionals, the students will be able to build the confidence necessary to be successful in technology-related areas.

The Athena Conference will run May 10th, 9-4 at UMBC. There will also be a parent session in the morning from 9-12.

A big thank you to our sponsors!



csta | Computer
Science
Teachers
Association

Maryland

Conference, Event Website, and Apparel



Minnesota

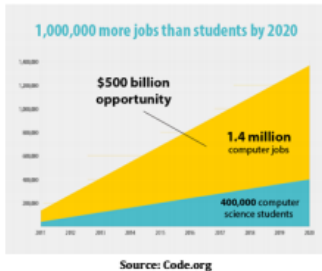
CSTA-MN The Gopher State Summer Workshop

Agenda for August 5

- 8:30 Registration in Thomson Reuter's main entrance (8:45 escorted to conference workshop room)
Continental Breakfast served in workshop room.
- 9:00 – 10:00 Opening Session
Welcome from President Doug Maine of the CSTA-MN, The Gopher State
Welcome and Logistics from Thomson Reuter's - Liz Cherif, Corporate Technology Recruitment
Department of Education STEM initiative in IT/Computing, Doug Paulson
- 10:15 – 11:40 Panel—Women in IT
Ida Lano, Principal Solution Specialist, Microsoft
Sophia Rubbelke, Securian
Naadia Sayed, Technical Account Manager, Microsoft
Janet Swedal, VP Technology/CTO, Thomson Reuters
MarineThomas, Lead Software Engineer, Thomson Reuters
Shirley Walz, Sr. Director IT Services Transformation, Thomson Reuters
- 11:45 – 12:30 Lunch with table talks
Advocacy for the CS Programs – Table leader Jen Rosoto
Resources – Table leader - Cindy Drahos
Robotics – Table leader Cheryl Moeller, High Tech Kids
Advance IT Minnesota – Russel Fraenkel
eMentor & More –Bonnie Vagasky, BestPrep
- 12:30 – 1:00 Tour – Jill Keller
- 1:00 – 1:30 Technology Briefing from Thomson Reuter s
Liz Cherif, Thomson Reuters and Roger Peterson, Director of Mobile Technology
- 1:30 – 2:00 Guest Speaker – Tika Kude, Computer Science Instructor at Wayzata High School and NCWIT Teacher of

New Jersey CS Awareness Campaign

CS Job Opportunities



Job growth 2010-2020

US Department of Labor

CS/IT	758,800 new jobs	+22%
Software Developers & Programmers		+25%
Computer System Analysts		+22%
Database System Admins & Network Arch		+28%
Computer Support Specialists		+18%
Security Analyst, Web Dev, CS Res		+15%

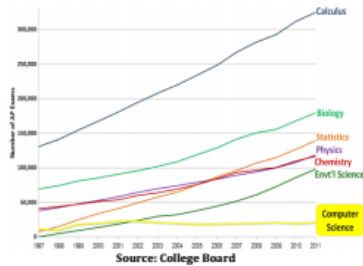
Average Salaries 2013/14

PayScale.com top 20

Career	Starting	Mid-Career
6. Computer Engineer	\$65,300	\$106,000
8. Computer Science	\$59,800	\$102,000
12. Software Engineer	\$60,500	\$99,300
18. Management Info Syst	\$53,800	\$92,200

Missed Opportunities

High School Advanced Placement Exams 1997-2011



2013 AP Computer Science Statistics for New Jersey

Schools

Only 17.2% (139) of NJ high schools offer AP CS

Students

Less than 0.5% (1582) of NJ high school students took the APCS exam

Underrepresentation

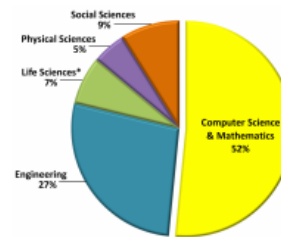
Of the students taking APCS in NJ

- 15.3% Female (242)
- 2.1% Black (34)
- 6.1% Hispanic (96)

There will never be a shortage of opportunities for people who know how to solve problems
Dean Kamen – FIRST Robotics Founder

Projected Annual Growth of STEM Job Openings 2010-2020

US Department of Labor



Each software job yields 4.3 additional jobs

67% of all software jobs are outside of the tech industry such as banking, retail, gov't, pharmaceutical and entertainment

The students graduating from NJ colleges in Computer and Information Science can only fill 33% of the projected annual computing job openings in the state.

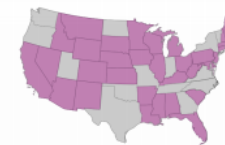
Educating students for the jobs of the past is a recipe for both economic and social disaster
Chris Stevenson – CSTA executive director

Computer Science Education

Good for our **Students**

Good for our **State**

IN 35 OF 50 STATES, COMPUTER SCIENCE CLASSES DON'T COUNT TOWARDS HIGH SCHOOL GRADUATION MATH OR SCIENCE REQUIREMENTS.



Contact the co-chairs:

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Fran Trees fran.trees@cs.rutgers.edu

cstanj.org

facebook.com/cstanj

Resources:

code.org
computinginthecore.org
csta.acm.org
ncwit.org

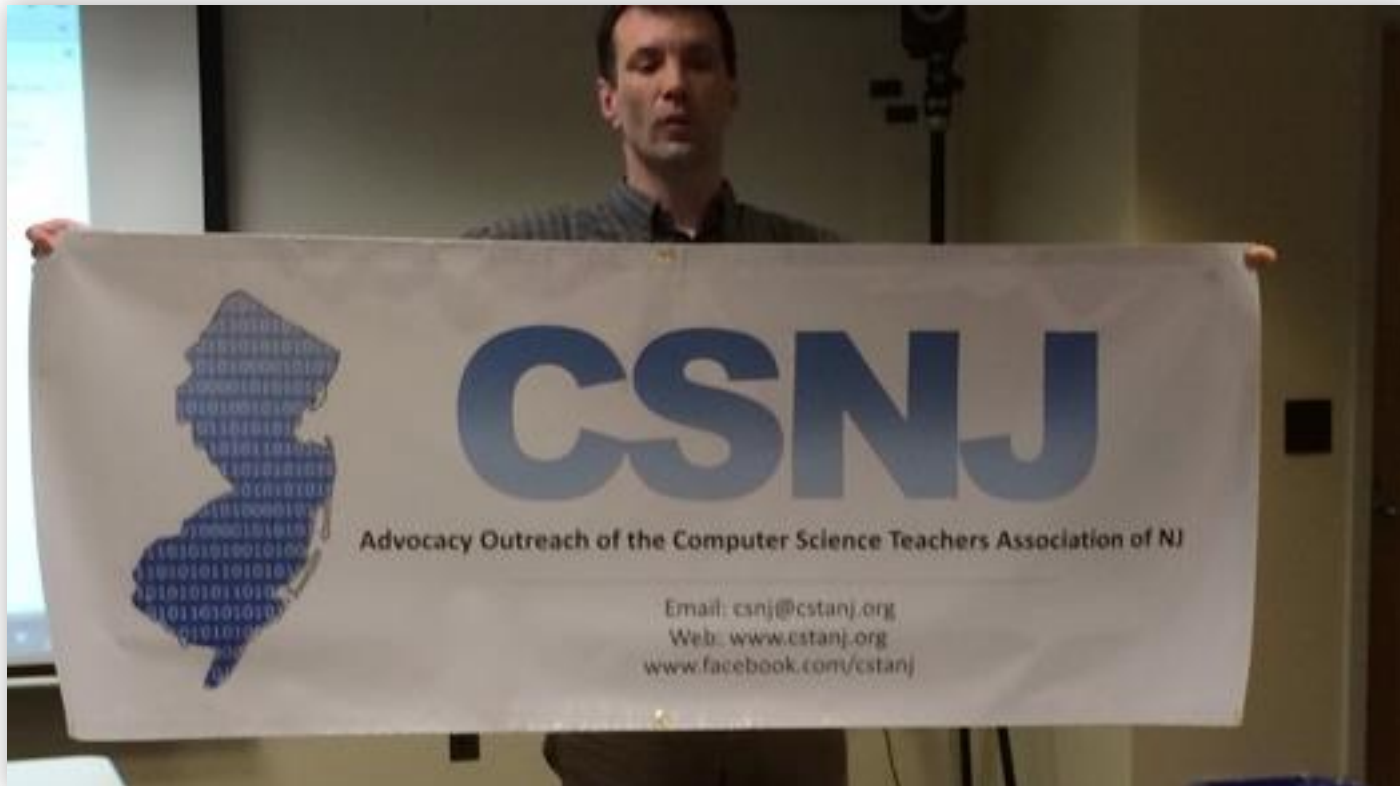
CSNJ

Advocacy Outreach of the Computer Science Teachers Association of NJ (CSTANJ)



Make CS Count !

New Jersey CS Awareness Campaign



New Jersey Conferences

- [New Jersey School Boards Association \(NJSBA\) Workshop 2014](#) – October 28-30, 2014
 - Workshop: Teaching Computer Science in K through 12 (Daryl Detrick and Gary Hull)
- [New Jersey Education Association \(NJEA\) Convention 2014](#) – November 6-7, 2014
 - Workshop: Computer Science Education: Good for our Students and our State (Daryl Detrick and Mayra Bachrach)

Ohio

CSTA Advocacy & PD Workshops

- Three one-day workshops in different locations throughout the state of Ohio.
- Each will include a mix of leadership, advocacy, and programming training.
- Currently scheduled Spring 2015.



Rhode Island Packets

CSTA K-12 Computer Science Standards

Operational Definition

The International Society for Technology in Education (ISTE) and the Computer Science Teachers Association (CSTA) have collaborated with leading educational organizations to create an operational definition of computer science for computational thinking that will result from nearly 700 computer science teachers' input for the operational definition.

Computational thinking (CT) is the following characteristics:

- Formulating problems in a way that can be solved through computation
- Logically organizing and analyzing data
- Representing data through abstractions, such as lists and maps
- Automating solutions through algorithms
- Identifying, analyzing, and implementing efficient and effective combinations of algorithms
- Generalizing and transferring the solutions to new problems

These skills are supported an essential dimensions of CT. These skills are supported an essential dimensions of CT. These skills are supported an essential dimensions of CT.

- Confidence in dealing with complexity
- Persistence in working with difficult problems
- Tolerance for ambiguity
- The ability to deal with open-ended problems
- The ability to communicate and collaborate

The CSTA Standards



Copyright 2011, International Society for Technology in Education (ISTE) and Computer Science Teachers Association (CSTA). This material is supported by the National Science Foundation under Grant No. IRI-0933370.

Support Computer Science Education in Rhode Island!

Computer science drives job growth and innovation throughout our economy and society. More than half of projected jobs in STEM fields are in computing occupations; computing occupations dominate "help wanted" ads; and computer science is one of the hottest degrees for new college graduates. Further, computer science is fundamental knowledge all students need for the 21st century. However, computer science education is marginalized throughout K-12 education—denying access to this critical knowledge, particularly among underrepresented groups.



! What can your state do to improve K-12 CS Education?

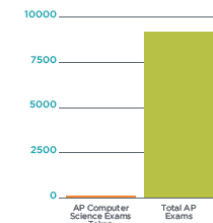
1. Allow computer science classes to satisfy existing graduation or higher education requirements for math or science. Current computer science courses often do not count towards a student's required coursework—they are treated as electives. And these courses often do not meet entrance requirements for college. Given the academic demands, college-bound students cannot afford to take computer science as an elective. This policy would not require schools to offer computer science or students to study it; it simply allows existing computer science courses to satisfy a core requirement that already exists.

2. Establish computer science standards. Most states do not have discrete computer science standards within their existing state standards. States should establish rigorous standards for computer science focused on the creation (not just the use) of software and other computing technologies. The Computer Science Teachers Association has model K-12 CS standards.

3. Establish or strengthen computer science teachers. Most states do not have clear pathways for people to become computer science teachers. Those that have the desire, knowledge and skills to teach young people computer science should have a clear, navigable and rewarding path to K-12 classrooms.

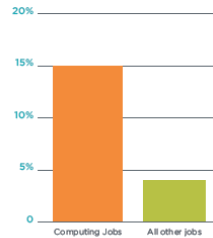
AP Computer Science in Rhode Island

Source: College Board



Demand for jobs in Rhode Island

Source: Conference Board Help Wanted Online Updated Regularly



Computer Science Materials for Students & Parents

that do not require computers but engage kids in games and promote computer science and math thinking skills: unplugged - csunplugged.org - <http://www.cs4fn.org> Computer Science Teacher's Association) has materials for introducing computer science into the curriculum - www.csta.org - especially good for high schools wishing standalone CS. CSTA has also just aligned their standards for certification with the ISCS and the national core curriculum. www.ncwit.org is a very rich site for learning how to attract and retain girls to computer science. www.ncwit.org is a great programming language and the folks who created it at MIT are making it in the clouds - providing materials and creating communities for students, and parents - scratch.mit.edu is a great programming language with similar support - www.ncwit.org

like interactive programming with sensors and actuators there are many great (and inexpensive) platforms to support this, such as Raspberry Pi. On the Arduino the students would write the code and then load the compiled code on to these small devices. With Raspberry Pi, students will typically plug the device into a computer and write code directly on the device. Very attractive to girls and other students whose applications include music, art, sound, sensors (medical as well as environmental), etc. Raspberry Pi was developed for educational purposes and for kids in the UK. www.arduino.cc, and for educational ideas, see playground.arduino.cc/Main/ManualsAndCurriculum#U0w0IP1V

Information about Raspberry Pi, Google "educational materials Raspberry Pi" and you will find resources and information about introductory programming courses that include computational thinking concepts (programming is the literacy of computing, many concepts that must be covered ... computer science is not just programming) see:

Exploring Computer Science - <http://www.exploringcs.org> - Developed by the LAUP school in conjunction with the LAUP school. Now counts toward a CS class in CA, and used nationally as a first CS class. <http://www.csprinciples.org> - now being piloted for a CS AP course unanchored in a particular programming language. <http://www.csprinciples.org> is an architecture with strong attention to computer science concepts and learning outcomes. This is being piloted around the country in many high schools and colleges. scratch.mit.edu - The MIT site for AppInventor - A visual language used to program Android cell phones.

QUESTIONS or MORE INFORMATION: joan@cs.uri.edu



New York Spring 2015 Conference

- Two-day conference for K–12 CS professional development
- Anticipating 20+ attendees
- Scheduled for March 2015

Virginia #1 Bus Advertisement



27,000 computer jobs
can't be filled in Virginia.*
It's time to teach our
kids the new language.

 **CODEVIRGINIA**

* Government jobs in Northern Virginia alone

I understand computer science
*I will be able to get a great job when I
graduate.*

Virginia #2

The Digital Divide:
Who will fill the 1.4 million
US computing jobs in

100%
students
take computer
science

5%

China

It's the world's fastest growing job sector.
And 90% of our schools don't teach it. Yet.

1,000,000 more jobs than students by 2020

1,400,000

1 million
jobs

computer
students

2019 2020

In Virginia, computer jobs are growing at more than triple
the national rate. But 90% of our schools don't even teach
computer science. If this continues, about 1 million
US computer jobs will be unfilled due to lack of training.

CodeVA seeks to build a strong, vibrant 21st-century Virginia
workforce by providing access to computer science education
for every child. Anyone can code. Everyone should.



CODEVA

Go to codevirginia.org to learn more.

Wisconsin Brochure and Resource Development

10.org

Q&A

Who can teach Computer Science?

Exploring Computer Science can be taught by anyone with any valid high school license

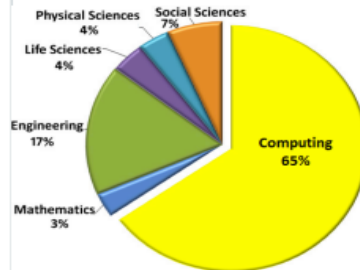
Other high school courses having more than 25% programming content require a teacher with CS 405 Endorsement

Counting Computer Science for Mathematics credit

- Will require inclusion of a set of Mathematics Practices and topics
- Will require a CS 405 endorsement and likely a Math 400 license
- Likely courses to qualify may be APCS-A and APCS Principles but not ECS

Coming: Praxis-like test to allow a teacher with a Mathematics 400 license and some CS experience to obtain the CS 405 Endorsement

Proj. Annual Growth of NEWLY CREATED STEM Job Openings 2012-2022



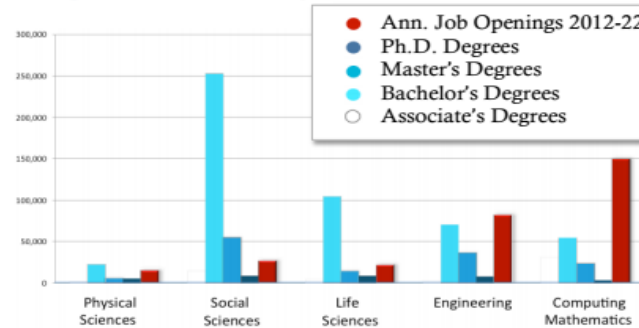
Why is there high interest in broadening the teaching of real computer science in K-12?

The opportunities are huge for this decade:

- For example, nearly 2/3 of new STEM job openings will be in Computing
- The projected number of total computing jobs (new and replacement) is about 1.3 million per year 2012-22.
- The numbers of students in the pipeline for these careers is only about 40% of the number of job openings (new and replacement) in Computing

The severe shortage of CS pipeline is both an economic and a national security issue (Bur. of Labor Statistics, Dept of Labor, Jan 2014)

Degrees vs. Jobs Annually



Recommended Curriculum

Elementary School Level from Code.org

- Gr K-5 modules
- Gr 6-8 multidisciplinary units
- Gr K-8 Intro to Computer Science course

High School Level

Exploring Computer Science (ECS) (complete curriculum and Professional Dev, gr 9-10)

APCS Principles of Computer Science (gr 10-12) (APCSP)

APCS-A Java (gr 11-12)

What professional development opportunities are there?

- NSF CE21 PUMP-CS sponsored Summer workshops in ECS and APCSP in 2015 and 2016 <http://pumpcs.mu.edu>
- During the school year workshops and sessions that are sponsored by NSF and CSTA-WI Dairyland.
- Computer Science Methods course Computer Science 405 endorsement in 2015 and beyond

Thank you
for supporting CSTA!



Lissa Clayborn
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