Lot of good news and some bad
Daryl Detrick

- CSTA Central NJ past-president
- CSNJ co-chair
- New Jersey representative to CSALT
- CS teacher at Warren Hills HS
- DarylDetrick@cstanj.org
CSTANJ

CSTANJ goal is to enhance CS Education by promoting communication through a network of CS Educators from K through College. CSTANJ hopes to provide opportunities for discussions, collaboration, professional development, and advocacy work.
Efforts Underway - CSTA in New Jersey

CSTANJ

CSTANNJ
Northern @ Kean

CSTACNJ
Central @ Rutgers

CSTASNJ
Southern @ Stockton

CSNJ
Advocacy

CSTANJ.org
CSTA Chapters in NJ

**CSTA Northern NJ - Kean**
- Next meeting ______
- President Lee Hayden
- Email – lhayden@roxbury.org

**CSTA Central NJ - Rutgers**
- Next meeting October 13
- President John Hajdu
- Email - jhajdu@chatham-nj.org

**CSTA Southern NJ – Richard Stockton**
- Next meeting September 9
  - 6:00 with Google Hangout
- President Lynne Kesselman
- Email - lynnekesselman@gmail.com
An advocacy outreach of CSTA in New Jersey.

Mission Statement: To establish K-12 computer science as an essential academic discipline in NJ.

Goals:

- Make CS count as math or science core class
- Adopt CS standards for New Jersey
- Define CS teacher certification/endorsement
- Require all New Jersey students take a CS course to graduate

Have any connections in industry, government or DOE?
Opportunities

“We need students to be innovative creators of technology, not just passive users”

Chris Stevenson
Former CSTA Executive Director
Where the STEM Jobs Will Be
Degrees vs. Jobs Annually

1,000,000 more jobs than students by 2020

Computer science is a top paying college degree and computer programming jobs are growing at 2X the national average.

$500 billion opportunity

1.4 million computing jobs

400,000 computer science students
Statistics

New Jersey only has enough college Computer Science graduates each year to fill 33% of the states annual job openings in computing.

There are current 23,330 job openings in NJ in computing.

NCWIT.org and Code.org

Outdated with new growth?
The Opportunities WASTED (update – good news and bad news)

“Educating students for the jobs of the past is a recipe for both economic and social disaster.”

Chris Stevenson
Former CSTA Executive Director
The job/student gap in computer science

- Jobs:
  - 60% Computing Jobs
  - 40% All other math & sciences

- Students:
  - 98% All other math & sciences
  - 2% Computer science students

Less than 2.4% of college students graduate with a degree in computer science. And the numbers have dropped since last decade.
High School Advanced Placement

Exams 1997-2011

Calculus
Biology
Statistics
Physics
Chemistry
Envt'l Science
Computer Science

Growth in APCS exam
National Numbers

<table>
<thead>
<tr>
<th>Year</th>
<th>National Numbers</th>
<th>Increase</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>22,176</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2012</td>
<td>26,103</td>
<td>18%</td>
<td>#1</td>
</tr>
<tr>
<td>2013</td>
<td>31,117</td>
<td>19%</td>
<td>#1</td>
</tr>
<tr>
<td>2014</td>
<td>37,521</td>
<td>21%</td>
<td>#1</td>
</tr>
</tbody>
</table>
Calculus represents the combined data of Calculus AB and BC. Physics represents the combined data of Physics B, C: Electricity and Magnetism, and C: Mechanics. Computer Science represents combined data of Computer Science A and B.
APCS in NJ
Good news and Bad news

Data from College Board via Barbara Ericson
## New Jersey Statistics on AP exam

<table>
<thead>
<tr>
<th>Year</th>
<th># schools</th>
<th># Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>136</td>
<td>942</td>
</tr>
<tr>
<td>2011</td>
<td>128</td>
<td>1120</td>
</tr>
<tr>
<td>2012</td>
<td>133</td>
<td>1235</td>
</tr>
<tr>
<td>2013</td>
<td>139</td>
<td>1582</td>
</tr>
<tr>
<td>2014</td>
<td>157</td>
<td>1986</td>
</tr>
</tbody>
</table>

Approximately 800 HS in NJ. (505 public and 302 private)

**Less than 20% of NJ HS offer APCS**

Note: Approximately 350,000 high school students in NJ

**Less than 0.6% of NJ HS students took APCS**
<table>
<thead>
<tr>
<th>Year</th>
<th>Students</th>
<th>Growth of Test Takers of Students</th>
<th>Percent of Test Takers</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>156</td>
<td></td>
<td>17%</td>
</tr>
<tr>
<td>2011</td>
<td>193</td>
<td></td>
<td>17%</td>
</tr>
<tr>
<td>2012</td>
<td>217</td>
<td></td>
<td>18%</td>
</tr>
<tr>
<td>2013</td>
<td>242</td>
<td></td>
<td>15%</td>
</tr>
<tr>
<td>2014</td>
<td>397</td>
<td></td>
<td>20%</td>
</tr>
</tbody>
</table>

Females in NJ taking APCS exam
## Black Students in NJ taking APCS exam

<table>
<thead>
<tr>
<th>Year</th>
<th>Students</th>
<th>Percent</th>
<th># Black females</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>22</td>
<td>2%</td>
<td>5</td>
</tr>
<tr>
<td>2011</td>
<td>34</td>
<td>3%</td>
<td>10</td>
</tr>
<tr>
<td>2012</td>
<td>37</td>
<td>3%</td>
<td>5</td>
</tr>
<tr>
<td>2013</td>
<td>34</td>
<td>2%</td>
<td>7</td>
</tr>
<tr>
<td>2014</td>
<td>65</td>
<td>3%</td>
<td>17</td>
</tr>
</tbody>
</table>

Note: 13.6% of NJ residences are black
Hispanic Students in NJ taking APCS exam

<table>
<thead>
<tr>
<th>Year</th>
<th>Students</th>
<th>Percent</th>
<th># Hispanic females</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>53</td>
<td>6%</td>
<td>9</td>
</tr>
<tr>
<td>2011</td>
<td>55</td>
<td>5%</td>
<td>7</td>
</tr>
<tr>
<td>2012</td>
<td>74</td>
<td>6%</td>
<td>20</td>
</tr>
<tr>
<td>2013</td>
<td>96</td>
<td>6%</td>
<td>11</td>
</tr>
<tr>
<td>2014</td>
<td>143</td>
<td>7%</td>
<td>30</td>
</tr>
</tbody>
</table>

Note: 17.6% of NJ residences are Hispanic/Latino
1 year summary of APCS in NJ
2013 - 2014

26% increase in total students
1582 to 1986

64% increase in females students
242 to 397

91% increase in black students
34 to 65

49% increase in Hispanic students
96 to 143

13% increase in schools
139 to 157
5 year summary of APCS in NJ 2010 - 2014

111% increase in total students
942 to 1986

155% increase in females students
156 to 397

195% increase in black students
22 to 65

170% increase in Hispanic students
53 to 143

15% increase in schools
136 to 157
Legislation and NJDOE

“Access to CS Education has become the social justice issue of the 21st century. The way to get people out of poverty is to give them access to privileged skills.”

Chris Stevenson
CSTA Executive Director
Standards

Sue Sullivan of NJDOE is responsible for the Technology Standards and 21st Century Careers (8 and 9)
As part of the 5 year update, Sue contacted CSNJ to discuss adding Computational Thinking
Standards released in October 2014 added 8.2.E

Very basic, but a good started.
Makes NJ one of the few states with any CS standards.
Hoping for more through legislation.
# Technology 8.2.E

Computational Thinking and Programming

Adopted October 1, 2014

<table>
<thead>
<tr>
<th>Content Area</th>
<th>Technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard</td>
<td>8.2 Technology Education, Engineering, Design, and Computational Thinking - Programming: All students will develop an understanding of the nature and impact of technology, engineering, technological design, computational thinking and the designed world as they relate to the individual, global society, and the environment.</td>
</tr>
<tr>
<td>Strand</td>
<td>E. Computational Thinking: Programming: Computational thinking builds and enhances problem solving, allowing students to move beyond using knowledge to creating knowledge.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Grade Level</th>
<th>Content Statement</th>
<th>Indicator</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>K-2</td>
<td>Computational thinking and computer programming as tools used in design and engineering.</td>
<td>8.2.2.E.1 List and demonstrate the steps to an everyday task.</td>
<td>8.2.2.E.2 Demonstrate an understanding of how a computer takes input through a series of written commands and then interprets and displays information as output.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8.2.2.E.3 Create algorithms (a sets of instructions) using a pre-defined set of commands (e.g., to move a student or a character through a maze).</td>
<td>8.2.2.E.4 Debug an algorithm (i.e., correct an error).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8.2.2.E.5 Use appropriate terms in conversation (e.g., basic vocabulary words: input, output, the operating system, debug, and algorithm).</td>
<td></td>
</tr>
<tr>
<td>Grade Level</td>
<td>Computational thinking and computer programming as tools used in design and engineering.</td>
<td>8.2.5.E.1</td>
<td>Identify how computer programming impacts our everyday lives.</td>
</tr>
<tr>
<td>-------------</td>
<td>----------------------------------------------------------------------------------------</td>
<td>----------</td>
<td>----------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8.2.5.E.2</td>
<td>Demonstrate an understanding of how a computer takes input of data, processes and stores the data through a series of commands, and outputs information.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8.2.5.E.3</td>
<td>Using a simple, visual programming language, create a program using loops, events and procedures to generate specific output.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8.2.5.E.4</td>
<td>Use appropriate terms in conversation (e.g., algorithm, program, debug, loop, events, procedures, memory, storage, processing, software, coding, procedure, and data).</td>
</tr>
<tr>
<td>Grade Level</td>
<td>Computational thinking and computer programming as tools used in design and engineering.</td>
<td>8.2.8.E.1</td>
<td>Identify ways computers are used that have had an impact across the range of human activity and within different careers where they are used.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8.2.8.E.2</td>
<td>Demonstrate an understanding of the relationship between hardware and software.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8.2.8.E.3</td>
<td>Develop an algorithm to solve an assigned problem using a specified set of commands and use peer review to critique the solution.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8.2.8.E.4</td>
<td>Use appropriate terms in conversation (e.g., programming, language, data, RAM, ROM, Boolean logic terms).</td>
</tr>
<tr>
<td>Grade Level</td>
<td>Computational thinking and computer programming as tools used in design and engineering.</td>
<td>8.2.12.E.1</td>
<td>Demonstrate an understanding of the problem-solving capacity of computers in our world.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8.2.12.E.2</td>
<td>Analyze the relationships between internal and external computer components.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8.2.12.E.3</td>
<td>Use a programming language to solve problems or accomplish a task (e.g., robotic functions, website designs, applications, and games).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8.2.12.E.4</td>
<td>Use appropriate terms in conversation (e.g., troubleshooting, peripherals, diagnostic software, GUI, abstraction, variables, data types and conditional statements).</td>
</tr>
</tbody>
</table>
Legislation

www.njleg.state.nj.us

keyword “computer science”

Use this site to contact your legislators
A2597 / S2161

Make CS count as a math or science

– Assemblyman Singleton and Diegnan
– CSNJ testified at the Assembly Education Committee (Passed 8-0)
– Passed the Assembly on June 2014 (76-0)
– Referred to the Senate Education Committee
– Senate version sponsored by Senator Ruiz (petition)
A2597 / S2161

UPDATE – stuck in Senate Education Committee

NJDOE has issues with wording

Computer science in America

Computer science can only count toward high school math or science graduation requirements in 26 states.
A3440 / S2030

Requires State Board of Education to develop rigorous computer science curriculum guidelines and school districts to incorporate those guidelines in grades six through 12

– Senator Cody and Assemblyman Diegnan
– CSNJ testified to the Senate Budget and Appropriations Committee (Passed 13-0)
– Passed the Senate on June 2014 (Passed 35-1)
– Referred to the Assembly Education Committee
A3440 / S2030

Update

• CSNJ testified at Assembly Education Committee  Passed 8-0

• Passed Assembly June 2015 (73-2)

• Vetoed by Lieutenant Governor August 6, 2015
  – First Veto by a Lieutenant Governor in history of NJ
  – Governor was in Ohio for the debate
A3440 / S2030

Conditional Veto summary:

Instead of requiring NJBOE/NJDOE to create standards in science or technology standards and to create curriculum the condition veto says that NJDOE has to determine if there is a need for CS standards and make a recommendation by December 31, 2015.
A3440 / S2030

Options with conditional veto
1. Forget about it and move on
2. Override the veto
3. Accept the conditions of the veto
4. Reintroduce the bill in January

“Brick walls are not there to stop us, they are there to show how much we want something”

Randy Pausch
CSNJ worked with Rutgers, Kean, TCNJ, Rowan, Richard Stockton and Ramapo to create a proposal for a CS endorsement.

Assemblyman Diegnan introduced the bill.
Referred to the Assembly Education Committee.

• In addition to a certification in another area
• Recommendation, not requirement at first
• Grandfather clause when a requirement
• Four courses equivalent to :
  – CS Principles, APCS A, Data Structures and CS Methods
CSTANJ

Get involved...

Any questions

Feel free to contact me at
DarylDetrick@cstanj.org