The 44th Technical Symposium on Computer Science Education

The Changing Face of Computing

March 6-9, 2013
Denver, Colorado, USA

http://www.sigcse.org/sigcse2013
## Thursday at a Glance

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Location</th>
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</thead>
<tbody>
<tr>
<td>8:30-10:00</td>
<td>Welcome Plenary</td>
<td>Ballroom ABC</td>
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<tr>
<td></td>
<td>Keynote: <em>Changing the Face of Computing</em></td>
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<tr>
<td>10:00-10:45</td>
<td>Break &amp; Exhibits</td>
<td>Plaza Exhibits</td>
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<tr>
<td>10:00-11:30</td>
<td>NSF Showcase #1</td>
<td>Plaza Exhibits</td>
</tr>
<tr>
<td>10:45-12:00</td>
<td>Panel: Shifting African-American Students from Consumers to Producers of CS</td>
<td>Ballroom D</td>
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<td>Panel: Curr. 2013: Reviewing Ironman</td>
<td>Ballroom E</td>
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<tr>
<td></td>
<td>Special: CSE for Social Good</td>
<td>Ballroom F</td>
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<tr>
<td></td>
<td>Papers: Data Structures</td>
<td>Governors 10</td>
</tr>
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<td></td>
<td>Papers: Peer Instruction</td>
<td>Governors 12</td>
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<td></td>
<td>Papers: Student Dynamics</td>
<td>Governors 14</td>
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<td></td>
<td>Papers: Non-Majors</td>
<td>Governors 15</td>
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<td></td>
<td>Papers: Approaches for Outreach</td>
<td>Governors 16</td>
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<tr>
<td></td>
<td>Intel: Lightning #2: Embedded, Security, Parallel</td>
<td>Governors 11</td>
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<tr>
<td></td>
<td>Microsoft: MS Programs for Higher Ed.</td>
<td>Governors 17</td>
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<tr>
<td>12:00-1:45</td>
<td>First Timers’ Luncheon</td>
<td>Ballroom AB</td>
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<tr>
<td></td>
<td>Keynote: <em>Principles, Priorities, and Pressures</em></td>
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<tr>
<td>12:00-1:45</td>
<td>Lunch Break</td>
<td>On your own</td>
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<tr>
<td>1:45-5:15</td>
<td>Student Research Competition Posters Session</td>
<td>Plaza Exhibits</td>
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<tr>
<td>1:45-3:00</td>
<td>Panel: Mobile App Dev in Comp. Curriculum</td>
<td>Ballroom D</td>
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<tr>
<td></td>
<td>Panel: Strategies for Adding PDC to CS Courses</td>
<td>Ballroom E</td>
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<tr>
<td></td>
<td>Panel: Fulbrights Abroad in CS</td>
<td>Ballroom F</td>
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<tr>
<td></td>
<td>Papers: Alternatives to Lectures</td>
<td>Governors 10</td>
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<tr>
<td></td>
<td>Papers: Instructional Technologies</td>
<td>Governors 12</td>
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<td>Papers: Tough Curricular Challenges</td>
<td>Governors 14</td>
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<td>Papers: Retention</td>
<td>Governors 15</td>
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<tr>
<td></td>
<td>Papers: CS Education Research</td>
<td>Governors 16</td>
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<tr>
<td></td>
<td>Google: Think Even Bigger: Scaling HS CS</td>
<td>Governors 11</td>
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<td></td>
<td>ABET: Dispelling Myths About Accreditation</td>
<td>Governors 17</td>
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<tr>
<td>3:00-3:45</td>
<td>Break &amp; Exhibits</td>
<td>Plaza Exhibits</td>
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<tr>
<td>3:00-4:30</td>
<td>NSF Showcase #2</td>
<td>Plaza Exhibits</td>
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<tr>
<td>3:45-5:00</td>
<td>Panel: Curr. 2013: Soc./Prof. Recommendations</td>
<td>Ballroom F</td>
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<tr>
<td></td>
<td>Special: NSF Funding Opportunities</td>
<td>Governors 15</td>
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<tr>
<td></td>
<td>Special: Interactive Explor. of Gender and Comp.</td>
<td>Ballroom D</td>
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<tr>
<td></td>
<td>Special: Demystifying Computing with Magic</td>
<td>Ballroom E</td>
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<tr>
<td></td>
<td>Papers: Tools</td>
<td>Governors 10</td>
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<td>Papers: Student Behaviors and Experiences</td>
<td>Governors 12</td>
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<td>Papers: Introducing CS in High School</td>
<td>Governors 14</td>
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<td>Papers: Socio-Cultural Issues</td>
<td>Governors 16</td>
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<tr>
<td></td>
<td>Microsoft: TouchDevelop Mobile App Dev.</td>
<td>Governors 11</td>
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<tr>
<td></td>
<td>Intel: Introducing Parallelism at the Entry Level</td>
<td>Governors 17</td>
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<tr>
<td>5:10-7:00</td>
<td>Birds of a Feather: Sessions I &amp; II</td>
<td>See page 46</td>
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<tr>
<td>7:00-8:00</td>
<td>SIGCSE Reception</td>
<td>Ballroom AB</td>
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<tr>
<td>8:00-10:00</td>
<td>Movie: <em>Codebreaker</em></td>
<td>Ballroom C</td>
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<tr>
<td>Time</td>
<td>Event</td>
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<tr>
<td>7:15-8:15</td>
<td>Alice Breakfast</td>
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<tr>
<td>8:30-10:00</td>
<td>Plenary Session</td>
<td>Ballroom ABC</td>
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<tr>
<td></td>
<td>Keynote: <em>This Much I Know – Thoughts on the Past, Present and Future of Educational Programming Tools</em></td>
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<tr>
<td>10:00-10:45</td>
<td>Break &amp; Exhibits</td>
<td>Plaza Exhibits</td>
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<tr>
<td>10:00-12:00</td>
<td>Poster Session I</td>
<td>Plaza Exhibits</td>
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<tr>
<td>10:00-11:30</td>
<td>NSF Showcase #3</td>
<td>Plaza Exhibits</td>
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<tr>
<td>10:45-12:00</td>
<td>Panel: Teaching Secure Coding: Myths &amp; Realities</td>
<td>Ballroom D</td>
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<tr>
<td></td>
<td>Special: Alternatives to Lecture</td>
<td>Ballroom E</td>
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<tr>
<td></td>
<td>Special: ACM/IEEE CS 2013 Exemplar Fest</td>
<td>Ballroom F</td>
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<tr>
<td></td>
<td>Papers: Student-Centered Approaches</td>
<td>Governors 10</td>
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<td>Papers: Underserved Populations</td>
<td>Governors 12</td>
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<td></td>
<td>Papers: Architecture and Hardware</td>
<td>Governors 14</td>
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<td>Papers: Teaching CS1</td>
<td>Governors 15</td>
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<td></td>
<td>Papers: Assessment</td>
<td>Governors 16</td>
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<td></td>
<td>Google: Building Online Courses</td>
<td>Governors 11</td>
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<tr>
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<td>Microsoft: Kinect in HCI and Game Design Classes</td>
<td>Governors 17</td>
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<tr>
<td>12:00-1:45</td>
<td>Lunch Break</td>
<td><em>On your own</em></td>
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<tr>
<td>12:30-1:30</td>
<td>Plenary Session</td>
<td>Ballroom ABC</td>
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<td></td>
<td>Keynote: <em>Online Education</em></td>
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<tr>
<td>1:45-3:00</td>
<td>Panel: Growing Female Undergrad Enrollments</td>
<td>Ballroom D</td>
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<td></td>
<td>Panel: Rediscovering Passion, Beauty, Joy &amp; Awe</td>
<td>Ballroom E</td>
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<tr>
<td></td>
<td>Special: AP CS A: From Gridworld to Labs</td>
<td>Governors 15</td>
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<tr>
<td></td>
<td>Special: Revision of the SE 2004 Curriculum Model</td>
<td>Ballroom F</td>
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<td></td>
<td>Papers: Tools for Teaching the Core</td>
<td>Governors 10</td>
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<td></td>
<td>Papers: Parallel / Distributed Computing</td>
<td>Governors 12</td>
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<td>Papers: Teacher Preparation</td>
<td>Governors 14</td>
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<td>Papers: Diversity</td>
<td>Governors 16</td>
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<td></td>
<td>Microsoft: New Windows, Devices, Cloud Services</td>
<td>Governors 11</td>
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<tr>
<td>3:00-3:45</td>
<td>Break &amp; Exhibits</td>
<td>Plaza Exhibits</td>
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<tr>
<td>3:00-4:30</td>
<td>NSF Showcase #4</td>
<td>Plaza Exhibits</td>
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<tr>
<td>3:00-5:00</td>
<td>Poster Session II</td>
<td>Plaza Exhibits</td>
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<tr>
<td>3:45-5:00</td>
<td>Panel: Revolution Will Be Televised: MOOE</td>
<td>Ballroom E</td>
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<td></td>
<td>Special: Engaging Math. Reasoning Exercises</td>
<td>Governors 15</td>
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<tr>
<td></td>
<td>Special: How AP CS A Matches College Courses</td>
<td>Ballroom D</td>
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<td></td>
<td>Special: Stories From the Scratch Community</td>
<td>Ballroom F</td>
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<td></td>
<td>Papers: Assessment in Programming Courses</td>
<td>Governors 10</td>
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<td>Papers: Active Learning</td>
<td>Governors 12</td>
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<td>Papers: Tools to Support Novice Programmers</td>
<td>Governors 14</td>
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<td>Papers: SE and Professional Practice</td>
<td>Governors 16</td>
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<td>ABET: Is There Value in ABET Accreditation?</td>
<td>Governors 11</td>
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<tr>
<td>5:10-5:55</td>
<td>SIGCSE Business Meeting</td>
<td>Ballroom E</td>
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<tr>
<td>6:00-7:00</td>
<td>CCSCNE Business Meeting</td>
<td>Ballroom E</td>
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<td>NCWIT Reception</td>
<td>Ballroom A</td>
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<tr>
<td>7:00-10:00</td>
<td>Workshops 13, 15-24, 26</td>
<td><em>See page 68</em></td>
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</table>
### Saturday at a Glance

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
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<tbody>
<tr>
<td>7:30-8:45</td>
<td>Scratch Breakfast</td>
<td>Ballroom ABC</td>
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<tr>
<td>9:00-10:15</td>
<td>Special: Designing Collab. Learning Exercises</td>
<td>Ballroom D</td>
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<td>Special: Nifty Assignments</td>
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<td></td>
<td>Special: Expanding Access to K-12 CS Ed.</td>
<td>Ballroom F</td>
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<td></td>
<td>Papers: Curricular Innovations</td>
<td>Governors 10</td>
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<td>Papers: Improving Student Learning in Courses</td>
<td>Governors 11</td>
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<td>Papers: Working the Web</td>
<td>Governors 12</td>
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<td></td>
<td>Papers: Computational Thinking</td>
<td>Governors 14</td>
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<td></td>
<td>Papers: Camps and Mobile Computing</td>
<td>Governors 15</td>
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<td></td>
<td>Graduate Student Research Presentations</td>
<td>Governors 16</td>
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<td></td>
<td>Undergraduate Student Research Presentations</td>
<td>Governors 17</td>
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<tr>
<td>10:15-10:45</td>
<td>Break &amp; Exhibits (Exhibits open at 9:30)</td>
<td>Plaza Exhibits</td>
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<tr>
<td>10:15-11:45</td>
<td>NSF Showcase #5</td>
<td>Plaza Exhibits</td>
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<tr>
<td>10:45-12:00</td>
<td>Panel: Textbook Pricing: Present and Future</td>
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<td>Special: CS Principles: Course &amp; Community</td>
<td>Ballroom D</td>
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<td>Special: Addressing 21st Cent. Skills: CS in K-12</td>
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<td></td>
<td>Papers: Classroom Management</td>
<td>Governors 12</td>
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<td></td>
<td>Papers: Music and Computing Education</td>
<td>Governors 14</td>
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<td>Papers: Security and Secure Programming</td>
<td>Governors 15</td>
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<td>Papers: Capstones</td>
<td>Governors 16</td>
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<td>Papers: Educational Research</td>
<td>Governors 17</td>
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<td>Oracle: Getting Started with Java using Alice3</td>
<td>Governors 11</td>
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<tr>
<td>12:00-2:00</td>
<td>SIGCSE Luncheon</td>
<td>Ballroom ABC</td>
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<td>Keynote: Unlocking the Clubhouse: A Decade Later and Now What?</td>
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<tr>
<td>3:00-6:00</td>
<td>Workshops 25, 27-36</td>
<td>See page 72</td>
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</table>

### General Schedule Notes

**NSF Project Showcase Sessions** feature recipients of education-related National Science Foundation grants and will take place in the Plaza Exhibits area.

- **Sessions 1 and 2:** Thursday: 10:00am – 11:30am, 3:00pm – 4:30pm
- **Sessions 3 and 4:** Friday: 10:00am – 11:30am, 3:00pm – 4:30pm
- **Session 5:** Saturday: 10:15am – 11:45am

**The Student Research Competition** features the work of graduate and undergraduate researchers and takes place in two phases (see page 61):

- **Poster presentations:** Thursday 10:00am – 11:30am Plaza Exhibits
- **Research presentations:** Saturday 9:00am – 12:00pm Governors 16 & 17
Message from the Symposium Chairs

Welcome to the proceedings of the 44th ACM Technical Symposium on Computer Science Education, or SIGCSE 2013, where you will find over one hundred papers as well as multiple other session formats that document the latest in computer science education: research, tool building, teaching, curriculum and philosophy. The theme of this year’s symposium is “The Changing Face of Computing”, and features a number of talks and sessions focused on how changes in computing technology and changes in student demographics requires a change in the way computing is taught.

SIGCSE 2013’s opening keynote session on Thursday will be different than anything seen at SIGCSE previously. It consists of “flash talks” (where several “all stars” in computing will be given five minutes to share 20 slides, each of which automatically advance) that answer the question: “What can WE do to change the face of computing?” Jane Margolis of UCLA will provide SIGCE 2013’s closing keynote session on Saturday, where she’ll examine how underrepresentation in computing relates to a larger educational crisis and issues we face as world citizens. In addition, during a special keynote session on Friday, Stanford’s Provost (John Etchemendy) will discuss whether massively open online courses will change our universities at we know them or be a “flash in the pan”.

We are pleased to announce the winners of the two annual SIGCSE awards. Professor Michael Kölling of University of Kent will receive the SIGCSE award for Outstanding Contribution to Computer Science Education, and will provide Friday’s keynote address. Henry Walker of Grinnell College will accept the SIGCSE Award for Lifetime Service to the Computer Science Education Community and speak at our First Timer’s Lunch. (SIGCSE First Timers will receive the lunch for free; SIGCSE Old Timers can purchase a ticket and (a) enjoy a delicious meal, (b) mentor a First Timer, and (c) listen to Professor Walker’s talk.)

Symposium statistics are presented in the following table. We thank the authors, reviewers, and Program Committee members whose enormous and vital service generated this program. This year’s program includes the usual wide selection of events, including the Evening Reception on Thursday and the ACM SIGCSE Student Research Competition, as well as some unusual offerings, such as the Codebreaker drama-documentary on Alan Turing’s remarkable and tragic life story, a puzzle extravaganza with a raffle for those who complete it, and a CSTA K-12 Computing Teachers Workshop. Our exhibit hall features a number of exhibitors showcasing the latest in hardware, software tools, textbooks and educational programs and research. We also continue to offer accessibility at SIGCSE 2013 for the deaf and hard of hearing.

<table>
<thead>
<tr>
<th>Proposal type</th>
<th>Accepted</th>
<th>Received</th>
<th>Acceptance Rate</th>
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<tbody>
<tr>
<td>Paper</td>
<td>111</td>
<td>293</td>
<td>37.9%</td>
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<tr>
<td>Panel</td>
<td>11</td>
<td>23</td>
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<tr>
<td>Special Session</td>
<td>16</td>
<td>23</td>
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<tr>
<td>Workshop</td>
<td>35</td>
<td>84</td>
<td>41.7%</td>
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<tr>
<td>Poster</td>
<td>52</td>
<td>103</td>
<td>50.5%</td>
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<tr>
<td>Birds of a Feather</td>
<td>36</td>
<td>49</td>
<td>73.5%</td>
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</tbody>
</table>
We are excited about the variety of pre-symposium events that will exist at SIGCSE 2013. As of the press deadline for this overview, meetings on the following topics will occur on Wednesday: Managing the Academic Career for Women, Open Source Software, Computational Thinking Through Computing and Music, CSAB Computing Accreditation Workshop, Git & GitHub Foundations for Educators, SIGCAS share and Learn, Using the GENI Networking Testbed, Exploring the Next Generation of Scratch, and Integrating Computing Ethics into the Curriculum.

Our sincere thanks go out to the people who made this Symposium extraordinary. First, our symposium committee: Joel Adams, Dan Bogard, Marilyn Cadenhead, Adrienne Decker, Lynn Degler, John Dooley, James Early, Sue Fitzgerald, Susan Fox, Ria Galanos, Scott Grissom, Susan Hailer, Sarah Heckman, Steven Huss-Lederman, Catherine Lang, Cary Lazer, James Maher, Lester I. McCann, Larry Merkle, Jody Paul, Susan Rodger, Ann Sobel, Jodi Tims, Kimberly Voll, Henry Walker, Steven Wolfman, Jian Zhang, and Steve Zilora. Additional thanks go to our Associate Program Chairs who provided meta-reviews for papers: Allison Elliott Tew, Brad Richards, Stephen Cooper, Mary Anne Egan, Eric Aaron, Charles Leska, Pam Cutter, Ruth E. Anderson, Sara Miner More, and Suzanne Fox Buchele. We’d also like to thank all of our student volunteers who help us with all of the small details and our International Liaison Committee (Reyyan Ayfer, Mordechai Ben-Ari, Janet Carter, Alison Clear, Mohamed Hamada, Sridhar Iyer, Maria Knobelsdorf, Chi-Un Lei, Claudia Bauzer Madeiros, Cecille Marsh, Guido Rößling, Yasuto Shirai, Su White, and Gary K.W. Wong) for helping ensure SIGCSE 2013 is welcoming to attendees from around the world.

In difficult economic times, we extend a very grateful thank you to our supporters, vendors, exhibitors and in-kind donors whose participation literally make the symposium possible. We especially thank Microsoft as the Platinum Plus Supporter, ABET, Google and Intel as Platinum Supporters, and Oracle as a Silver Supporter. Special thanks go to Dorothea Heck and her team at D. Lawrence Planners for coordinating an outstanding exhibition and to Susan Rodger, our amazing supporter/exhibitor liaison.

We thank SIGCSE President Renée McCauley and the entire SIGCSE Board for their support and guidance, and acknowledge the contributions of SIGCSE Symposium Site Coordinators Bob Beck and Scott Grissom, as well as Ashley Cozzi of ACM. Lisa Tolles of Sheridan Printing Company brought all materials together. Also, the City of Denver provided valuable information through their excellent Visit Denver site, and SIGCSE 2013 attendees owe Soulaiman Bahalla (our main contact at Sheraton) a ‘high five’ for all his efforts.

Special thanks to our home institutions for providing needed resources: Colorado School of Mines, Georgia Gwinnett College, Haverford College, and Rochester Institute of Technology. We genuinely hope you enjoy the Symposium and find the SIGCSE 2013 Proceedings of use for your work now and your future projects and activities.

**Symposium Chairs**

**Tracy Camp**  
*Colorado School of Mines*

**Paul Tymann**  
*Rochester Institute of Technology*

**Program Chairs**

**John Dougherty**  
*Haverford College*

**Kris Nagel**  
*Georgia Gwinnett College*
SIGCSE 2013 Symposium Committee

Symposium Chairs
Tracy Camp, Colorado School of Mines
Paul Tymann, Rochester Inst. of Tech.

Program Chairs
J.D. Dougherty, Haverford College
Kris Nagel, Georgia Gwinnett College

Panels and Special Sessions
Sue Fitzgerald, Metropolitan State U.

Workshops
Susan Haller, SUNY Potsdam
Lester McCann, U. of Arizona

Publications
Joel Adams, Calvin College

Database Administrators
John Dooley, Knox College
Henry Walker, Grinnell College

Registration
Lynn Degler, Rose-Hulman Inst. of Tech.
Cary Laxter, Rose-Hulman Inst. of Tech.
Larry Merkle, Comp. Opt. Services

Posters
Jodi Tims, Baldwin Wallace U.

Birds of a Feather
Jian Zhang, Texas Women’s U.

Student Volunteers and Activities
Steven Huss-Lederman, Beloit College
Steven Wolfman, U. of British Columbia

Webmasters
Dan Bogaard, Rochester Inst. of Tech.
Steve Zilora, Rochester Inst. of Tech.

Treasurer
Scott Grissom, Grand Valley State U.

Evaluations
James Early, SUNY Oswego

Kids Camp
Susan Fox, Macalester College
James Maher, Colorado School of Mines

Publicity / Social Media
Kimberly Voll, U. of British Columbia

Support / Exhibitor Liaison
Susan Rodger, Duke U.

Pre-Conference Events Liaison
Adrienne Decker, Rochester Inst. of Tech.

Affiliated Events Liaison
Sarah Heckman, North Carolina State U.

K-12 Liaison
Marilyn Cadenhead, S. of S. & E. Magnet
Ria Galanos, Thomas Jefferson HS for S. & T.

Local Arrangements
Jody Paul, Metropolitan St. U. of Denver

Student Research Competition
Ann Sobel, Miami U. (Ohio)

International Liaison
Catherine Lang, Swinburne U. of Tech.

International Liaison Committee
Rayyan Ayfer, Bilkent U., Turkey
Mordechai Ben-Ari, Weizmann Inst. of Sci., IL
Janet Carter, U. of Kent, UK
Alison Clear, Christchurch Polytechnic Inst. of Tech., New Zealand
Maria Knobelsdorf, U. of Potsdam, DE
Claudia Bauzer Madeiros, UNICAMP, BRA
Cecille Marsh, Walter Sisulu U., S. Africa
Guido Rößling, Tech. U. Darmstadt, DE
Su White, U. of Southampton, UK
Mohamed Hamada, U. of Aizu, Japan
Yasuto Shirai, Shizuoka U., Japan
Sridhar Iyer, Indian Insti. of Tech., India
Chi-Un Lei, EEE U. of Hong Kong
Gary K. W. Wong, Hong Kong Inst. of Ed.

Associate Program Chairs
Eric Aaron, Wesleyan U.
Ruth E. Anderson, U. of Washington
Suzanne Fox Buchele, Southwestern U.
Stephen C. Cooper, Stanford U.
Pam Cutter, Kalamazoo College
Mary Anne Egan, Siena College
Charles Leska, Randolph-Macon College
Sara Miner More, McDaniel College
Brad Richards, U. of Puget Sound
Allison Elliott Tew, U.W. Tacoma
The demand for computing professionals continues to grow, while women and minorities remain severely underrepresented at all levels. This opening SIGCSE 2013 keynote asks the crucial question “What can WE do to change the face of computing?” Several answers to this question will be provided in an unusual format with the following all star cast. Each speaker will take five minutes to share 20 slides (which automatically advance every 15 seconds) to provide a stimulating presentation that ends with “What can YOU do to change the face of computing?”

Principles, Priorities, and Pressures: Personal and Organizational

Henry Walker, Grinnell College
2013 Award for Lifetime Service

Early discussion regarding a talk at the First-Timers Luncheon highlighted the opportunity for an oldtimer to welcome first timers, encourage participation, and provide perspectives.

Throughout my career, I have been privileged to be able to connect my personal career with activities for the broad, educational-computing community. This talk reflects on factors that have impacted both my own career and the evolution of broader groups --- particularly SIGCSE.

Some general principles (e.g., inclusion, respect, service and social responsibility) seem clear, but even then circumstances present challenges and contradictions. Other principles (e.g., encouraging creative brainstorming, utilizing serendipity, listening to people) may be less obvious, but equally vital.

Many have described the SIGCSE community as a professional family, and this talk seeks to celebrate that community as promotes a vision for fulfilling personal careers and continued organizational development.
This Much I Know – Thoughts on the Past, Present and Future of Educational Programming Tools

Michael Kölling, University of Kent, Canterbury
Ballroom ABC

Friday, 8:30 AM

2013 Award for Outstanding Contribution to Computer Science Education

Tools to support and improve the learning and teaching of programming have been developed, used and researched for many years. Yet, sometimes it seems we are still faced with exactly the same problems we were trying to tackle a decade ago, or two decades ago.

In this talk I will look back on educational software tools, through very subjective blinkers, and present a highly personal slice of the history of some of these efforts. This is followed by an attempt to speculate about the future. Where my crystal balls fails me, I will simply stipulate wishes, requirements and challenges – always much easier than presenting facts. Overall, I hope that some current trends in educational software tools emerge.

Online Education

John Etchemendy, Provost, Stanford University
Ballroom ABC

Friday, 12:30 PM

There has been an explosion of interest in Online Education since Stanford made three computer science courses freely available in September 2011 and attracted 300,000 “students.” Yet Online Education has been around in various forms for thirty plus years. What accounts for the sudden inflection point sparked by these courses? Will the rush to put courses online prove to be (a) a flash in the pan, (b) the savior of higher education, (c) the death knell of universities as we know them, (d) all of the above?

Unlocking the Clubhouse:
A Decade Later and Now What?

Jane Margolis, UCLA
Ballroom ABC

Saturday, Noon

In the decade since Unlocking the Clubhouse: Women in Computing (MIT Press, 2002) was published, educational institutions have coalesced around the mission of increasing women’s participation in computing. Yet, despite the uptick of interest in computer science majors and the surge of technology shaping all aspects of our lives, the numbers of women majoring in computer science are still abysmally small. In this talk, I will further reflect on why this is the case, and make connections to the issues raised in Stuck in the Shallow End: Education, Race, and Computing—the underrepresentation in computer science of students of color. I will examine how underrepresentation in computing relates to the larger educational crisis in this country and issues we face as world citizens. This talk is part of an overarching mission to understand how inequality is produced in this country and the types of social action required to equalize opportunities and broaden participation in computing.
### Pre-Conference Events

**Wednesday, 8:00 a.m. to 5:00 p.m.**
- Managing the Academic Career for Women  
  Governors 12

**Wednesday, 9:00 a.m. to 5:00 p.m.**
- Open Source Software  
  Governors 9
- Computational Thinking Through Computing and Music  
  Governors 11
- CSAB Computing Accreditation Workshop  
  Governors 14
- Git & GitHub Foundations for Educators  
  Governors 16

**Wednesday Morning, 9:00 a.m. to 12:00 p.m.**
- SIGCAS Share and Learn  
  Governors 10
- Using the GENI Networking Testbed  
  Governors 15

**Wednesday Afternoon, 1:00 p.m. to 5:00 p.m.**
- Exploring the Next Generation of Scratch  
  Governors 15
- Integrating Computing Ethics into the Curriculum  
  Governors 10

**Wednesday Evening, 7:00 p.m. to 10:00 p.m.**
- Workshops 1 - 12  
  Various Locations

*Full descriptions and locations of workshops may be found on page 64 of this program, and on the conference website: [http://www.sigcse.org/sigcse2013/](http://www.sigcse.org/sigcse2013/).*
Thursday Morning, 8:30 a.m. to 10:00 a.m.

SIGCSE Opening Plenary Session

8:30 Welcome
Tracy Camp, Symposium Co-Chair, *Colorado School of Mines*
Paul Tymann, Symposium Co-Chair, *Rochester Institute of Technology*

Keynote Panel:

*Changing the Face of Computing*
Tracy Camp (Moderator), *Colorado School of Mines*
Ed Lazowska, *University of Washington*
Bobby Schnabel, *Indiana University*
Mary Lou Soffa, *University of Virginia*
Lucy Sanders, *University of Colorado - Boulder*
Jan Cuny, *National Science Foundation*
Patty Lopez, *Intel Corp.*

Thursday Morning, 10:00 a.m. to 10:45 a.m.

Break & Exhibits

Thursday Morning, 10:00 a.m. to 11:30 a.m.

NSF Showcase #1

- Diane Baxter, *Computing Principles for All Students' Success (ComPASS)*
- Andrew Ko, CER: *Collaborative Research: Computing Education through Collaborative Debugging*
- Stephanie Ludi, BP: *Collaborative Research: I-ECS: Inclusive Exploring CS Curriculum Enhancement as Face-to-Face and Online Support for Visually Impaired, High School Students*
- Kelvin Sung, *Game-Themed CS1/2: Empowering the Faculty*

Thursday Morning, 10:45 a.m. to 12:00 p.m.

Panel session: Shifting the Paradigm of African-American Students from Consumers of Computer Science to Producers of Computer Science

Moderator: Yolanda Rankin, *Spelman College*
Panelists: Jakita O. Thomas, *Spelman College*
Quincy Brown, *Bowie State University*
Leshell Hatley, *Uplift, Inc.*
Panel session: ACM/IEEE-CS Computer Science Curriculum 2013: Reviewing the Ironman Report

Moderator: Mehran Sahami, Stanford University
Panelists: Steve Roach, University of Texas at El Paso
Ernesto Cuadros-Vargas, San Pablo Catholic University
Richard LeBlanc, Seattle University

Special session: CS Education for the Social Good

Participants: Michael Goldweber, Xavier University
John Barr, Ithaca College
Elizabeth Patitsas, University of Toronto

Paper session: Data Structures

Chair: Jodi Tims, Baldwin Wallace University

10:45 Board Game Strategies in Introductory Computer Science
Ivona Bezakova, Rochester Institute of Technology
James Heliotis, Rochester Institute of Technology
Sean Strout, Rochester Institute of Technology

11:10 Integrating Theoretical and Empirical Computer Science in a Data Structures Course
John Coffey, University of West Florida

11:35 Hunting High and Low: Instruments to Detect Misconceptions Related to Algorithms and Data Structures
Wolfgang Paul, Technische Universität Dortmund
Jan Vahrenhold, Westfälische Wilhelms-Universität Münster

Paper session: Peer Instruction

Chair: Adrian German, Indiana University

10:45 Experience Report: CS1 in MATLAB for Non-Majors, with Media Computation and Peer Instruction
Cynthia Lee, University of California, San Diego

11:10 How We Teach Impacts Student Learning: Peer Instruction vs. Lecture in CS0
Jaime Spacco, Knox College
Beth Simon, University of California at San Diego
Julian Parris, University of California at San Diego

11:35 Peer Instruction in Computing: the Role of Reading Quizzes
Daniel Zingaro, University of Toronto
Cynthia Bailey Lee, University of California, San Diego
Leo Porter, Skidmore College
Paper Session: Student Dynamics 10:45am–Noon
Chair: Suzanne Buchele, Southwestern University
Governors 14

10:45  **Incorporating Metacognition into Learning**  
Murali Mani, University of Michigan, Flint  
Quamrul Mazumder, University of Michigan, Flint

11:10  **Teaching Computer Science Soft Skills as Soft Concepts**  
Orit Hazzan, Technion – Israel Institute of Technology  
Gadi Har-Shai, Technion – Israel Institute of Technology

11:35  **The Relationship between Belonging and Ability in Computer Science**  
Nanette Veilleux, Simmons College  
Rebecca Bates, Minnesota State University, Mankato  
Cheryl Allendoerfer, University of Washington, Seattle  
Dianne Jones, University of Washington, Seattle  
Joyous Crawford, University of Washington, Seattle  
Tamara Floyd Smith, Tuskegee University

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Paper session: Non-Majors 10:45am–Noon
Chair: Debra Goldberg, University of Colorado at Boulder  
Governors 15

10:45  **A Data-Centric Introduction to Computer Science for Non-Majors**  
David G. Sullivan, Boston University

11:10  **Demystifying Networking: Teaching Non-Majors via Analogical Problem-Solving**  
Sahana Murthy, Indian Institute of Technology Bombay  
Sridhar Iyer, Indian Institute of Technology Bombay

11:35  **Computation, Complexity, and Emergence: An Interdisciplinary Honors Seminar**  
Marie desJardins, University of Maryland, Baltimore County

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Paper session: Approaches For Outreach 10:45am–Noon
Chair: Adam Anthony, Baldwin Wallace University  
Governors 16

10:45  **Application of the Cognitive Apprenticeship Framework to a Middle School Robotics Camp**  
D. Brian Larkins, Coastal Carolina University  
J. Christopher Moore, Coastal Carolina University  
Laura R. Covington, Coastal Carolina University  
Louis J. Rubbo, Coastal Carolina University

11:10  **Using Scaffolded Examples to Teach Computational Thinking Concepts**  
Heidi Webb, Penn State University  
Mary Beth Rosson, Penn State University
11:35  

*A Cascading Mentoring Pedagogy in a CS Service Learning Course to Broaden Participation and Perceptions*  
Yasmin Kafai, *University of Pennsylvania*  
Jean Griffin, *University of Pennsylvania*  
Quinn Burke, *College of Charleston*  
Michelle Slattery, *Peak Research*  
Deborah Fields, *Utah State University*  
Rita Powell, *University of Pennsylvania*  

**Supporter Session: Intel**  
10:45am–Noon  
Governors 10

**Lightning Round 2 – New Ideas in Embedded Security and Parallelism**  
Organizer: Matt Wolfe, *Georgia Tech*

**Supporter Session: Microsoft**  
10:45am–Noon  
Governors 17

**Microsoft Programs for Higher Education**  
Presenter: Judith Bishop, *Microsoft Research*

*Detailed descriptions for Supporter Sessions are on page 40 of this program.*

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**Thursday Lunch, 12:00 p.m. to 1:45 p.m.**

**First Timers’ Lunch**  
Ballroom AB  
Address: *Principles, Priorities, and Pressures: Personal and Organizational*  
Henry Walker, *Grinnell College*,  
SIGCSE 2013 Lifetime Service Award Winner

**Lunch Break**  
*On your own.*

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**Thursday Afternoon, 1:45 p.m. to 5:00 p.m.**

**Student Research Poster Session**  
Plaza Exhibits
Thursday Afternoon, 1:45 p.m. to 3:00 p.m.

Panel Session: Mobile Application Development in Computing Curriculum
1:45am–3:00pm
Ballroom D
Moderator: Stoney Jackson, Western New England University
Panelists: Stan Kurkovsky, Central Connecticut State University
           Eni Mustafaraj, Wellesley College
           Lori Postner, Nassau Community College.

Panel session: Strategies for Adding the Emerging CS 2013 PDC Curriculum Recommendations Into CS Courses
1:45am–3:00pm
Ballroom E
Moderator: Richard A. Brown, St. Olaf College
Panelists: Joel C. Adams, Calvin College
           David P. Bunde, Knox College
           Jens Mache, Lewis and Clark College
           Elizabeth Shoop, Macalester College.

Panel session: Fulbrights Abroad in Computer Science
1:45am–3:00pm
Ballroom F
Moderator: Matthew Boutell, Rose-Hulman Institute of Technology
Panelists: Tom Armstrong, Wheaton College
           Linda Ott, Michigan Technological University.

Paper session: Alternatives to Lectures
1:45pm – 3:00pm
Governors 10
Chair: Sherri Goings, Carleton College

1:45 The Inverted Classroom and the CS Curriculum
Kate Lockwood, California State University, Monterey Bay
Rachel Esselstein, California State University, Monterey Bay

2:10 Integrating Fantasy Role-Play into the Programming Lab: Exploring the 'Projective Identity' Hypothesis
Michael James Scott, Brunel University
Gheorghita Ghinea, Brunel University

2:35 Teaching Creativity in Computer Science
Andrea Salgian, The College of New Jersey
Teresa Nakra, The College of New Jersey
Christopher Ault, The College of New Jersey
Yunfeng Wang, The College of New Jersey
### Paper session: Instructional Technologies 1:45pm – 3:00pm

**Chair:** Ashish Amresh, *Arizona State University*  
**Governors 12**

**1:45**  
**Seeking Grace: A New Object-Oriented Language for Novices**  
Kim Bruce, *Pomona College*  
Andrew Black, *Portland State University*  
Michael Homer, *Victoria University of Wellington*  
James Noble, *Victoria University of Wellington*  
Amy Ruskin, *Pomona College*  
Richard Yannow, *Pomona College*

**2:10**  
**Developing a Highly Interactive eBook for CS Instruction**  
James Fenwick Jr., *Appalachian State University*  
Barry Kurtz, *Appalachian State University*  
Philip Meznar, *Appalachian State University*  
Reed Phillips, *Appalachian State University*  
Alex Weidner, *Appalachian State University*

**2:35**  
**CS50 Sandbox: Secure Execution of Untrusted Code**  
David J. Malan, *Harvard University*

### Paper session: Tough Curricular Challenges 1:45pm – 3:00pm

**Chair:** Andrea Danyluk, *Williams College*  
**Governors 14**

**1:45**  
**Cloud Computing in the Curriculum: Fundamental and Enabling Technologies**  
Charles Border, *Rochester Institute of Technology*

**2:10**  
**Characterizing the Need for Graduate Ethics Education**  
Scott Dexter, *Brooklyn College, CUNY*  
Elizabeth Buchanan, *University of Wisconsin-Stout*  
Kellen Dins, *University of Wisconsin-Stout*  
Kenneth R. Fleischmann, *University of Texas at Austin*  
Keith Miller, *University of Illinois Springfield*

**2:35**  
**Methodology Education in Computing: Towards a Congruent Design Approach**  
Matti Tedre, *Stockholm University*

### Paper session: Retention 1:45pm – 3:00pm

**Chair:** Carl Alphonce, *University of Buffalo*  
**Governors 15**

**1:45**  
**Retaining Nearly One Third More Majors with a Trio of Instructional Best Practices in CS1**  
Leo Porter, *Skidmore College*  
Beth Simon, *University of California, San Diego*
2:10  *Retention of STEM Majors using Early Undergraduate Research Experiences*  
Maureen Doyle, Northern Kentucky University  
Bethany Bowling, Northern Kentucky University  
Heather Bullen, Northern Kentucky University  
John Filaseta, Northern Kentucky University

2:35  *Halving Fail Rates using Peer Instruction: A Study of Four Computer Science Classes*  
Leo Porter, Skidmore College  
Cynthia Bailey Lee, University of California, San Diego  
Beth Simon, University of California, San Diego

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**Paper session: CS Education Research**  
**Chair:** Kristy Boyer, NC State University  
Governors 16  
1:45  *Becoming Experts: Measuring Attitude Development in Introductory Computer Science*  
Brian Dorn, University of Hartford  
Allison Elliott Tew, University of Washington, Tacoma

2:10  *What Is It We Are Asking: Interpreting Problem-Solving Questions in Computer Science and Linguistics*  
Noa Ragonis, Beit Berl College, Technion - ITT  
Gila Shilo, Beit Berl College

2:35  *Investigating Factors of Student Learning in Introductory Courses*  
Matthew Hertz, Canisius College  
Sarah Ford, University of Massachusetts, Amherst

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**Supporter Session: Google**  
Think Even Bigger: Scaling High School CS  
**Presenter:** Maggie Johnson, Google Inc.  
Governors 11  
1:45am–3:00pm

**Supporter Session: ABET**  
Dispelling Myths: Common Misconceptions About ABET And Accreditation  
**Presenters:** Michael Milligan, ABET  
Susan Conry, Clarkson University  
Governors 17  
1:45am–3:00pm

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Detailed descriptions for Supporter Sessions are on page 40 of this program.

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**Thursday Afternoon, 3:00 p.m. to 3:45 p.m.**

**Break & Exhibits**  
Plaza Exhibits
Thursday Afternoon, 3:00 p.m. to 4:30 p.m.

NSF Showcase #2

- Alex Repenning, *CT4TC - Computational Thinking for Teaching Computing: Validating a Theory of Broadening Participation*
- Bill Chu and Michael Whitney, *Supporting Secure Programming Education in the IDE*
- Cyndi Rader, *Collaborative Research: BP: CS Unplugged: Encourage Computing without Computers*
- Massood Towhidnejad, *A Curriculum-wide Software Dev. Case Study*

Thursday Afternoon, 3:45 p.m. to 5:00 p.m.

**Panel session: Computer Science Curriculum 2013:** 3:45am–5:00pm

*Social and Professional Recommendations* Ballroom F

Moderator: Elizabeth K. Hawthorne, *Union County College*

Panelists: Florence Appel, *St. Xavier University*

Carol Spradling, *Northwest Missouri State University*

Lisa Kaczmarczyk, *Independent Evaluation Consultant*

**Special session: Understanding NSF Funding Opportunities** 3:45pm – 5:00pm

Governors 15

Organizer: Jeffrey Forbes, *National Science Foundation*

Participants: Victor Piotrowski, *National Science Foundation*

Jane Prey, *National Science Foundation*

D. Suzanne Westbrook, *National Science Foundation*

**Special session: An Interactive Exploration of Gender and Computing: Unpacking the Student Experience** 3:45pm – 5:00pm

Ballroom D

Participants: Lynn Andrea Stein, Debbie Chachra,

Yevgeniya V. Zastavker, Caitrin Lynch, and

Alisha Sarang-Sieminski,

all of *Franklin W. Olin College of Engineering*

**Special session: Demystifying Computing with Magic, Continued** 3:45pm – 5:00pm

Ballroom E

Participants: Daniel D. Garcia, *University of California, Berkeley*

David Ginat, *Tel-Aviv University*
Paper session: Tools
Chair: Laurie King, College of the Holy Cross
3:45pm – 5:00pm
Governors 10

Reading Mobile Games Throughout the Curriculum
Michael Spear, Lehigh University
Jennifer Bayzick, Lehigh University
Bradley Askins, Lehigh University
Sharon Kalafut, Lehigh University

Hairball: Lint-inspired Static Analysis of Scratch Projects
Bryce Boe, University of California Santa Barbara
Charlotte Hill, University of California Santa Barbara
Barbara Michelle Len, University of California Santa Barbara
Greg Dreschler, University of California Santa Barbara
Phillip Conrad, University of California Santa Barbara
Barbara Diana Franklin, University of California Santa Barbara

GSK: Universally Accessible Graph SKetching
Suzanne Balik, North Carolina State University
Sean Mealin, North Carolina State University
Matthias Stallmann, North Carolina State University
Robert Rodman, North Carolina State University

Paper session: Student Behaviors and Experiences
Chair: Martha Kosa, Tennessee Technological University
3:45pm – 5:00pm
Governors 12

Collaborative Learning and Anxiety:
A phenomenographic study of collaborative learning activities
Katrina Falkner, University of Adelaide
Nickolas Falkner, University of Adelaide
Rebecca Vivian, University of Adelaide

Life’s a Game and the Game of Life:
How Making a Game out of it Can Change Student Behavior
Adrienne Decker, Rochester Institute of Technology
Elizabeth Lane Lawley, Rochester Institute of Technology

A Student Perspective on Prior Experience in CS1
Anyta Tafliovich, University of Toronto Scarborough
Jennifer Campbell, University of Toronto
Andrew Petersen, University of Toronto Mississauga
Paper session: Introducing CS in High School 3:45pm – 5:00pm
Chair: Chris Hundhausen, Washington State University

3:45 The Role of Teachers in Implementing Curriculum Changes
Tim Bell, University of Canterbury
David Thompson, University of Canterbury
Peter Andreae, Victoria University of Wellington
Anthony Robins, University of Otago

4:10 Computer Science Principles: Analysis of a Proposed Advanced Placement Course
Owen Astrachan, Duke University
R. Brook Osborne, Duke University
Dwight Barnette, Virginia Tech
Matthew Bauer, Illinois Institute of Technology
Marilyn Carrell, Springdale High School
Rebecca Dovi, Patrick Henry High School
Baker Franke, Chicago Lab High School
Christina Gardner, Georgia Institute of Technology
Jeff Gray, University of Alabama
Jean Griffin, University of Pennsylvania
Richard Kick, Newbury Park High School
Andy Kuemmel, West High School
Ralph Morelli, Trinity College
Deepa Muralidhar, North Gwinnett High School
Chinma Uche, Greater Hartford Academy of Math and Science
Andrea Arpaci-Dusseau, University of Wisconsin Madison

4:35 A More Formal Approach to “Computer Science: Principles”
Ruben Gamboa, University of Wyoming
Rex Page, University of Oklahoma

Paper session: Socio-Cultural Issues 3:45pm – 5:00pm
Chair: Allison Elliott Tew, University of Washington Tacoma Governors 16

3:45 Building Equitable Computer Science Classrooms: Elements of a Teaching Approach
Niral Shah, University of California, Berkeley
Colleen Lewis, Harvey Mudd College
Roxane Caires, University of California, Berkeley
Nasar Khan, University of California, Berkeley
Amirah Qureshi, University of California, Berkeley
Danielle Ehsanipour, University of California, Berkeley
Noopur Gupta, University of California, Berkeley
4:10  *Bringing Computer Science Back Into Schools: Lessons from the UK*
Neil Brown, *University of Kent*
Michael Kölling, *University of Kent*
Tom Crick, *Cardiff Metropolitan University*
Simon Peyton Jones, *Microsoft Research*
Simon Humphreys, *BCS*
Sue Sentance, *Anglia Ruskin University*

4:35  *Cultivating a K12 Computer Science Community: A Case Study*
Sarah Hug, *University of Colorado, Boulder*
Richard Guenther, *St. Vrain Valley School District*
Michael Wenk, *University of Colorado, Boulder*

Supporter Session: Microsoft  
**TouchDevelop Mobile App Development for Everyone**  
3:45am–5:00pm  
Governors 11
Chair: Arjmand Samuel, *Microsoft Research*
Presenters: Nikolai Tillmann, *Microsoft Research*
Michael Braun, *Seattle Public School District*

Supporter Session: Intel  
**Curriculum Workshop: How To Introduce Parallelism Into Entry Level Programming Classes**  
3:45am–5:00pm  
Governors 17
Presenter: David Valentine, *Slippery Rock University*

*Detailed descriptions for Supporter Sessions are on page 40 of this program.*

**Thursday Evening, 5:10 p.m. to 7:00 p.m.**

**Birds of a Feather:**
- **Flock I (5:10-6:00):** Please see page 46 for descriptions and locations.
- **Flock II (6:10-7:00):** Please see page 50 for descriptions and locations.

**Thursday Evening, 7:00 p.m. to 8:00 p.m.**

**SIGCSE Reception – Hot Hors d’oeuvres and Beverages**  
7:00pm – 8:00pm  
Ballroom AB

**Thursday Evening, 8:00 p.m. to 10:00 p.m.**

**Movie Screening: Codebreaker**  
7:00pm – 10:00pm  
Ballroom C
**Friday Morning, 7:15 a.m. to 8:15 a.m.**

Alice Breakfast

Ballroom E

**Friday Morning, 8:30 a.m. to 10:00 a.m.**

SIGCSE Plenary Session

Ballroom ABC

8:30 Welcome

J.D. Dougherty, Program Co-Chair, *Haverford College*
Kristine Nagel, Program Co-Chair, *Georgia Gwinnett College*

**Keynote Address:**

*This Much I Know – Thoughts on the Past, Present and Future of Educational Programming Tools*

Michael Kölling, *University of Kent, Canterbury*

**Friday Morning, 10:00 a.m. to 10:45 a.m.**

Break & Exhibits

Plaza Exhibits

**Friday Morning, 10:00 a.m. to 12:00 p.m.**

Poster Session I

Plaza Exhibits

*Detailed information about posters may be found on page 50.*

**Friday Morning, 10:00 a.m. to 11:30 p.m.**

NSF Showcase #3

Plaza Exhibits

- Jennifer Kidd and Ed Gehringer, *Collaborative Research: Production and Assessment of Student-Authored Wiki Textbooks*
- Ralph Morelli and Chinma Uche, *CS 10K: Mobile CSP: Using Mobile Learning to Teach CS Principles in Connecticut Schools*
- Apan Qasem, *Preparing Computer Science Students for the Multicore Era: Teaching Parallel Computing in the Undergraduate Curriculum*
- Amruth Kumar, *The Next Generation of Practice Exercises for Computer Science I*
Friday Morning, 10:45 a.m. to 12:00 p.m.

Panel session: Teaching Secure Coding – the Myths and the Realities 10:45am–Noon
Moderator: Blair Taylor, Towson University
Participants: Matt Bishop, University of California at Davis
Elizabeth Hawthorne, Union County College
Kara Nance, University of Alaska Fairbanks

Special session: Alternatives to Lecture: Revealing the Power of Peer Instruction and Cooperative Learning 10:45am–Noon
Participants: Scott Grissom, Grand Valley State University
Leland Beck, San Diego State University
Beth Simon, University of California, San Diego

Special session: ACM/IEEE Computer Science 2013 Exemplar-Fest 10:45am–Noon
Participants: Andrea Danyluk, Williams College
Steve Roach, ITT Exelis
Elizabeth K. Hawthorne, Union County College
Henry M. Walker, Grinnell College
Ruth E. Anderson, University of Washington
Christa M. Chewar, U.S. Military Academy

Paper session: Student Centered Approaches 10:45am–Noon
Chair: Durell Bouchard, Roanoke College
10:45 Studio-Based Learning and App Inventor for Android in an Introductory CS Course for Non-Majors
Khuloud Ahmad, Ball State University
Paul Gestwicki, Ball State University
11:10 Impacts of Adaptive Feedback on Teaching Test-Driven Development
Kevin Buffardi, Virginia Tech
Stephen H. Edwards, Virginia Tech
11:35 Adding a Contributing Student Pedagogy Component to an Introductory Database Course
Henry A. Etlinger, Rochester Institute of Technology
Paper session: Underserved Populations 10:45am–Noon
Chair: Eric Aaron, Wesleyan University Governors 12

10:45  **On the Nature of Fires and How to Spark Them When You’re Not There**
Sarah Esper, University of California, San Diego
Stephen R. Foster, University of California, San Diego
William G. Griswold, University of California, San Diego

11:10  **Cupcake Cushions, Scooby Doo Shirts, and Soft Boomboxes: E-Textiles in High School to Promote Computational Concepts, Practices, and Perceptions**
Yasmin Kafai, University of Pennsylvania
Kristin Searle, University of Pennsylvania
Eliot Kaplan, Westminster Schools
Deborah Fields, Utah State University
Eunkyoung Lee, University of Pennsylvania
Deborah Liu, University of Pennsylvania

11:35  **Workifying Games: Successfully Engaging African American Gamers with Computer Science**
Betsy DiSalvo, Georgia Institute of Technology
Mark Guzdial, Georgia Institute of Technology
Charles Meadows, Morehouse College
Tom McKlin, The Findings Group
Ken Perry, Morehouse College
Amy Bruckman, Georgia Institute of Technology

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Paper session: Architecture and Hardware 10:45am–Noon
Chair: Tim Stanley, Utah Valley University Governors 14

10:45  **Emumaker86: A Hardware Simulator for Teaching CPU Design**
Michael Black, American University
Nathaniel Waggoner, American University

11:10  **Helping Students Understand the Datapath with Simulators and Crazy Models**
James Teresco, The College of Saint Rose
Michael Gousie, Wheaton College

11:35  **Step-by-Step Design and Simulation of a Simple CPU Architecture**
Derek C. Schuurman, Redeemer University College
FRIDAY   FRIDAY   FRIDAY   FRIDAY   FRIDAY   FRIDAY   FRIDAY   FRIDAY
FRIDAY   FRIDAY   FRIDAY   FRIDAY   FRIDAY   FRIDAY   FRIDAY   FRIDAY
FRIDAY   FRIDAY   FRIDAY   FRIDAY   FRIDAY   FRIDAY   FRIDAY   FRIDAY

Paper session: Teaching CS1  
Chair: Jian Zhang, Texas Women’s University

10:45 Introducing Computer Science in an Integrated Science Course  
Barry Lawson, University of Richmond  
Doug Szajda, University of Richmond  
Lewis Barnett, University of Richmond

11:10 Teaching the Security Mindset to CS 1 Students  
Vahab Pournaghshband, UCLA

11:35 Constructive Use of Errors in Teaching CS1  
David Ginat, Tel-Aviv University  
Ronit Shmalo, Tel-Aviv University

Paper session: Assessment  
Chair: Eric Snow, SRI International

10:45 Computing Creativity: Divergence in Computational Thinking  
Vicki Bennett, Kyu Han Koh, Alexander Repenning,  
all of University of Colorado at Boulder

11:10 On Plugging “Unplugged” into CS Classes  
Renate Thies, Cusanus-Gymnasium Erkelenz and Technische Universität Dortmund  
Jan Vahrenhold, Westfälische Wilhelms-Universität Münster

11:35 Assessment of Computer Science Learning in a Scratch-Based Outreach Program  
Bryce Boe, Diana Franklin, Phillip Conrad, Katy Nilsen,  
Charlotte Hill, Michelle Len, Greg Dreschler, Gerardo Aldana,  
and Sarah Hough, all of the University of California Santa Barbara

Supporter Session: Google  
Building Online Courses  
Presenter: Peter Norvig, Director of Research, Google Inc.

Supporter Session: Microsoft  
Using Kinect in HCI and Game Design Classes:  
Experiences, Opportunities & Tips  
Presenters: Stewart Tansley, Microsoft Research

Detailed descriptions for Supporter Sessions may be found on page 40.
Friday Lunch, 12:00 p.m. to 1:45 p.m.

Lunch Break

On your own.

Friday Afternoon, 12:30 p.m. to 1:30 p.m.

SIGCSE Plenary Session

Ballroom ABC

Keynote Address: Online Education
John Etchemendy, Provost, Stanford University

Friday Afternoon, 1:45 p.m. to 3:00 p.m.

Panel Session: Growing Female Undergraduate Enrollments in Computer Science: Some Successful Approaches

Moderator: Wendy DuBow, University of Colorado
Panelists: Ignatios Vakalis, Cal Poly, San Luis Obispo
Manuel A. Perez-Quinones, Virginia Tech
Jason T. Black, Florida A&M

Panel Session: Rediscovering the Passion, Beauty, Joy, and Awe: Making Computing Fun Again, part 6

Moderator: Daniel D. Garcia, University of California, Berkeley
Panelists: Valerie Barr, Union College
Mark Guzdial, Georgia Institute of Technology
David J. Malan, Harvard University

Special session: AP CS A Exploration of a Change from GridWorld to Labs

Participants: Renee L. Ciezki, Estrella Mountain Community College
Lien Diaz, College Board
Robert Glen Martin, School for the Talented and Gifted
Henry M. Walker, Grinnell College
Special session: Revision of the SE 2004 Curriculum Model
1:45pm–3:00pm Ballroom F
Participants: Gregory W. Hislop, Drexel University
Mark Ardis, Stevens Institute of Technology
David Budgen, Durham University
Mark J. Sebern, Milwaukee School of Engineering
Jeff Offut, George Mason University
Willem Visser, University of Stellenbosch

Paper session: Tools for Teaching the Core 1:45pm–3:00pm
Chair: Marie Bienkowski, SRI International Governors 10
1:45 Teaching Garbage Collection without Implementing Compilers or Interpreters
Arjun Guha, Cornell University
Gregory H. Cooper, Google, Inc.
Arjun Guha, Cornell University
Shriram Krishnamurthi, Brown University
Jay McCarthy, Brigham Young University
Robert Bruce Findler, Northwestern University
2:10 .NET Gadgeteer: A New Platform for K-12 Computer Science Education
Steve Hodges, Microsoft Research
James Scott, Microsoft Research
Sue Sentance, Anglia Ruskin University
Colin Miller, Microsoft Corp.
Nicolas Villar, Microsoft Research
Scarlet Schwiderski-Grosche, Microsoft Research
Kerry Hammil, Microsoft Corp.
Steven Johnston, Microsoft Research
2:35 Using FPGAs As A Reconfigurable Teaching Tool Throughout CS Systems Curriculum
D. Brian Larkins, Coastal Carolina University
William M. Jones, Coastal Carolina University
H. Erin Rickard, Coastal Carolina University

Paper session: Parallel/Distributed Computing 1:45pm–3:00pm
Chair: Mike Helmick, Google Governors 12
1:45 MDAT: A Multithreading Debugging and Testing Tool
Eric Larson, Seattle University
Rochelle Palting, Seattle University
2:10  **Pattern Programming Approach for Teaching Parallel and Distributed Computing**  
Barry Wilkinson, University of North Carolina Charlotte  
Jeremy Villalobos, formerly of University of North Carolina Charlotte  
Clayton Ferner, University of North Carolina Wilmington

2:35  **Parallel from the Beginning: The Case for Multicore Programming in the Computer Science Undergraduate Curriculum**  
Bernd Burgstaller, Yonsei University  
Yousun Ko, Yonsei University  
Bernhard Scholz, The University of Sydney

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**Paper session: Teacher Preparation**  
1:45pm–3:00pm

Chair: Shaileen Pokress, MIT

1:45  **Pair Programming for Middle School Students: Does Friendship Influence Academic Outcomes?**  
Linda Werner, University of California, Santa Cruz  
Jill Denner, Education, Training, Research Associates  
Shannon Campe, Education, Training, Research Associates  
Eloy Ortiz, Education, Training, Research Associates  
Dawn DeLay, Florida Atlantic University  
Amy C. Hartl, Florida Atlantic University  
Brett Laursen, Florida Atlantic University

2:10  **CS4Impact: Measuring Computational Thinking Concepts Present in CS4HS Participant Lesson Plans**  
Dennis Brylow, Marquette University  
Heather Bort, Marquette University

2:35  **Going Mobile with App Inventor for Android – A One-Week Computing Workshop for K-12 Teachers**  
Jiangjiang Liu, Lamar University  
Phillip Potter, Lamar University  
Ethan Hasson, Lamar University  
Zebulun Barnett, Lamar University

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**Paper session: Diversity**  
1:45pm–3:00pm

Chair: Ruth Anderson, University of Washington

1:45  **A Large-Scale Quantitative Study of Women in Computer Science at Stanford University**  
Mehran Sahami, Stanford University  
Katie Redmond, Stanford University  
Sarah Evans, Stanford University
2:10  *From Difference to Diversity: Including Women in The Changing Face of Computing*
Carol Frieze, Carnegie Mellon University
Jeria Quesenberry, Carnegie Mellon University

2:35  *Are IT Interventions For Girls A Special Case?*
Annemieke Craig, Deakin University
Jo Coldwell-Neilson, Deakin University
Jenine Beekhuyzen, Deakin University

**Supporter Session: Microsoft**
1:45am–3:00pm
Governors 11

New Windows Ecosystem, Connected Devices, and Cloud Services: Faculty Tools and Resources
Presenter: Panel of Microsoft Global Academic Team and Educators

*Detailed descriptions for Supporter Sessions may be found on page 40.*

**Friday Afternoon, 3:00 p.m. to 3:45 p.m.**

**Break & Exhibits**
Plaza Exhibits

**Friday Afternoon, 3:00 p.m. to 4:30 p.m.**

**NSF Showcase #4**
Plaza Exhibits

- Cliff Shaffer, *OpenDSA / Transforming Introductory Computer Science Projects via Real-Time Web Data*
- Penny Rheingans and Marie desJardins, *TUES: Transforming the Freshman Experience of Computing Majors*
- Beth Simon, *Peer Instruction in Computer Science*
- Ilmi Yoon, *Transforming Experience of Computer Science Software Development through Multiplayer Online Game Classroom Collaboration*

**Friday Afternoon, 3:00 p.m. to 5:00 p.m.**

**Poster Session II**
Plaza Exhibits

*Detailed information about posters may be found on page 58.*
Friday Afternoon, 3:45 p.m. to 5:00 p.m.

Panel session: The Revolution will be Televised: Perspectives on Massive Open Online Education
3:45pm–5:00pm Ballroom E
Moderator: Mehran Sahami, Stanford University
Panelists: Mark Guzdial, Georgia Institute of Technology
Fred G. Martin, University of Massachusetts Lowell
Nick Parlante, Stanford University

Special session: Engaging Mathematical Reasoning Exercises
3:45pm–5:00pm Governors 15
Participants: Joseph Hollingsworth, Indiana University Southeast
Joan Krone, Dennison University
Jason O. Hallstrom, Clemson University
Murali Sitaraman, Clemson University
Bruce Weide, The Ohio State University

Special session: How AP CS A Matches College Courses
3:45pm–5:00pm Ballroom D
Participants: Renee L. Ciezki, Estrella Mountain Community College
Lien Diaz, College Board
Frances E. Hunt, Educational Testing Service
Henry M. Walker, Grinnell College

Special session: Stories from the Scratch Community: Connecting with Ideas, Interests, and People
3:45pm–5:00pm Ballroom F
Participants: Karen Brennan, Harvard University
Mitchel Resnick, MIT Media Lab

Paper session: Assessment in Programming Courses
3:45pm–5:00pm Governors 10
Chair: Karl Schmitt, University of Maryland
3:45 Measuring Increased Engagement Using Tablet PCs in a Code Review Class
Samuel Kamin, University of Illinois
Wade Fagen, University of Illinois
4:10  *What Are We Thinking When We Grade Programs?*
Sue Fitzgerald, Metropolitan State University
Brian Hanks, BFH Educational Consulting
Raymond Lister, University of Technology
Renee McCauley, College of Charleston
Laurie Murphy, Pacific Lutheran University

4:35  *Automated Online Grading for Virtual Machine-based Systems Administration Courses*
Lewis Baumstark, University of West Georgia
Edwin Rudolph, University of West Georgia

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**Paper session: Active Learning**

3:45pm–5:00pm

**Chair:** Dick Brown, St. Olaf College

3:45  *Building Knowledge and Confidence with Mediascriptin: A Successful Interdisciplinary Approach to CS1*
Samuel Rebelsky, Grinnell College
Janet Davis, Grinnell College
Jerod Weinman, Grinnell College

4:10  *The Inverted-Lecture Model: A Case Study in Computer Architecture*
Edward Gehringer, North Carolina State University
Barry Peddycord III, North Carolina State University

4:35  *Learning Computer Science in the “Comfort Zone of Proximal Development”*
Nicole Anderson, Winona State University
Tim Gegg-Harrison, Winona State University

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**Paper session: Tools to Support Novice Programmers**

3:45pm–5:00pm

**Chair:** Brad Richards, University of Puget Sound

3:45  *The Simulation Creation Toolkit: An Initial Exploration Into Making Programming Accessible While Preserving Computational Thinking*
Ashok Basawapatna, University Of Colorado Boulder
Alexander Repenning, University Of Colorado Boulder
Clayton Lewis, University Of Colorado Boulder

4:10  *Middle School Students Using Alice: What Can We Learn from Logging Data?*
Linda Werner, University of California, Santa Cruz
Charlie McDowell, University of California, Santa Cruz
Jill Denner, Education, Training, Research Associates
**4:35 Bug Catcher: A System for Software Testing Competitions**
Renee Bryce, University of North Texas
Quentin Mayo, Aaron Andrews, Daniel Bokser Michael Jessica Gonzalez, Tara Noble, Utah State University (REU Program)

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**Paper session: SE and Professional Practice**
Chair: Colleen Lewis, Harvey Mudd College

**3:45 Analyzing PHP Frameworks for Use in a Project-Based Software Engineering Course**
Lisa Lancor, Southern Connecticut State University
Samyukta Katha, Southern Connecticut State University

**4:10 Gaps Between Industry Expectations and the Abilities of Graduates: Systematic Literature Review Findings**
Gursimran Walia, North Dakota State University
Alex Radermacher, North Dakota State University

**4:35 A Mid-Career Review of Teaching Computer Science I**
Amruth Kumar, Ramapo College of New Jersey

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**Supporter Session: ABET**
Moderator: Lawrence G Jones, Carnegie Mellon University

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**Friday Evening, 5:10 p.m. to 5:55 p.m.**

**SIGCSE Business Meeting**
Ballroom E

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**Friday Evening, 6:00 p.m. to 7:00 p.m.**

**CCSCNE Business Meeting**
Ballroom E

**NCWIT Reception for Faculty & Staff of Educational Institutions**
Ballroom A

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**Friday Evening, 7:00 p.m. to 10:00 p.m.**

**Workshops 13, 15 – 24, 26**
Various Locations

*Full descriptions and locations of workshops may be found on page 68, as well as the conference website: http://www.sigcse.org/sigcse2013/*
Saturday Morning, 7:30 a.m. to 8:45 a.m.
Scratch Breakfast
Ballroom ABC

Saturday Morning, 9:00 a.m. to 10:15 a.m.

Special session: Designing and Supporting Collaborative Learning Activities
9:00am–10:15am
Ballroom D
Participants: Katrina Falkner, University of Adelaide
Nickolas J.G. Falkner, University of Adelaide

Special session: Nifty Assignments
9:00am–10:15am
Ballroom E
Moderators: Nick Parlante, Stanford University
Julie Zelenski, Stanford University

Special session: Expanding Access to K-12 Computer Science Education: Research on the Landscape of Computer Science Professional Development
9:00am–10:15am
Ballroom F
Moderator: Baker Franke, University of Chicago Lab Schools
Participants: Jeanne Century, University of Chicago
Michael Lach, University of Chicago
Cameron Wilson, ACM
Mark Guzdial, Georgia Institute of Technology
Gail Chapman, UCLA
Owen Astrachan, Duke University

Paper session: Curricular Innovations
9:00am–10:15am
Governors 10
Chair: Kurt Eiselt, University of British Columbia

9:00 Two Models of a Cryptography and Computer Security Class in a Liberal Arts Context
Suzanne Fox Buchele, Southwestern University

9:25 The Entrepreneur's Bootcamp: A new model for teaching Web/Mobile development and Software Entrepreneurship
Timothy Hickey, Brandeis University
Pito Salas, Brandeis University
9:50  Growing a Computer Science Program with a Focus on Game Development
Timothy Roden, Lamar University
Rob LeGrand, Angelo State University

Paper session: Improving Student Learning in Courses  9:00am–10:15am
Chair: Pam Cutter, Kalamazoo College

9:00  Trace-Based Teaching in Early Programming Courses
Matthew Hertz, Canisius College
Maria Jump, King’s College

9:25  Teaching Cyber-Physical Systems to Computer Scientists via Modeling and Verification
Kostadin Damevski, Virginia State University
Badreldin Altayeb, Virginia State University
Hui Chen, Virginia State University
David Walter, Virginia State University

9:50  A Derivation-First Approach to Teaching Algorithms
Ran Libeskind-Hadas, Harvey Mudd College

Paper session: Working the Web  9:00am–10:15am
Chair: Tim Fossum, SUNY Potsdam

9:00  Online Python Tutor: Embeddable Web-Based Program Visualization for CS Education
Philip Guo, Google, Inc.

9:25  Facilitating Code-Writing in PI Classes
Andrew Petersen, University of Toronto Mississauga
Daniel Zingaro, University of Toronto
Yuliya Cherenkova, University of Toronto Mississauga
Olessia Karpova, University of Toronto Mississauga

9:50  CS Circles: An In-Browser Python Course for Beginners
David Pritchard, Princeton University
Troy Vasiga, University of Waterloo

Paper session: Computational Thinking  9:00am–10:15am
Chair: Catherine Lang, Swinburne University

9:00  Will it Stick? Exploring the Sustainability of Computational Thinking Education Through Game Design
KYU HAN KOH, University of Colorado at Boulder
Alexander Repenning, University of Colorado at Boulder
Hilarie Nickerson, University of Colorado at Boulder
Yasko Endo, University of Colorado at Boulder
Pate Motter, University of Colorado at Boulder
9:25  The Social Turn in K-12 Programming: Moving from Computational Thinking to Computational Participation  
Yasmin Kafai, University of Pennsylvania  
Quinn Burke, College of Charleston

9:50  Accelerating K-12 Computational Thinking Using Scaffolding, Staging, and Abstraction  
David S. Touretzky, Carnegie Mellon University  
Daniela Marghitu, Auburn University  
Stephanie Ludi, Rochester Institute of Technology  
Debra Bernstein, TERC  
Lijun Ni, Georgia Institute of Technology

Paper session: Camps and Mobile Computing  
9:00am–10:15am  
Chair: Jakita Thomas, Spelman College

9:00  Girls on the Go: A CS Summer Camp to Attract and Inspire Female High School Students  
Gerald Gannod, Miami University  
Janet Burge, Miami University  
Maureen Doyle, Northern Kentucky University  
Karen Davis, University of Cincinnati

9:25  Using App Inventor in K-12 Summer Camp  
Amber Wagner, University of Alabama  
Jeff Gray, University of Alabama  
Jonathan Corley, University of Alabama  
David Wolber, University of San Francisco

9:50  No Sensor Left Behind: Enriching Computing Education with Mobile Devices  
Brian Dean, Clemson University  
Matthew Dabney, Clemson University  
Tom Rogers, Southside High School

Saturday Morning, 9:00 a.m. to 10:15 a.m.

Student Research Presentations  
Governors 16 (graduate)  
Governors 17 (undergraduate)
Saturday Morning, 10:15 a.m. to 11:45 p.m.

NSF Showcase #5

- Jill Denner, Linda Werner, and Shannon Campe, *Collaboration across Disciplines and Organizations: Enhancing Research on Diversity and Equity in K-12 Computer Science Education*
- Kemi Jona, *Casting a Wide Net: Applied Computational Thinking*
- Diana Franklin, *CER: DEPICT: Developing Elementary (Learning) Progressions to Integrate Computational Thinking*
- Xiaohong Yuan, *Developing Faculty Expertise in Information Assurance through Case Studies and Hands-on Labs*

Saturday Morning, 10:15 a.m. to 10:45 a.m.

Break & Exhibits

Saturday Morning, 10:45 a.m. to 12:00 p.m.

Panel session: Textbook Pricing: Present and Future  10:45am–Noon  Ballroom E

Moderator: Edward F. Gehringer, North Carolina State University
Panelists: Beth Lang Golub, John Wiley & Sons
          Randi Cohen, Taylor & Francis
          David M. Arnow, Brooklyn College
          Cliff Shaffer, Virginia Tech

Paper session: Classroom Management  10:45am–Noon  Governors 12

10:45  *Git on the Cloud in the Classroom*
       Joseph Lawrance, Wentworth Institute of Technology
       Seikyung Jung, Bridgewater State University
       Charles Wiseman, Wentworth Institute of Technology
11:10  *Creating Effective Student Groups: an Introduction to groupformation.org*
       Tyson Henry, California State University, Chico
11:35  *The Effectiveness of Live-Coding to Teach Introductory Programming*
       Marc Rubin, Colorado School of Mines
### Paper session: Music and Computing Education  
**Chair:** Laurie Murphy, *Pacific Lutheran University*  
**Governors 14**

**10:45**  
*Tackling Engagement in Computing with Computational Music Remaking*  
Brian Magerko, *Georgia Tech*  
Jason Freeman, *Georgia Tech*  
Tom McKlin, *The Findings Group, LLC*  
Scott McCoid, *Georgia Tech*  
Tom Jenkins, *Georgia Tech*

**11:10**  
*Computer Science “Big Ideas” Play Well in Digital Sound and Music*  
Jennifer Burg, *Wake Forest University*  
Jason Romney, *University of North Carolina School of the Arts*  
Eric Schwartz, *University of North Carolina School of the Arts*

**11:35**  
*Form, Function and Performances in a Musical Instrument MAKers Camp*  
Blake Sawyer, *Virginia Tech*  
Jason Forsyth, *Virginia Tech*  
Taylor O’Connor, *Virginia Tech*  
Brennon Bortz, *Virginia Tech*  
Teri Finn, *Virginia Tech*

### Paper session: Security and Secure Programming  
**Chair:** David Stucki, *Otterbein University*  
**Governors 15**

**10:45**  
*Learning Mobile Security with Android Security Labware*  
Minzhe Guo, *University of Cincinnati*  
Prabir Bhattacharya, *University of Cincinnati*  
Ming Yang, *Southern Polytechnic State University*  
Kai Qian, *Southern Polytechnic State University*  
Li Yang, *University of Tennessee at Chattanooga*

**11:10**  
*A Method for Incorporating Usable Security into Computer Security Courses*  
Binto George, *Western Illinois University*  
Martha Klems, *Western Illinois University*  
Anna Valeva, *Western Illinois University*

**11:35**  
*Interactive Support for Secure Programming Education*  
Jun Zhu, *University of North Carolina at Charlotte*  
Heather Lipford, *University of North Carolina at Charlotte*  
Bill Chu, *University of North Carolina at Charlotte*
Paper session: Capstones
10:45am–Noon
Chair: Haklin Kimm, East Stroudsburg University
10:45  *A Case for Course Capstone Projects in CS1*
Saquib Razak, Carnegie Mellon University
11:10  *Empirical Evaluation of Periodic Retrospective Assessment*
Paul Gestwicki, Ball State University
Brian McNely, University of Kentucky
11:35  *Software Security Testing of an Online Banking System: A Unique Research Experience for Undergraduates and Computer Teachers*
Dianxiang Xu, Dakota State University

Paper session: Educational Research
10:45am–Noon
Chair: James Maher, Colorado School of Mines
10:45  *CE21–Maryland: The State of Computer Science Education in Maryland High Schools*
Marie desJardins, University of Maryland, Baltimore County
Susan Martin, University of Maryland, Baltimore County
11:10  *How Students Estimate the Effects of IT and Programming Courses*
Michail Giannakos, Norwegian University of Science and Technology
Peter Hubwieser, Technische Universität München
Nikos Chrisochoides, Old Dominion University
11:35  *Using a Discourse-Intensive Pedagogy and Android’s App Inventor for Introducing Computational Concepts to Middle School Students*
Shuchi Grover, Stanford University
Roy Pea, Stanford University

Special session: CS Principles: Development and Evolution of a Course and a Community
10:45am–Noon
Ballroom D
Participants: Owen Astrachan, Duke University
Amy Briggs, Middlebury College
Lien Diaz, College Board
R. Brook Osbourne, Duke University

Special session: Addressing 21st Century Skills by Embedding CS in K-12 Classes
10:45am–Noon
Ballroom F
Participants: Debra S. Goldberg, University of Colorado Boulder
Dirk Grunwald, University of Colorado Boulder
Clayton Lewis, University of Colorado Boulder
Jessica Feld, University of Colorado Boulder
Kristin Donley, Boulder Valley School District
Odette Edbrooke, Boulder Valley School District
Supporter Session: Oracle
Getting Started with Java using Alice3
Presenter: Caron Newman, Oracle Academy

Saturday Lunch, 12:00 p.m. to 2:00 p.m.

SIGCSE Luncheon and Concluding Address Ballroom ABC
Unlocking the Clubhouse: A Decade Later and Now What?
Jane Margolis, Senior Researcher
UCLA Graduate School of Education and Information Studies

Saturday Afternoon, 3:00 p.m. to 6:00 p.m.

Workshops 25, 27 - 36 Various Locations
Full descriptions and locations of workshops may be found on page 72, as well as the conference website: http://www.sigcse.org/sigcse2013/.
SIGCSE 2013 Corporate Supporter Sessions

Through the SIGCSE 2013 Symposium, corporate supporters have the opportunity to schedule sessions on topics of their choice. The following sessions have been coordinated with the SIGCSE 2013 Committee. The SIGCSE 2013 Committee and SIGCSE appreciate the interest of these companies in computer science education and their willingness to work with the SIGCSE 2013 committee to coordinate these events.

Thursday, March 7, 2013 10:45am - 12:00PM

Intel: Lightning Round 2 - New Ideas in Embedded, Security and Parallelism
Governors 11
Presenter: Matt Wolf, Georgia Tech

Come get the latest in teaching content from your peers to introduce embedded, security and parallel concepts into computer science classes. See short, fun and exciting examples of how your peers are bringing embedded, security or parallelism concepts into their curriculum.

Microsoft: Microsoft programs for Higher Education
Governors 17
Presenter: Judith Bishop
Director of Computer Science, Microsoft Research

Microsoft Research Connections helps bring together academics and our own researchers to assist in shaping the future in such fields as cloud computing, devices and services, software engineering, natural user interfaces, and data-intensive scientific research. We provide an array of programs that support faculty and students in their research, teaching and studies. In addition to financial awards, we also offer faculty visits, internships, competitions, specialized workshops and events, and device loan programs. All of these are supported by our computer scientists based around the world. Whether you have participated in our programs before or are curious about how to join in, this session will outline these programs, and give you an opportunity for Q&A on interacting with Microsoft Research.
Google: Think Even Bigger: Scaling High School CS
Governors 11

Presenter: Maggie Johnson, Director of Education and University Relations, Google Inc.

In the last five years, we have seen significant progress in raising awareness about the importance of Computer Science for high school students. Standards, professional development, and new CS curriculum have been created and tested. Now, it's time to determine the best means for consolidating all the great work that has been done and scaling it so every high school student will have access to high-quality CS. This talk will review current work in CS for high schools, and propose strategies for scaling.

Bio: Ms. Johnson is Google’s Director of Education and University Relations. She manages all technical training, content development, and information management programs for Google engineers and operations staff, as well as Google’s K12 educational programs in STEM and computer science. She manages Google’s MOOC development programs and oversees the University Relations area, building strategic research partnerships with faculty and labs globally. Prior to Google, she was teaching faculty and Director of Educational Affairs in the Department of Computer Science at Stanford University.

ABET: Dispelling Myths: Common Misconceptions About ABET And Accreditation
Governors 17

Presenters: Michael Milligan, ABET
Susan Conry, Clarkson University

ABET is the global “gold standard” for accreditation of university-based degree programs in computing, applied science, engineering and technology, encompassing 3,200 programs at more than 660 universities in 24 nations. Yet the ABET accreditation process is largely unknown to stakeholders ranging from employers to prospective students, and is often criticized by faculty members for perceived flaws. At this session, senior ABET officials address the most common myths about the organization’s accreditation activities, and invite audience members to voice their ideas, questions and concerns.
Thursday, March 7, 2013 3:45pm - 5:00pm

Microsoft: TouchDevelop- Mobile App Development for Everyone
Governors 11

Chair: Arjmand Samuel, Microsoft Research

Presenters: Nikolai Tillmann, Microsoft Research
            Michael Braun, Seattle Public School District

TouchDevelop Web App is a development environment to create apps ON your tablet or smartphone. TouchDevelop has a predictive on-screen code keyboard and a general-purpose touch-optimized programming language. Scripts written by using TouchDevelop can access data, media, and sensors on the phone, tablet, and PC. Scripts can interact with cloud services, including storage, computing, and social networks. TouchDevelop lets you quickly create fun games and useful tools. In this session, Nikolai Tillmann, from Microsoft Research, will introduce you to TouchDevelop. You can bring your own tablet or smartphone (iPad, iPhone, Android phone or tablet, Windows phone, tablet or laptop) and follow along. We will also have a few Windows Phones for you to borrow. Michael Braun, a teacher from the Seattle Public School District will talk about his experiences using TouchDevelop in the classroom, and inspiring high school students to take on programming.

Intel: Curriculum Workshop: How To Introduce Parallelism Into Entry Level Programming Classes
Governors 17

Presenter: Dr. Dave Valentine, Slippery Rock University

This session is a hands-on experience in adding parallelism to several of the ACM SIGCSE Nifty programming assignments. ACM SIGCSE Nifty assignments are a great way to expose introductory students to parallel programming. The session begins with completed versions of the Nifty Programs and uses Intel’s Parallel Studio to identify hot spots that will benefit from parallelism. Finally, the session will show how OpenMP, TBB and/or Cilk can be added easily to the serial program. The session demonstrates how to teach introductory students how to grab the “low hanging fruit” and boost the productivity of their (already working) projects.
Friday, March 8, 2013 10:45am - 12:00pm

Google: Building Online Courses
Governors 11

Presenter: Peter Norvig, Director of Research, Google Inc.

In the early days of software creation, code was crafted by individuals. Over time we established processes that enabled large groups to build much larger systems. Today, courses are still crafted by an individual teacher -- if we want to build a larger class, serving more students, do we need a new set of course building processes? We now have many choices in course design: in the classroom, online, or as a hybrid. This talk will cover some of the mechanics of running online courses and building online communities.

Bio: Peter Norvig is a Fellow of the American Association for Artificial Intelligence, the Association for Computing Machinery and serves as the Director of Research at Google Inc. His efforts improved core web search algorithms at Google from 2002-2005, and more recently co-taught one of the first massive online open courses (MOOCs) in 2011. Previously, Norvig led the Computational Sciences Division at NASA Ames Research Center receiving the NASA Exceptional Achievement Award in 2001. He has served as an assistant professor at the University of Southern California and a member of the University of California at Berkeley Computer Science Department.

Microsoft: Using Kinect in HCI and Game Design Classes: Experiences, Opportunities & Tips
Governors 17

Presenter: Stewart Tansley, PhD, Microsoft Research

Introduced just 2 years ago, Kinect initially opened up new ways for people to play games and experience entertainment. But it has equally fostered a surge of creative experimentation and new applications. Fusing multiple sensors with artificial intelligence software, Kinect enables touchless user interfaces with both speech and whole body gesture control – an example of a new generation of “natural user interfaces”. Teaching future designers and engineers how to build systems that incorporate such techniques is crucial to avoid simply naively applying traditional GUI (graphical) and CLI (command line) paradigms. This session presents practical experiences in teaching using Kinect and summarizes best practices to save you time and energize your UI or game design classes.
**Friday, March 8, 2013 1:45pm - 3:00pm**

**Microsoft: New Windows Ecosystem, Connected Devices and Cloud Services: Faculty Tools and Resources**  
*Governors 11*

Presenters: Panel of Microsoft Global Academic Team members and Educators

Latest innovations in App Development, NUI devices, Cloud Computing and other advances introduce new and exciting opportunities for computing industry and higher education. Integrating these innovations in teaching presents a broad range of novel approaches (i.e. MOOCs) and interesting challenges (i.e. Lab in the Cloud). Come to hear about the new curriculum and cloud computing resources and other programs available to address the faculty needs and how they have been used in universities world-wide.

This panel will provide an opportunity for SIGCSE attendees to hear from a Global Academic team and faculty who have been teaching CS courses using the latest Microsoft technology, such as Windows 8 and Windows Azure, ask questions and discuss and share their own experiences.

**Friday, March 8, 2013 3:45pm - 5:00pm**

**ABET: Is There Value In ABET Accreditation?**  
*Governors 11*

Moderator: Lawrence G Jones, Software Engineering Institute, Carnegie Mellon University  
Panelists: Kenneth Martin, University of North Florida  
Ron Doyle, IBM Distinguished Engineer, SWG Strategy and Tech.

The accreditation process requires a lot of valuable institutional resources and volunteer time. Do the benefits outweigh the costs? In this session panelists from industry and academia will discuss what value results from the ABET accreditation process for the many stakeholders: students, employers, faculty members, program and institutional administrators.
Saturday, March 9, 2013 10:45am - 12:00pm

Oracle: Getting Started with Java using Alice3

Governors 11

Presenter: Caron Newman, Oracle Academy

This presentation engages participants with little or no programming experience to learn basic Java programming concepts. Presenter will showcase Carnegie Mellon’s Alice* platform and do something fun – create animated stories, movies and games. By dragging and dropping graphic tiles that contain standard Java programming statements, participants will see how to develop programs that animate 3D objects.

Bio: Caron, Senior Curriculum Manager, manages the design and development of the Oracle Academy Introduction to Computer Science curriculum used in high schools and community colleges. Free courses available globally include Database Design, SQL, PL/SQL, Alice 3, Greenfoot, and Java. Caron has 20+ years of experience in the software industry focused on technology in education. Caron has Masters degrees in Computer Information Systems and in Education.
SIGCSE 2013 Birds of a Feather Sessions (BOFs)

BOF sessions are informal gatherings for attendees who share a common interest.

Flock I: Thursday Evening, 5:10 p.m. to 6:00 p.m.

Teaching Computer Science Principles with Digital Sound and Music
Susan Reiser, UNC Asheville
Jennifer Burg, Wake Forest University

High school and CS0 computer science students often begin class having no computing education beyond studying office suite programs. Teaching digital audio, a ubiquitous application, allows an authentic and engaging context for the teaching of computer science principles as outlined at http://www.csprinciples.org. In particular, it demonstrates the interconnection of computer science with physics, mathematics, and audio engineering. Do you teach digital audio or music technology? Are you interested in teaching these subjects? In this BOF we will discuss digital audio in computer science CS0 classes.

Test-First Java for Beginners
Viera Proulx, Northeastern University

Test-First Design is well-regarded process among software developers. Practitioner report that it encourages better program design, improves the testability and reliability, and reduces the stress. We have used the test-first design approach in introductory Java-based programming courses for the past ten years. With the support of our tester library, students learn to design tests without any additional syntactic or structural overhead. A number of colleagues at other universities sued the tester library in a variety of courses. Join us for a discussion on how you can help your students learn to design programs in the test-first style.

Where is Computing in General Education?
Catherine Bareiss and Larry Vail, Olivet Nazarene University

Have you been through a general education review, taught a gen ed computing course, or provided a service course in computing? Are computing skills and knowledge a college entrance requirement, upper level discipline specific tool, graduation goal, or knowledge for citizens in a free society? Sample computing courses include: Computer Applications in Business, Writing Process using Microsoft Word, Quantitative Social Science using SPSS, Computing equals Programming, Computing does not equal Programming, AP CS Principles, Computer Ethics, Computers and Society, Computational Thinking, or Introduction to Computer Science. What has and hasn’t worked? What should computing offer to the university? Come hear what others are doing and share your insights.

Automated Generation and Grading of Programming Assignments
Steven Shaffer, Penn State University Park
Cliff Shaffer, Virginia Tech

A problem with teaching large classes of introductory programming students is that students need copious practice but instructors do not have time to grade hundreds of student programs. Large classes might require the instructor to restrict the graded programs to a handful. However, students need much more practice than this, and experience shows that if an assignment is not being graded then many students will not do it. Also, if the same problem is assigned to all students, copying of answers will occur. Programs that generate unique assignments and automatically grade submissions have been developed. Beginning with a brief example, this session will focus on experiences attendees have had with such approaches, and what an idealized system might look like, including exemplar use cases.
CSTA CS K–12 Instructional Standards and CS Curriculum

Deborah Seehorn, NC Department of Public Instruction
Chris Stephenson, CSTA Executive Director
Tammy Randall Pirmann, School District of Springfield Township
Kelly Powers, Advanced Math and Science Academy

In December 2011, CSTA published new instructional standards for K–12 CS Curriculum. In an era of high stakes accountability in our nation’s schools, it behooves CS teachers to align their CS curricula with the new CSTA K–12 CS Standards. K–12 CS Teachers as well as postsecondary educators will find this discussion relevant and informative.

Teaching with Alice

Donald Slater, Carnegie Mellon University
Wanda Dann, Carnegie Mellon University
Steve Cooper, Stanford University

This session is for anyone currently using Alice 3.x and / or Alice 2.x, or exploring the possibility of using Alice in his or her curriculum. The discussion leaders and experienced Alice instructors will share teaching strategies, tips, and tricks with each other and those new to Alice. The session provides an arena for sharing Alice instructional materials and ideas for courses at all educational levels. This is an opportunity to share assignments and pointers to web sites where collections of instructional materials, such as syllabi, student projects, exams, and other resources are available.

Nifty Computing in Society Case Studies

Netiva Caftori, Northeastern Illinois University
Jim Huggins, Kettering University
Alfreda Dudley, Towson University
Karla Carter, Bellevue University
Dee Weikle, Eastern Mennonite University in Harrisonburg

This session is being organized by ACM SIGCAS (Computers and Society) for those with an interest in addressing the social and ethical consequences of computing in our society within their curricula. We will share case studies for teaching a variety of issues resulting from the impact of computing in our society. Our discussion leaders will introduce briefly favorite case studies in their fields of interest and will encourage all participants to share examples of their own. Ways for dealing and solving current problems will be tackled. We will provide a plan of how to incorporate the case studies presented into our classes along with a handout of how to do so. Topics of interest include legal issues, social media, privacy, and sustainability.

Integrating Communication Skills into the CS Curriculum

Mark Hoffman, Quinnipiac University
Janet Burge, Miami University
Jerry Gannod, Miami University
Mladen Vouk, North Carolina State University

In response to employers’ needs for graduates with excellent communication skills and ABET requirements, the three-year NSF-funded CPATH II project “Incorporating Communication Skills into the Computer Science Curriculum” brought together Computer Science educators and communications specialist to develop assignments and communications supports that integrate communication instruction across the curriculum. In this Birds of a Feather session, participants will learn about the results of the CPATH II project, discuss their experience with incorporating communication into their courses, and learn how to utilize and contribute to the project’s on-line assignment repository.
The Future of ABET Computer Science Program Criteria
Governors 10
Allen Parrish, *The University of Alabama*
Cary Laxer, *Rose-Hulman Institute of Technology*
The ABET Computing Accreditation Commission and CSAB (made up of representatives from ACM and IEEE-CS) are currently considering the next generation of changes to the computing accreditation criteria, with emphasis on the program criteria for the various disciplinary areas, including computer science. This BOF will provide a platform for discussion of the types of changes that are currently under consideration, with a view toward obtaining feedback on those changes, as well as obtaining new ideas for revisions from the audience.

Bringing Security into Traditional Computer Science Courses: Challenges and Support
Governors 11
Ambareen Siraj, *Tennessee Tech University*
Blair Taylor, *Towson University*
Steve Cooper, *Stanford University*
In today’s world, it is critical that our students get exposure to security education as part of their Computer Science (CS) education because the lack of security consciousness in digital workforce is costing businesses, government, and citizens severely every year. A significant reason behind this problem stems from the fact that the majority of higher education institutions do not have adequate resources to educate CS students in information assurance (IA) and security. While security is not required in the current CS curriculum, IA has been designated as a knowledge area in the proposed ACM/IEEE-CS CS Curricula 2013. In this session, we will discuss challenges in integrating relevant security topics in traditional CS courses and support for CS faculty interested in such integration.

Technovation Challenge: Teaching Girls Computer Science & Entrepreneurship
Governors 12
AnnaLise Hoopes, *Iridescent, Technovation Challenge*
Technovation Challenge introduces computer science to high school girls in a dynamic learning environment that offers exciting, real-world challenges to conquer; fresh new ways of thinking and problem solving; and the support of hands-on female mentors drawn from academia and industry. Over the course of 12 intensive weeks, students identify a problem drawn from their own real-life experiences and program a mobile phone application to solve it. They practice their pitch with experienced investors who give them feedback on their app and business plan. After more polishing and practice, the girls then pitch their ideas to a panel of venture capitalists. The winning team receives funding to take their app to market.

Replicating “Exploring Computer Science” (ECS)
Governors 14
Dale Reed, *University of Illinois Chicago*
Don Yanek, *Northside College Prep High School*
Gail Chapman, *University of California Los Angeles*
Exploring Computer Science (ECS) is engaging, hands-on high school curriculum and associated professional development that is being implemented at a systemic level in the Los Angeles Unified School District and is now being replicated in Chicago Public Schools and elsewhere. The active partnership between Los Angeles, Chicago, the Chicago CSTA, university faculty and high school teachers and administrators has been critical to success in Chicago. What is so special about this guided-inquiry curriculum? For those wanting to replicate this in other cities, how can this be done?
**Teaching Track Faculty in CS**

Mark Sherriff, *University of Virginia*
Dan Garcia, *UC Berkeley*
Jody Paul, *Metropolitan State College at Denver*

Many computer science departments have chosen to hire faculty to teach in a teaching-track position that parallels the standard tenure-track position, providing the possibility of promotion, longer-term contracts, and higher pay for excellence in teaching and service. This birds-of-a-feather is designed to gather educators who are currently in such a position to share their experiences as members of the faculty of their departments and schools, and to provide opportunities for schools considering such positions to gather information.

**Starting and Sustaining an Undergraduate Research Program in CS**

Adam Anthony, *Baldwin Wallace University*
Marie desJardins, *University of Maryland Baltimore County*

A growing interest in experiential learning at many institutions has led to a recent development of institutional environments in which undergraduate research is strongly supported. In many disciplines, such an environment naturally supports basic research programs that are inclusive of both under- and upperclassmen. However, computer science research at the undergraduate level presents a major challenge: most students who have the requisite knowledge to complete a novel research project are already close to graduation, which can make it difficult to involve undergraduates in longer-term research projects. In this bof, we hope to gather both experienced and novice research advisers to discuss strategies for running a continuous research effort across several graduating classes.

**Multi-course Approaches to Curriculum 2013’s Parallel and Distributed Computing**

Richard Brown, *St. Olaf College*
David Bunde, *Knox College*
Elizabeth Shoop, *Macalester College*
Paul Steinberg, *Intel Corp.*
Joel Adams, *Calvin College*
Jens Mache, *Lewis & Clark College*
Michael Smith, *Intel Corp.*
Matthew Wolf, *Georgia Tech*

The CS2013 Curriculum recommendations call for greatly expanded emphasis on parallel and distributed computing (PDC), in response to recent industry changes. CS2013’s PDC knowledge units relate to many undergraduate courses. Participants in this BOF will consider responses to CS2013 PDC recommendations that involve multiple undergraduate CS courses at an institution, as opposed to approaches that concentrate PDC topics primarily within a single course. This sharing and brainstorming session will bring together: * people having experience with a multi-course or multi-level approach to teaching PDC; * people contemplating a multi-course approach to introducing PDC material; and * people wishing to provide and/or hear rationale for a multi-course strategy for teaching PDC.

**Brainstorming CS Principles Big Ideas III: Data and Information**

Suzanne Dietrich, *Arizona State University*
Don Goelman, *Villanova University*

“Data and information facilitate the creation of knowledge” is Big Idea III in the Computer Science Principles effort. As spotlighted in the June issue of ACM Inroads, some of the pilot offerings of CS Principles have included spreadsheets, database structure, and XML. The implementation of the CS Principles framework is quite flexible, as illustrated by these pilots. What concepts do you think should be included as part of data and information? The goal of this Birds-of-a-Feather session is to bring database educators together with those interested in teaching CS Principles to brainstorm this big idea.
A Town Meeting: SIGCSE Committee on Expanding the Women-in-Computing Community
Gloria Townsend, DePauw University

A Town Meeting: SIGCSE Committee on Expanding the Women-in-Computing Community. Gloria Childress Townsend, DePauw University. In January 2004, we organized the second SIGCSE Committee ("Expanding the Women-in-Computing Community"). Our annual Town Meeting provides dissemination of information concerning successful gender issues projects, along with group discussion and brainstorming, in order to create committee goals for the coming year. We select projects to highlight through listserv communication and through our connections with NCWIT, ABI, ACM-W, CRA-W, etc. This year we will highlight ACM-W Chapters and ACM-W Regional Celebrations.

Flock II: Thursday Evening, 6:10 p.m. to 7:00 p.m.

Trends in CS Enrollment at Small Liberal Arts Colleges  
Barbara Anthony, Southwestern University  
Lisa Bender, Concordia College  
Christine Chung, Connecticut College  
Mark Lewis, Trinity University

Enrollments in CS have been climbing dramatically in recent years at large schools, especially those in the top-tier for CS. This type of growth is part of the normal cycle for CS and is expected anytime that the public perceives that the job market for computing related fields is strong. It is unclear how much of this growth is currently seen on other campuses. The purpose of this BoF session is to discuss what educators at smaller campuses, and particularly liberal arts schools, are currently seeing in regards to enrollment in CS. This information could be of particular interest for those at schools considering cutting programs for economic reasons or those adjusting the number of faculty lines.

Logistics of Moving from Computer Fluency to Computational Thinking  
Monika Sobolewska, Michigan State University

As the theme of the conference indicates, computing is changing and so is its pedagogy. In the meantime, many computer science departments teach computer fluency service courses required by their universities, colleges, or other departments, in which the content of the course becomes highly challenged by institutional constraints (e.g. class size, university computer literacy requirement, etc.). This birds-of-a-feather is designed to gather educators who have been teaching fluency courses or may be teaching such courses in the future, so that they can share their experiences, learn from one another, and discuss the most effective ways of affecting change and delivering the content they deem most appropriate.
Computer Scientists Put the Informatics in Bio, Health, and Medical Informatics Education

Bonnie MacKellar, *St John's University*  
Marc Smith, *Vassar College*  
Tammy VanDeGrift, *University of Portland*  
Margaret Menzin, *Simmons College*

There has been an explosion of interest in bioinformatics, medical informatics, and healthcare informatics in the past decade. As a result, many computer science departments are developing courses or degree programs in bioinformatics and/or health informatics. This session is aimed at faculty who are teaching, or developing courses that tie together computer science and biology, medicine, or healthcare. The discussion leaders all have experience teaching courses in healthcare informatics and/or bioinformatics within computer science departments. We will share our expertise and experience on such questions as effectively team teaching interdisciplinary courses, topics to be included, developing case studies and projects, and developing links with biologists and clinicians.

Encouraging Faculty & Student Involvement in Humanitarian Free and Open Source Software (FOSS)

Heidi Ellis, *Western New England University*  
Gregory Hislop, *Drexel University*  
Darci Burdge, *Nassau Community College*  
Lori Postner, *Nassau Community College*

Many faculty members are excited by the prospect of their students contributing to HFOSS. They perceive it as an opportunity to engage students, regardless of race or gender, in projects that have societal impact. But many barriers to entry exist. This BOF will provide a gathering place for faculty who are interested in student participation in FOSS or HFOSS. The discussion will include an overview of an NSF-funded project, OpenFE. The goal of OpenFE is to develop faculty expertise in working with HFOSS projects and to develop curriculum materials that support faculty members in bringing this approach into their classrooms. The members of the OpenFE team will discuss plans for this grant and welcome both novices and experienced contributors to join us and provide feedback.

CSTA Chapters: Supporting Your Local CS Educators

Frances P. Trees, *Rutgers University*  
David Reed, *Creighton University*  
Tammy Pirmann, *Springfield High School*

As part of its commitment to developing a strong community of computer science educators, the Computer Science Teachers Association (CSTA) supports the development of regional CSTA chapters. A CSTA chapter is a local branch of CSTA designed to facilitate discussion of local issues, provision of member services at the local level, and to promote CSTA membership on the national level. This BOF will provide a platform for the discussion of CSTA chapter formation and for the sharing of new resources to help chapters create dynamic and meaningful chapter activities.

How PhD Students at Research Universities Can Prepare for a Career at a Liberal Arts College

Ann Irvine, *Johns Hopkins University*  
Darakhshan Mir, *Rutgers University*

We will discuss how to better organize as graduate students seeking a career in liberal arts colleges (LACs). The BoF will bring together graduate students who are interested in a career path to a LAC but do not have reliable advice and mentorship in their home departments and often turn out to be the only person in their department with such a career choice.
Computer Science Principles: Necessary for All Students’ Success?  
Diane Baxter, *University of California, San Diego*  
Elizabeth Simon, *University of California, San Diego*  

Computing pervades students’ academic and personal lives. Increasingly the core concepts of computational thinking are required for success in other fields. Should CS Principles become a general education requirement for all freshmen? This BOF will provide a platform for the discussion of whether or not the various courses taught as CS-0, Introduction to CS, or CS Principles have clearly defined a set of core competencies that should be required of all undergraduates. Related to this question is a proposed new CS Principles AP exam that is currently in development.

Broadening Mathematical Reasoning in Computing  
Douglas Baldwin, *SUNY Geneseo*  

The pending revision of the ACM/IEEE CS curriculum guidelines for computer science, and the continuing broadening of the computing disciplines, among other considerations, make now a good time to review the role of mathematical reasoning in computing education. This birds-of-a-feather session provides an opportunity for people interested in mathematics and its role in computing education to reflect on and discuss the future of mathematical reasoning in our curricula, guided by the question of whether it should be broader than it has been, narrower, or if it is just right as it is.

Using Version Control in the Classroom  
John Britton, *GitHub*  
Tim Berglund, *GitHub*  

Professional software developers depend on version control every day and that dependency will continue to grow as advances in version control technology continue. Students with experience using version control are more prepared and qualified to work in industry. We should expose students to version control early in their training not only as an additional skill but also as a tool to improve the learning experience. Version control can be leveraged to greatly improve assignment submission, grading, and feedback systems. In this session we will discuss strategies for incorporating the use of version control in the classroom as well as best practices for individual and group work submission, grading and feedback.

Including HCI and User Experience (UX) Methodologies in Computing Curriculum  
Debra Lee Davis, *Florida International University*  
Kip Irvine, *Florida International University*  
Janet Davis, *Grinnell College*  
Brian Dorn, *University of Hartford*  
Matt Jadud, *Berea College*  

With a growing awareness of the importance of Human Computer Interaction (HCI) and User Experience (UX) Design and Research in industry, many departments are examining ways to integrate this topic into their curriculum. What are the best ways to do this? Should HCI and UX be integrated into existing courses such as event-driven programming or mobile computing? Or should it be a separate course that integrates visual design, psychology and ergonomics? How important is this topic to students looking for internships and entry-level jobs? At what levels should these topics be taught in the curriculum? This BOF will let participants share their ideas and learn from their peers. A summary of the discussion will be provided to the chair of the HCI Knowledge Area for IEEE/ACM CS Curriculum 2013.
Taking Studio-Based Learning Online

Yolanda Jacobs Reimer, University of Montana
Christopher Hundhausen, Washington State University
Phillip Conrad, University of California, Santa Barbara

Studio-based learning (SBL), the centerpiece of architecture and fine arts education for over a century, has become increasingly attractive to computing educators. SBL can be conceptualized as an iterative process of solution refinement that relies heavily on shared physical space and design critiques. This session will explore ways in which CS educators can transition aspects of traditional or face-to-face SBL to an online learning environment. We will discuss the potential for online studios, how they might look and function, and how their effectiveness in promoting student learning might be gauged. As more and more CS courses assume an online presence, we seek to understand both the opportunities and limitations associated with conducting critical studio work in a digital medium.

Using POGIL Activities in Computer Science Classes

Helen Hu, Westminster College
Clifton Kussmaul, Muhlenberg College
Matthew Lang, Moravian College

POGIL activities are carefully designed to guide students to discover and explore concepts while encouraging students to practice process skills (e.g., team work, leadership and problem solving). Many college instructors have written POGIL activities for CS 1, CS 2, Software Engineering and other upper division CS classes (http://www.cspogil.org). High school teachers are also writing POGIL activities for the AP Principles course. This BOF is an opportunity for educators to share POGIL activities and ideas for improving group dynamics and encouraging reflection. We welcome everyone interested in learning more about POGIL and will provide information on regional POGIL workshops.

Technology that Educators of Computing Hail (TECH):

Come, Share Your Favorites

Daniel D. Garcia, UC Berkeley
Daniel Armendariz, UC Berkeley

The pace of technology for use in computing education is staggering. In the last five years, the following tools/websites have completely transformed our teaching: Piazza, Google Docs, YouTube, Doodle and whenisgood.net, Skype and Google Hangout, and Khan Academy among others. Hardware has also played a part – we love our Zoom H2 digital voice recorder (for recording CD-quality lecture audio), Blue Yeti USB mike (for audio/videoconferences), and iClickers (for engaging students in class). Do you wish you could easily share your favorites? Want to find out what the others know that you don’t? Have a tool you’ve built and want to get some users? Come to this BOF! We’ll also show the TECH website we’ve built that attempts to collect all of these tools in one place.

Teaching Security Using Hands-On Exercises

Richard Weiss, The Evergreen State College
Jens Mache, Lewis & Clark
Elizabeth Hawthorne, Union County College

Michael Locasto, University of Calgary
Blair Taylor, Towson University

We see teaching cybersecurity through hands-on, interactive exercises as a way to engage students. Some of the exercises that we have seen require significant preparation on the part of the instructor. Having a community makes it easier to share exercises, knowing what works and what problems students and instructors have encountered. This BOF will bring together instructors who have used hands-on exercises and those who would like to. We recognize that few CS programs can afford new required courses, so we would be discussing ways to integrate security-related exercises into existing ones. This could include networking, OS, computer architecture, programming languages, software engineering and algorithms.
Computational Literacy for Everyone: Opening a Dialogue
Between STEM and the Digital Arts & Humanities
Nick Senske, University of North Carolina at Charlotte

Much has been said about the need to teach computer programming and the fundamental ideas of computer science in STEM education. Initiatives aimed at this audience propose new requirements, curricula, tools, and teaching methodologies to encourage widespread computational literacy. But what is being done in non-STEM disciplines to promote and organize the same? The goal of this panel is to open a discussion about advancing computer science education within the digital arts and humanities and how this might relate or combine with similar efforts in STEM. What can members of the digital arts and humanities community learn from each other about starting new curricula and teaching these subjects, and what can be learned and borrowed from STEM education?

Dual-Degree Tracks for Computer Science Majors
Joanne Selinski, Johns Hopkins University
Kathie Yerion, Gonzaga University

Many institutions offer either a Bachelor of Science or a Bachelor of Arts degree program to computer science majors, often depending on what type of college or department houses the major. However, an increasing number of institutions have created dual degree tracks wherein students may choose to pursue either a BS or a BA, with a different set of requirements for each and possibly different credentialing as well. This BOF provides a forum for educators and administrators who currently offer dual degree options to share their experiences with those who are considering adding a second track. Issues of interest such as requirements within and outside the major, enrollment, accreditation, student outcomes, and possibly different career options may be discussed.

Universal Access to Computing Education
Richard E. Ladner, University of Washington

Approximately 10% of computer science and engineering majors have a disability of some kind. Those with disabilities are more likely to drop out of the major than those without disabilities. This BOF will bring together those who are interested in improving the success of these students. Strategies will be shared among the participants of the BOF to help each other do a better job of including these students in our classes and research projects.

The Joy of Word Games: Or, Putting the ‘Text’ Back into Context
Michael Rogers, Northwest Missouri State University

We have heard much discussion, in recent years, about various contexts for teaching Computer Science. One that does not get a lot of attention, but frankly deserves more, is the notion of using word games — in which language plays a predominant role — to teach Computer Science. There is a plethora of clever and simply fun games that can be used to illustrate almost any concept that arises in CS1 and CS2. We would like to start a conversation with other SIGCSE attendees who are interested in these very entertaining, algorithmically stimulating games, and see what techniques they use, and what successes they have had, in incorporating them into the classroom.
SIGCSE 2013 Poster Sessions

Posters present work-in-progress and other topics for which dialog and feedback are particularly appropriate. Posters are on display Friday morning and afternoon, and their presenters will be available for discussion during these sessions.

Session I: Friday, 10:00 – 12:00, Plaza Exhibits Area

A Combat Robotics Course: Programming Meets Computer-Aided Design and Fabrication
Lewis Baumstark, University of West Georgia

Communication Patterns: A tool for analyzing communication in emerging Computer Science educational practices
Shreya Kumar, Michigan Technological University (Presenter)
Charles Wallace, Michigan Technological University

Control-Alt-Hack: A Card Game for Computer Security Outreach and Education
Tamara Denning, University of Washington (Presenter)
Tadayoshi Kohno, University of Washington
Adam Shostack, University of Washington

K12 Outreach: Motivating K12 School Counselors to Embrace the Changing Face of Computing
Sarah Hug, University of Colorado, Boulder (Presenter)
Jane Krauss, National Center for Women & Information Technology

Sustainability Improves Student Learning (SISL) in Computing
Robert Beck, Villanova University (Presenter)
Daniel Joyce, Villanova University

Creation of Interdisciplinary Programs in Computational Science
Steven Gordon, Ohio Supercomputer Center

Curriculum Collaboration, Customization, and Reuse: Creating Communities in Digital Repositories
Scott Britell, Portland State University (Presenter)
Lois Delcambre, Portland State University
Edward Fox, Virginia Tech
Randy Steele, Olympia School District

Evaluation of the Emerging Scholars Program at Columbia University—a PLTL Program to Recruit Women into the Major
Rita Powell, University of Pennsylvania (Presenter)
Christian Murphy, University of Pennsylvania
Adam Cannon, Columbia University
Joshua Gordon, Columbia University
Arthi Ramachandran, Columbia University

Classroom Interventions to Reduce Failure & Course Withdrawal in CS1
Brian Hare, University of Missouri - Kansas City
Using an Alternate Reality Game as a Course Backdrop
Matthew Lang, Moravian College

Using Sequential Pattern Mining to Increase Graph Comprehension in Intelligent Tutoring System Student Data
Aaron Springer, Eastern Mennonite University

MyCS: A widely deployable middle-years CS curriculum
Zachary Dodds, Harvey Mudd College (Presenter)
Michael Erlinger, Harvey Mudd College

Cyberbullying and Game Models
Lila Ghemri, Texas Southern University (Presenter)
Rattikorn Hewitt, Texas Tech University
Colleen Livingston, Bemidji State University

Enhance Computer Networks Learning with Hands-on Mobile Device Based Labware
Ming Yang, Southern Polytechnic State University (Presenter)
Kai Qian, Southern Polytechnic State University
Minzhe Guo, University of Cincinnati
Prabir Bhattacharya, University of Cincinnati
Guillermo Francia, Jacksonville State University

Women in Technology: An International Collaborative Celebration
Alison Clear, Christchurch Polytechnic Institute of Technology (Presenter)
Annemieke Craig, Deakin University
Catherine Lang, Swinburne University of Technology

Creating an Educational Robot by Embedding a Learning Agent into a Physical World
Nan Li, Carnegie Mellon University (Presenter)
Apoorv Khandelwal, Carnegie Mellon University
Tung Phan, Carleton College
Dave S. Touretzky, Carnegie Mellon University
William W. Cohen, Carnegie Mellon University
Kenneth R. Koedinger, Carnegie Mellon University

Teaching Software Engineering with an Open-Source Humanitarian Software Project
Cameron Macdonell, Grant MacEwan University

Computing in Context
Robert Beck, Villanova University (Presenter)
Christine Nass, Villanova University
Edward Carr, North Carolina A&T University
Edward Fox, Virginia Tech
Wingyan Chung, University of North Carolina - Fayetteville

Integrating Computer Science into Middle School Mathematics
Susan Rodger (Presenter), Chris Brown, Michael Hoyle, Michael Marion, all of Duke University
OpenDSA: Using an Active eTextbook to Teach Data Structures and Algorithms
Clifford A. Shaffer, Virginia Tech (Presenter)
Eric Fouh, Virginia Tech
Mai Elshehaly, Virginia Tech
Ville Karavirta, Aalto University

Making Images By Hand and By Code - Motivating Students with Multi-Language Interactive Media Application Scripting
Samuel Rebelsky, Grinnell College (Presenter)
Chukwunweike Abuah, Grinnell College
Rogelio Calderon, Grinnell College
Martin Estrada, Grinnell College
Zarni Htet, Cornell College
Adriana Hurley, Grinnell College
Katherine Ingersoll, Grinnell College
Hart Russell, Grinnell College
Sydney Ryan, Grinnell College
Kimberly Spasaro, Grinnell College
Prashanna Tiwaree, Grinnell College

Selecting and Using a Parallel Programming Language
David Bunde, Knox College (Presenter)
Michael Graf, Knox College
Jens Mache, Lewis & Clark College
David Ely, The Ohio State University
David Lucas, Knox College

A Comprehensive Software Engineering Education Program for Grades 6 to 12 in NYC Public Schools
Cameron Fadjo, New York City Department of Education

Teaching Data Structures with BeSocratic
Sam Bryfczynski, Clemson University (Presenter)
Roy Pargas, Clemson University
Melanie Cooper, Clemson University
Brian Bean, Clemson University
Michael Klymkowsky, University of Colorado Boulder

RoboBuilder: A Computational Thinking Game
David Weintrop, Northwestern University (Presenter)
Uri Wilensky, Northwestern University

Modeling Student Programming with Multimodal Learning Analytics
Joseph Grafsgaard, North Carolina State University (Presenter)
Joseph Wiggins, North Carolina State University
Kristy Elizabeth Boyer, North Carolina State University
Eric Wiebe, North Carolina State University
James Lester, North Carolina State University
Session II: Friday, 3:00- 5:00, Plaza Exhibits Area

Embracing the Digital Humanities: A Course on Computing in the Humanities for Undergraduate Computer Science Minor Students
Deena Engel, New York University

A Cloud Computing Curriculum for Undergraduate CS Majors
Edward Walker, Whitworth University

Using the Atmel AVR (Arduino microcontroller) as the Foundation of Beginning Computer Organization Course
Susan Haynes, Eastern Michigan University

Technovation Challenge: Teaching Girls Computer Science & Entrepreneurship
AnnaLise Hoopes, Iridescent, Technovation Challenge

Making Programming Contest Practice Worthy of Academic Credit
Julie Johnson, Vanderbilt University

Interdisciplinary Computing, Successes and Challenges
Lillian Cassel, Villanova University
Ursula Wolz, Montclair State University

How Students Learn: Ripples in Computer Science/Software Engineering
Alison Clear, Christchurch Polytechnic Institute of Technology (Presenter)
Mike Lance, Christchurch Polytechnic Institute of Technology
Amit Sarkar, Christchurch Polytechnic Institute of Technology

Kodu, Alice and Lego Robotics: A three-step model of Effective Introducing Middle School Students to Computer Programming and Robotics
Daniela Marghitu, Auburn University (Presenter)
Taha Ben Brahim, Auburn University
John Weaver, Auburn University
Yasmeen Rawajfih, Auburn University

A Multi-Level Video Game for Teaching Security
Mario A.M. Guimaraes, Zayed University (Presenter)
Huwida Said, Zayed University

Computing Foundations for the Scientist
Catherine Bareiss, Olivet Nazarene University (Presenter)
Larry Vail, Olivet Nazarene University

On the Countably Many Misconceptions about #Hashtables
Elizabeth Patitsas, University of Toronto (Presenter)
Michelle Craig, University of Toronto
Steve Easterbrook, University of Toronto

Girls in IT: The Facts – A Comprehensive Look at the Latest Research on Gender and Technology in K-12 Contexts
Catherine Ashcraft, NCWIT, University of Colorado
Introducing Privacy in a Data Mining course
Lila Ghemri, Texas Southern University (Presenter)
Ping Chen, University of Houston-Downtown

“Dictionary Wars”: An Inverted, Leaderboard-Driven Project for Learning Dictionary Data Structures
Steven Wolfman, University of British Columbia (Presenter)
Kuba Karpierz, University of British Columbia
Joel Kitching, University of British Columbia
Brendan Shillingford, University of British Columbia
Elizabeth Patitsas, University of Toronto

Computer Science-Education Outreach: An Interdisciplinary Collaboration
Jennifer Rosato, College of St. Scholastica
Chery Takkunen, College of St. Scholastica

Improving Hispanic High School Student Perceptions of Computing
Marvin Andujar, Kean University (Presenter)
Lauren Aguilera, Kean University
Patricia Morreale, Kean University
Yerika Jimenez, Kean University
Farah Zabe, Kean University

Developing Game-Like Instructional Modules to Enhance Student Learning in Lower Level Core Computer Science Courses
Jinghua Zhang, Winston-Salem State University (Presenter)
Mustafa Atay, Winston-Salem State University
Rebecca Caldwell, Winston-Salem State University
Elva Jones, Winston-Salem State University

Geospatial Intelligence as a Context for Computing Education
Sambit Bhattacharya, Fayetteville State University (Presenter)
Bogdan Czejdo, Fayetteville State University
Rakesh Malhotra, Fayetteville State University

CloudCoder: Building a Community for Creating, Assigning, Evaluating and Sharing Programming Exercises
Jaime Spacco, Knox College (Presenter)
David Hovemeyer, York College
Matthew Hertz, Canisius College
Paul Denny, University of Auckland
Andrei Papancea, Knox College

DISSECT: Integrating Computational Thinking in the Traditional K-12 Curricula Through Collaborative Teaching
Sarah Hug, University of Colorado, Boulder (Presenter)
Enrico Pontelli, New Mexico State University
Ben Wright, New Mexico State University
Joshua Sandry, New Mexico State University
Ryan Vordermann, New Mexico State University
Ant Colony Simulation as an Engaging, Extendable, and Easily Gradable Programming Project
Roger West, University of Illinois at Springfield

An experiment to test bug density in students’ code
lia Shams, Virginia Tech (Presenter)
Stephen H. Edwards, Virginia Tech

A project spine framework for software engineering education
Kevin Gary, Arizona State University (Presenter)
Srividya Bansal, Arizona State University
Arbi Ghazarian, Arizona State University

Student Development of Board Game Strategies in a Web-Based Graphical Infrastructure
Ivona Bezakova, Rochester Institute of Technology (Presenter)
Adam Oest, Rochester Institute of Technology
James Heliotis, Rochester Institute of Technology
Sean Strout, Rochester Institute of Technology

Green Computing in the Introductory Curriculum
Susan Eileen Fox, Macalester College

An Interactive Exploration of Huffman Coding
Michael Goldwasser, Saint Louis University (Presenter)
Nicholas Brown, Saint Louis University
The 2013 ACM SIGCSE Student Research Competition
Supported by Microsoft Research

Thursday, March 7, 10:00am – 11:30am
Plaza Exhibits

Saturday, March 9, 9:00am – 12:00pm
Governors 16 and 17

The Student Research Competition (SRC) supported by Microsoft Research awards prizes to the top three graduate and undergraduate students as determined by conference attendee evaluations of their research projects. Initially, students use the interactive nature of a visual presentation to highlight different aspects of their research to individual evaluators. These presentations are evaluated on their quality, the significance of the work, and the clarity of the informal discussion. The semi-finalists, the top five students in each category, present their contributions using the standard forum of conference presentation during two conference sessions. This venue provides selected audience attendees with another platform for evaluation, the student with experience in formal presentations, and conference participants with the opportunity to learn of ongoing, current research in computer science.

The first round of competition takes place in Plaza Exhibits area from 10:00-11:30am on Thursday. Semi-finalists give their conference presentations in Governors 16 (graduate) and Governors 17 (undergraduate) from 9:00am-noon on Saturday. The winners will be announced and receive their awards during Saturday’s luncheon.
Graduate Research Projects

Preserving Data Privacy Through Data Partitioning in Mobile Application
Mohammad Al-Mutawa, University of Colorado

Green Dolphin: a question and answer site for novice programmers
Chulakorn Aritajati, Auburn University

Computing Computational Thinking Wacky Writing: Enhancing the XO Laptop Platform to Motivate Creative Writing by Children
Austin C. Bart, Virginia Tech

SLASH: Scratch-based visual programming in Second Life for introductory computer science education
Kara A. Behnke, ATLAS Institute

An Analysis of Optimizing Impact of Page Design Factor on Cyber Security
Ali Darwish, University of Sharjah

Navigation in a Virtual Environment by Dichotic Listening: Initial Exploration of Audio Cues for BCI Classification
Ashish Dhital, University of Wyoming

Preparing High School Teachers to Teach Computer Science
David P. Ely, The Ohio State University

Real-time Visualization of Sentiment Tracking in Twitter
Kathleen Ericson, Colorado State University

Real-time Visualization A Comprehensive Machine Learning Approach to Predicting and Maximizing Penetration Rates in Earth Pressure Balance (EPB) Tunnel Boring Machines
James Maher, Colorado School of Mines

On-Mote Compressive Sampling in Wireless Seismic Sensor Networks
Mark J. Rubin, Colorado School of Mines
Undergraduate Research Projects

TreeHouse: Tools for Visualizing and Analyzing Datasets from Large-Scale Phylogenetic Inference
Mark Adamo, Zayed University

A Cryptography Module for a Security Video Game
Abdulrahman Almarzooqi, University

Teaching Network Security with a Video Game Simulating Security Competitions
Fatma Y. Beshwari, Zayed University

Metagenomic Data Analysis using Clustering
Sulochana Bramhacharya, Hiram College

An Improved User Interface for the Corona Project
Coty Collins, Saint Bonaventure University

Debugging Using a Verifier
Farzeen Harunani, Marquette University

The Robustness of Medical Decisions with Noisy Data - An analysis of the robustness of eGFR calculations using unreliable inputs
Nathan Lapinski, University of Colorado

Digital Systems Test Bench
Amir Sabet, AASTMT

Enabling a Resource Limited Robot to Formulate Complex Plans
Demetrius Taylor, Lamar University

Matching XML Checkpointing MCMCTree
Dimitri Wijesinghe, Vassar College

Wireless Sensor Network Solution for Monitoring Earth Dams
Vladimir Yaremenko, Colorado School of Mines
SIGCSE 2013 Workshops

The following workshops are available to attendees at a nominal fee.

Workshops listed as LAPTOP will use participants’ laptop computers, and will be held onsite at the conference hotel. The software required for these workshops may be downloaded from http://www.cs.rit.edu/~sigcse06/software. Participants in these workshops will be required to bring their own laptops to the workshop to complete the hands-on activities.

Wednesday Workshops, 7:00 p.m. to 10:00 p.m.

1. **ROS at Every Level: Using the Robot Operating System**  
   in CS 0, 1, 2, and Beyond  
   Plaza 1

   Julian Mason, *Duke University*  
   Zachary Dodds, *Harvey Mudd College*  
   William Smart, *Oregon State University*

   After many years, the robotics research community has settled on standard middleware: the Robot Operating System (ROS). This standard presents a great opportunity for educational robotics. This hands-on workshop will engage participants in ROS-based curricula for CS 0-2 and advanced undergraduates. The workshop will highlight how ROS has simplified, enabled, and expanded flipped robotics curricula in CS 0-2. Our advanced materials show how ROS eases access to the robotics research community, permitting larger and more research-representative projects. This workshop is two long hands-on sessions punctuated with short experience reports. Participants will implement the first two assignments of our CS 2 curriculum. Laptop optional.  
   http://www.cs.hmc.edu/~dodds/ROSatSIGCSE2013

   Plaza 8

   Jason Hallstrom, *Clemson University*  
   Joe Hollingsworth, *Indiana University Southeast*  
   Joan Krone, *Denison University*  
   Murali Sitaraman, *Clemson University*

   Is it possible to excite students about learning the mathematical principles that underlie high-quality software? Can they use a development environment for “hands-on” experimentation with reasoning? Is this possible without displacing existing content? The answer is a resounding yes --from the experiences of professors at several institutions-- but it takes the right set of pedagogical principles, reasoning tools, and "hands-on" exercises. This laboratory will help educators transfer the excitement of learning how to apply mathematical reasoning in building high quality software, by adopting one reasoning concept at a time. Fees for this workshop will be covered for a limited number of attendees through an NSF award; limited travel support is also available.
3. Alice 3.1 Introductory Level

Wanda Dann, Carnegie Mellon University
Don Slater, Carnegie Mellon University
Steve Cooper, Stanford University

This workshop is designed to offer a hands-on introduction to Alice 3.1 (out of beta), as used in introductory courses in late high school and early college. The focus of this workshop is on using program visualization for introducing fundamental concepts of programming. The introductory features of Alice 3.1 will be presented in an active-learning style. Although some comparisons between Alice 2.x and 3.1 will be included, the content of the workshop does not assume familiarity with Alice 2.x. Attendees should bring their own laptop (no netbooks or tablets, please) with a mouse (2-button).


Semmy Purewal, University of North Carolina at Asheville

Khan Academy recently announced that they will soon be teaching introductory Computer Science topics with the Processing.js language and an interactive, web-based code editor. At UNC Asheville, we have been using a similar pedagogical approach for over a year. Specifically, we have integrated Processing.js into our introductory course for non-majors by building an open-source, web-based editor which makes it easy for students to edit, save and share their Processing.js sketches. This workshop offers a hands-on introduction to Processing.js and our editor. Participants will also be given an overview of the programming module in Creative Computing, our recently re-imagined CS0 course. Curious individuals with a laptop, a modern web-browser and some basic programming experience are welcome.

5. Computer Science Unplugged, Robotics, and Outreach Activities

Tim Bell, University of Canterbury
Daniela Marghitu, Auburn University
Lynn Lambert, Christopher Newport University
Paul Curzon, Queen Mary University of London

You've been asked to talk to an elementary or high school class about Computer Science, but how can you ensure that the talk is engaging? Or perhaps you’re trying to introduce a concept from Computer Science to a school group, but you want a fun way to get the class engaged. This workshop is a hands-on introduction to Computer Science Unplugged (www.csunplugged.org), a widely used set of kinesthetic, fun activities that cover many core areas of computer science without using high technology. We will explore how to use the activities in a variety of situations, including using them with robotics activities, school outreach, and computer clubs. Attendees will receive a CD with a copy of a handbook for teachers and a collection of videos demonstrating the activities.
6. **Making the Most of Undergraduate Research**
   Plaza 7
   Andrea Danyluk, *Williams College*
   Nancy Amato, *Texas A&M University*
   Ran Libeskind-Hadas, *Harvey Mudd College*
   Susan Rodger, *Duke University*
   Lori Pollock, *University of Delaware*

   Involving undergraduates in CS research has many benefits. It’s an exciting way for students to gain independent problem solving skills. It exposes them to interesting projects and the research process, thereby keeping them in CS, even encouraging them to go to grad school. And especially in primarily teaching institutions, it’s a rewarding way for faculty to remain engaged in their own research. In this workshop we will (1) present best practices for mentoring undergrad research, (2) equip participants with resources for mentoring their own students, and (3) further develop (1) and (2) through breakout sessions on concerns of interest to attendees. This workshop is intended for all college-level CS educators. Laptop Optional.

7. **Learn about Effective Proposal Writing via the Review Process**
   Governors 10
   Guy-Alain Amoussou, *National Science Foundation*

   This interactive workshop focuses on the National Science Foundation grant proposal review process. Via close examination of the review process, participants gain an understanding of how to write good reviews and how to improve their own proposal writing. The workshop topics include: the proposal review process; elements of a good review; NSF merit criteria; elements of good proposals; how to volunteer to review. Faculty (novice and experienced) who wish to understand the NSF review process or seek funding in support of undergraduate education are encouraged to attend. No laptop required.

8. **CSinParallel: Using Map-Reduce to Teach Parallel Programming Concepts Across the CS Curriculum**
   Governors 11
   Richard Brown, *St. Olaf College*
   Elizabeth Shoop, *Macalester College*
   Joel Adams, *Calvin College*

   Map-reduce, the cornerstone computational framework for cloud computing applications, has star appeal to draw students to the study of parallelism. Participants will carry out hands-on exercises designed for students at CS1/intermediate/advanced levels that introduce data-intensive scalable computing concepts, using WebMapReduce (WMR), a simplified open-source interface to the widely used Hadoop programming environment. WMR supports programming in a choice of languages (including Java, Python, C++, C#, Scheme). Workshop includes brief introduction to direct Hadoop programming. Workshop materials will reside on csinparallel.org, along with WMR software. Intended audience: CS instructors. Laptop required (Windows, Mac, or Linux).
9. Hands-on Cybersecurity Exercises and the RAVE Virtual Environment

Richard Weiss, The Evergreen State College
Vincent Nestler, California State University, San Bernardino
Michael Locasto, University of Calgary
Jens Mache, Lewis & Clark College
Brian Hay, University of Alaska, Fairbanks

This workshop is for anyone who would like to use hands-on exercises in cyber security that can be used in a variety of classes including Networking, OS and general programming. Attendees will have the opportunity to choose exercises tailored to their level and interests including the Hacker Curriculum. The goal of this workshop is to provide faculty with varied backgrounds in this area with tools and interactive exercises that would facilitate their incorporating this knowledge area into their curriculum. They will receive accounts on the RAVE with exercises that they can take back and use immediately with their classes. Each user gets a number of VMs pre-configured for the exercises. RAVE is also a general-purpose technology for other hands-on exercises. Laptop required.

10. Reimagining CS1/CS2 with Android and the Sofia Framework

Stephen H. Edwards, Virginia Tech

Android has seen increased use in introductory CS courses to motivate and excite students about their programming assignments, but using the standard Android libraries as a GUI platform in CS2 presents numerous challenges and using it in CS1 is nearly impossible. This workshop introduces participants to Sofia, the Simplified Open Framework for Innovative Android Applications. Sofia abstracts out many advanced concepts normally required to develop interesting applications, using a unique approach to event handling, binding GUI elements to Java code, and user interaction. The goal is to allow students to focus entirely on using Java programming skills to solve problems in the application domain, instead of writing monotonous glue code typically required to construct an Android application.

11. SNAP! (Build Your Own Blocks)

Brian Harvey, UC Berkeley
Tiffany Barnes, NC State University
Dan Armendariz, UC Berkeley
Sean Morris, Albany High School
Eugene Lemon, Ralph J Bunche High School

This workshop is for high school and college teachers of general-interest (“CS 0”) CS courses. It presents the programming environment used in two of the five initial AP CS Principles pilot courses. SNAP! (Build Your Own Blocks) is a free, graphical, drag-and-drop extension to the Scratch programming language. Scratch, designed for 8-14 year olds, models programs as “scripts” without names, arguments, or return values. SNAP! adds support for older learners (14-20) by adding named procedures (thus recursion), procedures as data (thus higher order functions) structured lists, and sprites as first class objects with inheritance. Participants will learn SNAP! through discussion, programming exercises, and exploration. See http://snap.berkeley.edu. Laptop required.
12. **Incorporating Version Control into Programming Courses**

Tommy MacWilliam, *Harvard University*

This workshop, aimed at instructors of introductory or intermediate courses, introduces participants to version control via two popular source code management (SCM) tools: SVN and Git. Not only is proficiency with SCM tools an invaluable skill for aspiring software developers, but version control also allows students to collaborate effectively on projects. Participants will complete hands-on activities using distributed and centralized SCM tools, learn how to integrate version control into curricula, and discuss the pros and cons of various hosting solutions. Participants will also be introduced to version50, an open-source abstraction layer that provides a common, simplified interface for SCM tools aimed at making version control accessible to novice programmers. Laptop required.

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**Friday Workshops, 7:00 p.m. to 10:00 p.m.**

13. **Computational Art and Creative Coding: Teaching CS1 with Processing**

Ira Greenberg, *Southern Methodist University*
Deepak Kumar and Dianna Xu, *Bryn Mawr College*

This workshop showcases a new approach to teaching CS1 using computational art as a context. Participants will be introduced to the Processing programming language and environment, designed for the construction of 2D and 3D visual forms. Its IDE is lightweight, but well-suited for the rapid prototyping needed for dynamic visual work. We hope to bring the excitement, creativity, and innovation fostered by Processing into the computer science education community. Instructors of all experience levels are welcome. Hands-on portion of the workshop will enable participants to explore Processing and create visual effects on the fly. Course materials and handouts detailing the software, curriculum, and teaching resources will be given out. Laptop required.

15. **AP CS Principles and The Beauty and Joy of Computing Curriculum**

Brian Harvey, *UC Berkeley*
Daniel Garcia, *UC Berkeley*
Tiffany Barnes, *NC State University*
Nathaniel Titterton, *UC Berkeley*
Dan Armendariz, *UC Berkeley*
Sean Morris, *Albany High School*
Josh Paley, *Gunn High School*
Eugene Lemon, *Ralph J Bunche High School*

The Beauty and Joy of Computing (BJC) is an introductory CS curriculum developed at UC Berkeley (and adapted at the UNC, Charlotte), intended for high school juniors through university non-majors. It was used in two of the five initial pilot programs for the AP CS Principles course being developed by the College Board and the National Science Foundation. Our overall goal is to support the CS10K project by preparing instructors to teach the AP CS Principles course through the BJC curriculum. In this workshop, we will share our experiences as instructors of the course at the university and high school level, provide a glimpse into a typical week of the course, and share details of NSF-funded summer professional development opportunities.
16. Introducing Secure Coding in CS0 and CS1

Siddharth Kaza, Towson University  Matt Bishop, UC Davis
Blair Taylor, Towson University  Elizabeth Hawthorne, Union County College
Diana Burley, The George Washington University

The CS 2013 curriculum draft includes Information Assurance and Security as a pervasive knowledge area. However, introducing security in CS0 and CS1 is challenging because of lack of appropriate teaching resources and training. This workshop will provide a well-tested strategy for introducing secure coding concepts in CS0 and CS1. We will introduce attendees to secure coding through a talk and hands-on exercise, and provide self-contained, lab-based modules designed to be injected into CS0/CS1 with minimal impact on the course (www.towson.edu/securityinjections). Participants are encouraged to bring their syllabi and labs to modify to include secure coding concepts. The first 15 attendees will be reimbursed for the workshop cost. Laptop recommended.

17. Experimenting With and Integrating Alice 2.3 Into Many Disciplines

Susan H. Rodger, Duke University
Steve Cooper, Stanford University
Wanda Dann, Carnegie Mellon University
Dwayne C. Brown, Jr., Duke University
Jacobo Carrasquel, Carnegie Mellon University

This interactive workshop will present the new features of Alice 2.3, and show how to integrate Alice 2.3 into multiple disciplines in middle school and high school. Participants will get hands-on experience with working with new Alice models and creating Alice projects. The workshop will also review curriculum materials and discuss mapping Alice to CSTA computer science standards. The curriculum materials presented could be used in middle school or high school in a variety of disciplines, or in college in a pre-CS 1 course. The target audience is middle school and high school teachers, and college faculty providing outreach to K-12 or teaching a pre-CS 1 course. Laptop required, and two-button mouse recommended.

18. How to Plan and Run Computing Summer Camps for 4th-12th Grade Students

Barbara Ericson, Georgia Institute of Technology
Christopher Michaud, Marist School
Nannette Napier, Georgia Gwinnett College
Krishnendu Roy, Valdosta State University

This workshop will provide details on how to run non-residential computing summer camps for 4th – 12th grade students. Georgia Tech has been offering camps since 2004. These camps are financially self-sustaining and effective. Items used include: Scratch, Alice, LEGO robots (WeDo, NXT, and Tetrix), and App Inventor. Georgia Tech has also helped start 11 other computing camps in Georgia. The workshop will include forms, a timeline, sample agendas, sample flyers, budget plans, a planning checklist, suggested projects, surveys, pre and post tests, evaluation results, and more. Intended
audience: high school teachers and undergraduate faculty that are interested in creating computing summer camps for 4th – 12th grade students. Laptop recommended.

19. Pedagogy for Engaging Diverse Students in Computing
   Plaza 7
   Joanne Cohoon, University of Virginia and NCWIT
   James Cohoon, University of Virginia
   Seth Reichelson, Lake Brantley High School

Research shows that several pedagogical practices can greatly contribute to students’ success and women’s persistence in computing. These practices include collaborative learning in the form of pair programming or peer led team learning; putting examples and exercises in contexts that appeal to a broad range of students; focusing on development of computing skills through practice; and development of spatial rotation abilities. Because these pedagogies are too seldom employed in computing, this workshop will introduce them to educators and provide brief experiences to illustrate how they can be employed in computer science courses.

20. Teaching the CS Principles Curriculum with App Inventor
   Governors 17
   Ralph Morelli, Trinity College
   David Wolber, University of San Francisco
   Shaileen Pokress, MIT Media Lab
   Fred Martin, University of Massachusetts Lowell
   Franklyn Turbak, Wellesley College

The CS Principles Project is an NSF-funded initiative to develop a breadth-first advanced placement (AP) course in computer science. App Inventor is a visual, block-based programming language that makes sophisticated computing concepts accessible to a broad range of students. This hands-on workshop, aimed at high school and undergraduate teachers, will introduce participants to lessons, homework exercises, project assignments, and assessment materials (quizzes, grading rubrics) that can be used in an App Inventor-based CS0 course. Participants will develop simple Android apps, using devices provided by the workshop, and will use them in the context of lessons and assignments that fit within the CS Principles framework. A laptop is required. Details: http://is.gd/sigcse2013appinv.

21. Using Scala Strategically Across the Undergraduate Curriculum
   Governors 9
   Mark Lewis, Trinity University
   Konstantin Läufer, Loyola University Chicago
   George Thiruvathukal, Loyola University Chicago

Various hybrid-paradigm languages, designed to balance compile-time error detection, conciseness, and performance, have emerged. Scala, e.g., is interoperable with Java and has become an early leader in adoption, especially in the start-up and open-source spaces. Workshop participants experience Scala’s value as a teaching language in the CS curriculum through four lecture-lab modules: In CS1, the read-eval-print loop and simple, uniform syntax aid programming in the small. In CS2, higher-order methods allow concise, efficient manipulation of collections. Advanced topics include domain-specific languages, concurrency, web apps/services, and mobile apps. Laptop recommended with Scala installed.
22. **NetLogo: Teaching with Turtles and Crossing Curricular Boundaries** Plaza 8

Forrest Stonedahl, *Centre College*
David Weintrop, *Northwestern University*
Paulo Blikstein, *Stanford University*
Christine Shannon, *Centre College*

This workshop, intended for CS educators from middle school through undergrad, will introduce participants to NetLogo. NetLogo is an easy-to-learn multi-agent language and integrated modeling environment in widespread use in classrooms (and research labs) globally. This hands-on tutorial will highlight computational modeling in the natural and social sciences, tie in core computer science concepts, and discuss how to promote student thinking about decentralized systems. The workshop will draw on the presenters’ own experiences teaching courses on computational science, computational art, theory of computation, and educational outreach events. Participants will learn firsthand how NetLogo can enrich a variety of computing courses. NetLogo runs on Mac/Linux/Windows. Laptop required.

23. **Implementing the Inverted Classroom** Governors 10

Kate Lockwood, *California State University, Monterey Bay*
Jeff McCall, *California State University, Monterey Bay*
Barbara Beckmeyer, *California State University, Monterey Bay*

The Inverted Classroom is an exciting pedagogical technique where more passive information assimilation activities (e.g. lectures) are assigned as homework and class time is reserved for active applied problem solving and group activities. With current technology, instructors wishing to implement inverted classroom have a variety of options to create engaging and accessible learning modules. In this workshop, we will provide an overview of inverted classroom philosophy and some initial data from successful pilots of the inverted classroom. Participants will work in small groups to develop small inverted classroom activities using software and technology provided by the presenters. We will wrap up with presentations from the groups and a discussion about assessment. Laptop Recommended.

24. **LittleFe Buildout Event (Part 1 Friday; Part 2 Saturday)** Plaza 1

Charles Peck, *Earlham College*
Aaron Weeden, *Shodor Education Foundation*
Jennifer Houchins, *Shodor Education Foundation*

LittleFe buildout events are training and infrastructure opportunities for teams of accepted faculty and students from educational institutions across the United States to assemble LittleFe educational appliances (http://littlefe.net) and learn to use them in the classroom to teach parallel programming, cluster computing, and computational/data enabled science & engineering (CDESE). The buildout consists of participants assembling their LittleFe unit from a kit; installing the Bootable Cluster CD (BCCD) software on it; learning about the curriculum modules available for teaching parallel programming, High Performance Computing (HPC) and CDESE; and learning how to develop new curriculum modules for the LittleFe/BCCD platform.
26. Peer Instruction in CS: Introduction and Recent Developments  
Daniel Zingaro, University of Toronto  
Cynthia Bailey-Lee, UC, San Diego  
John Glick, University of San Diego  
Leo Porter, Skidmore College  
Beth Simon, UC, San Diego

We introduce participants to Peer Instruction (PI): an active learning technique shown to be effective across the CS curriculum. In PI, Students work together to exchange perspectives and answer challenging conceptual questions, and are supported by short teaching segments. We will introduce and motivate PI, demonstrate its use via a clicker system, and describe ways to encourage student preparation for PI classes. Participants will work in groups to develop new PI questions addressing challenges to their students' learning, and discuss numerous pedagogical benefits conferred through PI. Instructors interested in increasing engagement in any CS course may attend. Participants are encouraged to bring current lecture materials. Laptop optional.

Saturday Workshops, 3:00 p.m. to 6:00 p.m.

25. LittleFe Buildout Event (Part 2)  
Plaza 1

Please see the description of Part 1 (Workshop 24) on page 71.

27. Android+Sphero: Teaching Mobile Computing and Robotics in a Single Course  
Stan Kurkovsky, Central Connecticut State University

Implications of using robotics and mobile computing in the curriculum extend far beyond motivation and engagement because skills in these areas can help students be more successful at the workplace. Our approach to teaching both subjects in one course focuses on using Sphero, a small ball-shaped wireless robot that can be controlled and programmed using an Android or iOS device via a Bluetooth link. Workshop participants will experience several hands-on projects that are offered to student in an Android+Sphero course, which culminates in a robot racing competition. This workshop is intended for high school and college faculty interested in mobile computing and/or robotics courses, projects, or activities. More information at http://www.cs.ccsu.edu/~stan/sigcse13/ Laptop recommended.

Susan Reiser, UNC Asheville  
Jennifer Burg, Wake Forest University

In this workshop, participants will create and manipulate digital audio using open source software (Audacity, PureData, Processing’s Minim Beta, Octave, and C/C++). The cross-disciplinary digital audio content links music, engineering, physics, mathematics, and computer science and was developed for and test-taught in computer science courses. Additionally, participants will access and use the freely available online videos, tutorials, and textbook that can be incorporated into their classrooms. The online content’s development was funded by the National Science Foundation CCLI Grant, “Linking Science, Art, and Practice Through Digital Sound”.

29. **Test-First Design in Introductory Java Programming**

Viera Proulx, *Northeastern University*

While professional programmers report on the advantages of test-first design discipline, typical introductory programming courses do not require that students design comprehensive test suites for their programs. For the past ten years we (and our adopters in a variety of settings) have used our tester library to support novice programmers in adopting test-first design. This workshop illustrates hands-on the benefits of test-first pedagogy on a series of typical introductory programming assignments and prepares the participants to adopt test-first design approach in their introductory (and advanced) Java-based courses. The tester library with tutorials, samples, downloads is available at: http://www.ccs.neu.edu/javalib/Tester https://github.com/TesterViera/JavaLibTester/.

30. **Experiments With Network Security Threats in a Safe, Easy Sandbox**

Michael Jipping, *Hope College*
Acshi Haggenmiller, *Yale University*
Matthew Koster, *Calvin College*
Eric Ostrowski, *Grand Valley State University*

Computer and network security are important topics discussed in many places in the curriculum. Security issues are difficult to work with as attacks on system security cannot be demonstrated on live campus networks. This workshop will demonstrate and experiment with several security attacks in a safe, sandbox-based virtual environment. We will begin two easy (CS0-appropriate) demonstrations and allow each participant to choose from six more advanced laboratory experiments. We will end with an ethics discussion. Each experiment includes descriptions of areas involved and ways to protect against exploits under scrutiny. Each participant will receive a DVD with all materials. This workshop is designed for instructors from all levels who want to add security experiments to classes.

31. **Developing a Hands-on Undergraduate Parallel Programming Course with Pattern Programming**

Barry Wilkinson, *University of North Carolina Charlotte*
Clayton Ferner, *University of North Carolina Wilmington*

Parallel programming has been taught for many years but has recently taken on greater significance with introduction of multicore and many-core processors. Still, most teaching has followed a traditional path of focusing on learning low-level libraries such as MPI. This workshop introduces a new educational approach based upon first selecting a computational pattern and then using higher-level tools to create parallel executable code. The first pattern covered is the widely applicable workpool pattern and other patterns will be introduced. In this approach, students focus upon computational strategies. Programming is much easier and less likely to be flawed. Each participant will receive a flash drive with all software pre-loaded for the workshop and afterwards. Laptop required.
32. LINQ from a Database Perspective: Querying Relations and XML

Suzanne Dietrich, Arizona State University

LINQ is a declarative language that provides a uniform paradigm for querying relations, objects, and XML. LINQ has from-where-select clauses, similar to SQL, but the clause order is based on its underlying formalism of functional programming. This workshop introduces LINQ from a database perspective with hands-on exercises over relational and XML data using a lightweight IDE for formative feedback. Participants will learn LINQ by experiencing sample exercises for incorporating LINQ into the database curriculum. The intended audience includes anyone with the knowledge of SQL who wants to learn LINQ. After learning LINQ to query relational data, participants will be introduced to XML and how LINQ can also be used to return, query, and transform XML data. Laptop recommended.

33. Catalyzing & Sustaining Change in Computing Education

Plaza 6

Lynn Andrea Stein, Franklin W. Olin College of Engineering
Debbie Chachra, Franklin W. Olin College of Engineering

This workshop is for those who want to create curricular change in their home departments, catalyze interdisciplinary curricula, or otherwise inspire innovation in teaching and learning at a scale that goes beyond a single classroom. Why is change in academia so difficult? What risks and pitfalls await? How can we approach change so that it does not depend solely on our efforts or end when we are no longer there to maintain it? In this collaborative, interactive workshop, we will explore these questions and craft strategies to create sustainable change in computing curricula. Some advance reading required. Laptop optional.

34. Drawing Machines: Exploring embedded system programming and hardware with an artistic flair

Governors 12

Jennifer Alford, Trinity Valley School
Erik Brunvand, University of Utah
Paul Stout, University of Utah

This workshop introduces embedded programming and hardware using Arduino in a creative context to make machines that make drawings. This is a powerful way to introduce programming and physical computing concepts to students from high school to undergraduate and to students who might not normally be intrigued by a computing course. Participants experience this curriculum first hand by using breadboards and electronic components to create circuits that they control programmatically. Using the Arduino C-based software, participants modify and develop code to control light sensors, range finders, pressure sensors, and servos. Provided art materials turn the circuits into mesmerizing contraptions that draw. Laptop required. Arduino and electronic components provided during the workshop.
35. Using POGIL to Help Students Discover CS Concepts and Develop Process Skills

Clifton Kussmaul, Muhlenberg College
Helen Hu, Westminster College
Matthew Lang, Moravian College

This workshop is for anyone who teaches CS, and introduces process-oriented guided inquiry learning (POGIL) in computer science. In a POGIL classroom, teams of 3-5 learners work on instructor-facilitated activities. Through scripted inquiry and investigation, learners discover concepts and construct their own knowledge. Using assigned team roles and meta-cognition, learners develop process skills and individual responsibility. Studies show that POGIL can significantly improve student performance. Workshop participants will experience POGIL activities, learn core practices, and draft activity pieces. POGIL materials for various CS concepts will be shared. More information is available at http://cspogil.org, including sample activities for CS1, CS2, and other courses. Laptops optional.

36. Augmenting Introductory Computer Science Classes with GameMaker and Mobile Apps

Tiffany Barnes, NC State University
Acey Boyce, NC State University
Veronica Cate, NC State University
Katelyn Doran, NC State University
Drew Hicks, NC State University
Sharon Jones, Phillip O. Berry High School, Charlotte
Leslie Keller, NC Virtual Public School; Raleigh
Renada Poteat, Independence High School, Charlotte

The new CS Principles curriculum, a pilot Advanced Placement course, offers novice students an exciting opportunity to learn computing in a hands-on, fun way. High school and college teachers of introductory computer science course are invited to this workshop to learn basic game and mobile phone development. Participants will learn GameMaker, AppInventor, and Touch Develop. These tools allow students to create and have fun with computing while teaching object-oriented and event-driven programming and game architectures. Participants should bring their own laptops (ideally with AppInventor installed). Windows 7 phones will be provided during the workshop. We will provide links to curricular modules for the CS Principles: Beauty and Joy of Computing course.
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SIGCSE 2013 Evaluations
Please let us know what you liked (and did not like) about SIGCSE 2013!

Upcoming Events

ITiCSE 2013: July 1-3, 2013; Canterbury, England;
   http://www.cs.kent.ac.uk/events/iticse2013/

ICER 2013: August 12-14, 2013; San Diego, CA, USA;
   http://wp.acm.org/icer-conference/

SIGCSE 2014: March 5-8, 2014 Atlanta, GA, USA;
   http://www.sigcse.org/sigcse2014/