SIGCSE 2016

47th TECHNICAL SYMPOSIUM on COMPUTER SCIENCE EDUCATION

Engage.
Energize.
Empower.

March 2-5, 2016
Sheraton Memphis Downtown Hotel
Memphis, Tennessee, USA

Conference Program | Exhibit Guide

Google

THURSDAY 1:45 - 3:00 PM

SURFACING SOLUTIONS TO THE CAPACITY CRUNCH

One of Google's goals is to identify innovations in teaching and technologies that will support the expansion of high-quality Computer Science (CS) programs at the undergraduate level while additionally ensuring better engagement of women and underrepresented minority students. Rather than focus on discussing of the nature of capacity crunch, this panel will share a variety of promising results arising from Google's Computer Science Capacity Awards program. The panel will be chaired by Chris Stephenson, Google's Head of Computer Science Education Programs.

THURSDAY 3:45 - 5:00 PM

IGNITECS: ADDRESSING UNDERGRADUATE CS RETENTION

In this panel discussion, previous and current student leaders will talk about their experiences creating an outreach program under Google's igniteCS program. They will discuss program development and implementation, hitting on struggles and successes along the way and share their thoughts on whether or not near-peer mentoring addresses CS undergraduate student retention. Information will also be provided on accessing igniteCS funding for your university.

FRIDAY 1:45 - 3:00 PM

UP CLOSE AND PERSONAL WITH GOOGLE COMPUTER SCIENCE PROGRAMS

Google invites you to get up close and personal with our suite of computer science education programs. Come chat with our program managers and learn more about cool Google tools, funding you can access, and tips on Google hiring.

SATURDAY 10:45 - 12:00 PM

LANDSCAPE OF K-12 COMPUTER SCIENCE EDUCATION IN THE U.S.: PERCEPTIONS, ACCESS, AND BARRIERS

This session presents Google's latest research study in computer science education, surveying nearly 16,000 respondents. To understand perceptions of computer science and associated opportunities, participation, and barriers, we worked with Gallup, Inc. to survey over 1,600 students, 1,600 parents, 1,000 teachers, 9,600 principals, and 1,800 superintendents.

GOOGLE PARTNER EVENTS

The ACM, CSTA, and Code.org

DEFINING CONCEPTS, PRACTICES, AND STANDARDS FOR K-12 CS

See BOF schedule for time

NCWIT

PRACTICAL METHODS FOR BROADENING PARTICIPATION THROUGH STUDENT ENGAGEMENT IN CS1/CS2 COURSES

See BOF schedule for time

NCWIT

SETTING QUANTIFIABLE GOALS FOR BROADENING PARTICIPATION IN COMPUTING

See BOF schedule for time

SIGCSE2016

47th ACM TECHNICAL SYMPOSIUM on COMPUTER SCIENCE EDUCATION

Conference Program & Exhibit Guide

CONTENTS

Message from the Symposium and Program Chairs 2016

Welcome to Memphis and SIGCSE 2016! As you settle in to the relaxed atmosphere of a city famous for good music, civil rights history, and, of course, delicious barbeque, we encourage you to take full advantage of all that this year's symposium has to offer. The many sessions being offered (papers, panels, special sessions, BoFs, posters, workshops, demos and lightning talks) will Engage, Energize, and Empower you on your journey as a computer science educator.

Our opening plenary address will be delivered by John Sweller, Professor Emeritus (University of New South Wales, Australia) and expert in cognitive load theory. John will challenge us to consider how our understanding of human cognition should impact our instructional procedures to provide the best learning environments for our students. Karen Ashcraft, Professor of Communication (University of Colorado, Boulder, CO) will present at the Saturday luncheon. Her work in the area of social identity will provide valuable insight to issues of gender and diversity in the computing industry. This year's recipient of the SIGCSE Award for Lifetime Service to the Computer Science Education Community, Barbara Boucher Owens (Emeritus Faculty, Southwestern University, Georgetown, TX) will speak at the First Timers' Lunch on Friday and Jan Cuny, recipient of the SIGCSE Award for Outstanding Contributions to Computer Science Education will give the Friday morning plenary address. We look forward to hearing from both of these valued members of the SIGCSE community.

Symposium statistics are presented in the acompanying table. In addition to these refereed sessions, this year's program includes the usual wide selection of events, including the Thursday evening reception (with a special Memphis treat!), the ACM SIGCSE Student Research Competition, and another challenging SIGCSE puzzle. Our exhibit hall features a number of exhibitors showcasing the latest in hardware, software tools, textbooks and educational programs and research.

Proposal Type	Accepted	Received	Acceptance Rate
Paper	105	297	35%
Panel	12	22	55%
Special Session	10	17	58%
Workshop	35	72	49%
Poster	51	89	57%
Birds of a Feather	32	65	49%
Demos	10	29	34%
Lightning Talks	12	23	52%

As of our publication deadline in mid-January, this year's Pre-symposium Event roster includes the following: Universal Design of Teaching in K-12 Computing (Access10K), Computational Thinking: A Chinese Perspective (Ming Zhang), Workshop on Computing for the Social Good: Educational Practices (SIGCAS), Integrating Computing Ethics and Professionalism into the Technical Curriculum (ACM Committee on Professional Ethics), Facilitating POGIL Activities to Support All Students (Helen Hu, et al), Creating Engaging and Relevant Classroom Activities and Assignments (Helen Hu and Beth Quinn), Fulbright for Computer Science Education (CIES), New Educators Workshop (SIGCSE), POSSE Roundup (Gregory Hislop), and Web Development with the MEAN Stack (Adrian German). We encourage you to participate in one of these exciting events.

A symposium as large as SIGCSE 2016 involves the efforts of many people and we wish to thank all of them for their help in making the event a success. Our program committee members (Laine Agee, Ruth Anderson, Bo Brinkman, Tom Cortina, Lynn Degler, Don Goelman, Charles Hardnett, Rachelle Kristof Hippler, Sarah Heckman, Daryl Hepting, Matt Jadud, Martha Kosa, Cary Laxer, Scott McElfresh, Sara Melnick, Larry Merkle, Brad Miller, Christine Moore, David Musicant, Alvaro Monge, Christopher Painter-Wakefield, Jill Pieritz, S. Monisha Pulimood, Samuel Rebelsky, Madeleine Schep, Ann Sobel,

Leenkiat Soh, Valerie Henderson Summet, and Jian Zhang) worked tirelessly on many details. Associate Program Chairs (Eric Aaron, Don Blaheta, Alistair Campbell, Steve Cooper, Adrienne Decker, Dave Levine, Robert McCartney, Sam Rebelsky, Brad Richards, Jaime Spacco, Tammy Vandegrift, and Ellen Walker) provided meta-reviews for all submitted papers. The International Liaison Committee (Craig Anslow, Paul Denny, Daryl Hepting, Jeisson Hidalgo-Céspedes, Ville Isomottonen, Sridhar Iyer, Mehdi Jazayeri, Carsten Kleiner, Kazushi Ohya, Ian Sanders, Ben Stephenson, Jan Vahrenhold, Gary Wong, and Ming Zhang) worked to ensure that attendees from all over the world find SIGCSE 2016 a welcoming and rewarding experience. And finally, we would like to thank the large contingent of student volunteers who pitch in to assist with numerous details such as stuffing conference bags, checking registration badges, distributing t-shirts, and counting attendance at sessions. Without their assistance, the symposium experience would be greatly diminished.

There are several others who have contributed to the planning of this year's symposium that we would like to thank. Zach Butler (Rochester Institute of Technology) has once again created a Puzzle Challenge that will be sure to be a big hit. Tracy Camp (Colorado School of Mines) and her CONNECT Team are providing the opportunity for electronic networking during and after the conference. Spryo Spondyl (Digital Media and Design alum of Baldwin Wallace University) designed this year's logo. Each of these volunteers used their talents to enhance your SIGCSE experience.

We'd like to thank all of our supporters, vendors, exhibitors and in-kind donors for the funding and services they provided to make this year's symposium possible. We especially wish to thank Google (platinum), Oracle (gold), IBM (gold), Vocareum (gold), GitHub (silver), Gradescope (silver), Microsoft (silver), Teradata (silver), Turing's Craft (silver), zyBooks (silver), and ABET (bronze).

Your experience at SIGCSE 2016 is influenced in countless ways by the efforts of the planners at Executivevents: Cara Candler, Miki Hodge, and Shannon Cunningham. Their support and guidance in the months leading up to the conference is much appreciated.

A debt of gratitude is owed to Susan Rodger (President) and the entire SIGCSE Board. Additional thanks go to Bob Beck and Scott Grissom (SIGCSE Symposium Site Coordinators), April Mosqus, Ann Lane, Irene Frawley, Donna Cappo, Adrienne Griscti, Stephanie Sabal, and Diana Brantus (ACM staff), Lisa Tolles (Sheridan Publishing), Bill Guckert (WRG Design), Cassandra Taylor, Patrick Aversa, Jessica Harmon, and Alan Waxman (Memphis Cook Convention Center & Visitors Bureau), and David Stewart (Sheraton Memphis Downtown). The assistance of all of these individuals has addressed a myriad of details that go into the planning of a successful conference and we are grateful to each and every one of them. We'd also like to extend a special thank you to Laine Agee, our local events committee member. Laine not only enthusiastically introduced us to all that Memphis has to offer during our site visits, but also stumped local organizations to consider supporting SIGCSE 2016. We are most appreciative of Laine's energy and love of Memphis that was evident throughout our planning.

A special thanks goes to our home institutions (Aarhus University, Baldwin Wallace University, the University at Buffalo, and Virginia Tech) for allowing us to serve the SIGCSE community as organizers of the symposium. It has been a rewarding experience and one that we hope will ***Engage, Energize, and Empower*** you on your journey of Computer Science Education.

Symposium Co-Chair

Jodi Tims
Baldwin Wallace University

Symposium Co-Chair

Carl Alphonce
University at Buffalo

Program Co-Chair

Stephen Edwards
Virginia Tech

Program Co-Chair

Michael E. Caspersen
Aarhus University

SIGCSE 2016 Symposium Committee

Symposium Chairs
Carl Alphonce, *University at Buffalo*
Jodi Tims, *Baldwin Wallace University*

Program Chairs
Michael E. Caspersen, *Aarhus University*
Stephen Edwards, *Virginia Tech University*

Panels and Special Sessions
Ruth Anderson, University of Washington

Workshops
Alvaro Monge, *California State University, Long Beach*
Bo Brinkman, *Miami University*

Publications
Jian Zhang, *Texas Woman's University*

Database Administrators
Brad Miller, *Luther College*
Leen-Kiat Soh, *University of Nebraska - Lincoln*

Registration
Lynn Degler, *Rose-Hulman Institute of Technology*
Cary Laxer, *Rose-Hulman Institute of Technology*
Larry Merkle, *Air Force Institute of Technology*

Posters
Don Goelman, *Villanova University*

Birds of a Feather
Samuel Rebelsky, *Grinnell College*

Lightning Talks and Demos
Martha Kosa, *Tennessee Technological University*

Student Volunteers and Activities
Sarah Heckman, *North Carolina State University*
S. Monisha Pulimood, *The College of New Jersey*
Sara Melnick, *Teacher's College, Columbia University*

Treasurer
Scott McElfresh, *Longwood University*

Evaluations
Christopher Painter-Wakefield, *Colorado School of Mines*

Kids Camp
Valerie Henderson Summet, *Emory University*
Charles Hardnett, *Gwinnett Technical College*

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Matt Jadud, *Berea College*

Support/Exhibitor Liaison
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Dave Musicant, *Carleton College*

Pre-Symposium Events & Affiliated Events Liaison
Rachelle Kristof Hippler, *Bowling Green University-Firelands*

K-12 Liaison
Jill Pieritz, *Girls Preparatory School, Chattanooga*

Local Arrangements
Laine Agee, *White Station High School, Memphis*

Student Research Competition
Ann Sobel, *Miami University (Ohio)*

Accessibility Chair
Madeleine Schep, *Columbia College*

International Liaison
Daryl Hepting, *University of Regina, Canada*

International Committee
Daryl Hepting (Chair), *University of Regina, CA*
Craig Anslow, *Middlesex University, United Kingdom*
Paul Denny, *The University of Auckland, New Zealand*
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Gary K. W. Wong, *The Hong Kong Institute of Education, China*
Ming Zhang, *Peking University, China*

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Eric Aaron, *Vassar College*
Don Blaheta, *Longwood University*
Alistair Campbell, *Hamilton College*
Steve Cooper, *Stanford University*
Adrienne Decker, *Rochester Institute of Technology*
Dave Levine, *St. Bonaventure University*
Robert McCartney, *University of Connecticut*
Sam Rebelsky, *Grinnell College*
Brad Richards, *University of Puget Sound*
Jaime Spacco, *Knox College*
Tammy Vandegrift, *University of Portland*
Ellen Walker, *Hiram College*

SIGCSE 2016 Symposium At-A-Glance

WiFi Network:
SIGCSE
Access Code:
BealeStreet

Wednesday • March 2

8:00 am - 5:00 pm	Pre-symposium Events	See page 12
3:00 pm - 9:30 pm	Registration	MCCC: Grand Lobby
7:00 pm - 10:00 pm	Workshops 101-112	See page 12-13

Thursday • March 3

7:30 am - 5:30 pm	Registration	MCCC: Grand Lobby
8:30 am - 10:00 am	Plenary & Keynote (Sweller)	Cannon Center
10:00 am - 10:45 am	Break, Exhibits & Demos	MCCC: Exhibit Hall
10:45 am - 12:00 pm	Technical Sessions	See pages 14-15
12:00 pm - 1:45 pm	First Timer's Luncheon (Owens)	MCCC: Ballroom B
12:00 pm - 1:45 pm	Lunch Break	On your own
1:45 pm - 3:00 pm	Technical Sessions	See page 16
1:45 pm - 5:00 pm	Student Research Posters	MCCC: Exhibit Hall
3:00 pm - 3:45 pm	Break, Exhitits & Demos	MCCC: Exhibit Hall
3:45 pm - 5:00 pm	Technical Sessions	See pages 17-18
5:30 pm - 6:20 pm	Birds of a Feather: Flock 1	See page 36
6:30 pm - 7:20 pm	Birds of a Feather: Flock 2	See page 37
7:30 pm - 9:30 pm	SIGCSE Reception	MCCC: Ballroom A

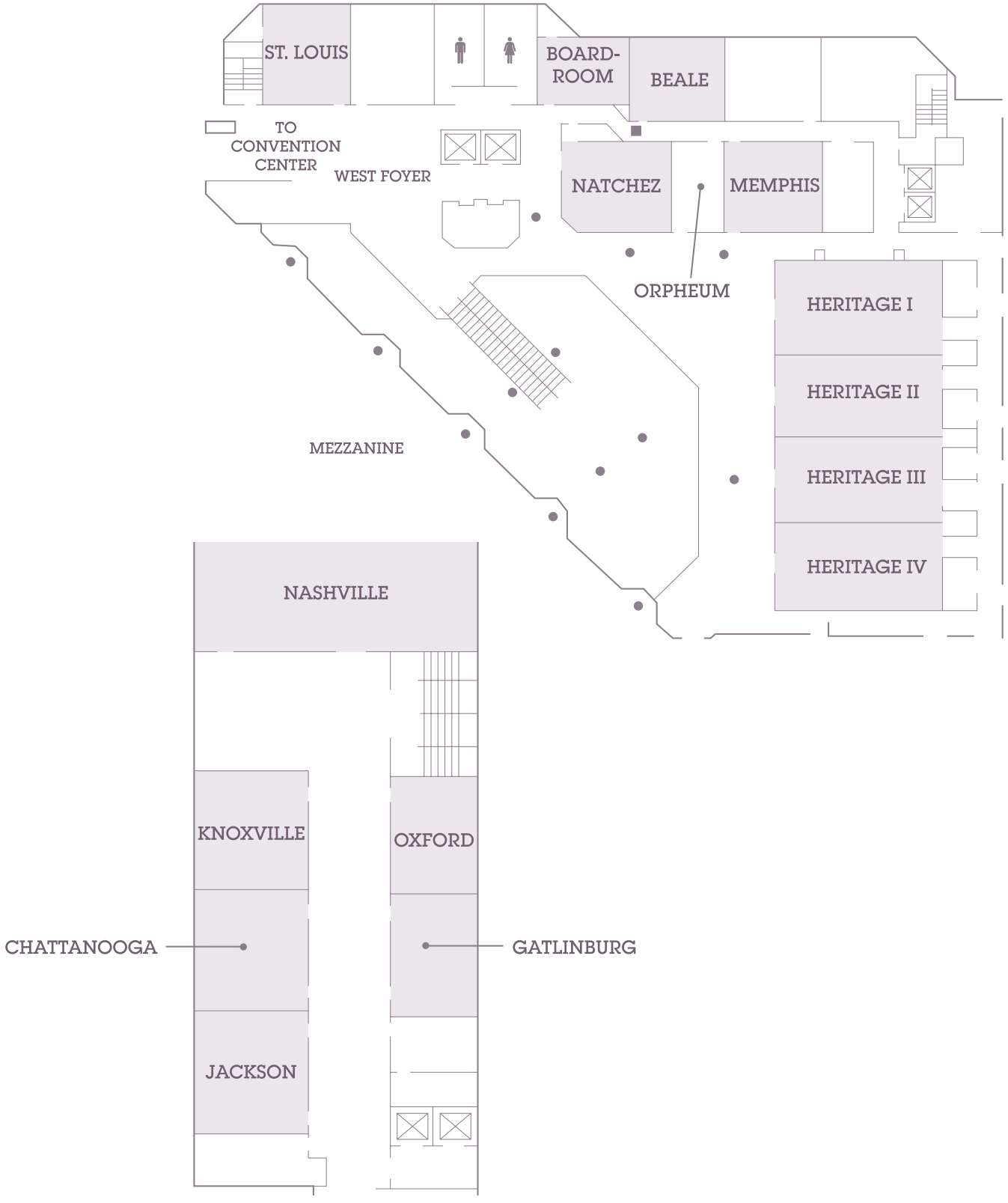
Friday • March 4

8:00 am - 5:00 pm	Registration	MCCC: Grand Lobby
8:30 am – 10:00 am	Plenary & Keynote (Cuny)	Cannon Center
10:00 am – 10:45 am	Break, Exhibits & Demos	MCCC: Exhibit Hall
10:00am – 12:00 pm	Poster Session I	MCCC: Exhibit Hall
10:45 am – 12:00 pm	Technical Sessions	See pages 20-21
12:00 pm – 1:45 pm	Lunch Break	On your own
12:00 pm – 1:45 pm	International Lunch	TBD
1:45 pm – 3:00 pm	Technical Sessions	See pages 22-23
3:00 pm – 3:45 pm	Break, Exhibits & Demos	MCCC: Exhibit Hall
3:00 pm – 5:00 pm	Poster Session II	MCCC: Exhibit Hall
3:45 pm – 5:00 pm	Technical Sessions	See pages 24-25
3:45 pm – 5:00 pm	Lightning Talks	MCCC: L10
5:10 pm – 6:00 pm	SIGCSE Business Meeting	MCCC: Cotton Row
6:10 pm – 7:00 pm	CCSC Business Meeting	MCCC: Cotton Row
7:00 pm – 10:00 pm	Workshops 301-312	See pages 25-26

Saturday • March 5

8:30 am - 11:45 am	Registration	MCCC: Grand Lobby
8:45 am – 10:00 am	Technical Sessions	See page 27-28
10:00 am – 10:45 am	Break, Exhibits & Demos	MCCC: Exhibit Hall
10:45 am – 12:00 pm	Technical Sessions	See pages 28-29
12:00 pm – 2:00 pm	Luncheon & Keynote (Ashcraft)	MCCC: Grand Ballroom
2:00 pm – 3:00 pm	Registration	MCCC: Grand Lobby
3:00 pm – 6:00 pm	Workshops 401-412	See page 30

Sheraton Memphis
2nd Floor

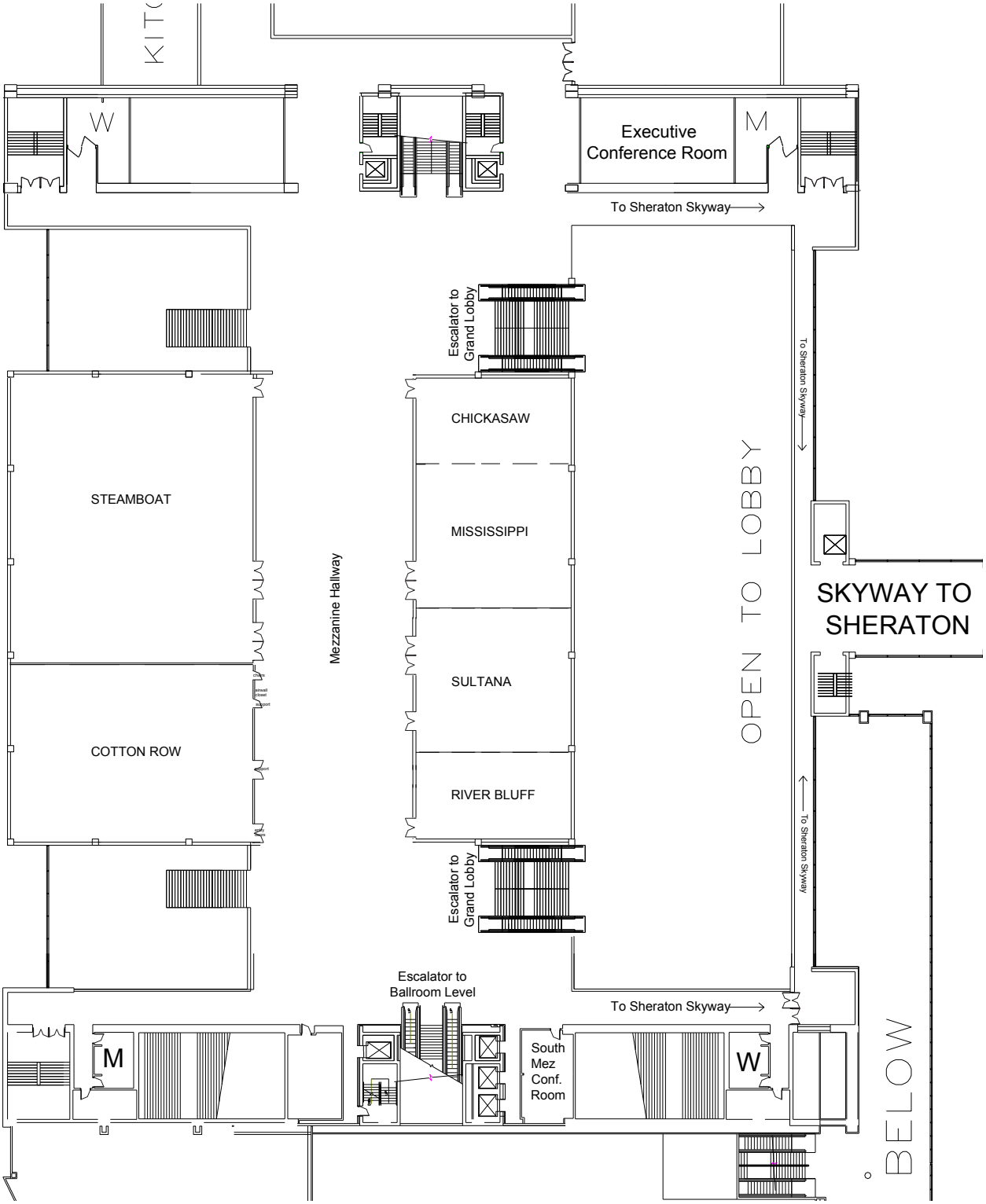


Memphis Cook Convention Center (MCCC)

Grand Lobby Level

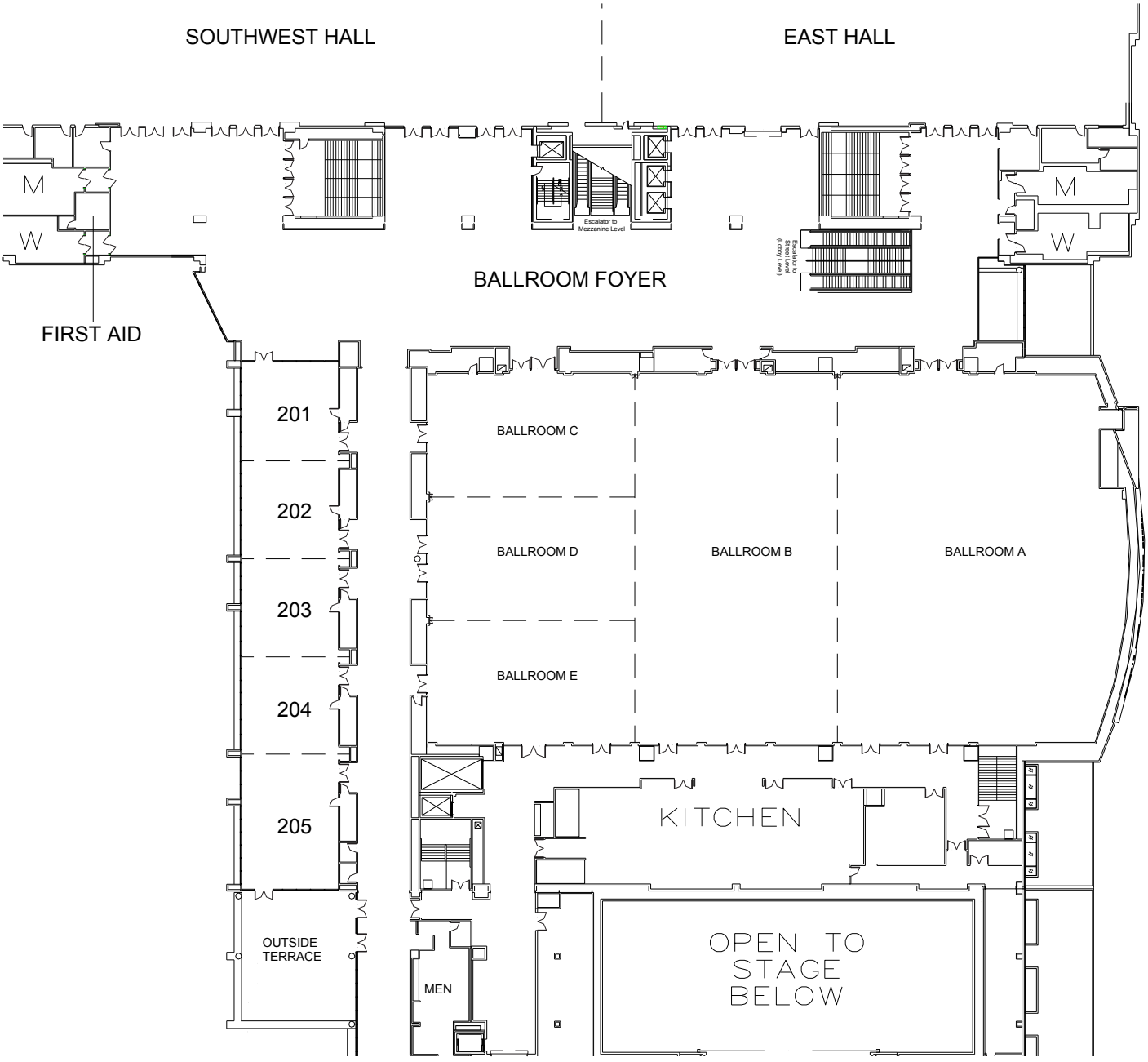
Memphis Cook Convention Center (MCCC)

Mezzanine Level



Memphis Cook Convention Center (MCCC)

Ballroom Level



Keynote Presentations

Thursday, March 3

8:30 am - 10:00 am
Room: Cannon Center

Cognitive Load Theory and Computer Science Education

John Sweller, *Emeritus Faculty, University of New South Wales*

Cognitive load theory uses our knowledge of human cognitive architecture to devise instructional procedures, most of which are directly relevant to computer science education. There are several basic aspects of human cognition that are critical to instructional design. First, based on evolutionary educational psychology, cognitive load theory assumes that most topics taught in educational and training institutions are ones that we have not specifically evolved to learn. Such topics require biologically secondary knowledge rather than the biologically primary knowledge that we have evolved to acquire. Second, these instructionally relevant topics require learners to acquire domain-specific rather than generic cognitive skills. Third, while generic cognitive knowledge does not require explicit instruction because we have evolved to acquire it, domain-specific concepts and skills that provide the content of educational syllabi, do require explicit instruction. These three factors interact with the well-known capacity and duration constraints of working memory and the unlimited capacity and duration characteristics of long-term memory to delineate a cognitive architecture relevant to instructional design. The working memory limits do not apply to biologically primary, generic knowledge acquired without explicit instruction but do apply to the biologically secondary, domain-specific knowledge that requires explicit instruction and that is relevant to computer science education. Human cognition when dealing with such knowledge constitutes a natural information processing system that has evolved to mimic the architecture of biological evolution. Cognitive load theory uses this architecture to generate a large range of instructional effects concerned with procedures for reducing extraneous working memory load in order to facilitate the acquisition of knowledge in long-term memory. This talk reviews the theory and indicates the instructional implications relevant to computer education.

Thursday, March 3

12:00 pm - 1:45 pm
Room: Ballroom B

Service as Rent

Barbara Boucher Owens, *Emeritus Faculty, Southwestern University*

“Service is the rent we pay for the space we take up on earth“, my dad’s mantra, and one used by many. Participating in professional organizations such as SIGCSE and its parent organization, ACM, has been for me an incredibly rewarding obligation. Many have given of their time and talents to help me on my way. Some of those who have followed in my footsteps have also forged paths of service making mine pale in comparison. This computer science education community affords incredibly rich opportunities for service in venues ranging from local to international. Service in SIGCSE and similar communities can reap untold benefits for both the volunteer and the community served.

Keynote Presentations

Friday, March 4

8:30 am - 10:00 am
Room: Cannon Center

CS Education: Catching the Wave

Jan Cuny, *Program Director for Broadening Participation and Education in Computing, National Science Foundation*

Computer Science (CS) education has caught a wave – of media attention, public support, public/private commitments, broad-based participation by educators, and a surge in student enrollments at the undergraduate level. It is a startling change over just the last 5 years. Over that 5 years, much has been accomplished at the high school level. The Exploring Computer Science and Advanced Placement® CS Principles courses were created to engage and inspire a diverse mix of students. Hundreds of teachers and university faculty have collaborated to develop course materials, assessments, MOOCS, and models of teacher professional development. Over 2,000 high schools now offer new CS courses, but that leaves out more than 34,000. Even then, students will need more than a single course, they will need a K-16 CS pathway. At the K-8 level, CS does not have the decades of research on the teaching and learning that is available to many other, more established disciplines. A stronger evidence base is needed as the basis for pedagogy, curricula, standards, and teacher preparation. The CS community must put greater emphasis on research in CS education and broadening participation, and it must build stronger collaborations with researchers in related disciplines. Over the last 5 years, college-level CS departments have been inundated with students. This growth is fueled by a strong job market for CS majors and an increasing awareness that computation is fundamental to many other industry sectors and academic disciplines. How will departments cope with increasing numbers without sacrificing access or quality? How will they respond to increasing diversity - of ethnicity and gender, but also of interests, and career goals - of their students? For those interested in CS education, it's an exciting time, but it comes with some urgency. This talk will discuss how to catch the current wave, using it to full advantage.

Saturday, March 5

12:00 pm - 2:00 pm
Room: Grand Ballroom

Lean In to the Evidence: Breaking the "Glass Slipper" of Technical Professions

Karen Lee Ashcraft, *Professor, University of Colorado, Boulder*

Occupations, like individuals, take on social identities such as gender and race. The social identity of an occupation has profound effects, for example, on wages and prestige, degree of professionalization, and ability to recruit and retain diverse populations. Sifting the historical evidence on technical work, Dr. Ashcraft develops a new concept - the "glass slipper" - which explains how durable associations between occupations and people arise and how they circulate among us like powerful brands. Despite appearances, this process is neither natural nor determined. It is political, however, revealing a reality more daunting than recent advice to "lean in" suggests. But if the social identities of occupations are strategically constructed, they also can be challenged through creative re-branding.

Pre-Symposium Events

8:00 am - 12:30 pm	**Web Development with the MEAN Stack: A Comprehensive Hands-On Tutorial for Educators**	MCCC: L5-L6
9:00 am - 12:00 pm	**Fulbright for Computer Science Education**	MCCC: L11-L12
9:00 am - 12:30 pm	**Facilitating POGIL Activities to Support All Students**	MCCC: L10
9:00 am - 12:30 pm	**SIGCAS Workshop on Computing for the Social Good: Educational Practices**	MCCC: L9
9:00 am - 5:00 pm	**New Educators Workshop**	MCCC: Mississippi
9:00 am - 5:00 pm	**POSSE Roundup**	MCCC: Sultana
2:00 pm - 5:00 pm	**Computing Principles and Computation in the First Course - Exemplars from China**	MCCC: L8
2:00 pm - 5:00 pm	**Integrating Computing Ethics and Professionalism into the Technical Curriculum**	MCCC: L9
2:00 pm - 5:00 pm	**Creating Engaging and Relevant Classroom Activities and Assignments**	MCCC: L10
2:00 pm - 5:00 pm	**Universal Design of Teaching K-12 Computing**	MCCC: L11-L12

Wednesday Workshops: 7:00 pm - 10:00 pm

Workshop 101	**CReST-Security Knitting Kit: Ready to Use Teaching Resources to Embed Security Topics into Upper Division CS Courses** Ambareen Siraj, *Tennessee Tech University*; Sheikh Ghafoor, *Tennessee Tech University*	MCCC: L1
Workshop 102	**Making Music with Computers: Creative Programming in Python** Bill Manaris, *College of Charleston*; Tobias Kohn, *ETH Zürich*	MCCC: L2-L3
Workshop 103	**A Web-Based IDE for Teaching with Any Language** Dan Armendariz, *Harvard University*; David Malan, *Harvard University*; Nikolai Onken, *Cloud9*	MCCC: L5-L6
Workshop 104	**High Yield in the Short Term: Planning Strategically to Get Women into your Major** Lecia Barker, *University of Texas at Austin*; Leisa Thompson, *University of Virginia*	MCCC: L8
Workshop 105	**Guiding Students to Discover CS Concepts and Develop Process Skills using POGIL** Clifton Kussmaul, *Muhlenberg College*; Helen Hu, *Westminster College*; Chris Mayfield, *James Madison University*	MCCC: L9
Workshop 106	**Engage, Energize and Empower Your Students with Team-Based Learning** Lenore Horowitz, *University at Albany*; George Berg, *University at Albany*; Kimberly Van Orman, *University at Albany*	MCCC: L10
Workshop 107	**Teaching Parallel Computing Concepts with OpenMP** Joel Adams, *Calvin College*; Richard Brown, *St. Olaf College*; Elizabeth Shoop, *Macalester College*	MCCC: L11-L12

Wednesday Workshops: 7:00 pm - 10:00 pm

Workshop 108	**Using OpenDSA eTextbooks in Your Class** Clifford Shaffer, *Virginia Tech*; Thomas Naps, *University of Wisconsin-Oshkosh*; Susan Rodger, *Duke University*	**MCCC: L13-L14**
Workshop 109	**Reading and Writing Like Computer Scientists: How to Promote Critical Thinking and Student Engagement** Mark Hoffman, *Quinnipiac University*; Jerod Weinman, *Grinnell College*	**MCCC: River Bluff**
Workshop 110	**Lego-based Case Studies for Teaching Software Engineering Concepts throughout the Curriculum** Stan Kurkovsky, *Central Connecticut State University*	**MCCC: Sultana**
Workshop 111	**Peer Instruction in Computing: a Focus on Student Learning** Daniel Zingaro, *University of Toronto Mississauga*; Leo Porter, *University of California, San Diego*; Quintin Cutts, *University of Glasgow*; John Glick, *University of San Diego*; Joe Hummel, *University of Illinois at Chicago*; Cynthia Lee, *Stanford University*; Jaime Spacco, *Knox College*	**MCCC: Mississippi**
Workshop 112	**How to Launch a STARS Computing Corps Cohort to Improve Retention and Broaden Participation in Computi** Jamie Payton, University of No[illegible] at Charlotte; Tiffany Barnes, North Carolina State University	**MCCC: Cotton Row**

Canceled

For a full list of workshops and descriptions visit: http://sigcse2016.sigcse.org/attendees/workshops.html

KEYNOTE SESSION

8:30 am -10:00 am	**Welcome:** Carl Alphonce, *Symposium Co-Chair, University of Buffalo* and Jodi Tims, *Symposium Co-Chair, Baldwin Wallace University* **Cognitive Load Theory and Computer Science Education** John Sweller, *Emeritus Faculty, University of New South Wales*	**MCCC: Cannon Center**

10:00 am - 10:45 am	**Break, Exhibits & Demos**	**MCCC: Exhibit Hall**
10:00 am - 10:45 am	**Demo Sessions:** Tiffany Barnes, *Chair* **OpenDSA: An Interactive eTextbook for Computer Science Courses** Clifford Shaffer, *Virginia Tech* **OSBLE+: A Next-Generation Learning Management and Analytics Environment for Computing Education** Daniel Olivares, Christopher Hundhausen, *Washington State University*	**MCCC: Exhibit Hall**
10:00 am - 11:30 am	**NSF Showcase #1** *(See page 40 for a complete listing of NFS Showcases)*	**MCCC: Exhibit Hall**

THURSDAY SESSIONS: 10:45 am - 12:00 pm

PAPER SESSIONS	10:45 AM	11:10 AM	11:35 AM
Data Structures Chair: Albert Chan, *Fayetteville State University* **MCCC: L11-L12**	**Paper vs. Computer-based Exams: A Study of Errors in Recursive Binary Tree Algorithms** Scott Grissom, *Grand Valley State University*; Laurie Murphy, *Pacific Lutheran University*; Renée McCauley, *College of Charleston*; Sue Fitzgerald, *Metropolitan State University*	**Stay on These Roads: Potential Factors Indicating Students' Performance in a CS2 Course** Holger Danielsiek, Jan Vahrenhold, *Westfälische Wilhelms-Universität Münster*	**BRIDGES: A System to Enable Creation of Engaging Data Structures Assignments with Real-World Data and Visualizations** David Burlinson, Mihai Mehedint, Chris Grafer, Kalpathi Subramanian, Jamie Payton, Paula Goolkasian, *The University of North Carolina at Charlotte*; Michael Youngblood, Xerox A PARC Company; Robert Kosara, Tableau Software
Computational Thinking Chair: Monisha Pulimood, *The College of New Jersey* **MCCC: L13-L14**	**Investigating Differences in Wiki-based Collaborative Activities Between Student Engagement Profiles in CS1** Adam Eck, Leen-Kiat Soh, Duane Shell, *University of Nebraska-Lincoln*	**A Study on the Impact of Multidisciplinary Collaboration on Computational Thinking** S. Monisha Pulimood, Kim Pearson, Diane C. Bates, *The College of New Jersey*	**Computational Thinking as Liberal Studies** Dave Mason, Irfan Khan, Vadim Farafontov, *Ryerson University*
Research on Learning Chair: Bo Brinkman, *Miami University* **MCCC: L5-L6**	**An Examination of Layers of Quizzing in Two Computer Systems Courses** Cindy Norris, *Appalachian State University*	**Subgoals Help Students Solve Parsons Problems** Briana Morrison, Lauren Margulieux, Barbara Ericson, Mark Guzdial, *Georgia Institute of Technology*	**As CS Enrollments Grow, Are We Attracting Weaker Students?: A Statistical Analysis of Student Performance in Introductory Programming Courses Over Time** Mehran Sahami, Chris Piech, *Stanford University*

THURSDAY SESSIONS: 10:45 am - 12:00 pm

PAPER SESSIONS	10:45 AM	11:10 AM	11:35 AM
Professional Development Chair: Andy Grover, *Thiel College* **MCCC: L2-L3**	**Implementation and Outcomes of a Three-Pronged Approach to Professional Development for CS Principles** Chrystalla Mouza, Lori Pollock, Kathleen Pusecker, Kevin Guidry, Ching-Yi Yeh, James Atlas, Terry Harvey, *University of Delaware*	**Deploying Exploring Computer Science Statewide** Helen Hu, *Westminster College*; Cecily Heiner, *Southern Utah University*; Jay McCarthy, *University of Massachusetts Lowell*	**TEALS: Teacher Professional Development Using Industry Volunteers** Nathaniel Granor, Kevin Wang, *Microsoft/TEALS*; Leigh Ann DeLyser, *CSNYC*

SPECIAL SESSIONS AND PANELS: 10:45 am - 12:00 pm

Panel Session	**Engaging CS Alumni from Afar** Christine Shannon, *Centre College*; James Kiper, *Miami University*; Samuel Rebelsky, *Grinnell College*; Janet Davis, *Whitman College*	**MCCC: Cotton Row**
Panel Session	**Rediscovering the Passion, Beauty, Joy, and Awe: Making Computing Fun Again, part 8** Daniel Garcia, *UC Berkeley*; Josh Caldwell, *code.org*; Pamela Fox, *Khan Academy*; Jeremy Keeshin, *CodeHS*	**MCCC: Steamboat**
Panel Session	**How to Use Open Source Software in Education** Judith Bishop, *Microsoft Research*; Carlos Jensen, *Oregon State University*; Walt Scacchi, *University of California*; Arfon Smith, *GitHub Inc.*	**MCCC: L10**
Special Session	**The Micro-Cluster Showcase: 7 Inexpensive Beowulf Clusters for Teaching PDC** Joel Adams, *Calvin College*; Jacob Caswell, *St. Olaf College*; Suzanne Matthews, *U.S. Military Academy*; Charles Peck, *Earlham College*; Elizabeth Shoop, *Macalester College*; David Toth, *Centre College*; James Wolfer, *Indiana University, South Bend*	**MCCC: Mississippi**
Teradata University Supporter Session	**Leveraging the Teradata University Network for Data Management Courses** Dr. Karen Davis, Professor, University of Cincinnati; Susan Baskin, Director, Teradata University Network, Teradata *(See page 32 for session description)*	**MCCC: Sultana**

12:00 pm - 1:45 pm	**First Timer's Lunch: Service as Rent** Barbara Boucher Owens, *Emeritus Faculty, Southwestern University*	**MCCC:** Ballroom B
12:00 pm - 1:45 pm	**Lunch and Learn: Making JavaScript Apps with Code.org<http://code.org/>'s App Lab (lunch)**	MCCC: L10
12:00 pm - 1:45 pm	**Lunch Break**	On Your Own
1:45 pm - 5:00 pm	**Student Research Competition Posters Session** *(See page 41 for a complete listing of Student Research Competition Posters)*	**MCCC:** Exhibit Hall

THURSDAY SESSIONS: 1:45 pm - 3:00 pm

Paper Sessions	1:45 pm	2:10 pm	2:35 pm
Pair Programming Chair: Amber Settle, *DePaul University* **MCCC: L11-L12**	**Teaching Mobile Development with Pair Programming** Mohammed Seyam, D. Scott McCrickard, *Virginia Tech*	**Observations of Pair Programming: Variations in Collaboration Across Demographic Groups** Omar Ruvalcaba, *California State University, Northridge*; Linda Werner, *University of California, Santa Cruz*; Jill Denner, *Education, Training, and Research*	**Three Years of Student Pair Programming – Action Research Insights And Outcomes** Ian McChesney, *Ulster University*
Engagement and Diversity Chair: Meghan Allen, *University of British Columbia* **MCCC: L13-L14**	**Enhancing Engagement by Blending Rigor and Relevance** Sarnath Ramnath, John Hoover, *St Cloud State University*	**Understanding How Research Experiences for Undergraduate Students May Foster Diversity In The Professorate** Burcin Tamer, Jane Stout, *Computing Research Association*	**Applying the Communal Goal Congruity Perspective to Enhance Diversity and Inclusion in Undergraduate Computing Degrees** Bo Brinkman, Amanda Diekman, *Miami University*
CS Ed Research 1 Chair: Leigh Ann Sudol-DeLyser, *CSNYC* **MCCC: L5-L6**	**An Effective Approach to Enhancing Compiler Error Messages** Brett A. Becker, *University College Dublin*	**Automatic Inference of Programming Performance and Experience from Typing Patterns** Juho Leinonen, Krista Longi, Arto Klami, Arto Vihavainen, *University of Helsinki*	**A (Updated) Review of Empiricism at the SIGCSE Technical Symposium** Ahmed Al-Zubidy, Jeffrey Carver, *University of Alabama*; Sarah Heckman, *North Carolina State University*; Mark Sheriff, *University of Virginia*
CS0 Chair: David Naugler, *Southeast Missouri State University* **MCCC: L2-L3**	**CS0 for Computer Science Majors at Ohio University** Cindy Marling, David Juedes, *Ohio University*	**Security Injections 2.0: Increasing Ability to Apply Secure Coding Knowledge using Segmented and Interactive Modules in CS0** Sagar Raina, Siddharth Kaza, Blair Taylor, *Towson University*	**Combining "Big Data" and "Thick Data" Analyses for Understanding Youth Learning Trajectories in a Summer Coding Camp** Deborah Fields, Janell Amely, Jason Maughan, *Utah State University*; Lisa Quirke, *University of Toronto*

SPECIAL SESSIONS AND PANELS: 1:45 pm - 3:00 pm

Special Session	**Training Teachers to Integrate Computational Thinking into K-12 Teaching** Rania Hodhod, Shamim Khan, Yesem Kurt-Peker, Lydia Ray, *Columbus State University*	**MCCC: Cotton Row**
Special Session	**Demystifying Computing with Magic, part III** Daniel Garcia, *UC Berkeley*; David Ginat, *Tel-Aviv University*	**MCCC: Steamboat**
Panel Session	**Engage in Reasoning with Tools** Greg Kulczycki, Virginia Tech; Murali Sitaraman, Clemson University; Nigamanth Sridhar, Cleveland State University; Bruce Weide, The Ohio State University	**MCCC: Mississippi**
Google Supporter Session	**Surfacing Solutions to the Capacity Crunch** Chris Stephenson, *Head of Computer Science Education Programs at Google*; Jeff Offut, *George Mason University*; Heather Pon-Barry, *Mount Holyoke College*, Kristy Boyer, *North Carolina State University/University of Florida*; Andrew Tang, *Rutgers University*, John DeNero, *UC Berkeley* *(See page 32 for abstract)*	**MCCC: Sultana**

3:00 pm - 3:45 pm	**Break, Exhibits & Demos**	**MCCC: Exhibit Hall**
3:00 pm - 3:45 pm	**Demo Sessions:** Martha Kosa, *Chair* **The Speech Recognition Virtual Kitchen Toolkit** Rebecca Bates, Sung Kim, *Minnesota State University, Mankato* **The Sensorian Shield: Transforming the Raspberry Pi into an IoT Platform** Qusay Mahmoud, Dhimiter Qendri, Michael Lescisin, *UOIT*	**MCCC: Exhibit Hall**
3:00 pm - 4:30 pm	**NSF Showcase #2** *(See pages 40 for a complete listing of NFS Showcases)*	**MCCC: Exhibit Hall**

THURSDAY SESSIONS: 3:45 pm - 5:00 pm

Paper Sessions	3:45 pm	4:10 pm	4:35 pm
Big Data Chair: Deepak Kumar, *Bryn Mawr College* **MCCC: L11-L12**	**VisMap: Exploratory Visualization Support for Introductory Data Science and Visualization** Dugald Hutchings, Megan Squire, *Elon University*	**A Practical and Sustainable Model for Learning and Teaching Data Science** Bina Ramamurthy, *University at Buffalo*	**Teaching Big Data with a Virtual Cluster** Joshua Eckroth, *Stetson University*
Teaching with Teams Chair: Leen-Kiat Soh, *University of Nebraska, Lincoln* **MCCC: L13-L14**	**Teaching Global Software Engineering by Simulating a Global Project in the Classroom** Yang Li, Stephan Krusche, Christian Lescher, Bernd Bruegge, *Technische Universitaet Muenchen*	**Evaluating Student Teams: Do Educators Know What Students Think?** Anya Tafliovich, *University of Toronto Scarborough*; Andrew Petersen, *University of Toronto Mississauga*; Jennifer Campbell, *University of Toronto*	**Exploring Lightweight Teams in a Distributed Learning Environment** Stephen MacNeil, Celine Latulipe, Bruce Long, *University of North Carolina at Charlotte*; Aman Yadav, *Michigan State University*
Program Design Chair: Imad Rahal, *Saint John's University* **MCCC: L5-L6**	**Modernizing Plan-Composition Studies** Kathi Fisler, *WPI*; Shriram Krishnamurthi, *Brown University*; Janet Siegmund, *Universität Passau*	**On the Interplay Between Bottom-Up and Datatype-Driven Program Design** Francisco Enrique Vicente Castro, Kathi Fisler, *Worcester Polytechnic Institute*	**Can Students Design Software? The Answer Is More Complex Than You Think** Chenglie Hu, *Carroll University*
Scratch Chair: Mark S. Hall, *University of Wisconsin, Marathon County* **MCCC: L2-L3**	**ITCH: Individual Testing Of Computer Homework For Scratch Assignments** David Johnson, *University of Utah*	**Multi-Track Programming Competitions with Scratch** Jason Arnold, Heather Bort, Ryan Naugle, Casey O'Hare, Dennis Brylow, *Marquette University*	**Initialization in Scratch: Seeking Knowledge Transfer** Diana Franklin, University of Chicago; Charlotte Hill, Hilary Dwyer, Alexandria Hansen, Ashley Iveland, Danielle Harlow, *University of California, Santa Barbara*

SPECIAL SESSIONS AND PANELS: 3:45 pm - 5:00 pm

Special Session	**ACM Joint Task Force on Cybersecurity Education** Diana Burley, *George Washington University*; Matt Bishop, *University of California*, Davis; Elizabeth Hawthorne, *Union County College*; Siddharth Kaza, *Towson University*; Lynn Futcher, *Nelson Mandela Metropolitan University*; Scott Buck, *Intel*	**MCCC: Cotton Row**
Panel Session	**Technology We Can't Live Without!, revisited** Daniel Garcia, *UC Berkeley*; Leslie Aaronson, *Forshay Learning Center*; Shawn Kenner, *Sharon High School*; Colleen Lewis, *Harvey Mudd College*; Susan Rodger, *Duke University*	**MCCC: Steamboat**
Panel Session	**igniteCS: Addressing Undergraduate CS Retention** Erin Cannon, *Google*; Priya Chawla, *University of Cincinnati*; Katherine Lo, *University of California, Irvine*; Haley Adams, *Rhodes College*	**Room: Mississippi**
Special Session	**Instructional Design is to Teaching as Software Engineering is to Programming** Austin Cory Bart, Clifford Shaffer, *Virginia Tech*	**MCCC: L10**
zyBooks Supporter Session	**Improving CS Teaching: Automated Homework/Labs, Shared Quizzes/Assignments, Student Activity Insights and More** Smita Bakshi, *zyBooks co-founder/CEO*, Frank Vahid, *zyBooks co-founder/CTO*; Roman Lysecky, *Professor, University of Arizona* *(See page 32 for complete abstract)*	**MCCC: River Bluff**
Oracle Supporter Session	**Solve it with SQL - Use SQL to Solve a Mystery** Bruce Regittko, *Oracle Academy Principal Instructor* *(See page 33 for complete abstract)*	**MCCC: Sultana**

5:30 pm - 6:20 pm	**Birds of a Feather Flock #1** *(See pages 36-37 For a complete listing of all Birds of a Feather presentations)*	**Sheraton Hotel and MCCC**
5:30 pm - 7:00 pm	**Teach GPU Accelerated Computing with NVIDIA® Teaching Kit for University Educators** Dr. Wen-Mei Hwu, *University of Illinois;* Joe Bungo, *GPU Educators Program Manager, NVIDIA Corporation*	**Sheraton Hotel and MCCC**
6:30 pm - 7:20 pm	**Birds of a Feather Flock #2** *(See pages 36-37 For a complete listing of all Birds of a Feather presentations)*	**Sheraton Hotel and MCCC**
7:30 pm - 9:30 pm	**SIGCSE Reception**	**MCCC: Ballroom A**

KEYNOTE SESSION

8:30 am -10:00 am	**Welcome:** Michael E. Caspersen, *Program Co-Chair, Aarhus University*; Stephen Edwards, *Program Co-Chair, University of Virginia* **Plenary Session: CS Education: Catching the Wave** Jan Cuny, *Program Director for Broadening Participation and Education in Computing, National Science Foundation*	**Cannon Center**

10:00 am - 10:45 am	**Break, Exhibits & Demos**	**MCCC: Exhibit Hall**
10:00 am - 10:45 am	**Demo Sessions:** Tiffany Barnes, *Chair* **Creating and Grading IPython/Jupyter Notebook Assignments with NbGrader** Jessica Hamrick, *University of California, Berkeley* **CodeSnaps: Block-Based Robotic Programming for the Low-Budget Classroom** Jennifer Sabourin, Lucy Kosturko, Scott McQuiggan, *SAS Institute, Inc*	**MCCC: Exhibit Hall**
10:00 am - 11:30 am	**NSF Showcase #3** *(See page 40 for a complete listing of NSF Showcases)*	**MCCC: Exhibit Hall**
10:00 am - 12:00 pm	**Poster Session** *(See pages 38-39 for a complete listing of Poster Sessions)*	**MCCC: Exhibit Hall**

FRIDAY SESSIONS: 10:45 am - 12:00 pm

Paper Sessions	10:45 am	11:10 am	11:35 am
Peer Techniques Chair: Kim Bruce, *Pomona College* **MCCC: L11-L12**	**Differences in the Learning Principles Dominating Student-Student vs. Student-Instructor Interactions while Working on Programming Tasks** Alessio Gaspar, Colin Arnold, *University of South Florida*; Joni Torsella, Nora Honken, *University of Cincinnati*; Sohum Sohoni, *Arizona State University*	**The Effects of Peer- and Self-assessment on the Assessors** Joonsuk Park, Kimberley Williams, *Cornell University*	**The Sweep: Essential Examples for In-Flow Peer Review** Joe Gibbs Politz, Shriram Krishnamurthi, *Brown University*; Joseph Collard, Arjun Guha, *UMass Amherst*; Kathi Fisler, *Worcester Polytechnic Institute*
Artistic Approaches Chair: Ravi Gandha, South Seattle College **MCCC: L13-L14**	**The MoveLab: Developing Congruence Between Students' Self-Concepts and Computing** Kayla DesPortes, Monet Spells, Betsy DiSalvo, *Georgia Institute of Technology*	**Creative Computation in High School** Dianna Xu, Deepak Kumar, *Bryn Mawr College*; Aaron Cadle, *Fort Worth Country Day School*; Darby Thompson, *Sidwell Friends School*; Ursula Wolz, *RiverSound Solutions*; Ira Greenberg, *Southern Methodist University*	**Computational Art - Introducing High School Students to Computing via Art** Zoe Wood, Katelyn Hicks, *California Polytechnic State University*; Paul Muhl, *Santa Barbara High School*
Tests and Outcomes Chair: Don Blaheta, *Longwood University* **MCCC: L5-L6**	**Introducing and Evaluating Exam Wrappers in CS2** Michelle Craig, Diane Horton, Danny Heap, *University of Toronto*; Daniel Zingaro, *University of Toronto, Mississauga*	**Measuring Effects of Modality on Perceived Test Anxiety for Computer Programming Exams** Robert Deloatch, Brian Bailey, Alex Kirlik, *University of Illinois Urbana Champaign*	**Impact of Student Achievement Goals on CS1 Outcomes** Daniel Zingaro, *University of Toronto Mississauga*; Leo Porter, *University of California, San Diego*

FRIDAY SESSIONS: 10:45 am - 12:00 pm

Paper Sessions	10:45 am	11:10 am	11:35 am
High School Diversity Chair: Howard Francis, *University of Pikeville* **MCCC: L2-L3**	**Towards More Gender Diversity in CS through an Artificial Intelligence Summer Program for High School Girls** Marie Vachovsky, Grace Wu, Sorathan Chaturapruek, Olga Russakovsky, Richard Sommer, Li Fei-Fei, *Stanford University*	**Investigating the Role of Being a Mentor as a Way of Increasing Interest in Computer Science** Jody Clarke-Midura, Vicki Allan, Kevin Close, *Utah State University*	**Sisters Rise Up 4 CS: Helping Female Students Pass the Advanced Placement Computer Science A Exam** Barbara Ericson, Miranda Parker, *Georgia Institute of Technology*; Shelly Engelman, *SageFox Consulting Group*

SPECIAL SESSIONS AND PANELS: 10:45 am - 12:00 pm

Panel Session	**Future Directions of Block-based Programming** Neil Brown, *University of Kent*; Jens Mönig, *SAP Labs*; Anthony Bau, *Phillips Exeter Academy*; David Weintrop, *Northwestern University*	**MCCC: Cotton Row**
Panel Session	**Why Don't Some CS0 Students Succeed? How Important Are Background, Experience, Culture, Aptitude, Habits and Attitude?** Daniel Garcia, *University of California, Berkeley*; Stuart Reges, *University of Washington*; Colleen Lewis, *Harvey Mudd College*; Nathan Ensmenger, *Indiana University*	**MCCC: Steamboat**
Panel Session	**Scrum and Agile Methods in Software Engineering Courses** Jennifer Campbell, *University of Toronto*; Stan Kurkovsky, *Central Connecticut State University*; Chun Wai Liew, *Lafayette College*; Anya Tafliovich, University of Toronto Scarborough	**MCCC: Mississippi**
Vocareum Supporter Session	**Assessment at Scale: The Next Frontier for Universal Computing Literacy** Sanjay Srivastava, *CEO, Vocareum* *(See page 33 for abstract)*	**MCCC: Sultana**
IBM Suppoter Session	**A Deep Dive into the IBM Bluemix Cloud Platform for Developers** Enrique V. Kortright, Ph.D., *Senior Academic Program Manager for IBM Analytics, IBM Corp* *(See page 33 for abstract)*	**MCCC: River Bluff**

12:00 pm - 1:45 pm	**Alice 3 to Java – Celebration with the Ghost Train Crew (lunch)**	MCCC: Ballroom B
12:00 pm - 1:45 pm	**New AP Computer Science Principles Course (lunch)**	MCCC: L10
12:00 pm - 1:45 pm	**Lunch Break**	On Your Own
12:00 pm - 1:45 pm	**International Lunch: contact sigcse2016-international@bw.edu for information**	

FRIDAY SESSIONS: 1:45 pm - 3:00 pm

Paper Sessions	1:45 pm	2:10 pm	2:35 pm
Problem Solving Chair: Ellen L. Walker, *Hiram College* **MCCC: L11-L12**	**Online CS1: Who Enrols, Why, and How Do They Do?** Diane Horton, Jennifer Campbell, Michelle Craig, *University of Toronto*	**The Influence of Problem Solving Abilities on Students' Performance on Different Assessment Tasks in CS1** Alex Lishinski, Aman Yadav, Richard Enbody, Jonathon Good, *Michigan State University*	**A Course on Programming and Problem Solving** Swapneel Sheth, Christian Murphy, *University of Pennsylvania*; Kenneth Ross, *Columbia University*; Dennis Shasha, *New York University*
Novel Learning Approaches Chair: Ruth Anderson, University of Washington **MCCC: L13-L14**	**The Video Collaboratory as a Learning Environment** Vikash Singh, Sarah Abdellahi, Mary Lou Maher, Celine Latulipe, *University of North Carolina at Charlotte*	**Just-In-Time Learning for the Just Google It Era** Elizabeth Boese Boese, *University of Colorado, Boulder*	**Hackathons as an Informal Learning Platform** Arnab Nandi, Meris Mandernach, *The Ohio State University*
CS Ed Research 2 Chair: Kathi Fisler, *Worcester Polytechnic Institute* **MCCC: L5-L6**	**SIGCSE 2016 Best Paper** **A Multi-institutional Study of Peer Instruction in Introductory Computing** Leo Porter, Beth Simon, *University of California, San Diego*; Dennis Bouvier, *Southern Illinois University, Edwardsville*; Quentin Cutts, *University of Glasgow*; Scott Grissom, *Grand Valley State University*; Cynthia Lee, *Stanford University*; Robert McCartney, *University of Connecticut*; Daniel Zingaro, *University of Toronto, Mississauga*	**Development of a Concept Inventory for Computer Science Introductory Programming** Ricardo Caceffo, Rodolfo Azevedo, *UNICAMP*; Steven Wolfman, Kellogg Booth, *University of British Columbia*	**A Data-Driven Analysis of Informatively Hard Concepts in Introductory Programming** Rudolf Wiegand, *University of Central Florida*; Anthony Bucci, *Independent Contractor*; Amruth Kumar, *Ramapo College of New Jersey*; Jennifer Albert, *The Citidel*; Alessio Gaspar, *University of South Florida*
K-8 Diversity Chair: Brian Krupp, Baldwin Wallace University **MCCC: L2-L3**	**How Early Does the CS Gender Gap Emerge? A Study of Collaborative Problem Solving in 5th Grade Computer Science** Jennifer Tsan, Collin Lynch, *North Carolina State University*; Kristy Boyer, *University of Florida*	**Differentiating for Diversity: Using Universal Design for Learning in Computer Science Education** Alexandria Hansen, Hilary Dwyer, Danielle Harlow, *University of California, Santa Barbara*; Eric Hansen, *Hope Elementary School, Santa Barbara*; Diana Franklin, *University of Chicago*	**Empowering All Students: Closing the CS Confidence Gap with an In-School Intervention for Middle School Students** Philip Buffum, Megan Frankosky, Eric Wiebe, Bradford Mott, James Lester, *North Carolina State University*; Kristy Boyer, *University of Florida*

SPECIAL SESSIONS AND PANELS: 1:45 PM - 3:00 PM

Special Session	**AP Computer Science and Service Learning with We.org** Lien Diaz, Crystal Furman, *College Board*; Sandy Czajka, *Riverside Brookfield High School*	MCCC: Cotton Row
Panel Session	**CS10K Teachers by 2017? Try CS1K+ students NOW! Coping with the Largest CS1 Courses in History** Daniel Garcia, John DeNero, *UC Berkeley*; Jennifer Campbell, *University of Toronto*; Mary Lou Dorf, *University of Michigan*; Stuart Reges, *University of Washington*	MCCC: Steamboat
Panel Session	**Booming Enrollments – Survey Data** Tracy Camp, *Colorado School of Mines*, Stu Zweben, *The Ohio State University*; Duncan Buell, *University of South Carolina*; Jane Stout, *Computing Research Association*	MCCC: L10
Special Session	**Updating Curricular Guidelines for Associate-Degree Computer Science Programs** Cara Tang, *Portland Community College*; Cindy Tucker, *Bluegrass Community and Technical College*; Elizabeth Hawthorne, *Union County College*	**MCCC: Mississippi**
Google Supporter Session	**Up Close and Personal with Google CS Programs** Chris Stephenson, *Head of Computer Science Education Programs, Google* *(See page 33 for session description)*	MCCC: Sultana

3:00 pm - 3:45 pm	**Break, Exhibits & Demos**	MCCC: Exhibit Hall
3:00 pm - 3:45 pm	**Demo Sessions:** Tiffany Barnes, *Chair* **OnRamp to Parallel and Distributed Computing: Web-Portal for Teaching Parallel and Distributed Computing** Joshua Hursey, *University of Wisconsin-La Crosse* **Education Modules for Networking, Cloud Computing and Security in Systems Courses** Jay Aikat, Michael Reiter, Kevin Jeffay, *UNC, Chapel Hill*	MCCC: Exhibit Hall
3:00 pm - 4:30 pm	**NSF Showcase #4** *(See page 40 for a complete listing of NSF Showcases)*	MCCC: Exhibit Hall
3:00 pm - 5:00 pm	**Poster Session** *(See pages 38-39 for a complete listing of Poster Sessions)*	MCCC: Exhibit Hall
3:45 pm - 5:00 pm	**Lightning Talks:** Martha Kosa, *Chair* *(See page 42 for a complete list of Lightning Talks)*	MCCC: L10

FRIDAY SESSIONS: 3:45 pm - 5:00 pm

Paper Sessions	3:45 pm	4:10 pm	4:35 pm
Databases Chair: Cliff Shaffer, *Virginia Tech* **MCCC: L11-L12**	**Students' Syntactic Mistakes in Writing Seven Different Types of SQL Queries and its Application to Predicting Students' Success** Alireza Ahadi, Vahid Behbood, Julia Prior, Raymond Lister, University of Technology Sydney Arto Vihavainen, University of Helsinki	**chidb: Building a Simple Relational Database System from Scratch** Borja Sotomayor, Adam Shaw, University of Chicago - Department of Computer Science	**SQL: From Traditional Databases to Big Data** Yasin Silva, Isadora Almeida, Michell Queiroz, Arizona State University
International Perspectives Chair: Dennis Bouvier, *Southern Illinois University* **MCCC: L13-L14**	**The Performance of Female Computer Science Students across Three Caribbean Islands** Daniel Fokum, Daniel Coore, Yewande Lewis-Fokum, *The University of the West Indies, Mona*	**Piloting Computer Science Education Week in Mexico** Nora Escherle, *Ph FHNW*; Silvia I. Ramirez-Ramirez, Juan Nolazco-Flores, *Department of Computer Science, Tecnológico de Monterrey*; Ashok Basawapatna, *Dept. Mathematics, Computer & Information Science, SUNY, Old Westbury*; Dorit Assaf, Alexander Repenning, Carmine Maiello, *School of Education, FHNW*; Yasko Endo, *University of Colorado, Boulder*	**Alice in the Middle East: An Experience Report from the Formative Phase** Saquib Razak, Huda Gedawy, Wanda Dann, Donald Slater, *Carnegie Mellon University*
Software Testing Chair: Ria Galanos, Thomas Jefferson High School **MCCC: L5-L6**	**Testing Strategies for the Automated Grading of Student Programs** Chris Wilcox, *Colorado State University*	**A Strategy to Combine Test-driven Development and Test Criteria to Improve Learning of Programming Skills** Bruno Henrique Pachulski Camara, Faculdade Integrado, Marco Aurélio Graciotto Silva, *Federal University of Technology, Paraná*	**Tool Design and Student Testing Behavior in an Introductory Java Course** Grant Braught, James Midkiff, *Dickinson College*
CS Principles Chair: Tiffany Barnes, *North Carolina State University* **MCCC: L2-L3**	**An Experience Report Assessing A Professional Development MOOC For CS Principles** Jeff Gray, Jonathan Corley, *The University of Alabama*; Brian Eddy, *University of West Florida*	**Two Teachers, Two Perspectives on CS Principles** Jean Griffin, *Temple University*; Tammy Pirmann, *Gwynedd Mercy University*; Brent Gray, *Carver Engineering and Science High School*	**Lessons Learned from "BJC" CS Principles Professional Development** Thomas W. Price, Veronica Catete, Tiffany Barnes, *NC State University*; Jennifer Albert, *The Citadel*; Daniel D. Garcia, *UC Berkeley*
Beale St. Sampler Chair: Roy Pargas, *Clemson University* **MCCC: Cotton Row**	**A Survey of Ethical Agreements in Information Security Courses** Benedict Chukuka, Michael Locasto, *University of Calgary*	**Assessing the Tier-1 Core Learning Outcomes of CS2013** James McGuffee, *Northern Kentucky University*; E, Palmer, *MacMurray College*; Indira Guzman, *Trident University International*	**Seeing Is Believing: Helping Students Visualize Multithreaded Behavior** Joel Adams, Patrick Crain, Christopher Dilley, Serita Nelesen, Javin Unger, Mark Vander Stel, *Calvin College*

SPECIAL SESSIONS AND PANELS: 3:45 pm - 5:00 pm

Panel Session	**Uncommon Teaching Languages** Mark Lewis, *Trinity University*; Douglas Blank, *Bryn Mawr College*; Kim Bruce, *Pomona College*; Peter-Michael Osera, *Grinnell College*	**MCCC: Mississippi**
Turing's Craft Supporter Session	**Creating Exercises and Engaging With Students** David Arnow, *President of Turing's Craft* *(See page 34 for session description)*	**MCCC: River Bluff**
Microsoft Supporter Session	**The BBC micro:bit powered by Microsoft Touch Develop** Michael Braun, *Educational Specialist* and Eric Anderson, *Senior Software Engineer, Microsoft Research* *(See page 34 for session description)*	**MCCC: Sultana**

5:10 pm - 6:00 pm	**SIGCSE Business Meeting**	**MCCC:** Cotton Row
6:00 pm - 7:00 pm	**NCWIT Academic Alliance Reception**	**Sheraton:** Heritage Ballroom
6:10 pm - 7:00 pm	**CCSC Business Meeting**	**MCCC:** Cotton Row
7:00 pm - 8:00 pm	**Community College Reception Sponsored by Intel**	**Sheraton: Nashville**

FRIDAY WORKSHOPS: 7:00 pm - 10:00 pm

Workshop 301	**A Hands-On Introduction to the Internet of Things** Bill Siever, *Western Illinois University*; Michael Rogers, *Northwest Missouri State University*	**MCCC: L1**
Workshop 302	**Introducing Secure Coding in CS0, CS1, and CS2** Blair Taylor, Siddharth Kaza, *Towson University*	**MCCC: L2-L3**
Workshop 303	**Building on Blocks: Getting Started Wi… …mes in Greenfoot 3** Amjad Altadmri, Neil Brown, *Unive…* Canceled	**MCCC: L5-L6**
Workshop 304	**Rubricking Like a Boss: Writing and Using Rubrics for Faster, Fairer Grading of Student Programs** Don Blaheta, *Longwood University*; Adrienne Decker, *Rochester Institute of Technology*	**MCCC: L8**
Workshop 305	**Permeating Data Visualization in CS Courses** Aaron Cadle, *Fort Worth Country Day School*; Ira Greenberg, *Southern Methodist University*; Deepak Kumar, Dianna Xu, *Bryn Mawr College*; Ursula Wolz, *RiverSound Solutions*	**MCCC: L9**
Workshop 306	**Learn CS1/2 by Playing and Building Commercial Grade Casual Games: No Background Required** Kelvin Sung, Rob Nash, Jason Pace, *University of Washington Bothell*	**MCCC: L10**
Workshop 307	**CSinParallel: Using WebMapReduce to Teach Parallel Computing Concepts, Hands-On** Richard Brown, *St. Olaf College*; Elizabeth Shoop, *Macalester College*; Joel Adams, *Calvin College*	**MCCC: L11-L12**
Workshop 308	**MUzECS: Block-based Arduino Programming for Exploring Computer Science** Dennis Brylow, *Marquette University*	**MCCC: L13-L14**
Workshop 309	**How to Plan and Run Summer Computing Camps - Logistics** Barbara Ericson, *Georgia Institute of Technology*; Kristine Nagel, Nannette Napier, *Georgia Gwinnett College*; Krishnendu Roy, *Valdosta State University*	**MCCC: River Bluff**

FRIDAY WORKSHOPS: 7:00 pm - 10:00 pm

Workshop 310	**K-12 Teacher Support for Computer Science Principles: An Introduction to the UTeach Course, Thriving in Our Digital World: AP** Jeff Mickel, Alicia Beth, *The UTeach Institute, The University of Texas at Austin*	MCCC: Sultana
Workshop 311	**Conducting Educational Research in the Computer Science Classroom: Choosing the Appropriate Research Design to Address Your Research Questions** Aman Yadav, *Michigan State University*	MCCC: Mississippi
Workshop 312	**AP CS Principles and The Beauty and Joy of Computing Curriculum** Daniel Garcia, Michael Ball, *UC Berkeley*; Tiffany Barnes, *NC State*; Emil Biga, *Millard North High School*; Josh Paley, *Gunn High School*; Marnie Hill, *J. H. Rose High School*; Nathan Mattix, *Piedmont High School*; Parisa Safa, *Urban School of San Francisco*; Sean Morris, *Albany High School*; Shawn Kenner, *Sharon High School*	MCCC: Cotton Row

For a full list of workshops and descriptions visit: ***http://sigcse2016.sigcse.org/attendees/workshops.html***

8:45 am - 10:00 am	**Student Research Competition: Semi-finalist Presentation (Undergraduate)** **Student Research Competition: Semi-finalist Presentation (Graduate)** *(See page 41 for a complete listing of the Student Research Competition)*	MCCC: L8 MCCC: L9

SATURDAY SESSIONS: 8:45 am - 10:00 am

Paper Sessions	8:45 am	9:10 am	9:35 am
Computer Engineering Chair: Helen Hu, *Westminster College* **MCCC: L11-L12**	**Effects of a Program Integrating Course for Students of Computer Science and Engineering** Viggo Kann, Anna-Karin Högfeldt, *KTH Royal Institute of Technology*	**Undergraduate Assembly Language Instruction Sweetened with the Raspberry Pi** Jalal Kawash, Andrew Kuipers, Leonard Manzara, *University of Calgary*; Robert Collier, *Carleton University*	**Droning On: Reflections on Integrating UAV Technology into a Computer Engineering Design Laboratory** Meriel Huggard, Ciarán Mc Goldrick, *Trinity College Dublin*
Out-of-school Activities Chair: David J. Stucki, *Otterbein University* **MCCC: L13-L14**	**Meeting Graduate Employability Needs Through Open-source Collaboration with Industry** Matthew Forshaw, Ellis Solaiman, Oonagh McGee, Hugo Firth, *Newcastle University*; Paul Robinson, Ryan Emerson, *Red Hat, Inc.*	**Computer History on the Move** Graham Farr, Barbara Ainsworth, Chris Avram, Judy Sheard, *Monash University*	**Agile Software Development: Study Away** Maureen Doyle, Candace Gibson, Michelle Melish, Rees Storm, *Northern Kentucky University*
Classroom Techniques Chair: Sue Fitzgerald, *Metropolitan State University* **MCCC: L5-L6**	**Animated Examples as Practice Content in Java Programming Course** Roya Hosseini, Julio Guerra, Peter Brusilovsky, *University of Pittsburgh*; Teemu Sirkia, Lauri Malmi, *Aalto University*	**Improving Engagement in Introductory Courses with Homework Resubmission** Amanda Holland-Minkley, Thomas Lombardi, *Washington & Jefferson College*	**Memory Diagrams: A Consistant Approach Across Concepts and Languages** Toby Dragon, Paul Dickson, *Ithaca College*
Computing in Middle School Chair: Robert McCartney, *University of Connecticut* **MCCC: L2-L3**	**MyCS at 5: Assessing a Middle-years CS Curriculum** Brenda Castro, Terrence Diaz, Marissa Gee, Rebekah Justice, David Kwan, Preethi Seshadri, Zachary Dodds, *Harvey Mudd College*	**Factors Influencing Computer Science Learning in Middle School** Shuchi Grover, *Stanford University/SRI International*; Roy Pea, Stephen Cooper, *Stanford University*	**"What Is A Computer?" What do Secondary School Students Think?** Shuchi Grover, Daisy Rutstein, Eric Snow, *SRI Interntaional*
Games Chair: Joe Hummel, *Loyola University, Chicago* **MCCC: Cotton Row**	**A Multidisciplinary, Multifaceted Approach to Improve the Computer Science based Game Design Education: Methodology and Assessment** Chang Yun, Hesam Panahi, Zhigang Deng, *University of Houston*	**Design Insights into the Creation and Evaluation of a Computer Science Educational Game** Britton Horn, Christopher Clark, Oskar Strom, Amy Stahl, Casper Harteveld, Gillian Smith, *Northeastern University*; Hilery Chao, *Brown University*	**Experiences from an Experiential Learning Course on Games Development** Stephan Krusche, Barbara Reichart, Paul Tolstoi, Bernd Bruegge, *Technische Universität München*

SPECIAL SESSIONS AND PANELS: 8:45 am - 10:00 am

Special Session	**Nifty Assignments** Nick Parlante, Julie Zelenski, Kevin Wayne, *Princeton University*; John DeNero, Marvin Zhang, *University of California, Berkeley*; Baker Franke, *Code.org*; Arvind Bhusnurmath, Karen Her, Kristen Gee, *University of Pennsylvania*; Eric Manley, Timothy Urness, *Drake University*	MCCC: Steamboat
Gradescope Supporter Session	**Build an Autograder in 45 Minutes** Arjun Singh, *Gradescope CEO & Co-founder* *(See page 34 for session description)*	MCCC: River Bluff

10:00 am - 10:45 am	**Break, Exhibits & Demos**	**MCCC: Exhibit Hall**
10:00 am - 10:45 am	**Demo Sessions:** Martha Kosa, *Chair* **Bringing Real-World Data And Visualizations Into Data Structures Courses Using BRIDGES** Kalpathi Subramanian, Jamie Payton, David Burlinson, Mihai Mehedint, *The University of North Carolina at Charlotte* **ParselT: A Tool for Teaching Parsing Techniques** Amey Karkare, Nimisha Agarwal, *IIT Kanpur*	**MCCC: Exhibit Hall**
10:00 am - 11:30 am	**NSF Showcase #5** *(See page 40 for a complete listing of NSF Showcases)*	**MCCC: Exhibit Hall**

SATURDAY SESSIONS: 10:45 am - 12:00 pm

Paper Sessions	10:45 am	11:10 am	11:35 am
Security Chair: Judy Sheard, *Monash University* **MCCC: L11-L12**	**Facilitating a Battle Between Hackers: Computer Security Outside of the Classroom** Nathan Backman, *Buena Vista University*	**A Reflective Approach to Assessing Student Performance in Cybersecurity Exercises** Richard Weiss, *The Evergreen State College*; Michael Locasto, *University of Calgary*; Jens Mache, *Lewis and Clark College*	**The Teaching Privacy Curriculum** Serge Egelman, Julia Bernd, Gerald Friedland, *International Computer Science Institute*; Daniel Garcia, *University of California, Berkeley*
Alternative Learning Experiences Chair: Lillian N. Cassel, *Villanova University* **MCCC: L13-L14**	**A Programming Contest Strategy Guide** Aaron Bloomfield, *University of Virginia*; Borja Sotomayor, *University of Chicago*	**Teaching "Lawfulness" With Kodu** David Touretzky, *Carnegie Mellon University*; Christina Gardner-McCune, Ashish Aggarwal, *University of Florida*	**Datathons: An Experience Report of Data Hackathons for Data Science Education** Craig Anslow, *Middlesex University*; John Brosz, Frank Maurer, Mike Boyes, *University of Calgary*
CS Ed Research 3 Chair: Neil Brown, *University of Kent* **MCCC: L5-L6**	**Retention of Flow: Evaluating a Computer Science Education Week Activity** Alexander Repenning, Dorit Assaf, Carmine Maiello, Nora Escherle, *School of Education FHNW*; Ashok Basawapatna, *SUNY Old Westbury*	**Students' Initial Course Motivation and Their Achievement and Retention in College CS1 Courses** Duane F. Shell, Leen-Kiat Soh, Abraham Flanigan, Markeya Peteranetz, *University of Nebraska-Lincoln*	**Towards a Common Framework for Evaluating Computing Outreach Activities** Adrienne Decker, *Rochester Institute of Technology*; Monica M. McGill, *Bradley University*; Amber Settle, *DePaul University*

SATURDAY SESSIONS: 10:45 am - 12:00 pm

Paper Sessions	10:45 am	11:10 am	11:35 am
K-12 Teaching Chair: Jan Vahrenhold, *Universität Münster* **MCCC: L2-L3**	**CS Teacher Experiences with Educational Technology, Problem-Based Learning, and a CS Principles Curriculum** George Veletsianos, *Royal Roads University*; Bradley Beth, Calvin Lin, *The University of Texas at Austin*	**Contextualized Teaching in the Lower Secondary Education * Long-term Evaluation of a CS Course from Grade 6 to 10** Arno Pasternak, *TU Dortmund*	**Landscape of K-12 Computer Science Education in the U.S: Perceptions, Access, and Barriers** Jennifer Wang, Hai Hong, Jason Ravitz, Sepehr Moghadam, *Google, Inc.*
Tools Chair: Bina Ramamurthy, *SUNY Buffalo* **MCCC: Cotton Row**	**Supporting Active Learning by Introducing an Interactive Teaching Tool in a Data Structures and Algorithms Course** Tommy Färnqvist, Fredrik Heintz, Patrick Lambrix, Chunyan Wang, *Linköping University*; Linda Mannila, *Åbo Akademi University*	**Incorporating Analogies and Worked Out Examples as Pedagogical Strategies in a Computer Science Tutoring System** Rachel Harsley, Nick Green, Mehrdad Alizedah, Sabita Acharya. Barbara Di Eugenio; Davide Fossati, Omar AlZoubi, *Carnegie Mellon University in Qatar*	**SEURAT_Edu: A Tool to Assist and Assess Student Decision-Making in Design** John Malloy, *Miami University*; Janet Burge, *Wesleyan University*

SPECIAL SESSIONS AND PANELS: 10:45 am - 12:00 pm

Special Session	**Advanced Placement Computer Science Principles (APCSP): A Report from Teachers** Owen Astrachan, Duke University; R. Brook Osborne, Code.org	**MCCC: Steamboat**
Special Session	**Helping Students to Develop Communication, Teamwork, and Other Process Skills with POGIL** Clifton Kussmaul, Muhlenberg College; Helen Hu, Westminster College; Tammy Pirmann, School District of Springfield Township	**MCCC: Mississippi**
GitHub Supporter Session	**Classroom for GitHub: A Tool Designed for Educators** Patrick McKenna, GitHub Trainer *(See page 34 for session description)*	**MCCC: River Bluff**

KEYNOTE SESSION

12:00 pm - 2:00 pm	**Lean In to the Evidence: Breaking the "Glass Slipper" of Technical Professions** Karen Lee Ashcraft, Professor, *University of Colorado, Boulder*	**MCCC: Grand Ballroom**

3:00 pm - 6:00 pm	**Community College Curriculum Development Workshop: Computer Science and Cybersecurity**	**MCCC: L8**

SATURDAY WORKSHOPS: 3:00 pm - 6:00 pm

Workshop 401	**JavaScript Applications for CS0/CS1 Hands-on with Code.org's App Lab** Canceled Baker Franke, Sarah Filman, Brook Osborne, *Code.org*	MCCC: L1
Workshop 402	**Programming Web Services on the Cloud with Node.js** Ariel Ortiz, *Tecnologico de Monterrey, Campus Estado de Mexico*	MCCC: L2-L3
Workshop 403	**Teaching Robotics Using ROS** Nathan Sprague, Ralph Grove, *James Madison University*	MCCC: L5-L6
Workshop 405	**Advanced Placement Computer Science Principles Performance Task: Create – Applications from Ideas, Approaches to Programming Collaboratively. It's a Hackathon Workshop!** Lien Diaz, *College Board*; Richard Kick, *Newbury Park High School*; Andrew Kuemmel, *Madison West High School*	MCCC: L9
Workshop 406	**Scaling up for CS10K: Teaching and Supporting New Computer Science High School Teachers** Tiffany Barnes, *North Carolina State University*; Jamie Payton, *University of North Carolina at Charlotte*; Daniel Garcia, *University of California and Berkeley*	MCCC: L10
Workshop 407	**App Development for All!** David Hayes, *Lane Tech College Prep High School (Chicago Public Schools)*; Dale Reed, *University of Illinois at Chicago*	MCCC: L11-L12
Workshop 408	**Mixing Code and 3D Printers with Madeup** Chris Johnson, Heather Amthauer, Ryan Hardt, *University of Wisconsin, Eau Claire*; Peter Bui, *University of Notre Dame*	MCCC: L13-L14
Workshop 409	**Infusing Cooperative Learning into Early Computer Science Courses to Support Improved Engagement** Canceled Fran Trees, Rutgers University; Jeff Gray, University of Alabama; Owen Astrachan, Duke University	MCCC: River Bluff
Workshop 410	**Solving the Cloud Computing Impasse: MBaaS** Canceled Michael Rogers, Northwest Missouri State University; Bill Siever, Western Illinois University	MCCC: Sultana
Workshop 411	**Reviewing NSF Proposals: Learn about Effective Proposal Writing via the Review Process** Paul Tymann, Michael Erlinger, The National Science Foundation	MCCC: Mississippi
Workshop 412	**Transition to Java Using Alice 3** Canceled Donald Slater, Wanda Dann, Alice [illegible], Carnegie Mellon University	MCCC: Cotton Row

For a full list of workshops and descriptions visit: ***http://sigcse2016.sigcse.org/attendees/workshops.html***

Supporter Sessions

Thursday, March 3

Presented courtesy of ***Teradata University Network***

Leveraging the Teradata University Network for Data Management Courses

▶ **10:45 am - 12:00 pm**
MCCC: Sultana

Speakers: Dr. Karen Davis, *Professor, ECE, College of Engineering and Applied Sciences, University of Cincinnati*; Susan Baskin, *Director, Teradata University Network, Teradata*

Teradata University Network (TUN) provides computer science and information systems faculty members and students with a rich variety of FREE resources for teaching and learning about data and database management, data warehousing, data science, and analytics, and information management. These resources include software (both from Teradata and its partners, such as SAS, MicroStrategy, and Tableau), teaching materials (exercises, assignments, tutorials, case studies, etc.), and access to real-world data sets. The purpose of this session is to provide introduction to the TUN resources and demonstrate how these resources can be used to support computer science courses. The session will also demonstrate ways in which you can contribute to TUN and make it an even better community for yourself and faculty with similar interests.

Presented courtesy of ***Google***

Surfacing Solutions to the Capacity Crunch

▶ **1:45 pm - 3:00 pm**
MCCC: Sultana

Chair: Chris Stephenson, *Head of Computer Science Education Programs at Google*
Panelists: Jeff Offut, *George Mason University*; Heather Pon-Barry, *Mount Holyoke College*; Kristy Boyer, *North Carolina State University/University of Florida*; Andrew Tang, *Rutgers University*; John DeNero, *UC Berkeley*

Dramatic increases in undergraduate CS enrollments are driving efforts to identify interventions that address current capacity challenges. One of Google's goals is to identify innovations in teaching and technologies that will support the expansion of high-quality Computer Science (CS) programs at the undergraduate level while additionally ensuring better engagement of women and underrepresented minority students. Rather than focus on discussion of the nature of capacity crunch, this panel will share a variety of promising results arising from Google's Computer Science Capacity Awards program. The CS Capacity program is a three-year grant program involving nine universities currently implementing and testing a variety of innovations. The panel will be chaired by Chris Stephenson, Google's Head of Computer Science Education Programs.

Presented courtesy of ***zyBooks***

Improving CS Teaching: Automated Homework/Labs, Shared Quizzes/ Assignments, Student Activity Insights and More

▶ **3:45 pm - 5:00 pm**
MCCC: River Bluff

Speakers: Smita Bakshi, *zyBooks co-founder/CEO*; Frank Vahid, *zyBooks co-founder/CTO and Professor, University of California, Riverside*; Roman Lysecky, *Professor, University of Arizona*

From inception, zyBooks has focused on creating Web-native CS learning material and tools built from the ground up to maximize student learning and minimize hurdles, while empowering teachers to focus on the high-value parts of teaching and also saving them significant time and administrative hassles. In this year's session, we are proud to announce what we call, "The easiest to use program submission/grading system on the planet", called, "zyLabs: Programming". With zyLabs, instructors can create new programming assignments in just minutes, along with test cases, with absolutely no scripting–or use our pre-made labs. zyLabs is integrated directly within a zyBook, which has numerous advantages: students can easily start programming on day one, instructors can lay out learning content and homework/ labs and get scores in one place, and more. In this session, we'll show just how easy zyLabs is to use, and summarize results from schools already using the tool, including University of California, California State University, and University of Illinois. We'll outline our plans to have instructors share with each other not only their zyLab assignments, but also quiz/test questions and other content. We'll also show some of the new features that provide instructors with insights into their class such as completion levels showing where students are struggling and what common mistakes students are making - which can then help instructors focus lecture time. We'll review studies showing learning outcome improvements, and hear experiences from instructors using zyBooks. And most importantly, we want to hear your thoughts, issues and suggestions so that we can better serve you - our CS instructor community.

Presented courtesy of ***Oracle***

Solve it with SQL: Use SQL to Solve a Mystery

▶ **3:45 pm - 5:00 pm**
MCCC: Sultana

Speaker: Bruce Regittko, *Oracle Academy Principal Instructor*

Learn how you can teach students to use Greenfoot, a Java IDE, to solve an SQL mystery. The session combines Java and SQL. It will also provide information on no cost (free) resources and professional development on database and Java curriculum.

Supporter Sessions

Friday, March 4

Presented courtesy of ***Vocareum***

Assessment at Scale: The Next Frontier for Universal Computing Literacy

▶ **10:45 am - 12:00 pm**
MCCC: Sultana

Speaker: Sanjay Srivastava, *CEO, Vocareum*

Society is rapidly expecting computing literacy to be on par with language and math. Computer science teachers are being asked to address an unprecedented increase in interest and enrollment in CS classes. We will address how technology can help teachers scale with tools for assessment. We believe that cloud computing is perfectly suited to address the issues of scale around CS assessment by bringing together the capabilities of automation, network, and data. In this session we will present case studies of large CS classes deployed on a cloud platform specifically designed for computer science.

Presented courtesy of ***IBM***

A Deep Dive into the IBM Bluemix Cloud Platform for Developers

▶ **10:45 am - 12:00 pm**
MCCC: River Bluff

Speaker: Enrique V. Kortright, Ph.D., *Senior Academic Program Manager for IBM Analytics, IBM Corp*

IBM Bluemix is an open-standards, cloud platform for building, running, and managing applications. With Bluemix, developers can focus on building excellent user experiences with flexible compute options, choice of DevOps tooling, and a powerful set of IBM and third-party APIs and services. Built on Cloud Foundry open source technology, Bluemix makes application development easier with Platform as a Service (PaaS). Bluemix also provides pre-built Mobile Backend as a Service (MBaaS) capabilities.

In this session, we will do a Bluemix deep dive, exploring its architecture and the multitude of services and frameworks it provides for application development, such as the Watson cognitive APIs, the Cloudant NoSQL database, the dashDB warehousing and analytics service, the Internet of Things, Node-RED, the WebSphere Liberty J2EE lightweight runtime, and the Git-based Bluemix DevOps framework. We will tie these concepts together by developing an application from scratch, all on the Cloud.

We will also discuss how computer science faculty are using Bluemix in courses across the CS curriculum and how IBM supports faculty and students by providing free access to many of Bluemix's key features, as well as through other academic initiatives, internships, Ph.D. fellowships and partnerships. For more information and updates on this session please visit http://ibm-sigcse2016.mybluemix.net/.

Presented courtesy of ***Google***

Up Close and Personal with Google CS Programs

▶ **1:45 pm - 3:00 pm**
MCCC: Sultana

Speaker: Chris Stephenson, *Head of Computer Science Education Programs, Google*

Conference attendees are invited to get up close and personal with Google's suite of computer science education tools and funding programs. This interactive session will allow attendees to meet Google's CS Education team in short and informative bursts. Program managers will facilitate interactive chats on issues of deep importance to high school and post-secondary computer science educators. Come learn how to access a wide range of programs and funding as you share your own perspectives and insights!

Presented courtesy of ***Turing's Craft***

Creating Exercises and Engaging With Students

▶ **3:45 pm - 5:00 pm**
MCCC: River Bluff

Speaker: David Arnow, *President of Turing's Craft*

Turing's Craft increases the "hands-on" coding time of CS1 students through CodeLab, an interactive, online system providing immediate feedback for over 700 programming exercises in the popular CS1 languages. These exercises range from elementary fragments such as declarations and expressions, through control structures, functions, recursion, techniques, algorithms, and class definitions. (They are also offered in Pearson's MyProgrammingLab (MPL)).

CodeLab and MPL offer tools that allow instructors to create exercises. These can be fragment exercises like those described above, but now they also allow instructors to "pour in" their own programming projects and assignments. Both students and faculty benefit from the additional automated checking and feedback. Besides simply checking assignments for correctness, additional tools are provided to grade them conditionally on factors like design, documentation and code quality, as well as to mark up and comment on student work. This session will go through the steps of creating such a homework project, interacting with a student regarding such a project and ultimately grading it.

Supporter Sessions

Friday, March 4

Presented courtesy of ***Microsoft***

The BBC micro:bit powered by Microsoft Touch Develop

▶ **3:45 pm - 5:00 pm**
MCCC: Sultana

Speakers: Michael Braun, *Educational Specialist*; Eric Anderson, *Senior Software Engineer, Microsoft Research*

The chance to influence the lives of a million children comes once in a generation. With the partnership between the BBC and several technology companies, a small device, the BBC micro:bit will be distributed to a million children in the UK in 2016 as part of the curriculum (https://www.microbit.co.uk/). Plans are afoot to extend the program to the USA and the rest of the world. This session describes the BBC micro:bit together with its software platform, based on Microsoft's established cross-platform browser based development system, Touch Develop. We'll illustrate the architecture of the micro:bit and the software engineering hurdles that had to be overcome to enable it to be used by children. Evaluation of studies of the software platform are available and early anecdotal evidence of the hardware. Attendees at this session will have the opportunity to use the micro:bits and evaluate how they could enhance CS0 classes and school outreach. A video about the micro:bit is available at http://aka.ms/bbcmicrobit.

Saturday, March 5

Presented courtesy of ***Gradescope***

Build an Autograder in 45 Minutes

▶ **8:45 am - 10:00 am**
MCCC: River Bluff

Speaker: Arjun Singh, *Gradescope CEO & Co-founder*

This session will illustrate how to use Gradescope's code autograding platform. Attendees will learn how to write an autograder for automatically evaluating students' programming assignments, and how to deploy their autograder to Gradescope. Although the platform supports any programming language, the sample project provided will use Python. Attendees are encouraged to bring their own laptops and follow along. The session will consist of a brief introduction, a hands-on tutorial, and Q&A. Gradescope helps instructors grade both paper-based assignments and coding projects online, for free. Our product has been used to grade over 5,000,000 pages belonging to over 60,000 students. Instructors report that grading is up to 2x faster, and students love the improved accuracy and feedback.

Presented courtesy of ***GitHub***

Classroom for GitHub: A Tool Designed for Educators

▶ **10:45 am - 12:00 pm**
MCCC: River Bluff

Speaker: Patrick McKenna, *GitHub Trainer*

Real-world, industry tools connect students to the practice of being a technologist. But as instructors, our classrooms have different needs – some assignments require privacy, and we need to assess student work. When we use real-world tools, we often end up hacking the features, or re-purposing them to suit our needs.

This talk will address how the needs of the classroom drove the design of Classroom for GitHub, a tool to manage technical assignments. We will walk through the design principles, best practices, and results from the first semester of using Classroom for GitHub at The Ohio State University. In addition to sharing instructor insights, we will demonstrate how to set up your course and impart best practices to help your first semester with this new tool be a success.

Birds of a Feather

Flock #1: Thursday, March 3

5:30 pm - 6:20 pm
Located in the Sheraton Hotel and the Memphis Cook Convention Center (MCCC)

Universal Access to Computing Education

Sheraton Heritage 1

Richard Ladner, Brianna Blaser, *University of Washington*; Andreas Stefik, *University of Nevada Las Vegas*; Daniela Marghitu, *Auburn University*

Updates to the ABET Computing Accreditation Criteria

Sheraton Heritage 2

Allen Parrish, *The University of Alabama*; Stan Thomas, *Wake Forest University*

A Town Meeting: SIGCSE Committee on Expanding the Women-in-Computing Community

Sheraton Heritage 3

Gloria Townsend, *DePauw University*

Teaching with Alice

Sheraton Heritage 4

Donald Slater, Wanda Dann, *Carnegie Mellon University*; Stephen Cooper, *Stanford University*

Small Department Initiative

Sheraton St. Louis

Cathy Bareiss, *Olivet Nazarene University*

Researching Programming Education with Blackbox

Sheraton Natchez

Neil Brown, Amjad Altadmri, *University of Kent*

Mentoring Student Teaching Assistants for Computer Science

Sheraton Beale

Charles Garrod, *Carnegie Mellon University*; Jeffrey Forbes, *Duke University*; Colleen Lewis, *Harvey Mudd College*; Peter-Michael Osera, *Grinnell College*

Practical Methods for Broadening Participation Through Student Engagement in CS1/CS2 Courses

Sheraton Memphis

Beth Quinn, *University of Colorado at Boulder*; Alvaro Monge, *California State University, Long Beach*; Lecia Barker, *University of Texas at Austin*; Leo Porter, *University of California, San Diego*; Daniel Zingaro, *University of Toronto, Mississauga*

Fostering Computational Creativity through Computing in the Arts: A Community of Educators

Sheraton Knoxville

Susan Reiser, Rebecca Bruce, *UNC Asheville*; Jennifer Burg, *Wake Forest University*; Bill Manaris, *College of Charleston*

SIGCSE Reads: Time for Book Discussion

Sheraton Chattanooga

Rebecca Bates, *Minnesota State University, Mankato*; Valerie Summet, *Emory University*

Teaching Track Faculty in CS

Sheraton Jackson

Mark Sherriff, *University of Virginia*, Dan Garcia, *University of California, Berkeley*

POGIL in Computer Science for Beginners and Experts

Sheraton Oxford

Chris Mayfield, *James Madison University*; Clif Kussmaul, *Muhlenberg College*; Saturnino Garcia, *University of San Diego*; Helen Hu, *Westminster College*; Tammy Pirmann, *School District of Springfield Township*

Preparing to Teach Humanitarian Open Source

Sheraton Gatlinburg

Heidi Ellis, Stoney Jackson, *Western New England University*; Gregory Hislop, *Drexel University*; S. Monisha Pulimood, *The College of New Jersey*; Gina Likins, *Red Hat - University Outreach*

CS Ed PhD Students Unite!

Sheraton Azalea

Briana Morrison, *Georgia Institute of Technology*; Jennifer Tsan, *North Carolina State University*, Rachel Harsley, *University of Illinois at Chicago*; Francisco Enrique Vicente Castro, *Worcester Polytechnic Institute*

Defining Concepts, Practices, and Standards for K-12 CS

MCCC L11-L12

Pat Yongpradit, *Code.org*

Industry Strength Tools for Software Engineering: What Works, What is Overkill?

MCCC L13-L14

Bonnie MacKellar, *St John's University*; Karen Jin, *University of New Hampshire at Manchester*

Birds of a Feather

Flock #2: Thursday, March 3

6:30 pm - 7:20 pm
Located in the Sheraton Hotel and the Memphis Cook Convention Center (MCCC)

How Do You Teach Debugging? Resources and Strategies for Better Student Debugging

Sheraton Heritage 1

Colleen Lewis, *Harvey Mudd College*; Chris Gregg, *Tufts University*

Teaching CS to Students of Color

Sheraton Heritage 2

Jakita Thomas, *Spelman College*; Shaundra Daily, *University of Florida*; Mikala Streeter, *Mikala Streeter Preparatory School*

Current Initiatives and Future Directions of the Computer Science Teachers Association (CSTA)

Sheraton Heritage 3

David Reed, *Creighton University/CSTA*; Mark Nelson, *Computer Science Teachers Association (CSTA)*

Web Programming

Sheraton Heritage 4

Marty Stepp, *Stanford University*; Allison Obourn, *University of Washington*; Jessica Wolk, *Microsoft Research*; Victoria Kirst, *Google*

Mathematical Reasoning in Computing Education: Connecting Math We Teach with Writing Correct Programs

Sheraton St. Louis

John Dougherty, *Haverford College*; Joseph Hollingsworth, *Indiana University Southeast*; Joan Krone, *Denison University*; Murali Sitaraman, *Clemson University*

Exploring Learning Analytics for Computing Education

Sheraton Natchez

Chris Hundhausen, Adam Carter, *Washington State University*

Handling Very Large Lecture Courses: Keeping the Wheels on the Bus II

Sheraton Beale

Josh Hug, Daniel D. Garcia, *UC Berkeley*

Setting Quantifiable Goals for Broadening Participation in Computing

Sheraton Memphis

Kate Lockwood, *University of St. Thomas*; Maureen Doyle, *Northern Kentucky University*

Computer Science Summer Camps: Making Summer Programs Fun and Sustainable

Sheraton Knoxville

David Johnson, *University of Utah, School of Computing*

Leveraging CS Teachable Moments in the Maker Movement

Sheraton Chattanooga

Jennifer (Ginger) Alford, *Trinity Valley School/Fort Worth Museum of Science and History*; Erik Brunvand, *University of Utah*

Brainstorming Data Science as a Fluency Course for Non-Majors and as a New Specialization

Sheraton Jackson

Lillian Cassel, Don Goelman, *Villanova University*; Darina Dicheva, Winston Salem State University; Heikki Topi, *Bentley University*

Competency Based Education in Lower-Division Computer Science Taught at Community Colleges

Sheraton Oxford

Amardeep Kahlon, Linda Smarzik, Mary Kohls, *Austin Community College*

Assessment of Security Knowledge, Skills and Abilities using Hands-On Exercises in 2016

Sheraton Gatlinburg

Richard Weiss, *The Evergreen State College*; Jens Mache, *Lewis & Clark College*; Michael Locasto, *University of Calgary*; Blair Taylor, Siddharth Kaza, *Towson University*; Ambareen Siraj, *Tennessee Tech University*; Elizabeth Hawthorne, *Union County College*

Student ICTD Research and Service Learning Abroad

Sheraton Azalea

Joseph Mertz, *Carnegie Mellon University*

Increasing Programming Contest Participation for Fun and Profit

MCCC L11-L12

Aaron Bloomfield, *Univeristy of Virginia*; Borja Sotomayor, *University of Chicago*

Providing Impactful Professional Development Teachers Can Implement

MCCC L13-L14

Kathy Menchaca Isbister, *Stanford University*

Poster Sessions

Friday, March 4

10:00 am - 12:00 pm

MCCC Exhibit Hall

Integrating Sustainability Concepts Into Introductory Programming Courses
Jeffrey Stone, *Penn State University*

The Development of Internationalized Computational Thinking Curriculum in Hong Kong Primary Education
Gary K. W. Wong, *The Hong Kong Institute of Education*; Kening Zhu, *City University of Hong Kong*; Xiaojuan Ma, *The Hong Kong University of Science and Technology*; John Huen, *Koding Kingdom*

A Holistic Sequence of Programming Assignments for CS2
Joanna Klukowska, *Courant Institute of Mathematical Sciences, New York University*; Stewart Weiss, *Hunter College of the City University of New York*

Combating Perceptions of Computer Scientists: A Short-term Intervention
Shaundra Daily, Kara Gundersen, *University of Florida*; Alison Leonard, Sophie Jörg, Sabarish Babu, Nikeetha Dsouza, Dhaval Parmar, Joseph Isaac, *Clemson University*

Coding, Designing, and Logistics; How Modes Affect Equity In Computer Science Education
Declan McClintock, Niral Shah, *Michigan State University*

Lights, Camera, but no Action: Exploring Affective Audio-Visual Features of Educational Videos
Abhay Doke, Niranjan Pedanekar, *Tata Research Development and Design Centre*

Increasing Security Awareness in Undergraduate Courses with Labware
Michael Weeks, Yi Pan, Yanqing Zhang, *Department of Computer Science, Georgia State University*

Visualizing Algorithm Analysis Topics
Mohammed Farghally, Sally Hamouda, Kyu Han Koh, Clifford Shaffer, *Virginia Tech*; Eric Fouh, *Lehigh University*

The Impact on Student Learning and Satisfaction When a CS2 Course Became Interactive
Steven Huss-Lederman, *Beloit College*

A Certification-Guided Course for Cloud Computing
Dahai Guo, Anna Koufakou, *Florida Gulf Coast University*

Automated Analysis of Student Programmer Coding Behavior Patterns
Clinton Staley, Corey Ford, *California Polytechnic State University, SLO*

SPOCK – A System for Encouraging Interaction in Small Private Online Courses
Ryan Hardt, Grant Wuerker, *University of Wisconsin-Eau Claire*

Broadening the Path to Cybersecurity Profession in Predominantly Undergraduate and Liberal Arts Institutions
Xenia Mountrouidou, *Wofford College*; Xiangyang Li, *Johns Hopkins University*

Leveraging Context to Create Opportunistic Co-Located Learning Environments
Stephen MacNeil, Celine Latulipe, *University of North Carolina at Charlotte*

Student Perceptions of Success in Computer Science Senior Capstone Projects
Rick Parker, *University of Colorado at Boulder*

Using Small Whiteboards to Engage Students in Active Learning
Victor Norman, Serita Nelesen, *Calvin College*

Design and Evaluation of a Course Module on Android Cipher Programming
Jinsheng Xu, Xiaohong Yuan, Ashrith Velma, *North Carolina A&T State University*

Building Pre-Service Teacher Interest in Computer Science Education through Mentoring Experiences
Kim Huett, *University of West Georgia*; Mary Alice Varga, *University of West Georgia*

Computing with a Community Focus: An App Inventor Summer Camp for Middle School Students
Lijun Ni, Mark Sherman, Fred Martin, *University of Massachusetts Lowell*; Diane Schilder, *Evaluation Analysis Solutions*

Exploring Gamification to Teach Computer Science to Non-Computer Science Related Major
Lorena Martinez-Elizalde, Monica Duarte-Dominguez, *ITESM*

Using Learning Analytics to Trace Academic Trajectories of CS and IT Students to Better Understanding Successful Pathways to Graduation
Huzefa Rangwala, Omaima Almatrafi, Aditya Johri, Jaime Lester, *George Mason University*

Promote Self-efficacy in Learning of Mobile App and Security with Real-World Relevant Laboratory
Kai Qian, Dan Lo, *Kennesaw State University*

Data Science for All: An Introductory Course for Non-Majors, in Flipped Format
Lillian Cassel, Don Goelman, Michael Posner, *Villanova University*; Darina Dicheva, Christo Dichev, *Winston Salem State University*

Clashroom: A Game to Enhance the Classroom Experience
Shannon Duvall, *Elon University*; Dan Eagle, *Credit Karma*; Riese Narcisse, *Credit Suisse*; Thomas Price, *NC State University*

We Have Questions: Pedagogical, Technical, and Procedural Assistance Requests in a Large Computational Thinking Curriculum Research Project
Hilarie Nickerson, Jeffrey Bush, Yasko Endo, *University of Colorado - Boulder*

Autograding and Feedback for Snap!, A Visual Programming Language
Michael Ball, Daniel Garcia, *UC Berkeley*

Poster Sessions

Friday, March 4

3:00 pm - 5:00 pm

MCCC Exhibit Hall

Combining Flipped Learning with Gamification to Improve Student Performance in a Data Structures Course
Darina Dicheva, *Winston Salem State University*

Assessing the Effectiveness of Experential-Learning-Based Teaching Tools in Cybersecurity Courses
Xiaohong Yuan, Jinsheng Xu, Huiming Yu, Junghee Kim, Taehee Kim, *North Carolina A&T State University*

Teaching and Learning in an Introductory Undergraduate Programming Class: A Reflective Autoethnography
S. Zahra Atiq, *Purdue University, West Lafayette*

18 hours of code with 5th grade students
Katie Davis, Zoë Wood, *California Polytechnic State University - San Luis Obispo*; John Wilcox, *Peabody Charter School*

Multifaceted Efforts to Create an Inclusive Environment and Increase Diversity
Perry Fizzano, David Hartenstine, *Western Washington University*

Deepening Learning in High School Computer Science Through Practices from the NGSS
Marie Bienkowski, *SRI International*

Replicating a Validated CS1 Assessment
Miranda Parker, Mark Guzdial, *Georgia Institute of Technology*

Assessing the Development of Computer Science Pedagogical Content Knowledge in the TEALS Program
Yvonne Kao, Aleata Hubbard, *WestEd*; Leigh Ann DeLyser, *CSNYC*

A Curiosity-Driven System for Developing Coding Literacy
Neeraj Chatlani, Daniel Myers, *Rollins College*

Teaching Software Engineering Skills in CS1.5: Incorporating Real-world Practices and Tools
Sarah Heckman, Jason King, *NC State University*

Designing and Refining of Questions to Assess Students' Ability to Mentally Simulate Programs and Predict Program Behavior
Ashish Aggarwal, Christina McCune, *University of Florida*; David Touretzky, *Carnegie Mellon University*

Megas and Gigas Educate (MaGE): A Curricular Peer Mentoring Program
Heather Pon-Barry, Audrey St. John, Becky Packard, Barbara Rotundo, *Mount Holyoke College*

Pixels, Post-It's® and CS Principles
Jeffrey Popyack, William Mongan, *Drexel University*

Adventures in K-5 STEM Outreach Using the NAO Robot
Steven Hadfield, Lillian Warner, *United States Air Force Academy*; Christopher Coulston, *Pennsylvania State University - Erie*; Marissa Hadfield, *Academy School District 20*

Engaging School Counselors, Creating Computing Allies
Sarah Hug, *University of Colorado, Boulder*; Jane Krauss, *NCWIT*

OnRamp to Parallel and Distributed Computing
Samantha Foley, Joshua Hursey, *University of Wisconsin-La Crosse*

Teaching Computational Thinking Through Bio-Design
Johanna Okerlund, Celine Latulipe, *UNC at Charlotte*; Orit Shaer, *Wellesley College*

User Experience/Feedback - Rensselaer Polytechnic Institute Homework Submission Server
Andrea Wong, Eric Tran, Joe Jung, Marina Espinoza, Ben Shaw, Beverly Sihsobhon, Melissa Lindquist, Samuel Breese, Matthew Peveler, Barbara Cutler, *Rensselaer Polytechnic Institute*

Guiding Career Development Prior to Capstone Experiences
Deborah Knox, *The College of New Jersey*

Bigger Isn't Better When It Comes to Online Computer Science Teacher Communities
Mackenzie Leake, *Stanford University*; Colleen Lewis, *Harvey Mudd College*

The Sol y Agua Project: Enhancing Middle School Education through Computing with an Emphasis on Simulation and Data Science
Ann Gates, Mary Roy, Monika Akbar, *University of Texas at El Paso*; Florencia Larsen, Ivonne Lopez, Christian Murga, Angel Ortega, Jesus Tellez, Rebecca Urbina, *Cyber-ShARE Center, University of Texas at El Paso*

An Expert System for the Prediction of Student Performance in an Initial Computer Science Course
Michael Kuehn, Jarred Estad, Jeremy Straub, Tom Stokke, *University of North Dakota*

A Web-based Environment for Developing and Utilizing Teaching Languages for Novice Computer Science Students
Benjamin Kruger, Richard Matzen, *Northeastern State University*

FunWithSound: A Music Composition and Synthesis Library for Processing
David Hovemeyer, *York College of Pennsylvania*

Exploring Computer Science in the Liberal Arts
Gary Skuse, *Rochester Institute of Technology*; Daniel Walzer, *University of Massachusetts at Lowell*

NSF Showcase

NSF Project Showcase Sessions feature recipients of education-related National Science Foundation grants and will take place in the SIGCSE Booth #509.

NSF Showcase #1

Thursday, March 3
10:00 am - 11:30 am

CrowdGrader: Peer Grading with Incentives
Luca de Alfaro, *UC Santa Cruz*

Project MLExAI: An Innovative Model for Teaching Core AI Concepts
Ingrid Russell, Zdravko Markov, Susan Imberman, *College of Staten Island*

Computing in the Arts: Community Building and Curriculum Development
Jennifer Burg, *Wake Forest University*

C5 - Catalyzing Computing and Cybersecurity in Community Colleges
Melissa Jane Dark, *Purdue University*; Beth Hawthorne, *Union County College*; Corrinne Sande, *Whatcom Community College*

NSF Showcase #2

Thursday, March 3
3:00 pm - 4:30 pm

Bringing Real-World Data And Visualizations Into Data Structures Courses Using BRIDGES
Kalpathi Subramanian, Jamie Payton, David Burlinson, Mihai Mehedint, *UNC Charlotte*

Software Tutors for Introductory Programming: Epplets, Codelets and Problets
Amruth N. Kumar, *Ramapo College of New Jersey*

Customizable Visualizations for Introducing Database Concepts to Many Majors
Suzanne W. Dietrich, *Arizona State University*; Goelman, *Villanova University*

Transforming Computer Science Education Research Through Use of Appropriate Empirical Research Methods: Mentoring and Tutorials
Jeffrey Carver, *University of Alabama*; Sarah Heckman, *North Carolina State University*; Mark Sherriff, *University of Virginia*

NSF Showcase #3

Friday, March 4
10:00 am - 11:30 am

Integrating Mobile Computing and Security into a Computer Science Curriculum
Xiaohong Yuan, Kenneth Williams, Jinsheng Xu, Kelvin Bryant, *North Carolina A&T University*

CS1: Creative Computation in the Context of Art and Visual Media
Dianna Xu, Deepak Kumar, *Bryn Mawr College*; Ira Greenberg, *Southern Methodist University*; Aaron Cadle, *Fort Worth Country Day School*; Ursula Wolz, *RiverSound Solutions*

Collaborative Education: Building a Skilled Software Verification and Validation User Community
Sushil Acharya, Priyadarshan Manohar, Peter Wu, *Robert Morris University*

Supporting Student Learning in Humanitarian Free and Open Source Software (HFOSS) Projects
Heidi J. C. Ellis, *Western New England University*; Darci Burdge, *Nassau Community College*; Gregory W. Hislop, *Drexel University*

NSF Showcase #4

Friday, March 4
3:00 pm - 4:30 pm

Increasing Retention in Engineering and Computer Science with a Focus on At-Risk First Year and Sophomore Students
Tammy VanDeGrift, *University of Portland*

Bolstering Security Education in Browser Security
Wenliang Du, *Syracuse University*; Li Yang, *University of Tennessee, Chattanooga*; Xiaohong Yuan, *North Carolina A&T University*

On Beyond Sudoku: Pencil Puzzles as an Engaging Problem Domain for Intro CS
Zack Butler, Ivona Bezakova, *Rochester Institute of Technology*

Computational Creativity to Improve CS Education
Leen-Kiat Soh, Duane Shell, *University of Nebraska*

NSF Showcase #5

Saturday, March 5
10:00 am - 11:30 am

Bringing a Rigorous CS Principles Course to the Largest School System in the U.S.
Dan Garcia, Brian Harvey, *UC Berkeley*; Tiffany Barnes, *North Carolina State University*; June Mark, E. Paul Goldenberg, *EDC*

Patternlets and TSGL: CSinParallel Tools for Visualizing Parallel Behavior
Joel C. Adams, *Calvin College*; Richard Brown, *St. Olaf College*; Elizabeth Shoop, *Mcalester College*

Computing in the Arts: Multidisciplinary I
Susan Reiser, Rebecca Bruce, *University of North Carolina, Asheville*

Collaborative Project: Building Virtual Research, Interactive, Service, and Experiential Learning Modules for Cyber Security Education
Feng Li, *Purdue University*

2016 ACM SIGCSE Student Research Competition

First Round of Competition

Thursday, March 3
1:45 pm - 5:00 pm

MCCC Exhibit Hall

Semi-Finalist Presentations

Saturday, March 5
8:45 am - 10:00 am

Undergraduate: MCCC L8

Graduate: MCCC L9

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

The winners will be announced and receive their awards during Saturday's luncheon.

GRADUATE STUDENT RESEARCH PROJECTS

Applying Formal Models of Instructional Design to Measurably Improve Learning in Introductory Computing
Austin Cory Bart, *Virginia Tech*

Learning to Program Using Online Forums, A Comparison of Links Posted on Reddit and Stack Overflow
Caroline D. Hardin, *University of Wisconsin-Madison*

Open Sourcing the Classroom
Mike Izbicki, *University of California, Riverside*

A Wavelet Transform Module for a Speech Recognition Virtual Machine
Euisung Kim, *Minnesota State University, Mankato*

Monitoring - An Intervention to Improve Team Results in Software Engineering Education
Maira Marques, *Universidad de Chile*

Pair Programming for Teaching Mobile Development
Mohammed Seyam, *Virginia Tech*

UNDERGRADUATE STUDENT RESEARCH PROJECTS

Community and Collaboration in an All-female Immersive Computer Science Program
Jeff Stern, *University of Michigan*

Implementing K-Means Clustering and Collaborative Filtering to Enhance Sustainability of Project Repositories
Matthew Steuerer, *The College of New Jersey*

Web-based Visual Programming for Media Computation Using Blockly
Jake Trower, *University of Alabama*

An Evaluation of Cluster 3.0 as a General Tool for Principal Component Analysis
Alex Bender, *Eastern Mennonite University*

Detecting Insider Attacks with Video Websites Using Distributed Image Steganalysis
Christopher Francis-Christie, *Kennesaw State University*

Programming by Voice to Support Hour of Code for Children with Motor Disabilities
Caitlin Hanley, *University of Alabama*

The Role of Chronology in Analyzing Introductory Programming Assignments
Kayla Holcomb, Nevan Simone, *Abilene Christian University*

A Simple Line Game With Real-Time Visualization of the Internal Data Structure
John Huff, *Ohio University*

3D-Printed Animatronic Hand with Wireless Mirroring Glove and Precision Control
Cyrus Xiyuan Liu, *Wake Forest University*

Robotic Navigation Through Gesture Based Control
Nickolas McCarley, *University of Alabama*

Advances in Phylogenetic-based Stemma Construction
Andrew Miller, Nathan Gould, *The College of New Jersey*

Syntactic Hint Generation for Introductory Programming Problems
Aayush Mudgal, *Indian Institute of Technology, Kanpur*

Novel Logical Reasoning Tutor
Matthew Pfister, *Clemson University*

Loop Invariants: Learning to Help Teach
Caleb Priester, *Clemson University*

Mobile Security via Reverse Tether
Donna Young, *Kennesaw State University*

Lightning Talks

Friday, March 4

3:45 pm - 5:00 pm

Chair: Martha Kosa, *Tennessee Tech*

MCCC L10

Study Support Eliminates the Negative Impact of Gender Stereotypes on Women's Self-Concept
Jane Stout, Burcin Tamer, Computing Research Association

Computational Making: What Does this Theory Mean for SIGCSE?
Jennifer Rode, Andrea Marshall, Houda El Mimouni, Jennifer Booker, *Drexel University*

Complexity Tutor: Developing an Interactive Tutoring System for Computational Complexity
Mark McCartin-Lim, *University of Massachusetts Amherst*

A Body of Knowledge for Usable Security and Privacy Education
Yousra Javed, Heather Richter Lipford, *UNC Charlotte*

U.S Army's Cyber Leader Development Program
James Finocchiaro, *Army Cyber Institute at West Point, NY*

Using Instant Chat for Fun and for Profit to Run a Large Class
Michael Ball, *UC Berkeley*

Crossing the Streams: Exploring the Interplay between Students' Online Social Activity and Programming Behavior
Adam Carter, Christopher Hundhausen, *Washington State University*

Social Network Analysis as a Tool for Understanding Student Interaction in Project-based Courses
Bonnie MacKellar, *St John's University*

Enhancing Teaching of Big Data by Using Real World Datasets
Anurag Nagar, *University of Texas at Dallas*

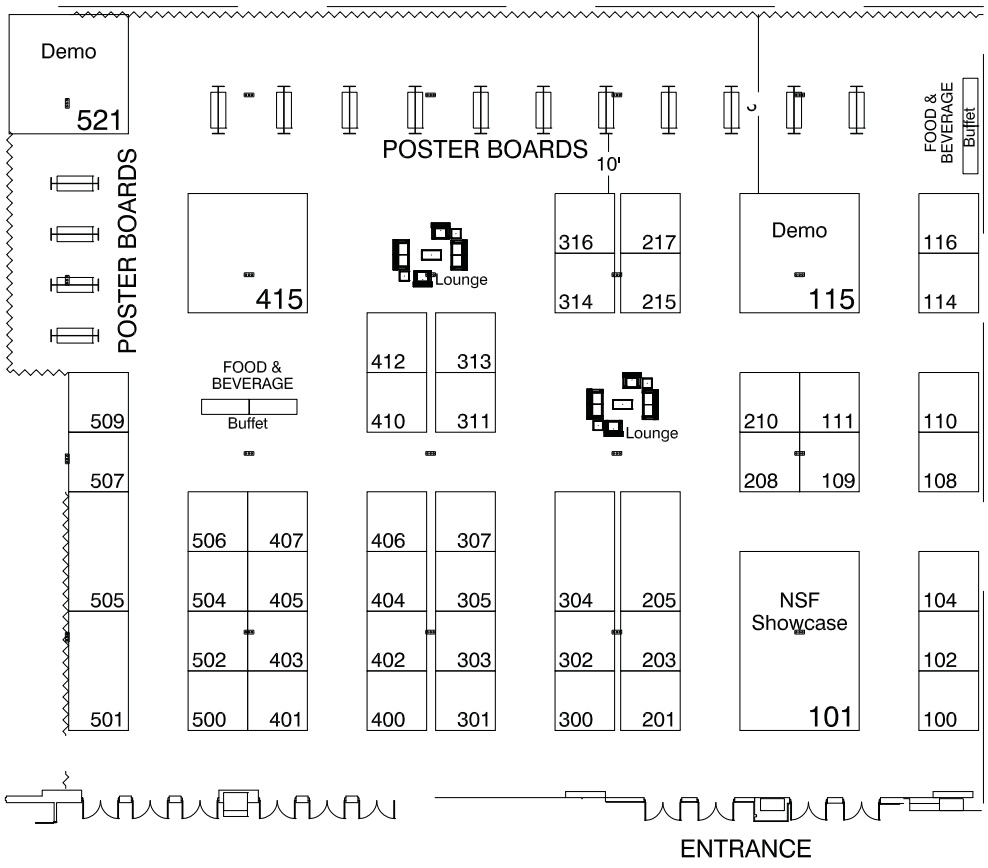
A "Grand Tour" of Computer Science: Re-Designing CS1 for Breadth and Retention
Natalie Linnell, Nicholas Tran, *Santa Clara University*

Raising the Awareness of Accessibility Needs in Block Languages
Amber Wagner, *Kennesaw State University*; Jeff Gray, *University of Alabama*; Daniela Marghitu, *Auburn University*; Andreas Stefik, *University of Nevada, Las Vegas*

You Wouldn't Know It From SIGCSE Proceedings, But We Don't Only Teach CS1
Colleen Lewis, *Harvey Mudd College*

Memphis Cook Convention Center

Exhibit Hall



Exhibitor	Booth
ABET	304
AccessComputing	301, 303, 305
AccessCS10K	301, 303, 305
ACM CCECC	114, 116
ACM SIGAda	314, 316
ACM-W	114, 116
Advancing the Successful IT Student through Enhanced Computational Thinking (ASSECT)	301, 303, 305
Auburn University - jGRASP	307
Broadening Participation in Computing (NCWIT)	301, 303, 305
Cengage Learning	406
CISS: Computing in Scondary Schools	301, 303, 305
Colloquium for Information Systems Security Education (CISSE)	403
The Committee on the Status of Women in Computing Research (CRA-W) and The Coalition to Diversify Computing (CDC)	301, 303, 305
Computational Creativity to Improve Computer Science Education for CS and non-CS Undergraduates	301, 303, 305
Computer Science Teachers Association (CSTA)	114,116
Computing Alliance of Hispanic-Serving Institutions (CAHSI)	301, 303, 305
Consortium for Computing Sciences in Colleges	504
CRC Press/Taylor & Francis Group	302
CS Teaching Tips	506
CS Unplugged Accessibility Laboratory for Education and Assistive Technology (LEAT)	301, 303, 305
Elsevier	505
EMC Corporation	110

Exhibitor	Booth
Franklin, Beedle & Associates Inc.	405
GitHub Education	300
Google CS First	201, 203
Gradescope, Inc.	108
IBM	501
ICCP	407
Institute for African American Mentoring in Computing Sciences (iAAMCS)	301, 303, 305
INTEL	111
Jones & Bartlett Learning	400, 402, 404
Lighthouse CC/PPF	301, 303, 305
Mercury Learning and Information	311
Microsoft	410
The MIT Press	313
NSF Showcase	101
NVIDIA Corporation/Academic Programs	507
Oracle Academy	208, 210
Pearson	415
Penjee Corporation	401
Piazza Technologies, Inc	100
Red Hat	500
SIGCSE 2017	509
Springer	215, 217
Teradata University Network	102
Turing's Craft	104
Vocareum Inc	205
Wiley	412
zyBooks	109

SIGCSE 2016
Guide to Exhibitors

BRONZE SUPPORTER

ABET

Booth 304

415 N. Charles Street
Baltimore, MD 21201
410-347-7700 • www.abet.org

ABET accredits college and university programs in applied science, computing, engineering and engineering technology. Nearly 3,500 programs at more than 698 institutions in 28 nations hold ABET accreditation. The ABET peer review process assures that academic programs meet quality standards established by the professions for which they are preparing students.

AccessComputing

Booths 301, 303, 305

University of Washington
Box 354842
Seattle, WA 98195-4842
206-221-4163
www.uw.edu/accesscomputing/

AccessComputing, with over 30 partner organizations and institutions, uses evidence-based practices to increase the participation and success of people with disabilities in computing. It supports communities of practice, minigrants to fund activities that promote computing careers for students with disabilities, a searchable knowledge base with case studies and effective practices, and mentoring and internships for students with disabilities.

AccessCS10K

Booths 301, 303, 305

University of Washington
Box 354842
Seattle, WA 98195-4842
206-221-4163
www.uw.edu/accesscomputing/accesscs10k

AccessCS10K works to increase the successful participation of students with disabilities in K-12 computing education through: (1) professional development aimed at the CS10K professional development trainers, curricular units, (2) real-time, individual teacher support, and (3) creating accessible tools and curricular units that teachers and students can use in their classrooms.

ACM CCECC

Booths 114, 116

2 Penn Plaza, Suite 701
New York, NY 10121-0701
800-342-6626 • www.ccecc.acm.org

Serving computing education communities since 1991, the ACM Committee for Computing Education in Community Colleges (CCECC) is devoted to advocacy and resources for computing education at associate-degree granting colleges and similar post-secondary institution throughout the world. Stop by our booth and enter to win a Kindle Fire or Raspberry Pi.

ACM SIGAda

Booths 314, 316

2 Penn Plaza, Suite 701
New York, NY 10121-0701
319-273-6056 • www.sigada.org

Ada 2012 is the next generation of the world's premier programming language for engineering safe, secure and reliable software. It includes runtime checking of formal preconditions and postconditions and further support of multicore. Come by the SIGAda booth to learn about the successes of Ada in the classroom.

ACM-W

Booths 114, 116

2 Penn Plaza, Suite 701
New York, NY 10121
212-626-0530 • http//women.acm.org

ACM-W supports, celebrates, and advocates internationally for women in computing. Primary activities are celebrations for women in computing, ACM-W chapters, scholarships for women students to attend research conferences, and Athena Lecturer Awards.

Advancing the Successful IT Student through Enhanced Computational Thinking (ASSECT)

Booths 301, 303, 305

University of Massachusetts Boston
100 Morrissey Boulevard
Boston, MA 02125
617-287-7295 • www.batec.org

Advancing the Successful IT Student through Enhanced Computational Thinking (ASSECT) is a project of Broadening Advanced Technological Education Connections (BATEC), an ATE National Center of Excellence for Computing and Information Technologies which has developed a rubric for computational thinking in Information Technology and industry-relevant scenarios for use in entry level IT classes.

Auburn University - jGRASP

Booth 307

Computer Science and Software Engineering
3101 Shelby Center
Auburn , AL 36849-5347
334-844-6315 • www.jgrasp.org

jGRASP is a freely available integrated development environment with visualizations for improving the comprehensibility of software. Features include: Control Structure Diagrams (CSDs) for Java, C/C++, Objective-C, Python, Ada, and VHDL; UML class diagrams for Java; and dynamic viewers and canvas integrated with a visual debugger, workbench, and interactions for Java.

Broadening Participation in Computing – National Center for Women & Information Technology (NCWIT)

Booths 301, 303, 305

University of Colorado
Campus Box 320
Boulder, CO 80309-0320
303-735-6004 • www.ncwit.org

The mission of NCWIT is to ensure that women are fully represented in the world of information technology and computing. NCWIT's goal is parity in the professional information technology (IT) workforce, and our fundamental strategy is to educate, disseminate, and advocate a national, multi-year implementation plan that generates tangible progress.

Cengage Learning

Booth 406

20 Channel Center
Boston, MA 02210
617-757-7900 • www.cengage.com

Cengage Learning engages your Computer Science students with relevant and authoritative digital and print educational materials as they prepare for the world of work. As a top higher education publisher, we support instructors utilizing our Computer Science & CIS Programming content with superior levels of service and support.

CISS: Computing in Secondary Schools

Booths 301, 303, 305

Cleveland State University
2121 Euclid Ave
Cleveland OH 44115
216-687 5341 • www.csedohio.org

Computing in Secondary Schools (CISS), a CS10K project, is preparing teachers in Ohio to teach the CS Principles course. The curriculum is geared toward inclusion of a broad demographic of students, specifically focused on motivating the creative aspects of computing, while addressing a broad range of topics in computing.

Colloquium for Information Systems Security Education (CISSE)

Booth 403

49004 Packard Court
Belleville, MI 48111
734-325-6823 • www.cisse.info

In 1996 the Colloquium for Information Systems Security Education (CISSE) was created to define requirements for Information Assurance (IA) education and has helped the implementation of IA courses in K-12, Community Colleges, Universities and governmental training. Join our academic, governmental and industry researchers at our 20th Annual Conference.

The Committee on the Status of Women in Computing Research (CRA-W) and The Coalition to Diversify Computing (CDC)

Booths 301, 303, 305

Computing Research Association
1828 L Street NW, Suite 800
www.cra-w.org
www.cdc-computing.org

The CRA-W/CDC Alliance offers programs at the undergraduate through mid-career levels aimed at increasing and retaining the number of women, underrepresented minorities and people with disabilities participating in computing research and education.

Computational Creativity to Improve Computer Science Education for CS and non-CS Undergraduates

Booths 301, 303, 305

University of Nebraska
256 Avery Hall
Lincoln, NE 68588-0115
402-472-6738
http://cse.unl.edu/agents/ic2think/

With the premise that students can leverage their creative thinking skills to "unlock" their understanding of computational thinking, we have developed a set of team-based, active learning-based Computational Creativity Exercises. These exercises, referencing Epstein's Generativity Theory, have been shown to improve student learning performance for both CS and non-CS majors.

Computer Science Teachers Association (CSTA)

Booths 114, 116

2 Penn Plaza, Suite 701
New York, NY 10121
212-626-0507 • www.csta.acm.org

The Computer Science Teachers Association is a membership organization that supports and promotes the teaching of computer science and other computing disciplines. CSTA provides opportunities for K-12 teachers and students to better understand computing disciplines and to more successfully prepare themselves to teach and learn.

Computing Alliance of Hispanic-Serving Institutions (CAHSI)

Booths 301, 303, 305

The University of Texas at El Paso
Computer Science Department
500 W. University Ave.
El Paso, TX 79968-0518
CCSB 3.1022
www.cahsi.org

The Computing Alliance of Hispanic-Serving Institutions (CAHSI) is an inclusive consortium of institutions and individuals committed to creating a unified voice and consolidating their strengths and resources to increase the number of Hispanics who pursue and complete baccalaureate and advances degrees in computing areas.

Consortium for Computing Sciences in Colleges

Booth 504

Attention Susan Dean
5 Maple Street
Walton, NJ 13856 • www.ccsc.org

The purpose of the Consortium is to promote the betterment of computer-oriented curricula in two- and four-year colleges and universities; to improve the use of computing as an educational resource for all disciplines; to encompass regional constituencies devoted to this purpose; and to promote a national liaison among local, regional, and national organizations also devoted to this purpose. Predominantly these colleges and universities are oriented toward teaching, rather than research.

SIGCSE 2016
Guide to Exhibitors

CRC Press/Taylor & Francis Group

Booth 302

6000 Broken Sound Parkway NW
Suite 300
Boca Raton, FL 33487
800-272-7737 • www.crcpress.com

CRC Press is the premier publisher of textbooks, reference books, and eBooks on computer science. Stop by our booth to view our latest computer science textbooks. If you are interested in writing a book, our computer science editor, Randi Cohen, will also be available to speak to you about your idea.

CS Teaching Tips

Booth 506

Harvey Mudd College
301 Platt Blvd.
Claremont, CA 91711
www.csteachingtips.org

CS Teaching Tips is a NSF funded project providing teaching tips to computer science educators. Learn more about CS Teaching Tips at CSTeachingTips.org and on Twitter @CSTeachingTips.

CS Unplugged Accessibility Laboratory for Education and Assistive Technology (LEAT)

Booths 301, 303, 305

Auburn University
338 Shelby Technology Center
345 W. Magnolia Street
Auburn, AL 36830
334-844-6386

CS Unplugged aims to make CS easier to access by avoiding using computers. However, students with disabilities (e.g. mobility, learning, cognitive or intellectual) face additional challenges with these kinesthetic activities, so the Auburn University Laboratory for Education and Assistive Technology has been improving the accessibility and inclusiveness of the activities.

Elsevier

Booth 505

Morgan Kaufmann
An imprint of Elsevier, Inc.
50 Hampshire St
Cambridge, MA 02139
781-663-5200
mkp.com • elsevier.com

Educating future computer scientists has always been Morgan Kaufmann's goal. By providing superior print and digital content, our leading authors educate readers and inspire future innovation. We publish textbooks that redefine the trajectory of computer science education and technical reference works that ensure that professionals stay ahead of the curve.

EMC Corporation

Booth 110

176 South St.
Hopkinton , MA 01748
508-435-1000 • www.emc.com

EMC Corporation is a global leader in enabling businesses and service providers to transform their operations and deliver IT as a service. We can help prepare students to be IT professionals who are as mission-critical as the technology itself. Learn more about our academic alliance at http://education.emc.com/academicalliance.

Franklin, Beedle & Associates Inc.

Booth 405

2154 NE Broadway, Suite 100
Portland, OR 97232
503-284-6348 • www.fbeedle.com

Franklin, Beedle & Associates is an independent publisher of computer science textbooks since 1985.

SILVER SUPPORTER

GitHub Education

Booth 300

88 Colin P. Kelly Jr St
San Francisco , CA 94107
education.github.com

GitHub is the best way to build software together. Whether it's your company's app, your favorite open source library, or a weekend side project, GitHub helps everyone work better by providing tools for easier collaboration and code sharing on any device. Start collaborating today – open source project hosting is free!

PLATINUM SUPPORTER

Google CS Education

Booths 201, 203

1600 Amphitheater Parkway
Mountain View, CA 94043

We believe that access to high quality computer science (CS) education should be a given. That is Google is committed to constantly improving the CS educational landscape with the tools we build, the programs we create and the funding we provide. By creating accessible learning opportunities, we aim to make high-quality CS education available for parents, students and teachers worldwide.

SILVER SUPPORTER

Gradescope, Inc.

Booth 108

2150 Shattuck Ave, PH
Berkeley, CA 94704
www.gradescope.com

Gradescope helps instructors grade paper-based homeworks and exams online, for free. Our product has been used to grade over 1,500,000 pages of tests and homework, belonging to over 20,000 students. Instructors report that grading is up to 2x faster, and students love the improved accuracy and feedback.

IBM Academic Initiative for Cloud

Helping faculty build next-generation skills

The explosion of Internet of Things, cognitive computing, mobile, big data and mobile is requiring your students, no matter what their major, understand how to leverage and build solutions on the cloud. With the new **Academic Initiative for Cloud** offer, you can provide hands-on cloud-based experiences for you and your students to propel radical ideas and innovation.

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Booths 301, 303, 305

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iAAMCS (pronounced "i am cs"), the Institute for African-American Mentoring in Computing Sciences, aims to significantly increase the number of Black/African-Americans pursuing and completing the PhD in computing fields through a national mentoring model. iAAMCS is synergized by previous NSF BPC Alliances (ARTSI, A4RC and EL) interventions and activities.

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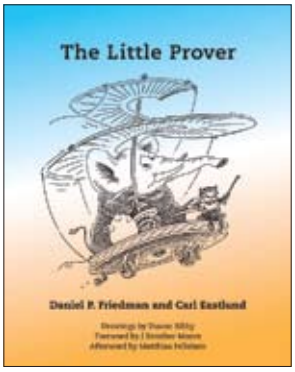

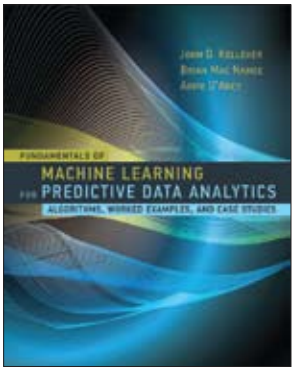

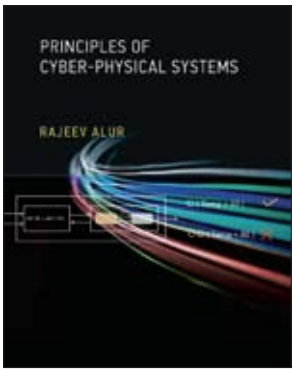

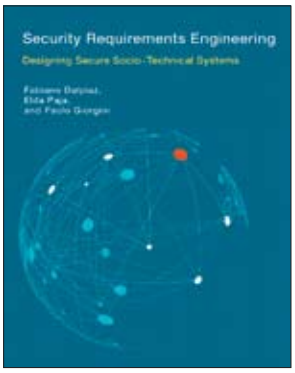

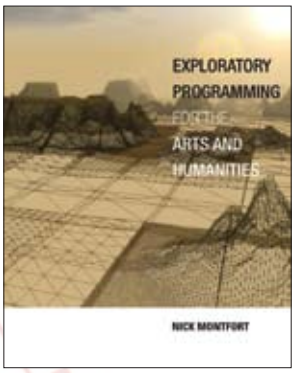

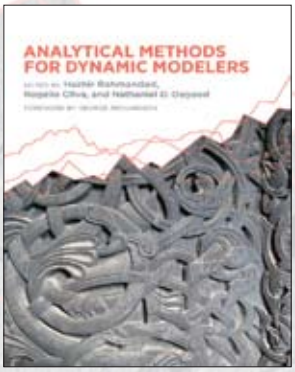

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