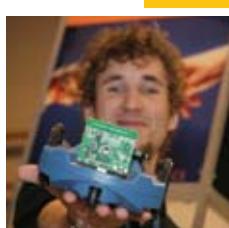
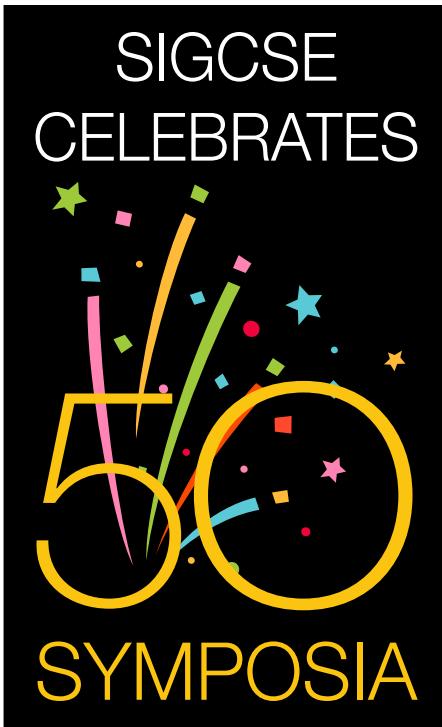


SIGCSE 2019

50th TECHNICAL SYMPOSIUM on COMPUTER SCIENCE EDUCATION



February 27-March 2, 2019

Hyatt Regency Minneapolis
Millennium Minneapolis



Conference Program | Exhibit Guide

**SAVE TIME,
MEASURE OUTCOMES,
AND CATCH PLAGIARISM.
LEARN HOW, WITH
MIMIR CLASSROOM
AT BOOTH 314.**



Mimir Classroom



SIGCSE 2019 Conference Program & Exhibit Guide

CONTENTS

- | | |
|-------|------------------------------------|
| 2-3 | SIGCSE Chair Welcome |
| 4-5 | Symposium Chairs' Welcome |
| 6-7 | Symposium Committee |
| 8 | At-A-Glance |
| 10-11 | Hotel Floor Plans |
| 12-14 | Keynotes |
| 16-43 | Schedule of Events |
| 45-48 | Supporter Sessions |
| 50-51 | Birds of a Feather |
| 53-56 | Poster Sessions |
| 58 | NSF Showcase |
| 59 | ACM Student Research Competition |
| 60 | Lightning Talks |
| 62 | Exhibitor Floor Plan |
| 63-70 | Alphabetical Listing of Exhibitors |
| 72 | Supporter Thank You |



Minneapolis Welcomes SIGCSE 2019



Welcome to the 50th SIGCSE Technical Symposium on Computer Science Education (the 2019 Symposium), the premiere technical conference for computer science educators. The 2019 Symposium is sponsored by the Association for Computing Machinery (ACM) Special Interest Group on Computer Science Education (SIGCSE).

SIGCSE has the third largest membership of any of ACM's Special Interest Groups (SIG), and is among the oldest SIGs. Only ten SIGs were founded prior to 1968 when SIGCSE was formed, and two other SIGs shared their 50th anniversary in 2018 with SIGCSE. The SIGCSE Board and many other SIGCSE volunteers celebrated the 50th anniversary last year, but I would like to give a special thanks to two people. Briana Morrison, who is on the SIGCSE Board, created a series of weekly postings about SIGCSE's anniversary. These postings were shared on the listserv and published on SIGCSE's web site, and I know that many of you, myself included, enjoyed them. I would also like to thank Jane Prey, who is a long-time SIGCSE volunteer and previous SIGCSE award winner, for her work as the guest editor of a special issue of ACM Inroads celebrating SIGCSE's anniversary.

However, the celebration for the SIG is far from over. This year marks the 50th Technical Symposium, an achievement that even fewer SIGs share, as only six ACM SIGs have conferences that have been held 50 or more times. Further, the SIGCSE Symposium is thriving. The past several years have seen large increases in attendance at the conference, and this year will be even better thanks in part to the 50th anniversary committee. Adrienne Decker, who is a SIGCSE Board member and chairing the committee, Carl Alphonse, and Kurt Eiselt have worked for more than a year to put together a series of special events at the 50th Symposium. There will be a track focused on anniversary content that includes peer-reviewed papers and panels and invited discussants. Previous conference co-chairs have been invited to attend the conference and will be recognized for their work. The Travel Grant program has been expanded to 50 people for the anniversary, which should bring a new group of educators to our community. There will be special ribbons, stickers, and mementos for all attendees, and there will be a 50th anniversary booth and signage throughout the conference providing information about the conference history. Finally, the committee has worked with a historian, the Charles Babbage Institute, and Computing Educator's Oral History Project to bring content to attendees and have attendees contribute to the organizations' initiatives. On behalf of the SIGCSE Board, I would like to thank the 50th anniversary committee for all of their hard work.

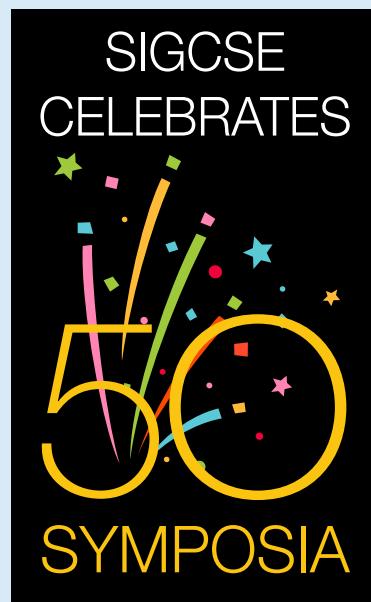
Of course, none of the activities at the 2019 Symposium would have been possible without the dedicated effort of conference co-chairs Manuel Pérez-Quiñones and Beth Hawthorne. They have spent countless hours ensuring that the 50th Technical Symposium will be an event to remember. They and their committee of nearly 100 people have put together an engaging and innovative program, created opportunities for networking, and handled all the issues big and small that come with a conference of this size. On behalf of the SIGCSE organization and Board, I thank Manuel and Beth for their hard work, innovative ideas, excellent communication, and sense of humor.

Along with everything else you can expect to see this year, the conference provides us with a chance to honor two people for their contributions to computer science education and the SIGCSE community. The annual SIGCSE award for Outstanding Contribution to Computer Science Education will be given to Mark Guzdial at the University of Michigan. Mark has worked to transform wide-scale teaching practice through contextualized computing education, most notably with the Media Computation curriculum, advocated and supported policy changes supporting computing for all in many states in the U.S., published core research in computing education over decades, and helped to foster the next generation of computing educators through his mentorship. It is difficult to find someone in the SIGCSE community who has not read something written by Mark, including the thousands of regular readers of his long-standing blog on computing education. He has also contributed significantly as an organizer of two SIGCSE conferences and served on the SIGCSE Board. Mark has touched the computing education community and SIGCSE in many ways throughout the years, and our community is better for it. The annual SIGCSE award for Lifetime Service will be given to Gloria Childress Townsend at DePauw University. Gloria has worked tirelessly on behalf of diversity and inclusion in computing. She was a co-founder and co-facilitator of the SIGCSE Committee on Expanding the Women-in-Computing Community, a committee that has led birds-of-a-feather sessions at the Technical Symposium annually since 2005. Gloria worked for decades with ACM-W serving on the Executive Board and as ACM-W chair. She conceived of the idea of small regional celebrations of women in computing and worked as a guide and leader for these celebrations as they spread from the United States across the globe. Her extensive service to the computing education community has helped it to reach people who might not have joined without her hard work. Please join me and the rest of the SIGCSE Board in congratulating both of them on their well-deserved awards.

The 50th SIGCSE Technical Symposium will be an amazing event. I hope that you enjoy the celebrations, learn something new about computing education, meet new colleagues and friends, and stay warm in chilly Minneapolis.

Enjoy the conference!

Amber Settle
SIGCSE Chair, 2016-2019



MESSAGE FROM THE SYMPOSIUM AND PROGRAM CHAIRS 2019

Welcome to the 50th ACM Technical Symposium on Computer Science Education! Our theme this year is Celebrating the 50 Technical Symposia that has taken us from a small gathering of Computing Education enthusiasts in Texas in 1970 to the largest computing education conference in the world. The first SIGCSE Technical Symposium had over 40 papers submitted, 18 of them were accepted. For the 50th symposium, we received 526 paper submissions and accepted 169. In addition, the program has grown to include the ACM Student Research Competition, posters, demos, birds-of-a-feather, panels, special sessions, pre-symposium events, and workshops. Including all tracks, we received 994 submissions, from over 50 countries, with a total of 2668 unique authors representing over 800 organizations. And the participating organizations cover the gamut of K-12, community colleges, public and private universities and colleges, non-profits, corporate entities, government offices, and national laboratories. The growth of this conference parallels the growth of interest in the understanding and study of computing. We have plenty of reasons to celebrate the 50th gathering of our community.

With the growth of the computing education community, so has grown attendance at SIGCSE. In 1972 attendance was around 300 participants. Last year attendance surpassed 1500, and it was the third year in a row with record attendance. What is often missed is that conferences like SIGCSE are run by volunteers. All reviewers, associate program chairs, committee members, symposium and program chairs, and students are volunteers. All are giving their time to help participate in the dissemination of the greatest ideas and research results having to do with computing education.

The 2019 program continues to grow. This year we have a number of presentations exploring our history - in a special 50th celebration track, alongside of the now traditional coverage of topics in computing education, including active learning, AP exams, CS1, computational thinking, issues of diversity, tools, assessment, curriculum issues, etc. As is customary, we have other events that share our passion for computing education and are co-located with us. RESPECT 2019, the fourth international conference on Research on Equity and Sustained Participation in Engineering, Computing, and Technology will take place on Wednesday. We also have the SIGCSE sponsored New Chairs Roundtable as well as a number of pre-symposia, workshops, sponsored and affiliated events to complement our already robust offerings.

We are honored to have Dr. Freeman Habrowski III, President of the University of Maryland, Baltimore County as our opening keynote. Among his many accomplishments, he chaired the committee that produced the National Academies' report, Expanding Underrepresented Minority Participation: America's Science and Technology Talent at the Crossroads. He will share a 50-year perspective on American society with a particular focus on technology, student success, and inclusion in computing.

We are also honored to have Dr. Blair Taylor of Towson University who consults with the NSA's College of Cyber, as a subject matter expert on long-term strategies to build the nation's cyber workforce. In the closing keynote, Dr. Taylor will share her experiences and perspectives on the future of integrating cybersecurity into computer science education.

The SIGCSE Symposium promotes high-quality scholarship and community engagement around computer science education. We continued the practice of reviewer discussions, an expanded associate program committee, and three paper submissions tracks, recognizing the differences in scope and review criteria between (1) CS education research, (2) experience reports and tools, and (3) curricula initiatives. In 2019, we changed the paper length up to a full 6 pages of content with a 7th page available for acknowledgments and references. These innovations have made our reviewing process more tailored and transparent. 797 volunteers provided each Paper with at least 5 reviews; and all other submissions with at least 3 reviews. Reviewers, along with 69 Associate Program Chairs and 14 Track Chairs, discussed submissions to come to a consensus. Program Chairs made final selections based on recommendations, importance, novelty, and timeliness. Table 1 table shows the number of submissions reviewed and accepted in each category.

Table 1: SIGCSE 2019 Submission and Acceptance Statistics

Track	# Submitted	# Accepted	Acceptance Rate
Papers (CS Education Research, Experience Reports and Tools, Curricula Initiatives)	526	169	32%
Panels	40	18	45%
Special Sessions	28	15	54%
Workshops	57	30	53%
ACM Student Research Competition	35	19	54%
Birds of a Feather	58	30	52%
Demos	24	11	46%
Lightning Talks	29	22	76%
Nifty Assignments	53	6	11%
Posters	144	90	63%

We are privileged to have exhibitors and supporters who champion CS education. This year's supporters include: Platinum: GitHub Education, Google, and Microsoft; Gold: Codio, Intel, Oracle Academy, Turing's Craft, and zyBooks; Silver: ABET, IBM, Gradescope by Turnitin, Mimir, and Vocareum; and Bronze: AnitaB.org.

This year the Program Chairs selected three best papers from each of the paper tracks for their accomplishment of high quality, novelty and broad appeal to reviewers. All best papers received at least one nomination from reviewers, high ratings, and excellent comments from reviewers. The top three papers in each track are shown below and highlighted throughout the printed program.

Best Papers: CS Education Research		
1. First Things First: Providing Metacognitive Scaffolding for Interpreting Problem Prompts James Prather, Raymond Pettit, <i>Abilene Christian University</i> ; Brett A. Becker, <i>University College Dublin</i> ; Paul Denny, <i>The University of Auckland</i> ; Dastyni Loksa, <i>University of Washington</i> ; Alani Peters, Zachary Albrecht, Krista Masci, <i>Abilene Christian University</i>	Fri 11:10 am Hyatt Greenway J	
2. Assessing Incremental Testing Practices and Their Impact on Project Outcomes Ayaan M. Kazerouni, Clifford A. Shaffer, Stephen H. Edwards, Francisco Servant, <i>Virginia Tech</i>	Thurs 3:45 pm Hyatt Greenway D/E	
3. Exploring the Value of Different Data Sources for Predicting Student Performance in Multiple CS Courses Soohyun Nam Liao, <i>University of California, San Diego</i> ; Daniel Zingaro, <i>University of Toronto Mississauga</i> ; Christine Alvarado, William G. Griswold, Leo Porter, <i>University of California at San Diego</i>	Thurs 11:10 am Millennium Grand South	

Best Papers: Experience Reports and Tools		
1. Computer Science Principles for Teachers of Blind and Visually Impaired Students Andreas Stefik, <i>University of Nevada, Las Vegas</i> ; Richard E. Ladner, <i>University of Washington</i> ; William Allee, <i>University of Nevada, Las Vegas</i> ; Sean Mealin, <i>North Carolina State University</i>	Friday 2:10 pm Millennium Grand South	
2. Developing Soft and Technical Skills Through Multi-Semester, Remotely Mentored, Community-Service Projects Janet Davis, <i>Whitman College</i> ; Samuel A. Rebelsky, <i>Grinnell College</i>	Thursday 11:10 am Hyatt Greenway J	
3. Visualizing Classic Synchronization Problems: Dining Philosophers, Producers-Consumers, and Readers-Writers Joel C. Adams, Elizabeth R. Koning, <i>Calvin College</i> ; Christiaan D. Hazlett, <i>University of Illinois at Urbana-Champaign</i>	Friday 4:35 pm Millennium Grand South	

Best Papers: Curricula Initiatives		
1. ');DROP TABLE textbooks;--: An Argument for SQL Injection Coverage in Database Textbooks Cynthia Taylor, <i>Oberlin College</i> ; Saheel Sakharkar, <i>University of Illinois at Chicago</i>	Thursday 2:10 pm Hyatt Greenway A	
2. A Flexible Curriculum for Promoting Inclusion through Peer Mentorship Heather Pon-Barry, Audrey St. John, Becky Wai-Ling Packard, Barbara Rotundo, <i>Mount Holyoke College</i>	Saturday 12:05 pm Hyatt Greenway J	
3. PythonSneks: An Open-Source, Instructionally-Designed Introductory Curriculum with Action-Design Research Austin Cory Bart, <i>University of Delaware</i> ; Allie Sarver, Michael Friend, Larry Cox, <i>Virginia Tech</i>	Thursday 1:45 pm Millennium Grand Central	

This event owes many thanks to the SIGCSE Board for their guidance over the years. In addition, many organizations and their representatives had a hand in the success of this event. In no particular order: the planners at dLPLAN Meetings | Events: Dorothea Heck, Peggy Robins, Angelina Palmieri, and Betsy Fenwick; the Symposium Site Coordinators: Bob Beck and Paul Tymann; the ACM staff: April Mosqus and Donna Cappo; representatives from Sheridan: Lisa Tolles; Bill Guckert from WRG Design, Cindy Lathrop from the Hyatt Regency Minneapolis, and Melissa Jetson from Meet Minneapolis. We thank our home institutions for their generous support by allowing us to devote time to serve the SIGCSE community.

Finally, we are tremendously grateful for the engagement and support of the SIGCSE community and countless volunteers over the first 50 Symposia, and we look forward to the continued growth of this vibrant academic community. Let the celebration begin!



Elizabeth K. Hawthorne

Symposium Co-Chair
Union County College



Manuel A. Pérez-Quiñones

Symposium Co-Chair
University of North Carolina
at Charlotte



Sarah Heckman

Program Co-Chair
North Carolina State
University



Jian Zhang

Program Co-Chair
Texas Woman's University

SIGCSE 2019 SYMPOSIUM COMMITTEE

Symposium Co-Chairs

Elizabeth K. Hawthorne, *Union County College*
Manuel A. Pérez-Quiñones, *University of North Carolina at Charlotte*

Program Co-Chairs

Sarah Heckman, *North Carolina State University*
Jian Zhang, *Texas Woman's University*

Special Sessions and Panels Co-Chairs

Christina Gardner-McCune, *University of Florida*
Alvaro Monge, *California State University, Long Beach*

Workshops Co-Chairs

Brett Becker, *University College Dublin, Ireland*
Pam Cutter, *Kalamazoo College*

ACM Student Research Competition Co-Chairs

Jessica Schmidt, *North Carolina State University*
Stephen Hughes, *Coe College*

Birds of a Feather Co-Chairs

Mary Anne Egan, *Siena College*
Mark Sherriff, *University of Virginia*

Demos and Lightning Talks Co-Chairs

Lina Battestilli, *North Carolina State University*
Peter-Michael Osera, *Grinnell College*

Nifty Assignments Co-Chairs

Nick Parlante, *Stanford University*
Julie Zelenski, *Stanford University*

Posters Co-Chairs

Laurence D. Merkle, *Air Force Institute of Technology*
S. Monisha Pulimood, *The College of New Jersey*

Accessibility Chair

Stacy Branham, *University of California, Irvine*

Pre-Symposium Events & Affiliated Events

Co-Chairs

John Dougherty, *Haverford College*
Diana Cukierman, *Simon Fraser University, Canada*

Registration

Lynn Degler, *Rose-Hulman Institute of Technology*
Cary Laxer, *Rose-Hulman Institute of Technology*
Laurence D. Merkle, *Air Force Institute of Technology*

Publications

Ruth Anderson, *University of Washington*

Database Administrators

Mark Sherriff, *University of Virginia*
Leen-Kiat Soh, *University of Nebraska, Lincoln*

Webmaster

Josh Hug, *University of California, Berkeley*
Matt Jadud, *Bates College*

Treasurer

Paul Tymann, *Rochester Institute of Technology*

Evaluations

Philip East, *University of Northern Iowa*

Supporter/Exhibitor Liaisons

Dave Musicant, *Carleton College*
Jodi Tims, *Baldwin Wallace University*

Student Volunteers and Activities

Sara Melnick, *Independent*
Darakshan Mir, *Bucknell University*
Samuel A. Rebelsky, *Grinnell College*

K-12 Liaison

Leigh Ann Sudol-DeLyser, *CS for all NYC Students*
Ria Galanos, *Thomas Jefferson High School for Science and Technology*

Community College Liaison

Cara Tang, *Portland Community College*

International Liaison

Jennifer Campbell, *University of Toronto, Canada*

Kids Camp

Dale-Marie Wilson, *University of North Carolina at Charlotte*
Meghan Allen, *University of British Columbia, Canada*

Puzzles, Social, & Board Games

Steven Wolfman, *University of British Columbia, Canada*
Zach Butler, *Rochester Institute of Technology*

Publicity and Social Media

Adam Blank, *California Institute of Technology*
John Lewis, *Virginia Tech*

Local Arrangements

Jigang Liu, *Metropolitan State University*

50th Celebration Planning Committee

Adrienne Decker, *University at Buffalo*
Kurt Eiselt, *University of California Davis*
Carl Alphonse, *University at Buffalo*

International Committee

Meghan Allen, *University of British Columbia, Canada*
Miles Berry, *University of Roehampton, UK*
Karen Bradshaw, *Rhodes University, South Africa*
Ernesto Cuadros-Vargas, *UTEC, Peru*
Paul Denny, *University of Auckland, New Zealand*
Rita Garcia, *Adelaide, Australia*
Orit Hazzan, *Technion, Israel*
Arto Hellas, *University of Helsinki, Finland*
Carsten Kleiner, *Hochschule Hannover, Germany*
Wendy Powley, *Queen's University, Canada*
Marco Silva, *Federal University of Technology, Brazil*
Abhijat Vichare, *Persistent, India*
Hironori Washizaki, *Waseda University, Japan*
Gary Wong, *University of Hong Kong, Hong Kong*
Ming Zhang, *Peking University, China*

SIGCSE 2019 SYMPOSIUM COMMITTEE

Associate Program Chairs

- Eric Aaron, *Colby College*
Joel C. Adams, *Calvin College*
Rajeev Agrawal, *US Army Engineer Research and Development Center*
Meghan Allen, *The University of British Columbia, Canada*
Carl Alphonse, *University at Buffalo*
Christine Alvarado, *University of California San Diego*
Ruth Anderson, *University of Washington*
Barbara Anthony, *Southwestern University*
Julio César Bahamón, *University of North Carolina at Charlotte*
Mark Bailey, *Hamilton College*
Tiffany Barnes, *North Carolina State University*
Brett A. Becker, *University College Dublin, Ireland*
Marie Bienkowski, *SRI International*
Kevin Buffardi, *California State University - Chico*
Alistair Campbell, *Hamilton College*
Paul Cao, *University of California San Diego*
Albert Chan, *Fayetteville State University*
Peter J. Clarke, *Florida International University*
Steve Cooper, *University of Nebraska, Lincoln*
Ernesto Cuadros-Vargas, *San Pablo Catholic University, Peru*
Adrienne Decker, *University at Buffalo*
Leigh Ann DeLyser, *CSforALL*
Mohsen Dorodchi, *University of North Carolina at Charlotte*
John P. Dougherty, *Haverford College*
Maureen Doyle, *Northern Kentucky University*
Joshua Eckroth, *Stetson University*
Stephen Edwards, *Virginia Tech*
Matthew Forshaw, *Newcastle University, United Kingdom*
Allan Fowler, *Kennesaw State University*
Michelle Friend, *University of Nebraska Omaha*
Chris Gregg, *Stanford University*
Cecily Heiner, *Southern Utah University*
Sharon Hsiao, *Arizona State University*
Helen Hu, *Westminster College*
Mark J. Johnson, *Central College*
Maria Jump, *Northeastern University, Charlotte*
Carsten Kleiner, *University of Applied Science and Arts Hannover, Germany*
Andrew J. Ko, *University of Washington*
Stephan Krusche, *Technical University of Munich, Germany*
David Levine, *Saint Bonaventure University*
Andrew Luxton-Reilly, *The University of Auckland, New Zealand*
Bruce R. Maxim, *University of Michigan*
Lester I. McCann, *University of Arizona*
Susan Mengel, *Texas Tech University*
Laurence D. Merkle, *Air Force Institute of Technology*
Craig Miller, *DePaul University*
Robert Noonan, *William and Mary*
Jody Paul, *Metropolitan State University of Denver*
Leo Porter, *University of California San Diego*
Wendy Powley, *Queen's University, Canada*
Samuel A. Rebelsky, *Grinnell College*
Suzanne Rivoire, *Sonoma State University*
Susan Rodger, *Duke University*
Ingrid Russell, *University of Hartford*
Mark Sherriff, *University of Virginia*
Swapneel Sheth, *University of Pennsylvania*
Simon, *University of Newcastle, Australia*
Melissa Stange, *Lord Fairfax Community College*
Ben Stephenson, *University of Calgary, Canada*
Jim Teresco, *Siena College*
Luther Tychonievich, *University of Virginia*
Paul Tymann, *Rochester Institute of Technology*
Frank Vahid, *University of California, Riverside*
Jan Vahrenhold, *Westfälische Wilhelms-Universität Münster, Germany*
Abhijat Vichare, *Abhijat Research and Software, India*
Ellen Walker, *Hiram College*
Henry Walker, *Grinnell College*
Charles Wallace, *Michigan Technological University*
Ursula Wolz, *Bennington College*

SIGCSE 2019 SYMPOSIUM AT-A-GLANCE

Wednesday • February 27

8:30 am - 5:00 pm	Pre-symposium Events	See pages 16-17
3:00 pm - 9:30 pm	Registration Open	Hyatt Nicollet Promenade
7:00 pm - 10:00 pm	Workshops 101-110	See page 17

Thursday • February 28

7:30 am - 9:30 pm	Registration Open	Hyatt Nicollet Promenade
8:15 am - 9:45 am	Opening Keynote: Dr. Freeman Hrabowski, III	Hyatt Nicollet Ballroom
10:00 am - 5:00 pm	Exhibit Hall Open	Hyatt Exhibit Hall
10:00 am - 10:45 am	Break, Demo #1, NSF Showcase #1	Hyatt Exhibit Hall
10:45 am - 12:00 pm	Technical Session #1	See pages 18-20
12:00 pm - 1:45 pm	First Timer's Lunch & Lifetime Service Awardee: Dr. Gloria Childress Townsend	Hyatt Nicollet Ballroom
12:00 pm - 1:45 pm	Lunch Break	On your own
1:45 pm - 3:00 pm	Technical Session #2	See pages 21-23
1:45 pm - 5:00 pm	ACM Student Research Competition (Posters)	Hyatt Exhibit Hall
3:00 pm - 3:45 pm	Break, Demo #2, NSF Showcase #2	Hyatt Exhibit Hall
3:45 pm - 5:00 pm	Technical Session #3	See pages 24-26
3:45 pm - 5:00 pm	Lightning Talks #1	Hyatt Lake Bemidji
5:30 pm - 6:20 pm	Birds of A Feather: Flock A	See page 50
6:30 pm - 7:20 pm	Birds of A Feather: Flock B	See page 51
7:30 pm - 9:30 pm	SIGCSE Reception	Hyatt Nicollet Ballroom

Friday • March 1

8:00 am - 5:00 pm	Registration Open	Hyatt Nicollet Promenade
8:15 am - 9:45 am	Outstanding Contribution Awardee: Dr. Mark Guzdial	Hyatt Nicollet Ballroom
10:00 am - 5:00 pm	Exhibit Hall Open	Hyatt Exhibit Hall
10:00 am - 10:45 am	Break, Demo #3, NSF Showcase #3	Hyatt Exhibit Hall
10:00 am - 12:00 pm	Poster Session #1	Hyatt Exhibit Hall
10:45 am - 12:00 pm	Technical Session #4	See pages 28-30
12:00 pm - 1:45 pm	Lunch Break	On your own
1:45 pm - 3:00 pm	Technical Session #5	See pages 31-33
3:00 pm - 3:45 pm	Break, Demo #4, NSF Showcase #4	Hyatt Exhibit Hall
3:00 pm - 5:00 pm	Poster Session #2	Hyatt Exhibit Hall
3:45 pm - 5:00 pm	Technical Session #6	See pages 33-35
3:45 pm - 5:00 pm	Undergraduate ACM SRC Semifinalists	Hyatt Greenway F/G
3:45 pm - 5:00 pm	Graduate ACM SRC Semifinalists	Hyatt Greenway H/I
5:10 pm - 6:00 pm	SIGCSE Business Meeting	Hyatt Greenway A
6:00 pm - 7:00 pm	CCSC Business Meeting	Hyatt Greenway B/C
6:00 pm - 7:00 pm	NCWIT Reception	Hyatt Northstar Ballroom
7:00 pm - 8:00 pm	Community College Reception	Hyatt Regency
7:00 pm - 10:00 pm	Workshops 301 – 310	See page 36

Saturday • March 2

7:00 am - 8:15 am	Community College Breakfast	Hyatt Regency
8:00 am - 11:45 am	Registration Open	Hyatt Nicollet Foyer
8:15 am - 9:30 am	Closing Keynote: Dr. Blair Taylor	Hyatt Nicollet Ballroom
9:45 am - 10:35 am	Technical Session #7	See pages 38-39
9:45 am - 10:35 am	Lightning Talks #2	Hyatt Lake Bemidji
9:45 am - 10:35 am	Demo #5	See page 40
10:00 am - 12:30 pm	Exhibit Hall Open	Hyatt Exhibit Hall
10:35 am - 11:15 am	Break, NSF Showcase #5	Hyatt Exhibit Hall
10:35 am - 12:30 pm	Poster Session #3	Hyatt Exhibit Hall
11:15 am - 12:30 pm	Technical Session #8	See pages 40-42
11:15 am - 12:30 pm	Nifty Assignments	Hyatt Northstar A
12:30 pm - 2:00 pm	Lunch & Closing Ceremonies	Hyatt Nicollet Ballroom
3:00 pm - 6:00 pm	Workshops 401 - 410	See page 43

GitHub Education

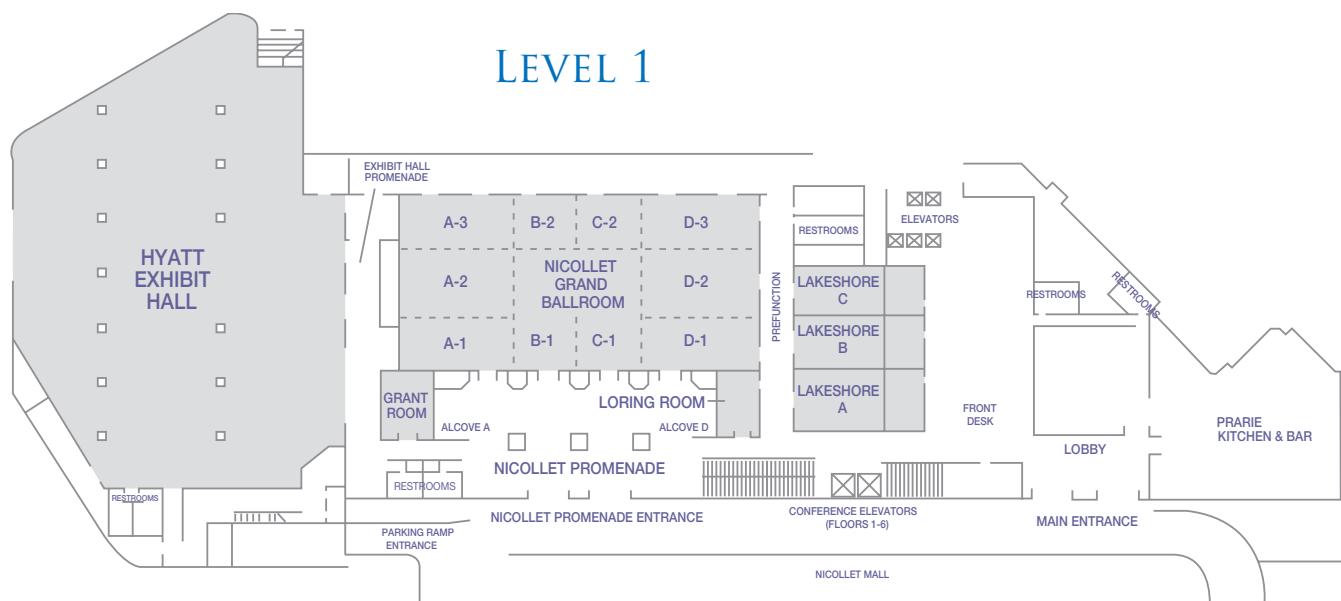
Real-world tools,
engaged students.

Find us at Booth 208
in the Exhibition Hall.
education.github.com



HYATT REGENCY MINNEAPOLIS

LEVEL 1

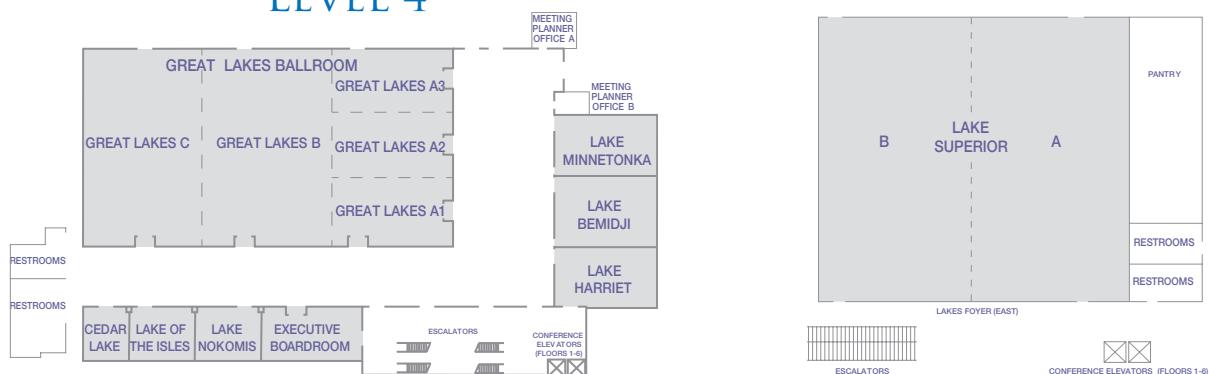


LEVEL 2

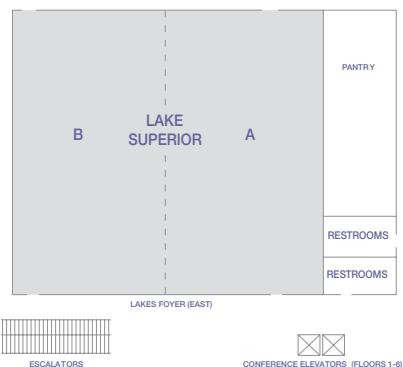


HYATT REGENCY MINNEAPOLIS

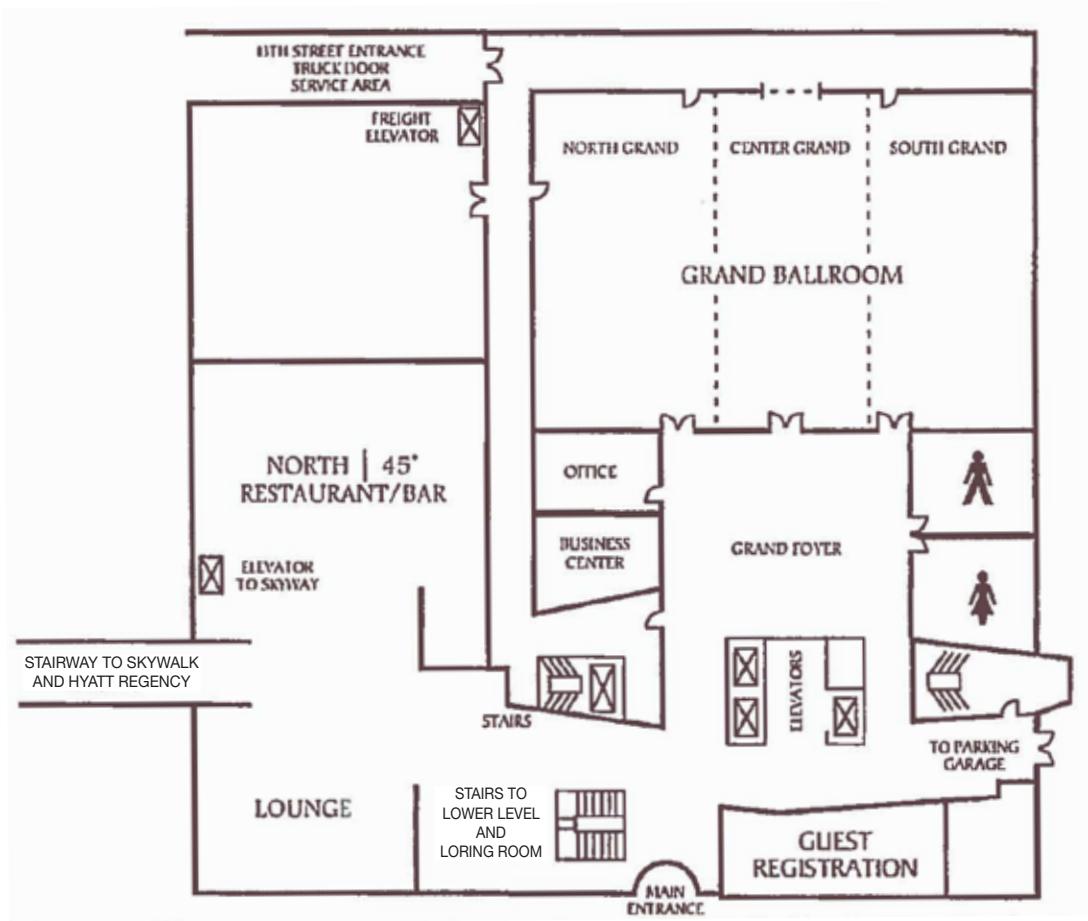
LEVEL 4



LEVEL 5



MILLENNIUM MINNEAPOLIS LOBBY LEVEL



SIGCSE 2019 KEYNOTE PRESENTATIONS



Thursday, February 28 - Opening Keynote

8:15 am - 9:45 am
Hyatt Nicollet Grand Ballroom

Pursuing the Dream: A 50-Year Perspective on American Society, Technology, and Inclusion in Computing

Dr. Freeman A. Hrabowski, III
President
University of Maryland, Baltimore County (UMBC)

Rapid and dramatic demographic and technological changes require our nation's schools, colleges, and universities to work with agility in preparing students – particularly those from diverse backgrounds – for careers in science, technology, engineering, and math (STEM) fields, including computer science. Exploring the interplay of technology, education, and inclusion over the past 50 years, Dr. Hrabowski examines what this means for our future work in higher education. Computing education provides a critically important case. As the sector evolves rapidly, many well-paid jobs go unfilled and we must explore ways to draw on talent wherever it is found. Emphasizing themes from his TED talk on student success, Dr. Hrabowski focuses our attention on the importance of high expectations and hard work, building community among students, faculty engagement with students, and rigorous assessment of what works. He assesses the way innovative approaches -- including course re-design, active and experiential learning, research, and partnerships with companies and agencies -- promote student success, inclusive excellence, and achievement for all students both in STEM generally and computer science in particular.

Speaker Bio:

Dr. Freeman A. Hrabowski, President of University of Maryland, Baltimore County (UMBC) since 1992, is a consultant on science and math education to national agencies, universities, and school systems. He was named by President Obama to chair the President's Advisory Commission on Educational Excellence for African Americans. He also chaired the National Academies' committee that produced the report, *Expanding Underrepresented Minority Participation: America's Science and Technology Talent at the Crossroads* (2011). His 2013 TED talk highlights the "Four Pillars of College Success in Science."

Named one of the 100 Most Influential People in the World by TIME (2012) and one of America's Best Leaders by U.S. News & World Report (2008), he also received TIAA-CREF's Theodore M. Hesburgh Award for Leadership Excellence (2011), the Carnegie Corporation's Academic Leadership Award (2011), and the Heinz Award (2012) for contributions to improving the "Human Condition." UMBC has been recognized as a model for inclusive excellence by such publications as U.S. News, which the past eight years has recognized UMBC as a national leader in academic innovation and undergraduate teaching. Dr. Hrabowski's most recent book, *Holding Fast to Dreams: Empowering Youth from the Civil Rights Crusade to STEM Achievement*, describes the events and experiences that played a central role in his development as an educator and leader.

SIGCSE 2019 KEYNOTE PRESENTATIONS



Thursday, February 28 - First Timer's Lunch Keynote & 2019 SIGCSE Award for Lifetime Service to the Computer Science Education Community

12:00 pm - 1:45 pm
Hyatt Nicollet Grand Ballroom

A Top-Ten List for 50-50

Dr. Gloria Childress Townsend
Professor of Computer Science
DePauw University

Recipient of the 2019 SIGCSE Award for Lifetime Service to the Computer Science Education Community

SIGCSE addresses gender issues in computing year after year. At DePauw University, we learned from SIGCSE's lessons – and those taught by ACM's Council on Women in Computing – and recently awarded 47% of our computer science undergraduate degrees to women. This talk provides a rapid-fire countdown of ten of our most effective strategies that created our 47% class.

Speaker Bio:

Gloria Childress Townsend, Professor of Computer Science, has taught at DePauw University for thirty-nine years and chaired her department for seven years. She founded ACM Celebrations and chaired the ACM-W Chapters project, during her seventeen-year tenure with ACM's Council on Women in Computing. Her research interests include evolutionary computation and gender issues in computing.



Friday, March 1 - Morning Keynote & 2019 SIGCSE Award for Outstanding Contribution to Computer Science Education

8:15 am - 9:45 am
Hyatt Nicollet Grand Ballroom

Computing Education as a Foundation for 21st Century Literacy

Dr. Mark Guzdial
Professor of Computer Science & Engineering
University of Michigan

Recipient of the 2019 SIGCSE Award for Outstanding Contribution to CS Education

Teaching programming as a way to express ideas, communicate with others, and understand our world is one of the oldest goals for computing education. The inventor of the term "computer science" saw it as the third leg of STEM literacy. In this talk, I lay out the history of the idea of universal computational literacy, some of what it will take to get there, and how our field will be different when we do.

Speaker Bio:

Mark Guzdial is a Professor in the Computer Science & Engineering Division and in Engineering Education Research at the University of Michigan. He studies how people come to understand computing and how to make that more effective. He led the CSLearning4U project to create ebooks to help high school teachers learn CS. He was one of the PI's on the NSF alliance "Expanding Computing Education Pathways" which helped 16 US states and Puerto Rico improve and broaden their computing education. He invented "Media Computation" and has published several books on the use of media as a context for learning computing. He is on the editorial boards of the "Journal of the Learning Sciences," "Computer Science Education," "ACM Transactions on Computing Education," and "Communications of the ACM." With his wife and colleague, Barbara Ericson, he received the 2010 ACM Karl V. Karlstrom Outstanding Educator award. He was also the recipient of the 2012 IEEE Computer Society Undergraduate Teaching Award. He is an ACM Distinguished Educator and a Fellow of the ACM.

SIGCSE 2019 KEYNOTE PRESENTATIONS



Saturday, March 2 - Closing Keynote

8:15 am - 9:30 am

Hyatt Nicollet Grand Ballroom

Cybersecurity is Not a Fad: Why Cyber is a Game Changer for Computer Science Education

Dr. Blair Taylor

Clinical Associate Professor of Computer and Information Sciences

Towson University

First, the bad news - Cybersecurity is here to stay. Threats are escalating and organizations are increasingly vulnerable. Hackers are smarter, there are more of them, and they continue to wreak havoc across critical infrastructure systems. There is a huge, growing shortfall of cyber talent. All students, and especially computer science students, need to learn cyber, but there is an acute shortage of cybersecurity faculty.

The good news – Cybersecurity is here to stay. We continue to need skilled cyber workers. Students like cyber. Cyber can draw more students to Computer Science and create opportunities for Computer Science faculty.

Dr. Blair Taylor will share her experiences building cyber curriculum from the classroom perspective and from her experience working with NSA to build a National Cybersecurity Curriculum Program.

Speaker Bio:

Dr. Blair Taylor is an award-winning educator with 20+ years' experience in academia. She is a national expert in cybersecurity education and curriculum development. As a Clinical Associate Professor in the Department of Computer and Information Sciences at Towson University, she has received over \$5 million of external funding. Her projects include Security Injections @ Towson, which provides security modules for integrating security across the curriculum and is a national model for teaching secure coding to introductory programming students, and SPLASH, which offers Secure Programming Logic for college credit to high school girls.

Dr. Taylor also works with NSA's College of Cyber as a Subject Matter Expert on long-term strategies to increase the pipeline of qualified students and build the nations' cyber workforce. These programs include the National Cybersecurity Curriculum Program and the Cyber Cube.

Dr. Taylor has received the University System of Maryland Regents Award for Teaching, the Fisher College of Science and Mathematics Outstanding Faculty Award and the Business Outreach Award. She has been recognized as one of 50 Women to Watch by the Baltimore Sun Magazine and one of Maryland's top female tech leaders by MDBIZNews. She holds a B.A. in Mathematical Science and an M.S. in Computer Science from Johns Hopkins University and a doctorate in Applied Information Technology from Towson University



Microsoft celebrates SIGCSE's 50th Anniversary



Skills for the 21st century and beyond

Empower your students with classroom tools that maximize student success with comprehensive solutions built on job-ready Microsoft technology.

Come learn more about Microsoft programs and technologies during the following sessions:

Visit us
at booth
#308

Thursday, February 28 | 10:45am
Create Classroom Labs in the Cloud

Friday, March 1 | 1:45pm
Microsoft MakeCode Arcade

Visit <https://aka.ms/SIGCSE2019> to learn more!

Thank you

A big thank you to all the members of the computer science education community. We appreciate all your efforts in teaching the next generation of computer scientists.

SIGCSE 2019 Schedule of Events

WEDNESDAY, FEBRUARY 27

Pre-Symposium Events - Morning

8:30 am - 12:00 pm Room: Hyatt Greenway H	Computing for the Social Good in Computer Science Education Associated with RESPECT Michael Goldweber, Xavier University; Lisa Kaczmarczyk, Lisa Kaczmarczyk PhD Consulting, LLC
8:30 am - 12:00 pm Room: Hyatt Greenway G	Peer Teaching Summit Jeffrey Forbes, Duke University; Kristy Elizabeth Boyer, University of Florida; Ketan Mayer-Patel, University of North Carolina at Chapel Hill
8:30 am - 12:00 pm Room: Hyatt Greenway A	Teaching Cybersecurity in CSP (or Any CS Class): Introducing the Security Mindset Maritza Johnson, International Computer Science Institute; Daniel D. Garcia, University of California, Berkeley; Julia Bernd, International Computer Science Institute; Serge Egelman, International Computer Science Institute, University of California, Berkeley; Buffie Holley, Albemarle High School and University of Virginia

Pre-Symposium Events - Afternoon

1:30 pm - 5:00 pm Room: Hyatt Greenway A	Development and Visualization of Computing Competencies Alison Clear, Eastern Institute of Technology; Allen S. Parrish, Mississippi State University; John Impagliazzo, Hofstra University
1:30 pm - 5:00 pm Room: Hyatt Greenway C	What to Teach about Accessibility Richard E. Ladner, Andrew J. Ko, University of Washington
1:30 pm - 5:00 pm Room: Hyatt Greenway G	Computer Science Principles Providers and Teachers Forum Lauren Mock, Michael Ball, Daniel D. Garcia, University of California, Berkeley; Tiffany Barnes, North Carolina State University
1:30 pm - 5:00 pm Room: Hyatt Greenway H	What!? You Want Me to Include Computing Ethics, Too!??!! Using the ACM Code of Ethics in Technical Computing Topics Don Gotterbarn, East Tennessee State University; Michael S. Kirkpatrick, James Madison University; Marty J. Wolf, Bemidji State University
1:30 pm - 5:00 pm Room: Hyatt Greenway I	FREE Cybersecurity Curriculum Melissa Dark, Purdue University; Blair Taylor, Siddharth Kaza, Towson University; Maureen Turney, National Security Agency

Pre-Symposium Events - All Day

8:30 am - 5:00 pm Room: Hyatt Greenway B	Department Chairs Roundtable Mary Lou Maher, University of North Carolina at Charlotte; Ran Libeskind-Hadas, Harvey Mudd College
8:30 am - 5:00 pm Room: Hyatt Greenway D	2019 CSAB Computing Accreditation Workshop Mary Jane Willshire-Fairley, CSAB, Inc; Liz Glazer, CSAB, Inc.
8:30 am - 5:00 pm Room: Hyatt Greenway E	CS Education Infrastructure for All II: Enabling the Change Clifford A. Shaffer, Virginia Tech; Peter Brusilovsky, University of Pittsburgh; Kenneth Koedinger, Carnegie Mellon University; Stephen H. Edwards, Virginia Tech
8:30 am - 5:00 pm Room: Hyatt Greenway F	POSSE Roundup Gregory W. Hislop, Drexel University; Grant Braught, Dickinson College; Darci Burdge, Heidi Ellis, Stoney Jackson, Western New England University; Cameron Macdonell, MacEwan University; Lori Postner, Nassau Community College
8:30 am - 5:00 pm Room: Hyatt Greenway J	Professional Development Workshop for Teaching-Track Faculty Lori Pollock, University of Delaware; Christine Alvarado, University of California, San Diego; Barbara Ryder, Virginia Tech; Mark Sherriff, University of Virginia
8:30 am - 6:30 pm Room: Millennium Grand Ballroom	RESPECT 2019: 4th International Conference on Research in Equity and Sustained Participation in Engineering, Computing, and Technology. Jamie Payton, Temple University; Tiffany Barnes, North Carolina State University

WEDNESDAY, FEBRUARY 27

Pre-Symposium Supporter Sessions • 8:30 am - 5:00 pm

Google Supporter Session Room: Hyatt Lakeshore A	Integrating Cloud Computing into the Computer Science Curriculum: Beginner Level (See page 45 for abstract)
Google Supporter Session Room: Hyatt Lakeshore B	Integrating Cloud Computing into the Computer Science Curriculum: Advanced Topics (See page 45 for abstract)

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

Workshop 101 Room: Hyatt Greenway A	Embracing our Future: CS Courses and Curriculum for Non-CS-majors Paul Ruvolo, <i>Olin College</i> ; Darakhshan J. Mir, <i>Bucknell University</i> ; Zachary Dodds, <i>Harvey Mudd College</i>
Workshop 102 Room: Hyatt Greenway B	Exploring Parallel Computing with OpenMP on the Raspberry Pi Suzanne J. Matthews, <i>United States Military Academy</i> ; Joel C. Adams, <i>Calvin College</i> ; Richard A Brown, <i>St. Olaf College</i> ; Elizabeth Shoop, <i>Macalester College</i>
Workshop 103 Room: Hyatt Greenway C	Transform Your Computer Science Course with Specifications Grading James W. McGuffee, <i>Christian Brothers University</i> ; David L. Largent, <i>Ball State University</i> ; Christian Roberson, <i>Florida Southern College</i>
Workshop 104 Room: Hyatt Greenway D	Narratives and Evaluation: How to Write Competitive NSF CS Education Proposals Stephanie E. August, <i>National Science Foundation & Loyola Marymount University</i> ; S. Megan Che, Eileen T. Kraemer, <i>Clemson University</i> ; Mark Pauley, <i>National Science Foundation</i> ; Murali Sitaraman, <i>Clemson University</i>
Workshop 105 Room: Hyatt Greenway E	Bringing Real-World Data and Visualizations of Student-Implemented Data Structures into Sophomore CS Courses Using BRIDGES Kalpathi Subramanian, <i>University of North Carolina at Charlotte</i> ; Jamie Payton, <i>Temple University</i> ; Erik Saule, <i>University of North Carolina at Charlotte</i>
Workshop 106 Room: Hyatt Greenway J	Guiding Students to Discover CS Concepts and Develop Process Skills Using POGIL Chris Mayfield, <i>James Madison University</i> ; Debra M. Duke, <i>Virginia Commonwealth University</i> ; Margarethe Posch, <i>Salt Lake Community College</i>
Workshop 107 Room: Hyatt Greenway I	Security Labs for Software Defined Networks in CloudLab Younghie Park, <i>San Jose State University</i> ; Hongxin Hu, <i>Clemson University</i> ; Xiaohong Yuan, <i>North Carolina A&T University</i>
Workshop 108 Room: Hyatt Greenway H	Programming Smart Contracts in Ethereum Blockchain Using Solidity Debasis Bhattacharya, Mario Canul, Saxon Knight, <i>University of Hawaii Maui College</i> ; Mohammad Q. Azhar, <i>BMCC, The City University of New York</i> ; Rajiv Malkan, <i>Lone Star College</i>
Workshop 109 Room: Hyatt Greenway G	Assessing Writing in CS: A Hands-on Workshop Phillip Barry, <i>University of Minnesota</i> ; Mia Minnes, <i>University of California, San Diego</i> ; Stephanie R. Taylor, <i>Colby College</i>
Workshop 110 Room: Hyatt Greenway F	Computing Infrastructure and Curriculum Design for Introductory Data Science Mine Cetinkaya-Rundel, <i>Duke University + RStudio</i>

For a full list of workshops and descriptions visit: <http://sigcse2019.sigcse.org/attendees/workshops.html>

THURSDAY, FEBRUARY 28

KEYNOTE SESSION

<p>8:15 am - 9:45 am Room: Hyatt Nicollet Grand Ballroom</p>	<p>Welcome to the 50th SIGCSE Technical Symposium! Elizabeth K. Hawthorne, <i>Union County College</i>; Manuel A. Pérez-Quiñones, <i>University of North Carolina at Charlotte</i></p> <p>OPENING KEYNOTE: Pursuing the Dream: A 50-Year Perspective on American Society, Technology, and Inclusion in Computing Dr. Freeman A. Hrabowski, III, <i>University of Maryland, Baltimore County (UMBC)</i></p>
--	--

Break, Exhibits & NSF Showcase • 10:00 am - 10:45 am

<p>10:00 am - 10:45 am Room: Hyatt Exhibit Hall</p>	<p>Break & Exhibits</p> <p>NSF Showcase #1 (See page 58 for complete listing of NSF Showcases)</p>
---	--

Demos • 10:00 am - 10:45 am

<p>10:00 am - 10:45 am Room: Hyatt Exhibit Hall</p>	<p>Demo Session #1: Chairs: Lina Battestilli, <i>North Carolina State University</i>; Peter-Michael Osera, <i>Grinnell College</i></p> <p>Applying Bioinformatics to Assignment Evaluation: A New Approach for Pattern Recognition in Open-Ended CS Assignments Keren Perry-Shamir, Seth Haberman, <i>Sense Education</i></p> <p>Integrating Computational Modeling in K-12 STEM Classrooms Gautam Biswas, Nicole Hutchins, Ákos Lédeczi, <i>Vanderbilt University</i>; Shuchi Grover, <i>Looking Glass Ventures, LLC</i>; Satabdi Basu, <i>SRI International</i></p>
---	--

Paper Sessions • 10:45 am - 12:00 pm

PAPER SESSIONS	10:45 AM	11:10 AM	11:35 AM
<p>Data Chair: Yingjun Cao, <i>University of California, San Diego</i></p> <p>Room: Hyatt Greenway A</p>	<p>A Module-based Approach to Teaching Big Data and Cloud Computing Topics at CS Undergraduate Level Debzani Deb, Muztaba Fuad, Keith Irwin, <i>Winston-Salem State University</i></p>	<p>Embracing the Liberal Arts in an Interdisciplinary Data Analytics Program Jessen Havill, <i>Denison University</i></p>	<p>A Novel Course in Data Systems with Minimal Prerequisites Thomas C. Bressoud, Gavin Thomas, <i>Denison University</i></p>
<p>Collaboration & Communicaton Chair: James Vanderhyde, <i>Saint Xavier University</i></p> <p>Room: Hyatt Greenway J</p>	<p>Investigating the Impact of Group Size on Non-Programming Exercises in CS Education Courses L.D. Miller, Leen-Kiat Soh, Markeya S. Peteranetz, <i>University of Nebraska - Lincoln</i></p>	<p>2nd BEST PAPER Experience Reports and Tools</p> <p>Developing Soft and Technical Skills Through Multi-Semester, Remotely Mentored, Community-Service Projects Janet Davis, <i>Whitman College</i>; Samuel A. Rebelsky, <i>Grinnell College</i></p>	<p>Does Social Sensitivity Impact Virtual Teams? Lisa L. Lacher, Cydnee Biehl, <i>University of Houston - Clear Lake</i></p>
<p>Enrollment & Retention Chair: Eric Aaron, <i>Colby College</i></p> <p>Room: Hyatt Greenway B/C</p>	<p>Student Performance in Computing Courses in the Face of Growing Enrollments Daniel T. Fokum, Daniel N. Coore, Eytan Ferguson, Gunjan Mansingh, Carl Beckford, <i>University of the West Indies, Mona</i></p>	<p>Understanding Who Enrolls in Introductory Computing Courses at Community Colleges Beth A. Quinn, Wendy M. DuBow, <i>University of Colorado Boulder</i>; David Sul, <i>Sul & Associates</i></p>	<p>Can Sending First and Second Year Computing Students to Technical Conferences Help Retention?: An Analysis of National Survey Data Heather M. Wright, N. Burçin Tamer, <i>Computing Research Association</i></p>

THURSDAY, FEBRUARY 28

Paper Sessions • 10:45 am - 12:00 pm

PAPER SESSIONS	10:45 AM	11:10 AM	11:35 AM
Tools 1 Chair: Charles Dierbach, <i>Towson University</i> Room: <i>Hyatt Greenway D/E</i>	Stride in BlueJ - Computing for All in an Educational IDE Michael Kölling, Neil C. C. Brown, Hamza Hamza, Davin McCall, King's College London	uAssign: Scalable Interactive Activities for Teaching the Unix Terminal Jacob Bailey, Craig Zilles, <i>University of Illinois at Urbana-Champaign</i>	MYR: A Web-Based Platform for Teaching Coding Using VR Christopher Berns, Grace Chin, Joel Savitz, Jason Kiesling, Fred Martin, <i>University of Massachusetts Lowell</i>
Practice & Problems Chair: Paul Denny, <i>The University of Auckland</i> Room: <i>Millennium Grand North</i>	Exploring the Applicability of Simple Syntax Writing Practice for Learning Programming Antti Leinonen, Henrik Nygren, Nea Pirttinen, Arto Hellas, Juho Leinonen, <i>University of Helsinki</i>	Stochastic Tree-Based Generation of Program-Tracing Practice Questions Anderson Thomas, Troy Stopera, Pablo Frank-Bolton, Rahul Simha, <i>George Washington University</i>	Exploring the Impact of Worked Examples in a Novice Programming Environment Rui Zhi, Thomas W. Price, Samiha Marwan, Alexandra Milliken, Tiffany Barnes, Min Chi, <i>North Carolina State University</i>
Process & Performance Chair: Razvan Alexandru Mezei, <i>Saint Martin's University</i> Room: <i>Millennium Grand South</i>	Coding Demonstration Videos for CS1 Ben Stephenson, <i>University of Calgary</i>	3rd BEST PAPER CS Education Research Exploring the Value of Different Data Sources for Predicting Student Performance in Multiple CS Courses Soohyun Nam Liao, <i>University of California, San Diego</i> ; Daniel Zingaro, <i>University of Toronto Mississauga</i> ; Christine Alvarado, William G. Griswold, Leo Porter, <i>University of California, San Diego</i>	The PyramidSnapshot Challenge: Understanding Student Process from Visual Output of Programs Lisa Yan, Nick McKeown, Chris Piech, <i>Stanford University</i>
Autograders Chair: Karen Jin, <i>University of New Hampshire</i> Room: <i>Millennium Grand Central</i>	Approaches for Coordinating eTextbooks, Online Programming Practice, Automated Grading, and More into One Course Margaret Ellis, Clifford A. Shaffer, Stephen H. Edwards, <i>Virginia Tech</i>	Autograding Distributed Algorithms in Networked Containers Evan Maicus, Matthew Peveler, Stacy Patterson, Barbara Cutler, <i>Rensselaer Polytechnic Institute</i>	Comparing Jailed Sandboxes vs Containers Within an Autograding System Matthew Peveler, Evan Maicus, Barbara Cutler, <i>Rensselaer Polytechnic Institute</i>
Capstones & Projects Chair: Michelle Friend, <i>University of Nebraska Omaha</i> Room: <i>Hyatt Greenway F/G</i>	Trial by Flyer: Building Quadcopters From Scratch in a Ten-Week Capstone Course Steven Swanson, <i>University of California, San Diego</i>	Redesigning a Software Development Course as a Preparation for a Capstone: An Experience Report Yekaterina Kharitonova, <i>University of California, Santa Barbara</i> ; Yi Luo, <i>Harvey Mudd College</i> ; Jeho Park, <i>Claremont McKenna College</i>	Experiential Learning of Software Project Management and Software Development via Course Collaboration Stefan C. Christov, Mark E. Hoffman, <i>Quinnipiac University</i>

THURSDAY, FEBRUARY 28

Paper Sessions • 10:45 am - 12:00 pm

PAPER SESSIONS	10:45 AM	11:10 AM	11:35 AM
Sister Session #1 RESPECT Chairs: Jamie Payton, <i>Temple University</i> ; Tiffany Barnes, <i>North Carolina State University</i> Room: Hyatt Lake Bemidji	Vlog Commentary YouTube Influencers as Effective Advisors in College and Career Readiness for Minorities in Computing: An Exploratory Study Robert Cummings, <i>Morehouse College</i> ; Earl Huff, <i>Clemson University</i> ; Naja Mack, <i>University of Florida</i> ; Kevin Womack, <i>Morehouse College</i> ; Amber Reid, <i>Clark Atlanta University</i> ; Brandon Ghoram, <i>Morehouse College</i> ; Juan Gilbert, <i>University of Florida</i> ; Kinnis Gosha, <i>Morehouse College</i>	Equity in the Who, How and What of CS Learning: K12 School District Conceptualizations of Equity in CSforAll Initiatives Rafi Santo, Leigh Ann DeLyser, <i>CSforALL</i> ; June Ahn, <i>University of California, Irvine</i> ; Anthony Pellicone, <i>University of Wisconsin-Madison</i> ; Julia Aguiar, <i>Stephanie Wortel-London, CSforAll</i>	Teaching Professional Morality & Ethics to Undergraduate Computer Science Students through Cognitive Apprenticeships & Case Studies: Experiences in CS-HU 130 'Foundational Values' Don Winiecki, Noah Salzman, <i>Boise State University</i>

Panel, Special, SIGCSE@50 and Supporter Sessions • 10:45 am - 12:00 pm

Panel Session Room: Hyatt Northstar A	Rethinking Debugging as Productive Failure for CS Education Yasmin B. Kafai, <i>University of Pennsylvania</i> ; David DeLiema, <i>University of California, Berkeley</i> ; Deborah A. Fields, <i>Utah State University</i> ; Gary Lewandowski, <i>Xavier University</i> ; Colleen M. Lewis, <i>Harvey Mudd College</i>
Panel Session Room: Hyatt Regency	Cybersecurity Program Accreditation: Benefits and Challenges Rajendra K. Raj, <i>Rochester Institute of Technology</i> ; Vijay Anand, <i>Southeast Missouri State University</i> ; David Gibson, <i>United States Air Force Academy</i> ; Siddharth Kaza, <i>Towson University</i> ; Andrew Phillips, <i>United States Naval Academy</i>
Special Session Room: Hyatt Greenway H/I	Propagating Educational Innovations Heather Bort, <i>Marquette University</i> ; David P. Bunde, <i>Knox College</i> ; Zack Butler, <i>Rochester Institute of Technology</i> ; Christopher Lynly Hovey, <i>University of Colorado Boulder</i> ; Cynthia Taylor, <i>Oberlin College</i>
Special Session Room: Hyatt Northstar B	Process Skills in Computer Science Helen H. Hu, <i>Westminster College</i> ; Chris Mayfield, <i>James Madison University</i> ; Clifton Kussmaul, <i>Muhlenberg College</i>
SIGCSE@50: Hot Topics in the SIGCSE Community Room: Hyatt Great Lakes A1 & A2	What Have We Talked About? An Analysis of the SIGCSE-Members Listserv Austin Cory Bart, <i>University of Delaware</i> ; Clifford A. Shaffer, <i>Virginia Tech</i> CS Education Then and Now: Recollections and Reflections Melinda McDaniel, <i>Georgia Institute of Technology</i> ; John Cigas, <i>Park University</i> ; Briana B. Morrison, <i>University of Nebraska Omaha</i> ; Henry M. Walker, <i>Grinnell College</i>
Microsoft Supporter Session Room: Hyatt Lakeshore A	Create Classroom Labs in the Cloud (See page 45 for abstract) Ji Eun Kwon, <i>Microsoft Corporation</i>
Google Supporter Session Room: Hyatt Lakeshore B	Content, Curricula, and Career Readiness: New Offerings from Google (See page 45 for abstract) Karen Gheno, Emily Kemp, Chris Stephenson, <i>Google</i>

THURSDAY, FEBRUARY 28

KEYNOTE SESSION

12:00 pm - 1:45 pm Room: Hyatt Nicollet Grand Ballroom	First Timer's Lunch KEYNOTE 2019 SIGCSE Award for Lifetime Service to the Computer Science Education Community Dr. Gloria Childress Townsend, <i>DePauw University</i>
--	--

Lunch Break • 12:00 pm - 1:45 pm

12:00 pm - 1:45 pm	Lunch Break (on your own)
--------------------	---------------------------

Paper Sessions • 1:45 pm - 3:00 pm

PAPER SESSIONS	1:45 PM	2:10 PM	2:35 PM
Databases Chair: James H. Davenport, <i>University of Bath</i> Room: Hyatt Greenway A	A Learning Platform for SQL Injection Nada Basit, Abdeltawab Hendawi, Joseph Chen, Alexander Sun, <i>University of Virginia</i>	1st BEST PAPER Curricula Initiatives ''); DROP TABLE textbooks: An Argument for SQL Injection Coverage in Database Textbooks Cynthia Taylor, <i>Oberlin College</i> ; Saheel Sakharkar, <i>University of Illinois at Chicago</i>	What to Expect and What to Focus on in SQL Query Teaching Toni Taipalus, Piia Perälä, <i>University of Jyväskylä</i>
Software Engineering Chair: Suzanne J. Matthews, <i>United States Military Academy</i> Room: Hyatt Greenway J	Perceived Benefits and Challenges of Learning Startup Methodologies for Software Engineering Students Jorge Melegati, <i>Free University of Bozen-Bolzano</i> ; Rafael Chanin, <i>PUCRS, School of Technology</i> ; Xiaofeng Wang, <i>Free University of Bozen-Bolzano</i> ; Afonso Sales, Rafael Prikladnicki, <i>PUCRS, School of Technology</i>	Motivating Students Beyond Course Requirements with a Serious Game Stacey Watson, <i>Nazareth College</i> ; Heather Richter Lipford, <i>University of North Carolina at Charlotte</i>	Active Learning with LEGO for Software Requirements Stan Kurkovsky, <i>Central Connecticut State University</i> ; Stephanie Ludi, <i>University of North Texas</i> ; Linda Clark, <i>Central Connecticut State University</i>
Advanced Topics Chair: Ahmed Abukmail, <i>University of Houston - Clear Lake</i> Room: Hyatt Greenway B/C	Effects of a Pathfinding Program Visualization on Algorithm Development Nicholas Lytle, <i>North Carolina State University</i> ; Mark Floryan, <i>University of Virginia</i> ; Tiffany Barnes, <i>North Carolina State University</i>	Teaching Android Mobile Security Jean-François Lalande, Valérie Viet Triem Tong, Pierre Graux, Guillaume Hiet, <i>CentraleSupélec, Inria, Univ Rennes, CNRS, IRISA</i> ; Wojciech Mazurczyk, <i>Institute of Telecommunications, Warsaw University of Technology</i> ; Habiba Chaoui, <i>National School of Applied Sciences, Ibn Tofail University</i> ; Pascal Berthomé, <i>INSA Centre Val de Loire, LIFO</i>	Allowing and Fully Supporting Multiple Programming Languages in a Computer Graphics Course: An Experience Amit Shesh, <i>Northeastern University</i>

THURSDAY, FEBRUARY 28

Paper Sessions • 1:45 pm - 3:00 pm

PAPER SESSIONS	1:45 PM	2:10 PM	2:35 PM
Feedback Chair: Barry Fagin, <i>United States Air Force Academy</i> Room: Hyatt Greenway D/E	An Approach to Generate Virtual Tutors for Game Programming Classes Alan de Oliveira Santana, Eduardo Aranha, <i>Federal University of Rio Grande do Norte</i>	Pensieve: Feedback on Coding Process for Novices Lisa Yan, Annie Hu, Chris Piech, <i>Stanford University</i>	Experiences Using Heat Maps to Help Students Find Their Bugs: Problems and Solutions Bob Edmison, Stephen H. Edwards, <i>Virginia Tech</i>
Active Learning Chair: Brian Railing, <i>Carnegie Mellon University</i> Room: Millennium Grand North	On the Effects of Active Learning Environments in Computing Education Tyler Greer, Qiang Hao, <i>Western Washington University</i> ; Mengguo Jing, <i>University of Wisconsin-Madison</i> ; Bradley Barnes, <i>University of Georgia</i>	Supporting Guided Inquiry with Cooperative Learning in Computer Organization Yejin Ham, Brandon Myers, <i>University of Iowa</i>	POGIL in Computer Science: Faculty Motivation and Challenges Aman Yadav, <i>Michigan State University</i> ; Clifton Kussmaul, <i>Muhlenberg College</i> ; Chris Mayfield, <i>James Madison University</i> ; Helen H. Hu, <i>Westminster College</i>
Gender Chair: Arno Pasternak, <i>TU Dortmund, Fritz-Steinhoff-Schule Hagen</i> Room: Millennium Grand South	Living-Learning Community for Women in Computer Science at Rutgers Rebecca N. Wright, Sally J. Nadler, Thu D. Nguyen, Cynthia N. Sanchez Gomez, <i>Rutgers University</i> ; Heather M. Wright, <i>Computing Research Association</i>	Achieving Gender Balance through Creative Expression William H. Bares, Bill Manaris, Renée McCauley, Christine Moore, <i>College of Charleston</i>	Gender-balanced TAs from an Unbalanced Student Body Amir Kamil, James Juett, Andrew DeOrio, <i>University of Michigan</i>
Curriculum Issues 1 Chair: Becky Grasser, <i>Lakeland Community College</i> Room: Millennium Grand Central	3rd BEST PAPER Curricula Initiatives PythonSneks: An Open-Source, Instructionally-Designed Introductory Curriculum with Action-Design Research Austin Cory Bart, <i>University of Delaware</i> ; Allie Sarver, Michael Friend, Larry Cox, <i>Virginia Tech</i>	Defining and Designing Computer Science Education in a K12 Public School District Chris Proctor, <i>Stanford University</i> ; Maxwell Bigman, <i>Harvard University</i> ; Paulo Blikstein, <i>Columbia University</i>	Developing Implementation Measures for K-12 Computer Science Curriculum Materials Daisy W. Rutstein, Yuning Xu, Kevin McElhaney, Marie Bienkowski, <i>SRI International</i>
Sister Session TOCE #1 Chair: Chris Hundhausen, <i>Washington State University</i> Room: Hyatt Lake Bemidji	RecurTutor: An Interactive Tutorial for Learning Recursion Sally Hamouda, <i>Rhode Island College</i> ; Stephen H. Edwards, <i>Virginia Tech</i> ; Hicham G. Elmougui, <i>Alexandria University and Umm Al-Qura University</i> ; Jeremy V. Ernst, Clifford A. Shaffer, <i>Virginia Tech</i>	Digital and Physical Fabrication as Multimodal Learning: Understanding Youth Computational Thinking When Making Integrated Systems Through Bidirectionally Responsive Design Gabriela Richard, Sagun Giri, <i>Pennsylvania State University</i>	Learning IS Child's Play: Game-Based Learning in Computer Science Education Hadi Hosseini, <i>Rochester Institute of Technology</i> ; Maxwell Hartt, <i>Cardiff University</i> ; Mehrnaz Mostafapour, <i>University of Waterloo</i>

Panel, Special, SIGCSE@50 and Supporter Sessions • 1:45 pm - 3:00 pm

Panel Session Room: Hyatt Greenway F/G	Including Embedded Systems in CS: Why? When? and How? Bill Siever, Roger D. Chamberlain, <i>Washington University in St. Louis</i> ; Elliott Forbes, <i>University of Wisconsin-La Crosse</i> ; Ingrid Russell, <i>University of Hartford</i>
Panel Session Room: Hyatt Northstar A	The New NSF Requirement for Broadening Participation in Computing (BPC) Plans: Community Advice and Resources Tracy Camp, <i>Colorado School of Mines</i> ; Wendy M. DuBow, <i>University of Colorado Boulder</i> ; Diane Levitt, <i>Cornell Tech</i> ; Linda J. Sax, <i>University of California, Los Angeles</i> ; Valerie Taylor, <i>CMD-IT</i> ; Colleen M. Lewis, <i>Harvey Mudd College</i>

THURSDAY, FEBRUARY 28

Panel, Special, SIGCSE@50 and Supporter Sessions • 1:45 pm - 3:00 pm

Special Session Room: Hyatt Greenway H/I	Where Are We Now? Results from a National Study of Computer Science Teachers and Teaching Eric R Baniolower, Evelyn M. Gordon, <i>Horizon Research, Inc.</i>
Special Session Room: Hyatt Northstar B	Shaping Curricular Guidelines for Associate-Degree Cybersecurity Programs Cara Tang, <i>Portland Community College</i> ; Cindy S Tucker, <i>Bluegrass Community and Technical College</i> ; Christian Servin, <i>El Paso Community College</i> ; Markus Geissler, <i>Cosumnes River College</i> ; Melissa Stange, <i>Lord Fairfax Community College</i>
Special Session Room: Hyatt Regency	SIGCSE Reads 2019: Discussion and Q & A Rebecca Bates, <i>Minnesota State University, Mankato</i> ; Valerie Summet, <i>Rollins College</i> ; Nanette Veilleux, <i>Simmons University</i> ; Judy Goldsmith, <i>University of Kentucky</i> ; Naomi Kritzer, <i>Self</i>
SIGCSE@50: CS1 Chair: James Caristi, <i>Valparaiso University</i> Room: Hyatt Great Lakes A1 & A2	1:45 pm - 2:10 pm 50 Years of CS1 at SIGCSE: A Review of the Evolution of Introductory Programming Education Research Brett A. Becker, <i>University College Dublin</i> ; Keith Quille, <i>Institute of Technology Tallaght</i> 2:10 pm - 3:00 pm Discussion Brett A. Becker, <i>University College Dublin</i> ; Donna Gavin, <i>University of Wisconsin, Platteville</i> ; David G. Kay, <i>University of California Irvine</i>
Turing's Craft, Inc. Supporter Session Room: Hyatt Lakeshore A	Customized Auto-Grading and Homework Project Management with CodeLab (See page 45 for abstract) David Arnow, <i>Brooklyn College</i>
GitHub Supporter Session Room: Hyatt Lakeshore B	#Get To Near-total Automation with GitHub: Teacher Stories (See page 46 for abstract) Dan Wallach, <i>Rice University</i> ; Paul Salvador Inventado, <i>California State University Fullerton</i> ; Vanessa Gennarelli, <i>Github Education</i>

ACM Student Research Competition • 1:45 pm - 5:00 pm

1:45 pm - 5:00 pm Room: Hyatt Exhibit Hall	ACM Student Research Competition - First Round of Competition (Posters) Chairs: Jessica Schmidt, <i>North Carolina State University</i> ; Stephen Hughes, <i>Coe College</i> (See page 59 for a complete listing of ACM Student Research Competition Posters)
---	---

Break, Exhibits & NSF Showcase • 3:00 pm - 3:45 pm

3:00 pm - 3:45 pm Room: Hyatt Exhibit Hall	Break & Exhibits
	NSF Showcase #2 (See page 58 for complete listing of NSF Showcases)

Demos • 3:00 pm - 3:45 pm

3:00 pm - 3:45 pm Room: Hyatt Exhibit Hall	Demo Session #2: Chairs: Lina Battestilli, <i>North Carolina State University</i> ; Peter-Michael Osera, <i>Grinnell College</i> Building Simple Games With BRIDGES David Burlinson, Erik Saule, Kalpathi Subramanian, <i>University of North Carolina at Charlotte</i> Engaging in Logical Code Reasoning with an Activity-Based Online Tool Joseph E. Hollingsworth, <i>Rose-Hulman Institute of Technology</i> ; Eileen T. Kraemer, Murali Sitaraman, <i>Clemson University</i>
---	--

Paper Sessions • 3:45 pm - 5:00 pm

PAPER SESSIONS	3:45 PM	4:10 PM	4:35 PM
Camps Chair: William H. Bares, <i>College of Charleston</i> Room: Hyatt Greenway A	▶ Camp or College?: Student Perspectives from College Computer Science Departments & Coding Boot Camps on Skills Learned Quinn Burke, <i>Digital Promise Global</i> ; Cinamon Sunrise Bailey, <i>College of Charleston</i>	A Middle-School Code Camp Emphasizing Digital Humanities Yesheng Chen, Zhen Chen, Shyamala Gumidyal, Annabella Koures, Seoyeon Lee, James Msekela, Halle Remash, Nolan Schoenle, Sarah Dahlby Albright, Samuel A. Rebelsky, <i>Grinnell College</i>	A Middle-School Camp Emphasizing Data Science and Computing for Social Good Caelin Bryant, Yesheng Chen, Zhen Chen, Jonathan Gilmour, Shyamala Gumidyal, Beatriz Herce-Hagiwara, Annabella Koures, Seoyeon Lee, James Msekela, Anh Thu Pham, Halle Remash, Marli Remash, Nolan Schoenle, Jonah Zimmerman, Sarah Dahlby Albright, Samuel A. Rebelsky, <i>Grinnell College</i>
Story & Video Chair: Caroline Budwell, <i>Virginia Commonwealth University</i> Room: Hyatt Greenway J	▶ Podcast Highlights: Targeted Educational Videos From Repurposed Lecture-capture Footage Mia Minnes, Christine Alvarado, Max Geislinger, Joyce Fang, <i>University of California, San Diego</i>	Student-Generated Videos for Promoting Better Attitudes towards Cryptography Ana I. González-Tablas, Pablo Martín-González, <i>Universidad Carlos III de Madrid</i>	Story Programming: Explaining Computer Science Before Coding Jennifer Parham-Mocello, Shannon Ernst, Martin Erwig, Lily Shellhammer, Emily Dominguez, <i>Oregon State University</i>
Games & Gamification Chair: Kalpathi Subramanian, <i>University of North Carolina at Charlotte</i> Room: Hyatt Greenway B/C	▶ OneUp: Engaging Students in a Gamified Data Structures Course Darina Dicheva, Keith Irwin, Christo Dichev, <i>Winston-Salem State University</i>	Program Wars: A Card Game for Learning Programming and Cybersecurity Concepts John Anvik, Vincent Cote, Jace Riehl, <i>University of Lethbridge</i>	Analyzing Gamification Impact on a Mastery Learning Introductory Programming Course Rafael G. de Pontes, <i>UFCG</i> ; Dalton D. Serey Guerrero, <i>Federal University of Campina Grande</i> ; Jorge C. A. de Figueiredo, <i>UFCG</i>
Testing 1 Chair: Mohsen Dorodchi, <i>University of North Carolina at Charlotte</i> Room: Hyatt Greenway D/E	▶ 2nd BEST PAPER CS Education Research Assessing Incremental Testing Practices and Their Impact on Project Outcomes Ayaan M. Kazerouni, Clifford A. Shaffer, Stephen H. Edwards, Francisco Servant, <i>Virginia Tech</i>	Pragmatic Software Testing Education Maurício Aniche, <i>Delft University of Technology</i> ; Feliënne Hermans, <i>Leiden Institute of Advanced Computer Science</i> ; Arie van Deursen, <i>Delft University of Technology</i> ;	Software Testing in Introductory Programming Courses: A Systematic Mapping Study Lilian Passos Scatalon, <i>University of São Paulo (ICMC-USP)</i> ; Jeffrey C. Carver, <i>University of Alabama</i> ; Rogério Eduardo Garcia, <i>São Paulo State University (FCT-Unesp)</i> ; Ellen Francine Barbosa, <i>University of São Paulo (ICMC-USP)</i>
Computation Thinking 1 Chair: Debzani Deb, <i>Winston-Salem State University</i> Room: Millennium Grand North	▶ The Zones of Proximal Flow Tutorial: Designing Computational Thinking Cliffhangers Ashok Basawapatna, <i>State University of New York, College at Old Westbury</i> ; Alexander Repenning, <i>University of Applied Sciences and Arts Northwestern Switzerland</i> ; Mark Savignano, <i>Minnesota State University, Mankato</i>	Infusing Computational Thinking Across Disciplines: Reflections & Lessons Learned Lori Pollock, Chrystalla Mouza, Kevin R. Guidry, Kathleen Pusecker, <i>University of Delaware</i>	Building Computational Creativity in an Online Course for Non-Majors Markeya S. Peteranetz, Leen-Kiat Soh, Elizabeth Ingraham, <i>University of Nebraska-Lincoln</i>

THURSDAY, FEBRUARY 28

Paper Sessions • 3:45 pm - 5:00 pm

PAPER SESSIONS	3:45 PM	4:10 PM	4:35 PM
Assessment 1 ► Chair: James W. McGuffee, <i>Christian Brothers University</i> Room: Millennium Grand South	Facilitating Course Assessment with a Competitive Programming Platform Daniel N. Coore, Daniel T. Fokum, <i>University of the West Indies, Mona</i>	Development of a Lean Computational Thinking Abilities Assessment for Middle Grades Students Eric Wiebe, <i>North Carolina State University</i> ; Jennifer London, <i>London & Associates</i> ; Osman Aksit, <i>Dhahran Ahliyya Schools</i> ; Bradford W. Mott, <i>North Carolina State University</i> ; Kristy Elizabeth Boyer, <i>University of Florida</i> ; James C. Lester, <i>North Carolina State University</i>	On the Fairness of Multiple-Variant Multiple-Choice Examinations Paul Denny, Sathiamoorthy Manoharan, Ulrich Speidel, Giovanni Russello, Angela Chang, <i>The University of Auckland</i>
Teaching Practice 1 ► Chair: Diana Franklin, <i>The University of Chicago</i> Room: Millennium Grand Central	Teaching Explicit Programming Strategies to Adolescents Andrew J. Ko, <i>University of Washington</i> ; Thomas D. LaToza, Stephen Hull, <i>George Mason University</i> ; Ellen A. Ko, <i>Juanita High School</i> ; William Kwok, Jane Quichocho, Harshitha Akkaraju, <i>University of Washington</i> ; Rishin Pandit, <i>Thomas Jefferson High School for Science & Technology</i>	Teachers' Experiences of using PRIMM to Teach Programming in School Sue Sentance, <i>King's College London</i> ; Jane Waite, <i>Queen Mary University of London</i> ; Maria Kallia, <i>King's College London</i>	Survey Results on Why CS Faculty Adopt New Teaching Practices Christopher Lynnly Hovey, Lecia Barker, Vaughan Nagy, <i>University of Colorado Boulder</i>

Panel, Special, SIGCSE@50 and Supporter Sessions • 3:45 pm - 5:00 pm

Panel Session Room: Hyatt Greenway F/G	Broadening Participation in Computing: Putting Our Work in Context Jennifer M. Blaney, <i>Utah State University</i> ; Linda J. Sax, <i>University of California, Los Angeles</i> ; David Feldon, <i>Utah State University</i> ; Ann Gates, <i>University of Texas at El Paso</i>
Panel Session Room: Hyatt Northstar A	The Reality of Inclusion: The Role of Relationships, Identity, and Academic Culture in Inclusive and Equitable Practices for Broadening Participation in Computing Education Jamika D. Burge, <i>black computHER</i> ; Jamie Payton, <i>Temple University</i> ; Jill Denner, <i>Education, Training, Research</i> ; Yolanda Rankin, <i>Florida State University</i> ; Celine Latulipe, <i>University of North Carolina at Charlotte</i>
Panel Session Room: Hyatt Regency	CS Principles Higher Education Pathways Crystal Furman, <i>College Board</i> ; Owen Astrachan, <i>Duke University</i> ; Daniel D. Garcia, <i>University of California, Berkeley</i> ; David Musicant, <i>Carleton College</i> ; Jennifer Rosato, <i>College of St. Scholastica</i>
Special Session Room: Hyatt Greenway H/I	AI for K-12 Guidelines Initiative David Touretzky, <i>Carnegie Mellon University</i> ; Fred Martin, <i>University of Massachusetts Lowell</i> ; Deborah Seehorn, <i>CSTA</i> ; Emily Reid, <i>AI4All</i> ; Miles Berry, <i>Roehampton University</i>
Special Session Room: Hyatt Northstar B	ACM Task Force on Data Science Education: Draft Report and Opportunity for Feedback Andrea Danyluk, <i>Williams College</i> ; Paul Leidig, <i>Grand Valley State University</i> ; Lillian (Boots) Cassel, <i>Villanova University</i> ; Christian Servin, <i>El Paso Community College</i>
SIGCSE@50: Computing Education Research Room: Hyatt Great Lakes A1 & A2	Negotiating Varied Research Goals in Computing Education Research Mark Guzdial, <i>University of Michigan</i> ; Colleen M. Lewis, <i>Harvey Mudd College</i> ; Lauren Margulieux, <i>Georgia State University</i> ; Greg L. Nelson, <i>University of Washington</i> ; Leo Porter, <i>University of California, San Diego</i>

THURSDAY, FEBRUARY 28

Supporter Sessions • 3:45 pm - 5:00 pm

zyBooks Supporter Session Room: Hyatt Lakeshore A	Is Your CS Course Too Complex? How Are You Handling Growth? (See page 46 for abstract) Smita Bakshi, zyBooks; Frank Vahid, zyBooks/University of California Riverside; Roman Lysecky, zyBooks/University of Arizona; Alex Edgcomb, zyBooks/University of California Riverside
Google Supporter Session Room: Hyatt Lakeshore B	Teaching with the Cloud (See page 46 for abstract) Laurie White, Google

Lightning Talks • 3:45 pm - 5:00 pm

3:45 pm - 5:00 pm Room: Hyatt Lake Bemidji	Lightning Talks #1 (See page 60 for complete list of Lightning Talks) Chairs: Lina Battestilli, North Carolina State University; Peter-Michael Osera, Grinnell College
---	--

Birds of a Feather • 5:30 pm - 6:20 pm

5:30 pm - 6:20 pm Room #: See page 50	Birds of a Feather Flock A (See page 50 for complete list of Birds of a Feather) Chairs: Mary Anne Egan, Siena College; Mark Sherriff, University of Virginia
--	---

Supporter Sessions • 5:30 pm - 6:20 pm

ABET Supporter Session Room: Hyatt Lakeshore A	Computer Science Accreditation - What You Should Know (See page 46 for abstract) John K. Estell, Ohio Northern University; David S. Gibson, United States Air Force Academy; Rajendra Raj, Rochester Institute of Technology
Mimir Supporter Session Room: Hyatt Lakeshore B	How FLCC Uses Mimir Classroom and OER to Improve Course Outcomes (See page 47 for abstract) Prahasith Veluvolu, Mimir; Dave Ghidiu, Finger Lakes Community College

Birds of a Feather • 6:30 pm - 7:20 pm

6:30 pm - 7:20 pm Room #: See page 51	Birds of a Feather Flock B (See page 51 for complete list of Birds of a Feather) Chairs: Mary Anne Egan, Siena College; Mark Sherriff, University of Virginia
--	---

Supporter Session • 6:30 pm - 7:20 pm

IBM Supporter Session Room: Hyatt Lakeshore A	Shortcuts for keeping your CS Curriculum Current (See page 47 for abstract) Misty Decker, Valinda Kennedy, IBM
---	--

Thursday Reception

7:30 pm - 9:30 pm Hyatt Nicollet Grand Ballroom	SIGCSE Reception
--	------------------



Teach without limits

From simulating the effects of climate change to training an algorithm to help detect cancer cells, Google Cloud is helping transform computer science education.

Explore our faculty programs at Booth #108.

- Open sourced and open minded
- Build faster with serverless computing
- Powerful data and analytics
- Dependable security at scale
- Pre-trained ML models
- Education grants for faculty

Google Cloud

For more information visit
<https://edu.google.com/higher-ed-solutions/CS/>



FRIDAY, MARCH 1

KEYNOTE SESSION

<p>8:15 am - 9:45 am Room: Hyatt Nicollet Grand Ballroom</p>	<p>General Information Elizabeth K. Hawthorne, <i>Union County College</i>; Manuel A. Pérez-Quiñones, <i>University of North Carolina at Charlotte</i></p> <p>KEYNOTE: Computing Education as a Foundation for 21st Century Literacy 2019 SIGCSE Award for Outstanding Contribution to Computer Science Education Dr. Mark Guzdial, <i>University of Michigan</i></p>
--	--

Break, Exhibits & NSF Showcase • 10:00 am - 10:45 am

<p>10:00 am - 10:45 am Room: Hyatt Exhibit Hall</p>	<p>Break & Exhibits</p> <p>NSF Showcase #3 (See page 58 for complete listing of NSF Showcases)</p>
---	--

Demos • 10:00 am - 10:45 am

<p>10:00 am - 10:45 am Room: Hyatt Exhibit Hall</p>	<p>Demo Session #3: Chairs: Lina Battestilli, <i>North Carolina State University</i>; Peter-Michael Osera, <i>Grinnell College</i></p> <p>Hands-on Cybersecurity Exercises that are Easy to Access Richard Weiss, <i>Evergreen State College</i>; Jens Mache, <i>Lewis and Clark College</i></p> <p>Gamifying Computer Science Courses with OneUp Keith Irwin, Austin Hodge, Darina Dicheva, <i>Winston-Salem State University</i></p>
---	---

Poster Session • 10:00 am - 12:00 pm

<p>10:00 am - 12:00 pm Room: Hyatt Exhibit Hall</p>	<p>Poster Session #1 (See pages 53-56 for complete listing of Posters) Chairs: Laurence D. Merkle, <i>Air Force Institute of Technology</i>; S. Monisha Pulimood, <i>The College of New Jersey</i></p>
---	---

Paper Sessions • 10:45 am - 12:00 pm

PAPER SESSIONS	10:45 AM	11:10 AM	11:35 AM
<p>Online Chair: Bernd Bruegge, <i>Technical University Munich</i></p> <p>Room: Hyatt Greenway A</p>	<p>Understanding Learning Curves and Trajectories in CSS Layout Meen Chul Kim, <i>Drexel University</i>; Thomas H. Park, <i>Codepip</i>; Ruixue Liu, <i>Worcester Polytechnic Institute</i>; Andrea Forte, <i>Drexel University</i></p>	<p>Captioning Online Course Videos: An Investigation into Knowledge Retention and Student Perception Michael Whitney, <i>Wintrop University</i>; Bryan Dallas, <i>Northern Illinois University</i></p>	<p>Facing Backwards While Stumbling Forwards: The Future of Teaching Web Development Randy Connolly, <i>Mount Royal University</i></p>
<p>Mistakes and Errors Chair: Ben Stephenson, <i>University of Calgary</i></p> <p>Room: Hyatt Greenway J</p>	<p>The Error Behind The Message: Finding the Cause of Error Messages in Python Tobias Kohn, <i>University of Cambridge</i></p>	<p style="text-align: center;">1st BEST PAPER CS Education Research</p> <p>First Things First: Providing Metacognitive Scaffolding for Interpreting Problem Prompts James Prather, Raymond Pettit, <i>Abilene Christian University</i>; Brett A. Becker, <i>University College Dublin</i>; Paul Denny, <i>The University of Auckland</i>; Dastyni Loksa, <i>University of Washington</i>; Alani Peters, Zachary Albrecht, Krista Masci, <i>Abilene Christian University</i></p>	<p>The Error Landscape: Characterizing the Mistakes of Novice Programmers Rebecca Smith, Scott Rixner, <i>Rice University</i></p>

FRIDAY, MARCH 1

Paper Sessions • 10:45 am - 12:00 pm

PAPER SESSIONS	10:45 AM	11:10 AM	11:35 AM
Instruments 1 Chair: Steven Bogaerts, <i>DePauw University</i> Room: Hyatt Greenway B/C	▶ How Many Abilities Can We Measure in Computational Thinking? A Study on Bebras Challenge Ana Liz Souto O. Araujo, <i>Federal University of Paraíba</i> ; Wilkerson L. Andrade, Dalton D. Serey Guerrero, Monilly Ramos Araujo Melo, <i>Federal University of Campina Grande</i>	(Re)Validating Cognitive Introductory Computing Instruments Ryan Bockmon, Stephen Cooper, <i>University of Nebraska - Lincoln</i> ; Jonathan Gratch, <i>Texas Woman's University</i> ; Mohsen Dorodchi, <i>University of North Carolina at Charlotte</i>	A Topical Review of Evaluation Instruments for Computing Education Adrienne Decker, <i>University at Buffalo</i> ; Monica M. McGill, <i>Knox College</i>
Testing 2 Chair: Clifford A. Shaffer, <i>Virginia Tech</i> Room: Hyatt Greenway D/E	▶ Automating Systems Course Unit and Integration Testing: Experience Report Dee A. B. Weikle, Michael O. Lam, Michael S. Kirkpatrick, James Madison University	Gamifying a Software Testing Course with Code Defenders Gordon Fraser, Alessio Gambi, Marvin Kreis, <i>University of Passau</i> ; José Miguel Rojas, <i>University of Leicester</i>	Measuring Unit Test Accuracy Kevin Buffardi, Pedro Valdivia, Destiny Rogers, <i>California State University, Chico</i>
Teaching Practice 2 Chair: Matthew Hertz, <i>University at Buffalo</i> Room: Millennium Grand North	▶ An Analysis of Using Many Small Programs in CS1 Joe Michael Allen, <i>University of California, Riverside</i> ; Frank Vahid, Alex Edgcomb, <i>University of California, Riverside</i> & zyBooks; Kelly Downey, Kris Miller, <i>University of California, Riverside</i>	Reducing Instructor Workload in an Introductory Robotics Course via Computational Design Devon J. Merrill, Steven Swanson, <i>University of California, San Diego</i>	Frequency of Instructor- and Student-Centered Teaching Practices in Introductory CS Courses Christopher Lynly Hovey, Lecia Barker, Margaret Luebs, <i>University of Colorado Boulder</i>
Assessment 2 Chair: Eileen T. Kraemer <i>Clemson University</i> Room: Millennium Grand South	▶ Harnessing the Wisdom of the Classes: Classsourcing and Machine Learning for Assessment Instrument Generation Sam Saarinen, Shriram Krishnamurthi, Kathi Fisler, Preston Tunnell Wilson, <i>Brown University</i>	An Assessment of Oral Exams in Introductory CS Peter Ohmann, <i>College of Saint Benedict/Saint John's University</i>	On the Effect of Question Ordering on Performance and Confidence in Computer Science Examinations Brian Harrington, Jingyiran Li, Mohamed Moustafa, Marzieh Ahmadzadeh, Nick Cheng, <i>University of Toronto Scarborough</i>
CS1 1 Chair: Eric Fouh, <i>University of Pennsylvania</i> Room: Millennium Grand Central	▶ Beauty and Joy of Computing: 2016-17 Findings from an AP CS Principles Course June Mark, Kelsey Klein, <i>Education Development Center</i>	Implementing EarSketch: Connecting Classroom Implementation to Student Outcomes Tom McKlin, Dana Wanzer, Taneisha Lee, <i>The Findings Group</i> ; Brian Magerko, Doug Edwards, Sabrina Grossman, Jason Freeman, <i>Georgia Institute of Technology</i>	Food for Thought: Supporting African American Women's Computational Algorithmic Thinking in an Intro CS Course Yolanda A. Rankin, <i>Florida State University</i> ; Jakarta O. Thomas, <i>Auburn University</i> ; India Irish, <i>Georgia Tech</i>
Sister Session SIGGRAPH Education Approaches Chair: Erik Brunvand, <i>The University of Utah</i> Room: Hyatt Lake Bemidji	▶ Real-Time Motion Capture for Performing Arts and Stage Serguei Mokhov, Amandeep Kaur, Mehak Talwar, Keerthana Gudavalli, Miao Song, Sudir Mudar, <i>Concordia University</i>	Creating Compelling Virtual Reality and Interactive Content for Higher Education Ralph Vituccio, <i>Entertainment Technology Center</i> ; Jaehee Cho, Tsung-Yu (Jack) Tsai, Sarabeth Boak, <i>Stitchbridge, Inc.</i>	Groovy Graphics Assignments Andrew Duchowski, <i>Clemson University</i>

FRIDAY, MARCH 1

Panel, Special, SIGCSE@50 and Supporter Sessions • 10:45 am - 12:00 pm

Panel Session Room: Hyatt Greenway F/G	This is What Diversity Looks Like: Making CS Curriculum Culturally Relevant for Spanish-speaking Communities Joseph Carroll-Miranda, <i>University of Puerto Rico</i> ; Patricia Ordóñez, <i>University of Puerto Rico, Rio Piedras</i> ; Edusmilo Orozco, <i>Milagros Bravo</i> , Michelle Borrero, Luis Lopez, Gerriann Houser, Eliud Gerena, <i>University of Puerto Rico</i> ; Dale Reed, <i>The University of Chicago</i> ; Brenda Santiago, Agustin Corchado, Andreshka Santana, <i>University of Puerto Rico</i>
Panel Session Room: Hyatt Greenway H/I	Civic Engagement Across the Computing Curriculum Mark Goadrich, <i>Hendrix College</i> ; Michael Goldweber, <i>Xavier University</i> ; Matthew Jadud, <i>Bates College</i> ; S. Monisha Pulimood, <i>The College of New Jersey</i> ; Samuel A. Rebelsky, <i>Grinnell College</i>
Panel Session Room: Hyatt Northstar B	Four Models for Including Community Colleges in Broadening Participation: A Call to Action Amardeep Kahlon, <i>Austin Community College</i> ; Deborah Boisvert, <i>University of Massachusetts Boston</i> ; Louise Ann Lyon, <i>Education, Training, and Research</i> ; Melanie Williamson, <i>Bluegrass Community and Technical College</i> ; Wendy M. DuBow, <i>University of Colorado Boulder</i>
Special Session Room: Hyatt Northstar A	Exploring our Privilege: Activities and Discussions Miranda Parker, <i>Georgia Tech</i> ; Jason T. Black, <i>Florida A&M University</i> ; Helen H. Hu, <i>Westminster College</i> ; Colleen M. Lewis, <i>Harvey Mudd College</i>
Special Session Room: Hyatt Regency	A Discussion of Research Practice Partnerships in CS Education Leigh Ann DeLyser, Joshua Elder, <i>CSforALL</i> ; Alan Peterfreund, Stacey Sexton, <i>Sagefox Consulting Group</i>
SIGCSE@50: Equity Room: Hyatt Great Lakes A1 & A2	Going Beyond the Platitudes of Equity: Developing a Shared Vision for Equity in Computer Science Education Jean Ryoo, <i>University of California, Los Angeles</i> ; Gail Chapman, <i>Exploring Computer Science</i> ; Julie Flapan, <i>University of California, Los Angeles</i> ; Joanna Goode, <i>University of Oregon</i> ; Jane Margolis, <i>University of California, Los Angeles</i> ; Christine Ong, <i>CRESST</i> ; Cynthia Estrada, <i>University of California, Los Angeles</i> ; Max Skorodinsky, <i>University of Oregon</i> ; Tiera Tanksley, <i>University of California, Los Angeles</i> ; Jamika D. Burge, <i>black computHER</i> ; Ryoko Yamaguchi, <i>Plus Alpha Research</i> ; Frieda McAlear, Allison Scott, Alexis Martin, Sonia Koshy, <i>Kapor Center</i> ; Kamau Bobb, Lien Diaz, <i>Georgia Tech</i>
Intel Supporter Session Room: Hyatt Lakeshore A	Jump Start Parallel Programming Education in Data Science, Artificial Intelligence and More (See page 47 for abstract) Henry Gabb, <i>Intel Corporation</i>
Vocareum Supporter Session Room: Hyatt Lakeshore B	Delivering Cutting Edge Compute Resources to the Classroom - Jupyter, Clusters, Container Networks, & More (See page 48 for abstract) Sanjay Srivastava, <i>Vocareum</i>

Friday Afternoon Events • 12:00 pm - 1:45 pm

12:00 pm - 1:45 pm	Lunch (on your own)
12:00 pm - 1:45 pm Room: Millennium Loring	International Committee Lunch
1:00 pm - 1:45 pm Room: Hyatt Northstar A	SIGCSE Volunteer/Conference Info

FRIDAY, MARCH 1

Paper Sessions • 1:45 pm - 3:00 pm

PAPER SESSIONS	1:45 PM	2:10 PM	2:35 PM
Professional Tools & Practice Chair: Roberto Hoyle, <i>Oberlin College</i> Room: <i>Hyatt Greenway A</i>	Interactive Peer-Led Code Reviews In CS2 Curricula Ryan Rybarczyk, <i>Butler University</i> ; Lingma Acheson, <i>Indiana University-Purdue University</i>	Static Analyses in Python Programming Courses David Liu, <i>University of Toronto</i> ; Andrew Petersen, <i>University of Toronto Mississauga</i>	Using GitHub in the Classroom Predicts Student Learning Outcomes and Classroom Experiences: Findings from a Survey of Students and Teachers Courtney Hsing, Vanessa Gennarelli, <i>Github Education</i>
Student Success Chair: Craig Zilles, <i>University of Illinois at Urbana-Champaign</i> Room: <i>Hyatt Greenway J</i>	Early Programming Education and Career Orientation: The Effects of Gender, Self-Efficacy, Motivation and Stereotypes Efthimia Aivaloglou, <i>Open University of the Netherlands</i> ; Felienne Hermans, <i>Leiden Institute of Advanced Computer Science</i>	The Academic Enhancement Program: Assessing Programs Designed to Support Student Success Diana R. Cukierman, Donna McGee Thompson, Wayne Sun, <i>Simon Fraser University</i>	Speed and Studying: Gendered Pathways to Success Iman YeckehZaare, Paul Resnick, <i>University of Michigan</i>
Instruments 2 Chair: Emily Lovell, <i>Berea College</i> Room: <i>Hyatt Greenway B/C</i>	An Item Response Theory Evaluation of a Language-Independent CS1 Knowledge Assessment Benjamin Xie, Matthew J. Davidson, Min Li, Andrew J. Ko, <i>University of Washington</i>	A Gap Analysis of Noncognitive Constructs in Evaluation Instruments Designed for Computing Education Monica M. McGill, <i>Knox College</i> ; Adrienne Decker, <i>University at Buffalo</i> ; Tom McKlin, <i>The Findings Group</i> ; Kathy Haynie, <i>Haynie Research and Evaluation</i>	Electronic Textiles in Computer Science Education: A Synthesis of Efforts to Broaden Participation, Increase Interest, and Deepen Learning Gayithri Jayathirtha, Yasmin B. Kafai; <i>University of Pennsylvania</i>
Security 1 Chair: Sotirios Kentros, <i>Salem State University</i> Room: <i>Hyatt Greenway D/E</i>	Evaluation of Peer Instruction for Cybersecurity Education Pranita Deshpande, <i>University of New Orleans</i> ; Cynthia B. Lee, <i>Stanford University</i> ; Irfan Ahmed, <i>Virginia Commonwealth University</i>	From Midshipmen to Cyber Pros: Training Minority Naval Reserve Officer Training Corp Students for Cybersecurity Naja A. Mac, <i>University of Florida</i> ; Kevin Womack, <i>Morehouse College</i> ; Earl W. Huff Jr., <i>Clemson University</i>	Topological Scoring of Concept Maps for Cybersecurity Education Pranita Deshpande, <i>University of New Orleans</i> ; Irfan Ahmed, <i>Virginia Commonwealth University</i>
Misconceptions Chair: Stephen H. Edwards, <i>Virginia Tech</i> Room: <i>Millennium Grand North</i>	Automated Critique of Early Programming Antipatterns Leo C. Ureel II, Charles Wallace, <i>Michigan Technological University</i>	A K-8 Debugging Learning Trajectory Derived from Research Literature Kathryn M. Rich, <i>Michigan State University</i> ; Carla Strickland, <i>University of Chicago STEM Education</i> ; T. Andrew Binkowski, Diana Franklin, <i>The University of Chicago</i>	Learning to use Functions: The Relationship Between Misconceptions and Self-Efficacy Maria Kallia, Sue Sentance, <i>King's College London</i>

FRIDAY, MARCH 1

Paper Sessions • 1:45 pm - 3:00 pm

PAPER SESSIONS	1:45 PM	2:10 PM	2:35 PM
Accessibility Chair: N. Burçin Tamer, <i>Computing Research Association</i> Room: Millennium Grand South	▶ Educational Experiences of Blind Programmers Catherine M. Baker, <i>Creighton University</i> ; Cynthia L. Bennett, <i>University of Washington</i> ; Richard E. Ladner, <i>University of Washington</i>	<div style="background-color: #546A9B; color: white; padding: 5px; text-align: center;"> 1st BEST PAPER Experience Reports and Tools </div> Computer Science Principles for Teachers of Blind and Visually Impaired Students Andreas Stefik, <i>University of Nevada, Las Vegas</i> ; Richard E. Ladner, <i>University of Washington</i> ; William Allee, <i>University of Nevada, Las Vegas</i> ; Sean Mealin, <i>North Carolina State University</i>	Accessible AST-Based Programming for Visually-Impaired Programmers Emmanuel Schanzer, <i>Bootstrap/Brown University</i> ; Sina Bahram, <i>Prime Access Consulting</i> ; Shriram Krishnamurthi, <i>Brown University</i>
Curriculum Issues 2 Chair: Afonso Sales, <i>PUCRS, School of Technology</i> Room: Millennium Grand Central	▶ From Clusters to Content: Using Code Clustering for Course Improvement David A. Joyner, Ryan Arrison, Mehnaz Ruksana, Evi Salguero, Zida Wang, Ben Wellington, Kevin Yin, <i>Georgia Institute of Technology</i>	Applying Machine Learning to Improve Curriculum Design Robert Ball, Linda Duhadway, Kyle Feuz, Joshua Jensen, Brian Rague, Drew Weidman, <i>Weber State University</i>	The Relationship Between Prerequisite Proficiency and Student Performance in an Upper-Division Computing Course Sander Valstar, William G. Griswold, Leo Porter, <i>University of California, San Diego</i>
Sister Session: Incorporating History in STEM Education Room: Hyatt Lake Bemidji	▶ The Charles Babbage Institute: An Overview of its Resources for CS Education Jeffrey R. Yost, <i>Charles Babbage Institute and University of Minnesota</i>	Archives in STEM Education Amanda Wick, <i>Charles Babbage Institute and University of Minnesota</i>	The SIGCSE Story – Getting the Scoop Barbara Boucher Owens, <i>Southwestern University</i> ; Vicki Almstrom, <i>Texas State University</i>

Panel & Special Sessions • 1:45 pm - 3:00 pm

Panel Session Room: Hyatt Northstar B	Wrestling with Retention in the CS Major: Report from the ACM Retention Committee Alison Derbenwick Miller, <i>Oracle</i> ; Christine Alvarado, <i>University of California, San Diego</i> ; Mehran Sahami, <i>Stanford University</i> ; Elsa Villa, <i>University of Texas at El Paso</i> ; Stuart Zweben, <i>The Ohio State University</i>
Panel Session Room: Hyatt Regency	Why and How to Spend a Sabbatical in Industry Ryan McFall, <i>Hope College</i> ; Zachary Kurmas, <i>Grand Valley State University</i> ; Phillip T. Conrad, <i>University of California, Santa Barbara</i> ; Dennis Frailey, <i>Raytheon Company (Retired)</i> , <i>University of Texas at Arlington</i>
Special Session Room: Hyatt Greenway F/G	ACM Code of Ethics: Looking Back and Forging Ahead Marty J. Wolf, <i>Bemidji State University</i> ; Don Gotterbarn, <i>East Tennessee State University</i> ; Michael S. Kirkpatrick, <i>James Madison University</i>
Panel Session Room: Hyatt Greenway H/I	Computing Curricula 2020: Introduction and Community Engagement Alison Clear, <i>Eastern Institute of Technology</i> ; Allen S. Parrish, <i>Mississippi State University</i> ; John Impagliazzo, <i>Hofstra University</i> ; Ming Zhang, <i>Peking University</i>
Special Session Room: Hyatt Northstar A	Leading Conversations about Microaggressions, Bias, and Other Difficult Topics Colleen M. Lewis, <i>Harvey Mudd College</i> ; Wendy M. DuBow, <i>University of Colorado Boulder</i> ; Kyla McMullen, <i>University of Florida</i>

FRIDAY, MARCH 1

SIGCSE@50 and Supporter Sessions • 1:45 pm - 3:00 pm

SIGCSE@50: CS0 Chair: Leigh Ann DeLyser, <i>CSforALL</i> Room: <i>Hyatt Great Lakes A1 & A2</i>	1:45 pm - 2:10 pm Punch Cards to Python: A Case Study of a CS0 Core Course Thomas Babbitt, Charles Schooler, Kyle King, <i>United States Military Academy</i> 2:10 pm - 3:00 pm Discussion Victoria Eisele, <i>Front Range Community College</i> ; Daniel D. Garcia, <i>University of California, Berkley</i> ; Henry M. Walker, <i>Grinnell College</i>
Microsoft Supporter Session Room: Hyatt Lakeshore A	Microsoft MakeCode Arcade (See page 48 for abstract) Jacqueline Russell, <i>Microsoft Corporation</i>
CODIO Supporter Session Room: Hyatt Lakeshore B	A Powerful, Flexible Platform for Instructors to Deliver and Assess Student Learning Experiences (See page 48 for abstract) Elise Deitrick, <i>Codio</i>

Break, Exhibits & NSF Showcase • 3:00 pm - 3:45 pm

3:00 pm - 3:45 pm Room: Hyatt Exhibit Hall	Break & Exhibits
	NSF Showcase #4 (See page 58 for complete listing of NSF Showcases)

Demo Session • 3:00 pm - 3:45 pm

3:00 pm - 3:45 pm Room: Hyatt Exhibit Hall	Demo Session #4: Chairs: Lina Battestilli, <i>North Carolina State University</i> ; Peter-Michael Osera, <i>Grinnell College</i> Code Defenders: A Mutation Testing Game Gordon Fraser, <i>University of Passau</i> An Interactive, Graphical Simulator for Teaching Operating Systems Joshua W. Buck, Saverio Perugini, <i>University of Dayton</i>
---	--

Poster Session • 3:00 pm - 5:00 pm

3:00 pm - 5:00 pm Room: Hyatt Exhibit Hall	Poster Session #2 (See pages 53-56 for complete listing Posters) Chairs: Laurence D. Merkle, <i>Air Force Institute of Technology</i> ; S. Monisha Pulimood, <i>The College of New Jersey</i>
---	---

Paper Sessions • 3:45 pm - 5:00 pm

PAPER SESSIONS	3:45 PM	4:10 PM	4:35 PM
Physical Computing ► Chair: Barbara Anthony, <i>Southwestern University</i> Room: <i>Hyatt Greenway A</i>	Designing a Middle School Science Curriculum That Integrates Computational Thinking and Sensor Technology Alexandra Gendreau Chakarov, <i>University of Colorado Boulder</i> ; Mimi Recker, <i>Utah State University</i> ; Jennifer Jacobs, Katie Van Horne, Tamara Sumner, <i>University of Colorado Boulder</i>	One Size Fits All: Designing for Socialization in Physical Computing Gabriella Anton, Uri Wilensky, <i>Northwestern University</i>	CS0: Introducing Computing with Raspberry Pis Brian Krupp, Andrew Watkins, <i>Baldwin Wallace University</i>

FRIDAY, MARCH 1

Paper Sessions • 3:45 pm - 5:00 pm

PAPER SESSIONS	3:45 PM	4:10 PM	4:35 PM
Professional Skills Chair: Victoria Hong, <i>St. Joseph's College</i> Room: <i>Hyatt Greenway J</i>	<p>Usage of Hints on Coding-Based Summative Assessments Jennifer K. Olsen, <i>École Polytechnique Fédérale de Lausanne</i>; Armando Fox; <i>University of California, Berkeley</i></p>	<p>A Collaborative Practicum Targeting Communication Skills for Computer Science Researchers Lori Pollock, <i>University of Delaware</i></p>	<p>Understanding CS Undergraduate Students' Professional Development through the Lens of Internship Experiences Amanpreet Kapoor, Christina Gardner-McCune, <i>University of Florida</i></p>
Attitudinal Chair: Bob Edmison, <i>Virginia Tech</i> Room: <i>Hyatt Greenway B/C</i>	<p>Assessing the Attitudes Towards Computing Scale: A Survey Validation Study Dana Wanzer, Tom McKlin, <i>The Findings Group</i>; Doug Edwards, Jason Freeman, Brian Magerko, <i>Georgia Institute of Technology</i></p>	<p>Are You Game?: Assessing Students' Perception of Learning, Instructors' Perspective, and Learning Attitude Hadi Hosseini, Laurel Perweiler, <i>Rochester Institute of Technology</i></p>	<p>Factors That Influence Students' Motivation and Perception of Studying Computer Science Merilin Säde, Reelika Suviste, Piret Luik, Eno Tönnisson, Marina Lepp, <i>University of Tartu</i></p>
Security 2 Chair: Carlos Cabrera, <i>Miami Dade College</i> Room: <i>Hyatt Greenway D/E</i>	<p>Introducing Practical SHA-1 Collisions to the Classroom Monique Mezher, Ahmed Ibrahim, <i>University of Virginia</i></p>	<p>Teaching Cybersecurity with Networked Robots Ákos Lédeczi, Miklós Maróti, Hamid Zare, Bernard Yett, Nicole Hutchins, Brian Broll, Péter Völgyesi, Michael B. Smith, Timothy Darrah, Mary Metelko, Xenofon Koutsoukos, Gautam Biswas, <i>Vanderbilt University</i></p>	<p>Fakesbook: A Social Networking platform for Teaching Security and Privacy Concepts to Secondary School Students Maximilian Zinkus, Oliver Curry, Marina Moore, Zachary Peterson, Zoë J. Wood, <i>California Polytechnic State University, San Luis Obispo</i></p>
Computational Thinking 2 Chair: Meg Ray, <i>Cornell Tech</i> Room: <i>Millennium Grand North</i>	<p>Primary School Teachers' Conceptions of Computational Thinking Megean Garvin, <i>University of Maryland, Baltimore County</i>; Heather Killen, Jandelyn Plane, David Weintrop, <i>University of Maryland, College Park</i></p>	<p>PRADA: A Practical Model for Integrating Computational Thinking in K-12 Education Yihuan Dong, Veronica Catete, <i>North Carolina State University</i>; Robin Jocius, <i>The Citadel</i>; Nicholas Lytle, Tiffany Barnes, <i>North Carolina State University</i>; Jennifer Albert, Deepti Joshi, Richard Robinson, Ashley Andrews, <i>The Citadel</i></p>	<p>Computational Thinking in the Danish High School: Learning Coding, Modeling, and Content Knowledge with NetLogo Line Have Musaeus, Peter Musaeus, <i>Aarhus University</i></p>
Systems Chair: Gursimran S. Walia, <i>North Dakota State University</i> Room: <i>Millennium Grand South</i>	<p>WatDFS: A Project for Understanding Distributed Systems in the Undergraduate Curriculum Michael Abebe, Brad Glasbergen, Khuzaima Daudjee, <i>University of Waterloo</i></p>	<p>Computer Organization and Design Course with FPGA Cloud Ke Zhang, Yisong Chang, Mingsyu Chen, Yungang Bao, Zhiwei Xu, <i>State Key Laboratory of Computer Architecture, ICT, CAS; University of Chinese Academy of Sciences</i></p>	<p>3rd BEST PAPER Experience Reports and Tools</p> <p>Visualizing Classic Synchronization Problems: Dining Philosophers, Producers-Consumers, and Readers-Writers Joel C. Adams, Elizabeth R. Koning, <i>Calvin College</i>; Christiaan D. Hazlett, <i>University of Illinois at Urbana-Champaign</i></p>

FRIDAY, MARCH 1

Paper Sessions • 3:45 pm - 5:00 pm

PAPER SESSIONS	3:45 PM	4:10 PM	4:35 PM
CS1 2 Chair: Ria Galanos, <i>Thomas Jefferson High School for Science & Technology</i> Room: Millennium Grand Central	<p>Up or Down? An Insight Into Programmer's Acquisition of Iteration Skills Cruz Izu, Cheryl Pope, Amali Weerasinghe, <i>University of Adelaide</i></p>	<p>Can You Teach Me To Machine Learn?: An Exploration of Pedagogical Content Knowledge for Teaching Machine Learning to Non-Majors Elisabeth Sulmont, Elizabeth Patitsas, Jeremy R. Cooperstock, <i>McGill University</i></p>	<p>Self-paced Mastery Learning CS1 Jennifer Campbell, <i>University of Toronto</i>; Andrew Petersen, <i>University of Toronto Mississauga</i>; Jacqueline Smith, <i>University of Toronto</i></p>
Sister Session TOCE #2 Chair: Chris Hundhausen, <i>Washington State University</i> Room: Hyatt Lake Bemidji	<p>Students' Experience of Participation in a Discipline – A Longitudinal Study of Computer Science and IT Engineering Students Anne-Kathrin Peters, <i>Uppsala University</i></p>	<p>Classroom-based Research Projects for Computing Teachers: Facilitating Professional Learning Sue Sentance, <i>King's College</i>; Jane Sinclair, <i>University of Warwick, Coventry</i>; Carl Simmons, <i>Edge Hill University, Ormskirk</i>; Andrew Csizmadia, <i>Newman University, Birmingham</i></p>	<p>Taking a Studio Course in Distributed Software Engineering from a Large Local Cohort to a Small Global Cohort William Billingsley, Rosemary Torbay, Peter R. Fletcher, <i>University of New England, Armidale</i>; Richard N. Thomas, Jim R. H. Steel, Jörn Guy Süß, <i>The University of Queensland, St Lucia</i></p>

Panel, Special, SIGCSE@50 and Supporter Sessions • 3:45 pm - 5:00 pm

Panel Session Room: Hyatt Northstar B	<p>Community College Transfer Pathways Jeffrey Forbes, <i>Duke University</i>; Jumee Song, <i>Siegel Family Endowment</i>; Louise Ann Lyon, <i>Education, Training, and Research</i>; Leslie Maxwell, <i>California State University, Monterey Bay</i>; Cindy S. Tucker, <i>Bluegrass Community and Technical College</i></p>
Special Session Room: Hyatt Northstar A	<p>Microteaching: Recursion, Coding Style, Creative Coding, Inheritance and Polymorphism, Loops, and the Internet Colleen M. Lewis, <i>Harvey Mudd College</i>; Daniel D. Garcia, <i>University of California, Berkeley</i>, Helen H. Hu, <i>Westminster College</i>; Saber Khan, <i>Packer Collegiate Institute & Processing Foundation</i>; Nigamanth Sridhar, <i>Cleveland State University</i>; Bryan Twarek, <i>San Francisco Unified School District</i>; Chinma Uche, <i>Academy of Aerospace and Engineering</i></p>
Special Session Room: Hyatt Regency	<p>Curious about Student Participation in Humanitarian Open Source Software? Darcy Burdge, <i>Nassau Community College</i>; Gregory W. Hislop, <i>Drexel University</i>; Grant Braught, <i>Dickinson College</i>; Josh Dehlinger, <i>Towson University</i>; Christian Murphy, <i>University of Pennsylvania</i>; Joanna Klukowska, <i>Courant Institute, NYU</i>; Lynn Lambert, <i>Christopher Newport University</i>; Patricia Ordóñez, <i>University of Puerto Rico, Rio Piedras</i>; Karl R. Wurst, <i>Worcester State University</i></p>
SIGCSE@50: Broadening Participation Chair: Alison Derbenwick Miller, <i>Oracle</i> Room: Hyatt Great Lakes A1 & A2	<p>3:45 pm - 4:10 pm “You Don’t Have to Be a White Male That Was Learning How to Program Since He Was Five:” Computer Use and Interest From Childhood to a Computing Degree Mathilde Collain, Deborah Trytten, <i>University of Oklahoma</i></p> <hr/> <p>4:10 pm - 5:00 pm Discussion Owen Astrachan, <i>Duke University</i>; Lecia Barker, <i>University of Colorado Boulder</i>; Barbara Ericson, <i>University of Michigan</i></p>
GitHub Supporter Session Room: Hyatt Lakeshore B	<p>## CS50’s GitHub-Based Tools for Teaching and Learning (See page 48 for abstract) David J. Malan, Brian Yu, Kareem Zidane, <i>Harvard University</i>; Chad Sharp, <i>Michigan University</i>; Vanessa Gennarelli, <i>Github Education</i></p>

FRIDAY, MARCH 1

ACM Student Research Competition • 3:45 pm - 5:00 pm

3:45 pm - 5:00 pm Room: Hyatt Greenway F/G	ACM Student Research Competition - Undergraduate: Final Round (See page 59 for complete ACM Student Research Competition listing) Chairs: Stephen Hughes, <i>Coe College</i> ; Jessica Schmidt, <i>North Carolina State University</i>
3:45 pm - 5:00 pm Room: Hyatt Greenway H/I	ACM Student Research Competition - Graduate: Final Round (See page 59 for complete ACM Student Research Competition listing) Chairs: Stephen Hughes, <i>Coe College</i> ; Jessica Schmidt, <i>North Carolina State University</i>

Friday Evening Events • 5:10 pm - 8:00 pm

5:10 pm - 6:00 pm Room: Hyatt Greenway A	SIGCSE Business Meeting
6:00 pm - 7:00 pm Room: Hyatt Greenway B/C	CCSC Business Meeting
6:00 pm - 7:00 pm Room: Hyatt Northstar Ballroom	NCWIT Reception
7:00 pm - 8:00 pm Room: Hyatt Regency	Community College Reception

Friday Workshops • 7:00 pm - 10:00 pm

Workshop 301 Room: Hyatt Lakeshore B	Adopting, Integrating, and Evaluating Computational Creativity Exercises to Improve Student Learning Leen-Kiat Soh, Markeya S. Peteranetz, <i>University of Nebraska - Lincoln</i>
Workshop 302 Room: Hyatt Lakeshore C	Using Raspberry Pi as a Platform for Teaching Cybersecurity Concepts Andreea Cotoranu, Li-Chiou Chen, <i>Pace University</i>
Workshop 303 Room: Hyatt Greenway A	Using Subgoal Labeling in Teaching CS1 Briana B. Morrison, <i>University of Nebraska Omaha</i> ; Lauren Margulieux, <i>Georgia State University</i> ; Adrienne Decker, <i>University at Buffalo</i>
Workshop 304 Room: Hyatt Greenway B/C	Micro:bit Magic: Engaging K-12, CS1/2, and Non-majors with IoT & Embedded Bill Siever, <i>Washington University in St. Louis</i> ; Michael P. Rogers, <i>Northwest Missouri State University</i>
Workshop 305 Room: Hyatt Greenway D/E	Integrating Agent-based Modeling in STEM Classes: From Blocks to Text and Back? Connor Bain, Gabriella Anton, <i>Northwestern University</i>
Workshop 306 Room: Hyatt Greenway J	SciGirls Code: Creative Robotics for Tween Girls in Out of School Time Joan Freese, <i>Twin Cities PBS</i> ; Heather Benedict, <i>Heather Benedict Consulting</i> ; Sarah Carter, Katie Hessen, Rita Karl, <i>Twin Cities PBS</i> ; Karen Peterson, <i>National Girls Collaborative</i> ; Cassandra Scharber, <i>University of Minnesota</i>
Workshop 307 Room: Hyatt Greenway F/G	Competency-Based Education: The Future of Learning Amardeep Kahlon, Ann Kennedy, Linda Smarzik, <i>Austin Community College</i>
Workshop 308 Room: Hyatt Greenway H/I	Playing with and Creating Practice Spaces for Equitable Teaching Joshua Littenberg-Tobias, Amanda Aparicio, Justin Reich, <i>Massachusetts Institute of Technology</i>
Workshop 309 Room: Hyatt Great Lakes A1 & A2	Code Crafters Curriculum: A Textile Crafts Approach to Computer Science Ursula Wolz, <i>Bennington College</i> ; Seoyeon (Stella) Lee, <i>Grinnell College</i> ; James Mulligan, Paulina Valdivieso, <i>Bennington College</i>
Workshop 310 Room: Hyatt Lake Bemidji	Make and Take an Ethics Module: Ethics Across the CS Curriculum Darakhshan J. Mir, <i>Bucknell University</i> ; Iris Howley, <i>Williams College</i> ; Janet Davis, <i>Whitman College</i> ; Evan Peck, <i>Bucknell University</i> ; Deborah Tatar, <i>Virginia Tech</i>

For a full list of workshops and descriptions visit: <http://sigcse2019.sigcse.org/attendees/workshops.html>

Inspire. Create. Innovate.



Looking for inspiring, hands-on resources to teach computer science? Oracle Academy is dedicated to advancing computing education globally to increase knowledge, innovation, skills development, and diversity in technology fields. We offer software, curriculum, hosted technology, faculty trainings, support, and resources—all at no cost.

Engage, inspire and prepare students to become tomorrow's innovators and leaders and achieve their dreams.

Learn more and join at academy.oracle.com.

SIGCSE Gold Sponsor | Come visit us at Booth 326!

CONNECT WITH US

 twitter.com/oracleacademy  instagram.com/oracleacademy  facebook.com/oracleacademy  academy.oracle.com

SATURDAY, MARCH 2

Saturday Morning Event • 7:00 am - 8:15 am

7:00 am - 8:15 am Room: Hyatt Regency	Community College Breakfast
--	-----------------------------

KEYNOTE SESSION

8:15 am - 9:30 am Room: Hyatt Nicollet Grand Ballroom	General Information Elizabeth K. Hawthorne, <i>Union County College</i> ; Manuel A. Pérez-Quiñones, <i>University of North Carolina at Charlotte</i> CLOSING KEYNOTE: Cybersecurity is Not a Fad: Why Cyber is a Game Changer for Computer Science Education Dr. Blair Taylor, <i>Towson University</i>
---	--

Paper Sessions • 9:45 am - 10:35 am

PAPER SESSIONS	9:45 AM	10:10 AM
Professional Development 1 Chair: Diana Cukierman, <i>Simon Fraser University</i> Room: Hyatt Greenway A	Assessing In-service Teachers' Development of Computational Thinking Practices in Teacher Development Courses Siu-Cheung Kong, <i>The Education University of Hong Kong</i> ; Andrew Chan-Chio Lao, <i>University of Macau</i>	Teaching Accessibility: A Design Exploration of Faculty Professional Development at Scale Saba Kawas, Laura Vonessen, <i>University of Washington-Seattle</i> ; Andrew J. Ko, <i>University of Washington</i>
REU Chair: Aarathi Prasad, <i>Skidmore College</i> Room: Hyatt Greenway J	Utilizing the Affinity Research Group Model in a Summer Research Experience for Undergraduates Program Ben Jelen, <i>Indiana University</i> ; Julia Dunbar, <i>University of Washington</i> ; Susan Monsey <i>Indiana University</i> ; Olivia K. Richards, <i>Pennsylvania State University</i> ; Katie A. Siek, <i>Indiana University</i>	Hello Research! Developing an Intensive Research Experience for Undergraduate Women Suzanne Menzel, Katie A. Siek, David Crandall, <i>Indiana University</i>
Expectations Chair: Brian Harrington, <i>University of Toronto Scarborough</i> Room: Hyatt Greenway B/C	Collaboration Versus Cheating: Reducing Code Plagiarism in an Online MS Computer Science Program Tony Mason, Ada Gavrilovska, David A. Joyner, <i>Georgia Institute of Technology</i>	What Do CS1 Syllabi Reveal About Our Expectations of Introductory Programming Students? Brett A. Becker, Thomas Fitzpatrick, <i>University College Dublin</i>
Outreach Chair: Alison Clear, <i>Eastern Institute of Technology</i> Room: Hyatt Greenway D/E	Computational Thinking Bins: Outreach and More Briana B. Morrison, Brian Dorn, Michelle Friend, <i>University of Nebraska Omaha</i>	Applying Self-Determination Theory towards Motivating Young Women in Computer Science Allison Mishkin, <i>University of Oxford</i>

SATURDAY, MARCH 2

Paper Sessions • 9:45 am - 10:35 am

PAPER SESSIONS	9:45 AM	10:10 AM
Theory & Math ► Chair: Shannon Reckinger, <i>University of Illinois Chicago</i> Room: Millennium Grand North	A Survey-based Exploration of Computer Science Student Perspectives on Mathematics Nikki Sigurdson, Andrew Petersen, <i>University of Toronto</i> <i>Mississauga</i>	Impact of Steps, Instruction, and Motivation on Learning Symbolic Reasoning Using an Online Tool Megan Fowler, Michelle Cook, Kevin Plis, Tim Schwab, Yu-Shan Sun, Murali Sitaraman, <i>Clemson</i> <i>University</i> ; Jason O. Hallstrom, <i>Florida Atlantic University</i> ; Joseph E. Hollingsworth, <i>Rose-Hulman</i> <i>Institute of Technology</i>
Pair Programming ► Chair: Juan Chen, <i>National</i> <i>University of Defense</i> <i>Technology</i> Room: Millennium Grand South	Hybrid Pair Programming - A Promising Alternative to Standard Pair Programming Hans Yuan, Yingjun Cao, <i>University of California, San</i> <i>Diego</i>	In Their Own Words: Gender Differences in Student Perceptions of Pair Programming Kimberly Michelle Ying, Lydia G. Pezzullo, Mohona Ahmed, Kassandra Crompton, Jeremiah Blanchard, Kristy Elizabeth Boyer, <i>University of Florida</i>
CSP ► Chair: Joshua Elder, <i>CSforALL</i> Room: Millennium Grand Central	AP Computer Science Principles' Impact on the Landscape of High School Computer Science using Maryland as a Model Heather Killen, <i>University of</i> <i>Maryland, College Park</i> ; David Weintrop, <i>University of Maryland</i> ; Megean Garvin, <i>University of</i> <i>Maryland, Baltimore County</i>	An Examination of the Correlation of Exploring Computer Science Course Performance and the Development of Programming Expertise Steven McGee, <i>The Learning</i> <i>Partnership</i> ; Ronald I. Greenberg, <i>Loyola University</i> ; Randi McGee- Tekula, Jennifer Duck, <i>The</i> <i>Learning Partnership</i> ; Andrew M. Rasmussen, Lucia Dettori, <i>Chicago</i> <i>Public Schools</i> ; Dale F. Reed, <i>University of Illinois at Chicago</i>

SIGCSE@50 & Supporter Sessions • 9:45 am - 10:35 am

SIGCSE@50: Historical Perspectives Room: Hyatt Great Lakes A1 & A2	9:45 am - 10:10 am The History of the SIGCSE Submission and Review Software: From Paper to the Cloud? Henry M. Walker, <i>Grinnell College</i> ; John F. Dooley, <i>Knox College</i> 10:10 am - 10:35 am Discussion Author(s) of the Top SIGCSE Technical Symposium Paper of All Time
Gradescope by Turnitin Supporter Session Room: Hyatt Lakeshore A	One Platform for Paper, Online, and Programming Assignments (See page 48 for abstract) Ibrahim Awwal, <i>Gradescope</i>

SATURDAY, MARCH 2

Demos & Lightning Talks • 9:45 am - 10:35 am

9:45 am - 10:35 am Room: Hyatt Greenway F/G Room: Hyatt Greenway H/I Room: Hyatt Northstar A	Demo Session #5: Chairs: Lina Battestilli, <i>North Carolina State University</i> ; Peter-Michael Osera, <i>Grinnell College</i> NetsBlox and Wireless Robots Make Cybersecurity Fun Ákos Lédeczi, Hamid Zare, Gordon Stein, <i>Vanderbilt University</i> Blocks4All: Making Blocks-Based Programming Languages Accessible for Children with Visual Impairments Lauren R. Milne, <i>Macalester College</i> ; Richard E. Ladner, <i>University of Washington</i> CodeBuddy (Collaborative Software Development Environment): In-and Out-Class Practice for Remote Pair-Programming with Monitoring Coding Students' Progress Teerapong Leelanupab, Tiwipab Meephruet, <i>King Mongkut's Institute of Technology Ladkrabang</i>
9:45 am - 10:35 am Room: Hyatt Lake Bemidji	Lightning Talks #2 (See page 60 for complete listing of Lightning Talks) Chairs: Lina Battestilli, <i>North Carolina State University</i> ; Peter-Michael Osera, <i>Grinnell College</i>

Break, Exhibits & NSF Showcase • 10:35 am - 11:15 am

10:35 am - 11:15 am Room: Hyatt Exhibit Hall	Break & Exhibits
	NSF Showcase #5 (See page 58 for complete listing of NSF Showcases)

Poster Session • 10:35 am - 12:30 pm

10:35 am - 12:30 pm Room: Hyatt Exhibit Hall	Poster Session #3 (See pages 53-56 for complete listing of Posters) Laurence D. Merkle, <i>Air Force Institute of Technology</i> ; S. Monisha Pulimood, <i>The College of New Jersey</i>
---	--

Paper Sessions • 11:15 am - 12:30 pm

PAPER SESSIONS	11:15 AM	11:40 AM	12:05 PM
Professional Development 2 Chair: Valerie Summet, <i>Rollins College</i> Room: Hyatt Greenway A	<p>“I Impressed Myself With How Confident I Felt”: Reflections on a Computer Science Assessment for K-8 Teachers Hannah E. Chipman, <i>Rhodes College</i>; Fernando J. Rodríguez, Kristy Elizabeth Boyer, <i>University of Florida</i></p>	<p>Reflective Diary for Professional Development of Novice Teachers Martin Ukrop, Valdemar Švábenský, Jan Nehyba, <i>Masaryk University</i></p>	<p>Helping K-12 Teachers Get Unstuck with Scratch: The Design of an Online Professional Learning Experience Paulina Haduong, Karen Brennan, <i>Harvard Graduate School of Education</i></p>
Mentorship Chair: Janet Davis, <i>Whitman College</i> Room: Hyatt Greenway J	<p>Perfect Match: Facilitating Study Partner Matching Tam Nguyen Thanh, Michael Morgan, Matthew Butler, Kim Marriott, <i>Monash University</i></p>	<p>A Structured Mentorship Model for Computer Science University Students in Kenya Chao Mbogo, <i>Kenya Methodist University</i></p>	<p>2nd BEST PAPER Curricula Initiatives A Flexible Curriculum for Promoting Inclusion Through Peer Mentorship Heather Pon-Barry, Audrey St. John, Becky Wai-Ling Packard, Barbara Rotundo, <i>Mount Holyoke College</i></p>

SATURDAY, MARCH 2

Paper Sessions • 11:15 am - 12:30 pm

PAPER SESSIONS	11:15 AM	11:40 AM	12:05 PM
Engagement Chair: Gloria Washington, <i>Howard University</i> Room: Hyatt Greenway B/C	<p>Student Engagement is Key to Broadening Participation in CS</p> <p>Beryl Hoffman, <i>Elms College</i>; Ralph Morelli, <i>Trinity College</i>; Jennifer Rosato, <i>College of St. Scholastica</i></p>	<p>Evaluating the Impact of Combination of Engagement Strategies in SEP-CyLE to Improve Student Learning of Programming Concepts</p> <p>Mourya Reddy Narasareddygari, Gursimran S. Walia, <i>North Dakota State University</i>; Debra M. Duke, <i>Virginia Commonwealth University</i>; Vijayalakshmi Ramasamy, James Kiper, <i>Miami University</i>; Debra Lee Davis, <i>Florida International University</i>; Andrew A. Allen, <i>Georgia Southern University</i>; Hakam W. Alomari, <i>Miami University</i></p>	<p>Non-Programming Activities for Engagement with Foundational Concepts in Introductory Programming</p> <p>Shuchi Grover, <i>Looking Glass Ventures, LLC.</i>; Patrik Lundh, Nicholas Jackiw, <i>SRI International</i></p>
Access Chair: Jennifer Parham-Mocello, <i>Oregon State University</i> Room: Hyatt Greenway D/E	<p>A Teacher Workshop for Introducing Computational Thinking in Rural and Vulnerable Environments</p> <p>Jocelyn Simmonds, Francisco J. Gutierrez, Cecilia Casanova, Cecilia Sotomayor, Nancy Hitschfeld, <i>University of Chile</i></p>	<p>An Analysis through an Equity Lens of the Implementation of Computer Science in K-8 Classrooms in a Large, Urban School District</p> <p>Jean Salac, Max White, Ashley Wang, Diana Franklin, <i>The University of Chicago</i></p>	<p>Increasing Capacity for Computer Science Education in Rural Areas through a Large-Scale Collective Impact Model</p> <p>Jayne R. Warner, Carol L. Fletcher, Ryan Torbey, Lisa S. Garbrecht, <i>University of Texas at Austin</i></p>
Culture & Language Chair: Andrew J. Ko, <i>University of Washington</i> Room: Millennium: Grand North	<p>The Role of Translanguaging in Computational Literacies: Documenting Middle School Bilinguals' Practices in Computer Science Integrated Units</p> <p>Sara Vogel, <i>The Graduate Center, City University of New York</i>; Christopher Hoadley, <i>New York University</i>; Laura Ascenzi-Moreno, <i>Brooklyn College, City University of New York</i>; Kate Menken, <i>Queens College & The Graduate Center, CUNY</i></p>	<p>A Cultural Computing Curriculum</p> <p>James Davis, <i>Rensselaer Polytechnic Institute</i>; Michael Lachney, <i>Michigan State University</i>; Zoe Zatz, William Babbitt, <i>Rensselaer Polytechnic Institute</i>; Ron Eglash, <i>University of Michigan</i></p>	<p>Stitching the Loop with Electronic Textiles</p> <p>Yasmin B. Kafai, <i>University of Pennsylvania</i>; Deborah A. Fields, <i>Utah State University</i>; Debora A. Lui, Justice T. Walker, Mia S. Shaw, Gayithri Jayathirtha, <i>University of Pennsylvania</i>; Tomoko M. Nakajima, <i>University of California, Los Angeles</i>; Joanna Goode, <i>University of Oregon</i>; Michael T. Giang, <i>California State Polytechnic University, Pomona</i></p>
Inclusion Chair: Durga Suresh-Menon, <i>Wentworth Institute of Technology</i> Room: Millennium Grand South	<p>How Faculty Negotiate "Inclusive Educational Practice" in Computer Science</p> <p>Heather Thiry, <i>Golden Evaluation</i>; Sarah Hug, <i>Colorado Evaluation & Research Consulting</i></p>	<p>Infusing Cooperative Learning into AP Computer Science Principles Courses to Promote Engagement and Diversity</p> <p>Jeff Gray, <i>University of Alabama</i>; Kathy Haynie, <i>Haynie Research and Evaluation</i>; Fran Trees, <i>Rutgers University</i>; Owen Astrachan, <i>Duke University</i>; Chinma Uche, <i>Academy of Aerospace and Engineering</i>; Richard Kick, <i>Newbury Park High School</i>; Siobhan Cooney, <i>Cooney Collaborative</i></p>	<p>Computer Science Educators Stack Exchange: Perceptions of Equity and Gender Diversity in Computer Science</p> <p>Sukanya Kannan Moudgalaya, Kathryn M. Rich, Aman Yadav, Matthew J. Koehler, <i>Michigan State University</i></p>

SATURDAY, MARCH 2

Paper Sessions • 11:15 am - 12:30 pm

PAPER SESSIONS	11:15 AM	11:40 AM	12:05 PM
Blocks ► Chair: Denise Case, <i>Northwest Missouri State University</i> Room: <i>Millennium Grand Central</i>	Defining Tinkering Behavior in Open-ended Block-based Programming Assignments Yihuan Dong, Samiha Marwan, Veronica Catete, Thomas W. Price, Tiffany Barnes, <i>North Carolina State University</i>	Using Rubrics Integrating Design and Coding to Assess Middle School Students' Open-ended Block-based Programming Projects Satabdi Basu, <i>SRI International</i>	Block-based Comprehension: Exploring and Explaining Student Outcomes from a Read-only Block-based Exam David Weintrop, <i>University of Maryland</i> ; Heather Killen, <i>University of Maryland, College Park</i> ; Talal Munzar, <i>University of Maryland</i> ; Baker Franke, <i>Code.org</i>
Sister Session SIGCAS: Values in Internet Security: Design and Governance ► Chair: Alyssa Moore, <i>Canadian Internet Registration Authority</i> ; Bradley Fidler, <i>Stevens Institute of Technology</i> Room: <i>Hyatt Lake Bemidji</i>	Rethinking Values in the Design of Security Technologies Farzaneh Badiei, <i>Georgia Institute of Technology</i>	Computer and Network Security: Understanding Communities of Ethical Research Practice Quinn DuPont, Megan Finn, <i>University of Washington</i>	The Politics Behind Internet Routing Security and Insecurity Bradley Fidler, <i>Stevens Institute of Technology</i>

Nifty Assignments • 11:15 am - 12:30 pm

Room: Hyatt Northstar A 11:15 am - 11:27 am 11:27 am - 11:39 am 11:39 am - 11:51 am 11:51 am - 12:03 pm 12:03 pm - 12:15 pm 12:15 pm - 12:27 pm	Nifty Assignments Chairs: Nick Parlante, Julie Zelenski, <i>Stanford University</i> Nifty #1: Post-It Pandemonium Jeffrey L. Popyack, <i>Drexel University</i> Nifty #2: Hawaiian Word Phonetic Generator Kendall Bingham, <i>University of Missouri-Kansas City</i> Nifty #3: Motion Parallax Benjamin Dicken, <i>University of Arizona</i> Nifty #4: CS1/2 Assignment: Computing Gerrymandering Allison Obourn, <i>University of Arizona</i> Nifty #5: Code Crusher Ben Stephenson, <i>University of Calgary</i> Nifty #6: Blocky Diane Horton, David Liu, <i>University of Toronto</i>
---	---

Panel and Special Sessions • 11:15 am - 12:30 pm

Panel Session Room: <i>Hyatt Regency</i>	Making K-12 CS Education Accessibility a Norm, not an Exception Maya Israel, <i>University of Florida</i> ; Shireen Hafeez, <i>Deaf Kids Code</i> ; Emmanuel Schanzer, <i>Bootstrap/Brown University</i> ; Rebecca Dovi, <i>CodeVA</i> ; Emma Koslow, <i>Programming Pals</i> ; Todd Lash, <i>University of Illinois at Urbana-Champaign</i>
Special Session Room: <i>Hyatt Greenway F/G</i>	Women and Girls of Color in Computing: Exploring Current Trends, Emerging Opportunities, and Strategies for Meaningful Impact Frieda McAlear, Allison Scott, <i>Kapor Center</i> ; Kimberly Scott, <i>Arizona State University</i> ; Jamika D. Burge, <i>black computHER</i> ; Sonia Koshy, <i>Kapor Center</i>
Special Session Room: <i>Hyatt Greenway H/I</i>	Demystifying Language about Students' Varied Identities Jason T. Black, <i>Florida A&M University</i> ; Kamau Bobb, <i>Georgia Tech</i> ; April Browne, <i>Butte College</i> ; Phillip T. Conrad, <i>University of California, Santa Barbara</i> ; Colleen M. Lewis, <i>Harvey Mudd College</i> ; Cheryl A. Swanier, <i>Claflin University</i> ; Sheila Tejada, <i>University of Southern California</i>

SATURDAY, MARCH 2

Lunch & Closing Ceremonies • 12:30 pm - 2:00 pm

12:30 pm - 2:00 pm Room: Hyatt Nicollet Grand Ballroom	Lunch & Closing Ceremonies Elizabeth K. Hawthorne, <i>Union County College</i> ; Manuel A. Pérez-Quiñones, <i>University of North Carolina at Charlotte</i> ; Jian Zhang, <i>Texas Woman's University</i> ; Mark Sherriff, <i>University of Virginia</i> ; Sarah Heckman, <i>North Carolina State University</i> ; Alvaro Monge, <i>California State University, Long Beach</i> ; Pamela Cutter, <i>Kalamazoo College</i>
--	---

Saturday Workshops • 3:00 pm - 6:00 pm

Workshop 401 Room: Hyatt Lakeshore A	Using and Customizing Open-Source Runestone Ebooks for Computer Science Classes Barbara Ericson, Jaclyn Cohen, <i>University of Michigan</i> ; Brad Miller, <i>Runestone Interactive, LLC</i>
Workshop 402 Room: Hyatt Lakeshore B	To Dissemination... And Beyond!: Building Better Propagation Plans for Computer Science Education Innovations Christopher Lynly Hovey, <i>University of Colorado Boulder</i> ; Cynthia Taylor, <i>Oberlin College</i> ; Heather Bort, <i>Marquette University</i> ; David P. Bunde, <i>Knox College</i> ; Zack Butler, <i>Rochester Institute of Technology</i>
Workshop 403 Room: Hyatt Lakeshore C	Architecting Serverless Microservices on the Cloud with AWS Ariel Ortiz, <i>Tecnológico de Monterrey, Campus Estado de México</i>
Workshop 404 Room: Hyatt Greenway A	NSF Interactive Discussion: Computer Science Undergraduate Education in 2026 and Beyond Stephanie E. August, <i>National Science Foundation & Loyola Marymount University</i> ; Alexandra Medina-Borja, Mark Pauley, Michael M. Rook, <i>National Science Foundation</i>
Workshop 405 Room: Hyatt Greenway B/C	CyberPaths: Cyber Security Labs for Liberal Arts Institutions Using the NSF Global Environment for Network Innovations (GENI) Xenia Mountrouidou, <i>College of Charleston</i> ; Vicraj Thomas, <i>Architecture Technology Corporation</i>
Workshop 406 Room: Hyatt Greenway D/E	Modernizing Early CS Courses with Parallel and Distributed Computing Sushil Prasad, <i>Georgia State University</i> ; Sheikh Ghafoor, <i>Tennessee Technical University</i> ; Charles Weems, <i>University of Massachusetts Amherst</i> ; Alan Sussman, <i>University of Maryland</i>
Workshop 407 Room: Hyatt Greenway J	An Afternoon with an AP Computer Science A Exam Reader Ria Galanos, <i>Thomas Jefferson High School for Science & Technology</i> ; Timothy Gallagher, <i>Winter Springs High School</i> ; Briana B. Morrison, <i>University of Nebraska Omaha</i>
Workshop 408 Room: Hyatt Greenway H/I	Interactive Programming Environments for Teachers and Students David J. Malan, Doug Lloyd, Kareem Zidane, <i>Harvard University</i>
Workshop 409 Room: Hyatt Greenway F/G	Big Data Analytics with Spark Mark C. Lewis, <i>Trinity University</i>
Workshop 410 Room: Hyatt Northstar A	Booting Into AI: Startup Instructions for Teaching Artificial Intelligence Brian K. Hare, <i>University of Missouri-Kansas City</i> ; David Heise, <i>Lincoln University of Missouri</i>

For a full list of workshops and descriptions visit: <http://sigcse2019.sigcse.org/attendees/workshops.html>

HOMEWORK PROGRAM AUTO-CHECKING MADE EASY ... *REAL EASY*

1

Assemble your ingredients:

- provide instructions for students

Write a program that ...

- supply at least one solution

import java.io.; ...*

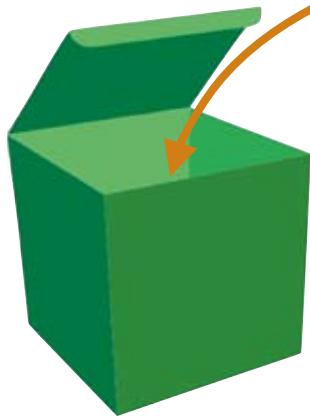
- specify the input for at least one test case

4 87.5 69.0 98.5 78.0

2

Pour Into CodeLab:

copy-paste into a web form



3

That's it! There's no step 3 –
CodeLab does the rest.



An ON-LINE, AUTO-CHECKED Homework Program:

- Command-line interface specs automatically generated
- Easy to understand feedback diagnostics for students
- Gradebook and LMS (Canvas, Moodle) integration
- Plagiarism checking
- Support for instructor comments, including scoring and communication with students

For More Details:

Come to our supporter session, Thursday 1:45pm, Room: Lakeshore A

OR

Drop by our booth (329)

OR

Email: arnow@turingscraft.com

Turing's Craft, the company behind CodeLab and MyProgrammingLab – offers hundreds of online, instant feedback coding exercises in each of Java, C++, C, C#, VB, Javascript, Python.

To date, over 140 million student code submissions have been checked. With plagiarism checking, LMS integrations, easier-than-ever customization tools, and an attractive introductory adoption discount, there's never been a better time for trying us out (www.turingscraft.com).



SUPPORTER SESSIONS

WEDNESDAY, FEBRUARY 27

Presented courtesy of Google

Integrating Cloud Computing into the Computer Science Curriculum: Beginner Level

- ▶ 8:30 am - 5:00 pm
Room: Hyatt Lakeshore A

Cloud computing makes a wide variety of computing resources available to every student. In this workshop, faculty will have the opportunity to get hands-on experience with a variety of cloud technologies, from Infrastructure as a Service launching a Virtual Machine in the cloud to Software as a Service, using pre-trained Machine Learning Models. Participants will have the opportunity to discuss how these can be used in classes. No previous cloud experience is assumed. This workshop will be coordinated with the Experienced-level workshop so participants can move to it if those sessions are more appropriate for their needs. Examples will be drawn from a variety of courses.

Presented courtesy of Google

Integrating Cloud Computing into the Computer Science Curriculum: Advanced Topics

- ▶ 8:30 am - 5:00 pm
Room: Hyatt Lakeshore B

Cloud computing makes a wide variety of computing resources available to every student. In this workshop, faculty will have the opportunity to get hands-on experience with a variety of cloud technologies, from Infrastructure as a Service launching a Virtual Machine in the cloud to Software as a Service, using pre-trained Machine Learning Models. Participants will have the opportunity to discuss how these can be used in classes. This workshop will be coordinated with the Intro-level workshop so participants can move to it if those sessions are more appropriate for their needs. Examples will be drawn from a variety of courses.

THURSDAY, FEBRUARY 28

Presented courtesy of Microsoft

Create Classroom Labs in the Cloud

- ▶ 10:45 am - 12:00 pm
Room: Hyatt Lakeshore A

Presenter: Ji Eun Kwon, *Microsoft Corporation*

Hands-on learning is often the best teacher, especially for computer science students who need exposure to various systems and software. Come join this interactive session to learn how easy it is to create classroom labs in Azure. Azure Lab Services is a service that enables educators to easily create labs of virtual machines in Azure, without having to master the complexities of setting up cloud infrastructure.

As educators, you can specify the exact machine setup you want to roll out to your students. You can spin up/tear down classroom labs on demand. Minimize costs by monitoring and controlling the

usage of the machines. Students go to a single place to access all the virtual machines they are given across multiple labs, and connect from there to do day-to-day work, short-term projects, or classroom exercises.

We will provide live demos and open the room for discussions.

Presented courtesy of Google

Content, Curricula, and Career Readiness: New Offerings from Google

- ▶ 10:45 am - 12:00 pm
Room: Hyatt Lakeshore B

Presenters: Karen Gheno, Emily Kemp, Chris Stephenson, *Google*

This session focuses on three free Google resources to address challenges CS faculty and departments are facing. Attendees will learn about programs and opportunities including Applied Computing Science: our on-campus introductory computer and data science courses and a 10-week immersive machine learning summer program. We will share information on Google's AI-First mission, providing a holistic overview of our strategy to democratize machine learning education for tech and non-tech audiences, and in multiple formats to meet different learning needs. And, we'll describe V3.0 of the Guide for Student Technical Development, including new content on Machine Learning and Computing in the Cloud. And as always, we hope you will come and meet with Googlers and share with us how we can better help you and your students.

Presented courtesy of Turing's Craft, Inc.

Customized Auto-Grading and Homework Project Management with CodeLab

- ▶ 1:45 pm - 3:00 pm
Room: Hyatt Lakeshore A

Presenter: David Arnow, *Brooklyn College*

CodeLab is an online, automated, interactive learning tool for students in programming courses. The CodeLab service provides hundreds of very short, focused coding exercises that help students gain mastery over the syntax, semantics and common usage patterns of language constructs and programming ideas. Code submissions for each exercise are automatically checked for correctness and students are given relevant hints in case of incorrect code.

Building on this platform, Turing's Craft has introduced a highly flexible, comprehensive, easy-to-use system that allows faculty to create their own auto-graded homework programming projects, with support for individualized grading and student-instructor communication. It's easier than ever for instructors to build, assign, establish due dates for, and optionally review any programming assignment. Projects may vary from fragments of code to full programs that involve both interactive and file i/o.

This session completely illustrates the process of creating, deploying, and grading homework projects.

SUPPORTER SESSIONS

THURSDAY, FEBRUARY 28

Presented courtesy of **GitHub**

Get to Near-total Automation with GitHub: Teacher Stories

► 1:45 pm - 3:00 pm

Room: Hyatt Lakeshore B

Presenters: Dan Wallach, *Rice University*; Paul Salvador Inventado, *California State University Fullerton*; Vanessa Gennarelli, *Github Education*

Dan Wallach was looking for a scalable, reliable solution for his course: In 2015 the peak loads from his students' work crashed their campus Subversion server, forcing them to extend their deadlines and ultimately run a private server, requiring significant assistance from Rice's IT group. So he tried GitHub Classroom in 2017, and now uses for his 200-level course at Rice University.

Paul Salvador Inventado has 60 - 120 students per semester at California State University, Fullerton, and that's a lot of checking. Inventado combines the use of a unit-testing framework with GitHub Classroom to automate the automatables: problem assignment, feedback, and checking. His research focuses on problem set generation, unit-testing, and machine learning. He is also a certified GitHub Campus Advisor.

Presented courtesy of **zyBooks**

Is Your CS Course Too Complex? How Are You Handling Growth?

► 3:45 pm - 5:00 pm

Room: Hyatt Lakeshore A

Presenters: Smita Bakshi, *zyBooks*; Frank Vahid, *zybooks/University of California, Riverside*; Roman Lysenky, *zyBooks/University of Arizona*; Alex Edgcomb, *zyBooks/University of California Riverside*.

"Programming is hard, but all the logins are harder" -- Said by a UCR student

Instructors often don't realize how complex CS courses have become ("feature creep"). zyBooks provide an outstanding interactive textbook, auto-grading homework system, and program auto-grader, all seamlessly integrated into ONE platform (with only one login -- or none via LMS integration). That's a key reason nearly all faculty come back, and why students ask to access our zyBooks even if their professor is using a different book. We'll show how our comprehensive solution leads to smooth courses that students love -- even if hard.

"I enjoy grading programs" -- Said by nobody

CS is experiencing explosive growth, which pushes our grading resources to the limit. Auto-grading saves huge amounts of time. Students get more practice and immediate feedback, so they can improve quickly. We've learned how to do auto-grading even better, like with automated hints in homework problems, or using many small programs in CS1. We'll show how easy it is to create auto-graded programming assignments, and tell you about our large set of zyBooks-maintained labs -- so you can focus on the parts of teaching you really enjoy.

Presented courtesy of **Google**

Teaching with the Cloud

► 3:45 pm - 5:00 pm

Room: Hyatt Lakeshore B

Presenter: Laurie White, *Google*

Cloud computing makes many different resources available to students in a variety of courses. Learn from professors who use cloud tools to support their courses in programs from community colleges to PhD programs in both cloud-specific courses and as part of other subject areas. This session will also include a brief overview of the Google Cloud Platform Education and Research Grants program which makes Google's cloud resources free for higher education classroom use in the US, Canada, and numerous countries around the world.

Presented courtesy of **ABET**

Computer Science Accreditation - What You Should Know

► 5:30 pm - 6:20 pm

Room: Hyatt Lakeshore A

Presenters: John K. Estell, *Ohio Northern University*; David S. Gibson, *United States Air Force Academy*; Rajendra Raj, *Rochester Institute of Technology*

This session will describe ABET's recently updated program evaluation criteria for computer science and related programs. Attendees from currently accredited programs will learn about significant changes to ABET's program evaluation criteria impacting computer science program reviews conducted in the 2019-2020 academic year and beyond. Attendees from institutions considering program accreditation will learn about the value of ABET accreditation to schools, students, and employers.

ABET's updated computing criteria reflects recent developments in computing disciplines as reflected in ACM and IEEE Computer Society curriculum guidelines, including the Curriculum Guidelines for Undergraduate Programs in Computer Science (CS2013). While focusing on criteria specific to computer science programs, we will also touch on the changes affecting all computing programs in general. We also will offer advice on transitioning from ABET's current criteria to its new criteria for programs seeking reaccreditation in the next few years.

SUPPORTER SESSIONS

THURSDAY, FEBRUARY 28

Presented courtesy of **Mimir**

How FLCC Uses Mimir Classroom and OER to Improve Course Outcomes

- 5:30 pm - 6:20 pm
Room: Hyatt Lakeshore B

Presenters: Prahasith Veluvolu, *Mimir*; Dave Ghidiu, *Finger Lakes Community College*

Assistant Professor of Computing Sciences, Dave Ghidiu of Finger Lakes Community College (FLCC), has been using Mimir Classroom to automate grading, reduce plagiarism, and efficiently teach computer science. Ghidiu also pairs open educational resources (OER) with Mimir Classroom to improve course outcomes. Since 2014, thousands of students, like Ghidiu, have been using the platform at more than 75 universities and have seen an 11% boost on average in final exam scores.

To open this session, CEO Prahasith Veluvolu will explain how Mimir is helping instructors, like Ghidiu, meet class size demand while offering free, pre-loaded curriculum through Mimir Classroom. Ghidiu will elaborate on his user experience, the 3-minute average response time he receives from support, and how he utilizes 40 languages, frameworks, and databases to teach his students. Veluvolu will highlight features in Mimir Classroom that have helped universities like Northern Kentucky University, Quinnipiac University, and Michigan State University optimize their courses.

Learn more about Mimir Classroom before the conference by visiting www.mimirhq.com/sigcse2019.

Presented courtesy of **IBM**

Shortcuts for Keeping Your CS Curriculum Current

- 6:30 pm - 7:20 pm
Room: Hyatt Lakeshore A

Presenters: Misty Decker, Valinda Kennedy, *IBM*

CS Technology changes so fast, it's impossible to keep your curriculum current with technologies such as: - Artificial Intelligence - Data Science - Blockchain - Cloud - Cybersecurity - Open Source technologies

Did you know that companies like IBM need to educate our clients on these new technologies and you can use many of the same resources in your classroom free of charge? Join us for a tour of the wide variety of resources available including Course Materials, Open Badges, Case Studies and Cloud Resources.

Bonus: You'll find many of our courses are also useful for educators looking to upgrade their own skills and earn official credentials. Bring your phone or your laptop so you can easily save links to your favorite materials.

FRIDAY, MARCH 1

Presented courtesy of **INTEL**

Jump Start Parallel Programming Education in Data Science, Artificial Intelligence and More

- 10:45 am - 12:00 pm
Room: Hyatt Lakeshore A

Presenter: Henry Gabb, *INTEL*

Henry Gabb is a senior principal engineer at Intel Corporation. Among other things, he is the editor of The Parallel Universe, Intel's quarterly magazine for software innovation. Henry first joined Intel in 2000 to help drive parallel computing inside and outside the company. Prior to joining Intel, Henry was Director of Scientific Computing at the U.S. Army Engineer Research and Development Center MSRC, a Department of Defense high-performance computing facility. Henry holds a BS in biochemistry from Louisiana State University, an MS in medical informatics from the Northwestern Feinberg School of Medicine, and a PhD in molecular genetics from the University of Alabama at Birmingham School of Medicine. He has published extensively in computational life science and high-performance computing. Henry recently rejoined Intel after spending four years working on a second PhD in information science at the University of Illinois at Urbana-Champaign.

Solving the biggest challenges in science, industry and society requires dramatic increases in computing efficiency. Today's applications must be parallelized to unlock the benefits of current and future hardware with the use of key software enablement tools. In this session, we will share resources that address educating the next generation of programmers, researchers, scientist, etc. through providing attendees with information focused on the different Intel architectures, programming models, algorithms, etc. Including, the sharing of resources for accessing various hardware, free software licenses offered to educators and students, educational content for teaching Parallel Programming, Data Science and Artificial Intelligence (machine and deep learning). By the end of this session, attendees will receive training materials for K-12 STEM initiatives, academic curriculum (undergraduate and graduate levels), and scientific research using real case study examples for hands-on experiments.

SUPPORTER SESSIONS

FRIDAY, MARCH 1

Presented courtesy of **Vocareum**

Delivering Cutting Edge Compute Resources to the Classroom - Jupyter, Clusters, Container Networks, & More

► 10:45 am - 12:00 pm

Room: Hyatt Lakeshore B

Presenter: Sanjay Srivastava, Vocareum

In this session, we will discuss (1) the growing variety of compute resources needed to support courses in programming, machine learning, data science, engineering and IT; (2) how top universities are using Vocareum to configure and deploy interactive computing (Jupyter, RStudio), cluster computing, distributed databases, container networks, and cloud infrastructure; and (3) how Vocareum cloud learning labs tightly integrate compute, storage, LMS and cost management to provide students with an optimized learning experience.

Presented courtesy of **Microsoft**

Microsoft MakeCode Arcade

► 1:45 pm - 3:00 pm

Room: Hyatt Lakeshore A

Presenter: Jacqueline Russell, Microsoft Corporation

Come join us to learn about the new Microsoft MakeCode Arcade platform - a 2D game development environment entirely online and free. In this workshop, attendees can expect to get hands-on creating simple sprite-based games using Microsoft MakeCode, download their games to hardware, and get access to open-source curriculum and resources they can use in the classroom. No prior experience required.

Presented courtesy of **CODIO**

Codio: A Powerful, Flexible Platform for Instructors to Deliver and Assess Student Learning Experiences

► 1:45 pm - 3:00 pm

Room: Hyatt Lakeshore B

Presenter: Elise Deitrick, Codio

Codio introduces their newest pedagogical tools built-in to the platform, including quality content, an auto-graded assessment library mapped to learning objectives, and the ability to customize student learning experiences. All of these features are on top of a platform designed to scale: (1) LMS integration including support for courses run on MOOC platforms such as edX or Coursera, (2) cloud-based IDEs/boxes the instructor configures, (3) integrated content-delivery to allow a variety of pedagogical approaches from blended/flipped to self-paced learning, (4) multi-modal content and assessment delivery, and (5) free support, including access to trained computer science professionals.

Presented courtesy of **GitHub**

CS50's GitHub-Based Tools for Teaching and Learning

► 3:45 pm - 5:00 pm

Room: Hyatt Lakeshore B

Presenters: David J. Malan, Brian Yu, Kareem Zidane, *Harvard University*; Chad Sharp, *Michigan University*; Vanessa Gennarelli, *GitHub Education*

CS50 at Harvard has developed a suite of GitHub-based tools to help students with the writing, testing, and submitting of programs. Among them are: check50, a Python-based API for functional testing of programs (themselves written in any language); submit50, a command-line tool that submits students' work via Git and prepares it for web-based commenting; and CS50 Lab, a web app that enables teachers to create step-by-step programming lessons, providing incremental feedback at each step. Learn more in this session about each of these tools and how you can use them (for free!) in your own courses.

SATURDAY, MARCH 2

Presented courtesy of **Gradescope by Turnitin**

One Platform for Paper, Online, and Programming Assignments

► 9:45 am - 10:35 am

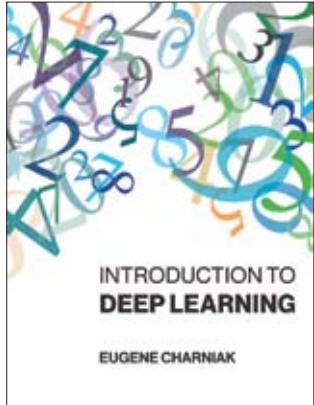
Room: Hyatt Lakeshore A

Presenter: Ibrahim Awwal, Gradescope

Gradescope is a single place for grading paper-based exams, programming projects, and online assignments. You will learn how to use our rubric-based grading interface to grade your exams and homework, faster, without compromising on quality. Additionally, you will see how to build your own autograders to automatically grade programming projects, in any language, at scale. We will also show our new feature this year, where we automatically run an updated version of MOSS on your students' code.



The MIT Press

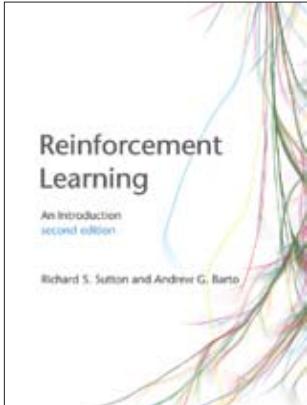


Introduction to Deep Learning

Eugene Charniak

A project-based guide to the basics of deep learning.

\$35.00 | £27.00 | cloth



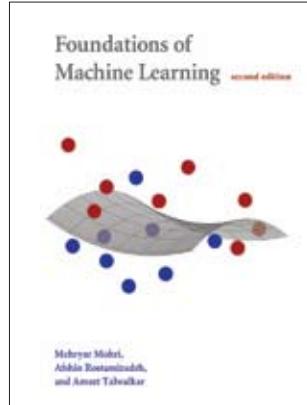
Reinforcement Learning

An Introduction
Second Edition

**Richard S. Sutton
and Andrew G. Barto**

The significantly expanded and updated new edition of a widely used text on reinforcement learning, one of the most active research areas in artificial intelligence.

\$80.00 | £62.00 | cloth

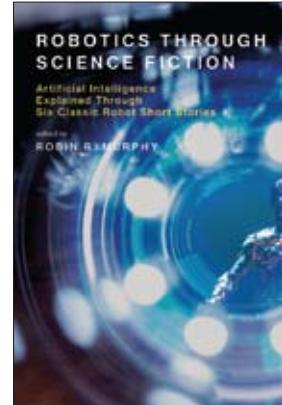


Foundations of Machine Learning

**Mehryar Mohri,
Afshin Rostamizadeh, and
Ameet Talwalkar**

Fundamental topics in machine learning are presented along with theoretical and conceptual tools for the discussion and proof of algorithms.

\$85.00 | £66.00 | cloth



Robotics Through Science Fiction

Artificial Intelligence Explained
Through Six Classic Robot Short Stories

edited by Robin R. Murphy

Six classic science fiction stories and commentary that illustrate and explain key algorithms or principles of artificial intelligence.

\$25.00 | £20.00 | paper

Model Checking

Second Edition

**Edmund M Clarke, Jr.,
Orna Grumberg, Daniel Kroening,
Doron Peled, and Helmut Veith**

An expanded and updated edition of a comprehensive presentation of the theory and practice of model checking, a technology that automates the analysis of complex systems.

\$75.00 | £58.00 | cloth

Decision Making Under Uncertainty

Theory and Application

Mykel J. Kochenderfer

An introduction to decision making under uncertainty from a computational perspective, covering both theory and applications ranging from speech recognition to airborne collision avoidance.

\$78.00 | £60.00 | cloth

Mathematics of Big Data

Spreadsheets, Databases, Matrices,
and Graphs

**Jeremy Kepner
and Hayden Jananthan**

foreword by Charles E. Leiserson
The first book to present the common mathematical foundations of big data analysis across a range of applications and technologies.

\$80.00 | £62.00 | cloth

The Little Typer

**Daniel P. Friedman and David
Thrane Christiansen**

Illustrations by Duane Bibby
Foreword by Robert Harper
Afterword by Conor McBride
An introduction to dependent types, demonstrating the most beautiful aspects, one step at a time.

\$38.00 | £30.00 | paper

Urban Computing

Yu Zheng

An authoritative treatment of urban computing, offering an overview of the field, fundamental techniques, advanced models, and novel applications.

\$85.00 | £66.00 | cloth

Essential Logic for Computer Science

Rex Page and Ruben Gamboa

An introduction to applying predicate logic to testing and verification of software and digital circuits that focuses on applications rather than theory.

\$50.00 | £40.00 | cloth

Visit our
booth
to receive
30% off

mitpress.mit.edu

BIRDS OF A FEATHER

FLOCK A: THURSDAY, FEBRUARY 28

5:30 pm - 6:20 pm

Chairs:

Mary Anne Egan, Siena College

Mark Sheriff, University of Virginia

Towards a More Inclusive Tech Culture: Promoting Professionalism in CS Classrooms and Labs

Room Hyatt Greenway A

Ursula Wolz, Bennington College; Stephanie R. Taylor, Colby College

AI for K-12: Making Room for AI in K-12 CS Curricula

Room Hyatt Greenway J

Christina Gardner-McCune, University of Florida; David Touretzky, Carnegie Mellon University; Fred Martin, University of Massachusetts Lowell; Deborah Seehorn, CSTA

Toward an Anti-Racist Theory of Computational Curricula

Room Hyatt Greenway B/C

Matthew Jadud, Bates College; Jamika D. Burge, *black computHER*; Jeffrey Forbes, Duke University; Celine Latulipe, University of North Carolina at Charlotte; Yolanda A. Rankin, Florida State University; Kristin Searle, Utah State University; Ben Shapiro, University of Colorado Boulder

What to Make of Makerspaces

Room Hyatt Greenway D/E

Michael P. Rogers, Northwest Missouri State University; Bill Siever, Washington University in St. Louis

Can Game Elements Make Computer Science Courses More Attractive?

Room Hyatt Greenway F/G

Darina Dicheva, Christo Dichev, Keith Irwin, Elva J. Jones, Winston-Salem State University; Lillian (Boots) Cassel, Villanova University; Peter J. Clarke, Florida International University

Discussion of Integrating Hands-on Cybersecurity Exercises into the Curriculum in 2019

Room Hyatt Greenway H/I

Richard Weiss, Evergreen State College; Jens Mache, Lewis and Clark College; Blair Taylor, Siddharth Kaza, Towson University; Ankur Chattopadhyay, University of Wisconsin at Green Bay

Teaching Track Faculty in CS

Room Hyatt Northstar A

Chris Gregg, Stanford University; Shawn Lupoli, Texas A&M University; Laney Strange, Northeastern University

Computing Competencies and the CC2020 Project

Room Hyatt Northstar B

Alison Clear, Eastern Institute of Technology; John Impagliazzo, Hofstra University; Ming Zhang, Peking University

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

Room Hyatt Regency

Paula Gabbert, Furman University; Wendy Powley, Queen's University; Gloria Childress Townsend, DePauw University

The Problem of Packaging Curricular Materials

Room Hyatt Great Lakes A1 & A2

Austin Cory Bart, University of Delaware; Michael Hilton, Carnegie Mellon University; Bob Edmison, Virginia Tech; Phillip T. Conrad, University of California, Santa Barbara

Modernizing the Mathematics Taught in Computer Science

Room Hyatt Lake Bemidji

Barbara Anthony, Southwestern University; Mia Minnes, University of California, San Diego; David Liben-Nowell, Carleton College; Peter-Michael Osera, Grinnell College

Teaching Human-Centered Design in CSE Programs

Room Hyatt Lake Minnetonka

Tamara Peyton, Harrisburg University; Aarathi Prasad, Skidmore College; Sa Liu, Harrisburg University; Joslenne Pena, Pennsylvania State University

Incorporating Computing for Social Good in Computing Education

Room Millennium Grand North

Gregory W. Hislop, Drexel University; Darci Burdge, Nassau Community College; Michael Goldweber, Xavier University; Samuel A. Rebelsky, Grinnell College; Stewart N. Weiss, Hunter College of the City University of New York

How Can We Make Office Hours Better?

Room Millennium Grand Central

Kristin Stephens-Martinez, Duke University; Brian Railling, Carnegie Mellon University

Supporting Students Living With Mental Illness

Room Millennium Grand South

Christian Murphy, University of Pennsylvania; Linda Duhadway, Weber State University; Matthew Hanson, University of Minnesota

BIRDS OF A FEATHER

FLOCK B: THURSDAY, FEBRUARY 28

6:30 pm - 7:20 pm

Chairs:

Mary Anne Egan, Siena College
Mark Sheriff, University of Virginia

Academic Cybersecurity Disciplinary Foundations and Accreditation

Room Hyatt Greenway A

Allen S. Parrish, Mississippi State University; Rajendra K. Raj, Rochester Institute of Technology; Lawrence Jones, ABET

Sponsoring Girls Who Code Clubs

Room Hyatt Greenway J

Pamela Cutter, Kalamazoo College

Developing a Contemporary and Innovative Operating Systems Course

Room Hyatt Greenway B/C

Saverio Perugini, David J. Wright, University of Dayton

Co-Curricular Activities in Computer Science Departments

Room Hyatt Greenway D/E

Kathleen Freeman Hennessy, University of Oregon; Jennifer Parham-Mocello, Oregon State University; Henry M. Walker, Grinnell College

Access to Computing Education for Students with Disabilities

Room Hyatt Greenway F/G

Richard E. Ladner, University of Washington; Andreas Stefik, University of Nevada, Las Vegas; Andrew J. Ko, Brianna Blaser, University of Washington

Building Bridges for Data Science Education

Room Hyatt Greenway H/I

Mine Cetinkaya-Rundel, Duke University + RStudio; Andrea Danyluk, Williams College; Jeffrey Forbes, Duke University; Michael Posner, Villanova University

Birds of a Feather Who'd Like to Share Software Together: Teaching Tools that Improve Efficiency and Outcomes

Room Hyatt Northstar A

Doug Lloyd, Erin Carvalho, David J. Malan, Harvard University

Bringing Reflection into Computer Science Education

Room Hyatt Northstar B

Paul E. Dickson, John Barr, Ithaca College

Undergraduate TA and Mentor Programs in Computer Science

Room Hyatt Regency

Diba Mirza, Phillip T. Conrad, University of California, Santa Barbara; Colleen M. Lewis, Harvey Mudd College; Cynthia B. Lee, Stanford University

Auto-Graded Programming Labs: Dos and Don'ts for Less-Stressed Higher-Performing Students, Reduced Grading Time, and Happier Teachers

Room Hyatt Great Lakes A1 & A2

Frank Vahid, University of California, Riverside & zyBooks; Roman Lysecky, University of Arizona

POGIL in Computer Science for Beginners and Experts

Room Hyatt Lake Bemidji

Debra M. Duke, Virginia Commonwealth University; Margarethe Posch; Salt Lake Community College

Broadening Participation in Computing: A Call to Action for Universities and Community Colleges

Room Hyatt Lake Minnetonka

Amardeep Kahlon, Austin Community College; Deborah Boisvert, University of Massachusetts Boston; Cheryl Calhoun, Santa Fe College; Louise Ann Lyon, Jill Denner, Education, Training, Research; Wendy M. DuBow, University of Colorado Boulder; Melanie Williamson, Bluegrass Community and Technical College

Enriching Courses on Computers and Society and Computer Ethics

Room Millennium Grand North

Ronald M. Baecker, University of Toronto; Elliot B. Koffman, Temple University

Exploring Programming Instruction in Multidisciplinary Contexts

Room Millennium Grand Central

Leo C. Ureel II, Michelle Jarvie-Eggart, Melanie Kueber Watkins, Russell Louks, Briana Bettin, Michigan Technological University

How Can We Engage in Inclusive, Culturally Responsive Computer Science?

Room Millennium Grand South

Eileen T. Kraemer, Murali Sitaraman, S. Megan Che, Clemson University

Cloud Learning Labs

How would you use it?

Automate grading tasks

"The scalability and automated grading lets us simultaneously deliver exercises to thousands of MOOC students around the world."

David Joyner, GeorgiaTech



Teach with Jupyter Notebooks

"Jupyter is wonderful, not only as a resource, but also the way it changes learning. So, we have classes flipped and it's all active learning with Vocareum."

Adam Pah, Northwestern / Kellogg



Deploy AWS Resources

"Our work with Vocareum helps AWS Educate provide the resources necessary for students around the world to develop the skills to pursue a career in cloud computing."

Ken Eisner, Global Lead, AWS Educate



Learn more at SIGCSE - Booth #521

Integrated Book and Tutorials?

*Introducing
CodeLab NOTES*



Find out more
at Booth 329.

IBM Academic Programs

Free and discounted resources
for academia in cyber security, artificial
intelligence, data science, blockchain,
cloud, systems & more...



IBM Global University Programs
<https://www.research.ibm.com/university>

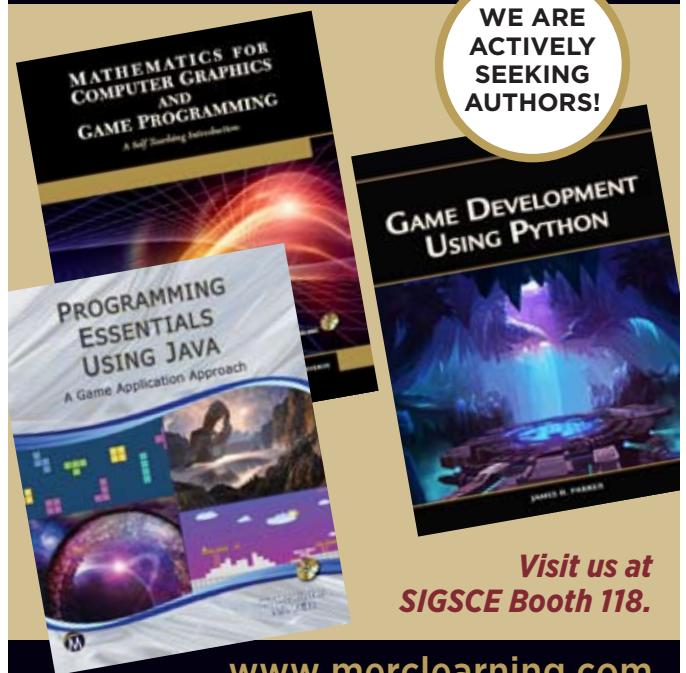
Master the Mainframe
ibm.biz/masterthemainframe

Come by and see us at the IBM Booth #413.
And join our session on
Shortcuts for Keeping your CS Curriculum Current
Thursday, February 28th from 6:30 pm - 7:20 pm

 MERCURY
LEARNING AND INFORMATION

Our books
are affordably
priced, timely
and up-to-date.

WE ARE
ACTIVELY
SEEKING
AUTHORS!



Visit us at
SIGCSE Booth 118.

www.merclearning.com

POSTER SESSIONS

Chairs:

Laurence D. Merkle, *Air Force Institute of Technology*
S. Monisha Pulimood, *The College of New Jersey*

POSTER SESSION #1

Friday, March 1

10:00 am - 12:00 pm

Hyatt Exhibit Hall

Coding Pedagogy for the Liberal Arts: An Online Publication
Jeremy H. Sarachan, Sean O'Leary, *St. John Fisher College*

Online or In Person? Student Motivations in the Choice of a CS1 Experience

Melinda McDaniel, David A Joyner, *Georgia Institute of Technology*

viCyber: An Intelligent Curriculum Design Tool for Cybersecurity Education

Shamim Khan, Shuangbao Wang, Rania Hodhod, *Columbus State University*

Establishing Computational Thinking as Just Another Tool in the Problem Solving Tool Box

Hillary Fleenor, *Columbus State University*

Questioning the Board in Computer Science Education Board Games

Caroline Hardin, Alexander Brooks, Joshua Gabai, Anthony Pellicone, Isaac Sung, *University of Wisconsin-Madison*

Creating a Tech-in-Residence Corps of Industry Adjuncts: An Academic/Government/Industry Partnership

Susan P. Imberman, *City University of New York*; Robert J. Domanski, *NYC Tech Talent Pipeline*

Encouraging Reflection in Support of Learning Data Structures

Cheryl Resch, Christina Gardner-McCune, *University of Florida*

The Development and Validation of Survey Items on Upper Elementary Students' Perspectives and Attitudes on CS

Jessica Vandenberg, Jennifer Tsan, Zarifa Zakaria, *North Carolina State University*; Kristy Elizabeth Boyer, *University of Florida*; Collin F. Lynch, Eric Wiebe, *North Carolina State University*

Fostering State-level Change In CS Education: The Expanding Computing Education Pathways Alliance

Jeffrey Xavier, Alan Peterfreund, Rebecca Zarch, *SageFox Consulting Group*; William Richards Adrion, Renee Fall, *University of Massachusetts*; Mark Guzdial, *University of Michigan*; Barbara Ericson, *University of Michigan*, Sarah Dunton, *University of Massachusetts*; Tom Mcklin, *The Findings Group*

Teaching and Assessing Debugging, Testing, and Coding Style with Recursive Pedagogy using Spinoza

Fatima A. Abu Deeb, *King Saud bin Abulaziz University for Health Science*; Timothy J. Hickey, *Brandeis University*

Towards Learning Analytics in Cybersecurity Capture the Flag Games

Valdemar Švábenský, Jan Vykopal, Pavel Čeleda, *Masaryk University*

Boxes, Bumps & Breakfast: Object Lessons for Teaching Undergraduates the Importance of Human-Centered Research & Analysis

Tamara Peyton, *Harrisburg University*

Situated Learning in Systems-Level Coursework

Jeremiah Blanchard, *University of Florida*

Messy Learning: When Problem-based Learning Just Isn't Enough

Paul E. Dickson, John Barr, *Ithaca College*

Evaluating the Effect of Follow-up Questions in an Online Exercise

Yefei Dong, Michelle Craig, Jennifer Campbell, *University of Toronto*

What Can the Reid List of First Programming Languages Teach Us About Teaching CS1?

Robert M. Siegfried, *Adelphi University*; Diane Liporace, Katherine G. Herbert-Berger, *Montclair State University*

Game Engines Construction to Motivate Computing Concepts: Build from Scratch or Leverage Existing Systems

Christopher A. Egert, *Rochester Institute of Technology*

An Analysis of Upper Elementary and Middle Grade Teachers' Perceptions, Concerns and Goals for Integrating CS into Classrooms

Mehmet Celepkolu, Erin O'Halloran, Jamieka Wilkinson, Kristy Elizabeth Boyer, *University of Florida*

Integrating Computational Thinking in Informal and Formal Science and Math Activities for Preschool Learners

Shuchi Grover, *Looking Glass Ventures, LLC.*; Ximena Dominguez, Danae Kamdar, *Digital Promise Global*; Phil Vahey, *SRI International*; Savitha Moorthy, *Digital Promise Global*; Ken Rafanan, Sara Gracely, *SRI International*

Undergraduate Computer Science Student Perceptions of Their Own Field

Katelyn Manzo, *University of Maine*; Stacy A. Doore, Sarah Harmon, *Bowdoin College*

Overcoming Doubt: Workshop Aimed at Giving Students Strategies to Build Their Authentic Self-Esteem Within Their Computing Major

Rachelle Kristof Hippler, *Baldwin Wallace University*

Debriefing Lab Content Using Active Learning

Michael J. McCarthy, Joseph Mertz, Martin L. Barrett, Michael Melville, *Carnegie Mellon University*

Graduate Curriculum Initiative -- COSMIC: Change Opportunity - Start Masters in Computing: COSMIC

Gary Krenz, Thomas Kaczmarek, *Marquette University*

An Investigation of Learning Outcomes Between Two Teaching Modalities to Improve Student Learning in Online Courses

Audrey Rorrer, Julio César Bahamón, *University of North Carolina at Charlotte*

University-Industry Collaboration in Curriculum Design: A Case Study of Curriculum Design for Early Undergraduate Computer Science Coursework with an Eye on Equity

Lauren Provost, *Simmons College*; Christopher Harrington

POSTER SESSIONS

A Peer Based Tutoring and Mentoring Model for First Year Computer Science Courses Based on Strategies Used by Songbirds for Learning

Ashwin Satyanarayana, *New York City College of Technology*; Lior Baron, *City University of New York*

Changing Teaching Assistant's Behavior Based on Learning Support Strategies for Programming Exercise

Yuuki Yokoyama, Hironori Egi, *The University of Electro-Communications*

Using Bloom's Taxonomy to Write Effective Programming Questions for Autograding Tools

Lina Battestilli, Sarah Korkes, *North Carolina State University*; Olivia Smith, *University of Minnesota*; Tiffany Barnes, *North Carolina State University*

Utilizing Participatory Design to Develop a Culturally Relevant Computer Science Curriculum

Merijke Coenraad, *University of Maryland, College Park*; Jen Palmer, Diana Franklin, *The University of Chicago*; David Weintrop, *University of Maryland*

Why are Linked List Operations Daunting to some College Students?: Exploring the Mental Models of Undergraduate Programmers

Harrison Chotzen, *Claremont McKenna College*; Alasdair J. Johnson, Parth M. Desai, *Pitzer College*

Benefits of Physical Interaction with Array Elements and Code Consolidation on Student Comprehension of Sorting Algorithms

Anisha Kaul, Julia Ann Pinedo, *Scripps College*; Anya Wallace, *Harvey Mudd College*

An Investigation of Conflicts Between Upper-Elementary Pair Programmers

Jennifer Tsan, Jessica Vandenberg, Xiaoting Fu, *North Carolina State University*; Jamieka Wilkinson, *University of Florida*; Danielle Boulden, *North Carolina State University*; Kristy Elizabeth Boyer, *University of Florida*; Collin F. Lynch, Eric Wiebe, *North Carolina State University*

Job Placement Experience of Alumni from a 3-year CS Program

Miguel Lara, *California State University, Monterey Bay*; Kathryn Cunningham, *University of Michigan*; Bude Su, *California State University, Monterey Bay*

Creating Co-curricular Programs to Improve CS Student Identity and Sense of Belonging

Cynthia Y. Lester, *Georgia State University*; Pamela Leggett-Robinson, *PLR Consulting*

Engaging Alumni Mentors in Software Engineering Project Courses

C.F. Larry Heimann, Sara Moussawi, Jeria Quesenberry, Raja Sorriamurthi, *Carnegie Mellon University*

Lessons Learned in 10 years of Distributed Systems Capstones

Carsten Kleiner, Arne Koschel, *University of Applied Sciences & Arts*

Improving Programming Skills Through Classroom Presentation of Assignments

Abhimanyu Ghosh, Keith Wojciechowski, Daniel Sinkovits, *University of Wisconsin-Stout*

Mobile App Development: Android or iOS? An Experience Report from Teaching Both Platforms

Gina Sprint, *Gonzaga University*

Building Trust in Computer Science Research-Practice Partnerships: A Theme Study

Todd Lash, *University of Illinois at Urbana-Champaign*; Stephanie Wortel-London, Leigh Ann DeLyser, Lauren Wright, *CSforALL*

Understand the Emerging Demands of Computing Education for Non-CS Major Students

Meng Han, Zhigang Li, Jing Selena He, Xin Shirley Tian, *Kennesaw State University*

Infusing CS Graduate Transition Curriculum with Professional, Technical and Data Science Competencies

Katherine G. Herbert-Berger, Nina Goodey, Stephen Ruczsyk, Scott Kight, *Montclair State University*; Thomas J. Marlowe, *Seton Hall University*

Towards Encapsulated Cyber Security Labs: A Container Based Approach

Selvarajah Mohanrajah, *University of North Carolina at Pembroke*; Gregory Ross, *SPAWAR*; Shan Suthaharan, *University of North Carolina at Greensboro*

POSTER SESSION #2

Friday, March 1

3:00 pm - 5:00 pm

Hyatt Exhibit Hall

Enhancing Essential Data Skills for College-wide Students

Qiong Cheng, *University of North Carolina at Charlotte*

Data Protection with SMSD Labware

Hossain Shahriar, Kai Qian, Md Arabin Islam Talukder, Reza Parizi, *Kennesaw State University*

Applying Project-Based Learning for An Online Object-Oriented Systems Course

Kalpathi Subramanian, Kiran Budhrani, *University of North Carolina at Charlotte*

Use Bots to Improve GitHub Pull-Request Feedback

Zhewei Hu, Edward Gehringer, *North Carolina State University*

Student Debugging Practices and Their Relationships to Project Outcomes

Ayaan M. Kazerouni, Rifat Sabbir Mansur, Stephen H. Edwards, Clifford A. Shaffer, *Virginia Tech*

Using Interactive Visualization and Programmed Instruction to Teach Formal Languages

Mostafa Mohammed, Clifford A. Shaffer, *Virginia Tech*; Susan H. Rodger, *Duke University*

POSTER SESSIONS

The Institute of Coding: A University-Industry Collaboration to Address the UK Digital Skills Crisis

James H. Davenport, Rachid Hourizi, *University of Bath*

Computer Science Problem Solving Course: Practical and Technical Thinking Skills for CS Majors

Margaret Ellis, *Virginia Tech*

Design of a Gateway for Open Source Software Development in a Traditional CS Curriculum

Stewart N. Weiss, *Hunter College of the City University of New York*

Inclusive Experiences Using HFOSS in a Senior Computer Science Elective

Becka Morgan, *Western Oregon University*

A Neural Network Model for a Tutoring Companion Supporting Students in a Programming with Java Course

Melissa Day, Javier Gonzalez-Sanchez, *Arizona State University*

Assessing Middle School Students' Computational Thinking Through Programming Trajectory Analysis

Bita Akram, Wookhee Min, Eric Wiebe, Bradford W. Mott, *North Carolina State University*; Kristy Elizabeth Boyer, *University of Florida*; James C. Lester, *North Carolina State University*

Evaluating Student Engagement Towards Integrating Parallel and Distributed Computing (PDC) Topics in Undergraduate Level Computer Science Curriculum

Mary Smith, *Hawaii Pacific University*; Srishti Srivastava, *University of Southern Indiana*

Dynamic Recitation: A Student-Focused, Goal-Oriented Recitation Management Platform

Joseph A Boyle, Georgiana Haldeman, Andrew Tjang, Monica Babes-Vroman, Ana Paula Centeno, Thu D. Nguyen, *Rutgers University*

Sentiment Analysis across the Courses of a MOOC Specialization

Kenny Wong, *University of Alberta*

Using an Art Museum Field Trip to Spark Classroom Discussions about Mobile App Design

Aarathi Prasad, *Skidmore College*

Lichen: Customizable, Open Source Plagiarism Detection in Submitty

Matthew Peveler, *Rensselaer Polytechnic Institute*; Tushar Gurjar, *ITT Kanpur*; Evan Maicus, Andrew Aikens, Alexander Christoforides, Barbara Cutler, *Rensselaer Polytechnic Institute*

Facilitating Discussion-Based Grading and Private Channels via an Integrated Forum

Andrew Aikens, *Rensselaer Polytechnic Institute*; Gagan Kumar, *Indian Institute of Technology Patna*; Shail Patel, Evan Maicus, Matthew Peveler, Barbara Cutler, *Rensselaer Polytechnic Institute*

POSTER SESSION #3

Saturday, March 2

10:35 am - 12:30 pm

Hyatt Exhibit Hall

Introducing Theoretical Computer Concepts in Secondary Education

Rafael del Vado Vírseda, *Universidad Complutense de Madrid*

Girls in Engineering Draw a Computer Scientist

Sabrina Tsui, *University of California, Santa Cruz*

What Does It Take to Teach K12 Computer Science?

Exploring Teachers' Attitudes Towards Teaching CS K12 in Georgia

Alfredo Perez, Hillary Fleenor, *Columbus State University*

Implementing CS0 with Computer Science Principles Curriculum

D. Cenk Erdil, Darcy Ronan, *Sacred Heart University*

Linear Data Structures: A Comparison of Novice and Expert Teacher Pedagogical Content Knowledge

Aleata Hubbard, *WestEd*

SciGirls Code: Computational Participation for Middle School Girls

Cassandra Scharber, Yu-Hui Chang, Sarah Barksdale, Lana Peterson, Angelina Constantine, Ramya Sivaraj, Jennifer Englund, *University of Minnesota*

Every Little Bit Counts: Experiences and Lessons Learned Building a Community Outreach Program from the Ground Up

Brian Krupp, Paul Peters, Tyler Hardy, Sydney Leither, Zach Egler, *Baldwin Wallace University*

Machine Learning: An Introductory Unit of Study for Secondary Education

Ramsey Young, Jonathan Ringenberg, *Millard West High School*; *University of Nebraska Omaha*

Comparing the Effects of Using a Tangible Object or a Simulation in Learning Elementary CS Concepts: A Case Study with Block-Based Programming

Grégoire Fessard, Ilaria Renna, *Institut Supérieur d'Électronique de Paris*; Patrick Wang, *Institut Supérieur d'Électronique*

Collaborative Coding and Composing of JazzHands: Integrating the Learning of Advanced Computational Concepts with Electronic Textiles to Make Music Wearables

Gayithri Jayathirtha, Yasmin B. Kafai, Debora A. Lui, Mia S. Shaw, *University of Pennsylvania*; Ji Yong Cho, *Cornell University*

Collaboration: Developing and Piloting a Cybersecurity Curriculum for Middle School

Hillary Fleenor, Yesem Peker, *Columbus State University*; Ebone Cutts, *Muscogee County School District*

Building Computer Science K-12 PLCs in Rural Communities

Allison Sauppé, Samantha S. Foley, Thomas Gendreau, Joshua T. Hertel, Mao Zheng, *University of Wisconsin-La Crosse*

POSTER SESSIONS

Computational Thinking in the Making: Lessons for Second Graders in a STEM Computer Science Immersion School

Lindsey Scheppegrill, Elyse Hiatt, Charlotte Mecklenburg Schools; Johanna Okerlund, David Wilson, University of North Carolina at Charlotte

CodeNC: Integrating Computational Thinking into K-12 Instructional Activities using Animated Videos

N. Rich Nguyen, University of Virginia; Iuliia Poliakova, Sahithi Meduri, Joshua Hutcheson, Ryan Ke, University of North Carolina at Charlotte

An Interactive Teaching Tool for Introducing Novices to Machine Translation

Huda Khayrallah, Rebecca Knowles, Kevin Duh, Matt Post, Johns Hopkins University

Teacher Beliefs in Student Capabilities as a Mediating Factor in a Novel Understanding of Enactment of CT Curriculum

Paige Prescott, University of New Mexico, Irene A. Lee, Massachusetts Institute of Technology; Kersti Tyson, University of New Mexico

Exploring the Definition of Computational Thinking in Research and the Classroom

Tony Lowe, Sean Brophy, Monica Cardella, Purdue University

Curated Pathways to Innovation: Personalized CS Education to Promote Diversity

Natalie Linnell, Santa Clara University; Phil Gonsalves, YWCA Silicon Valley; Mayank Kakodkar, Purdue University; Vanessa Martinez, YWCA Silicon Valley; Tim Urdan, Santa Clara University; Bruno Ribiero, Purdue University; Janice Zdankus, Hewlett Packard Enterprise

Using Music to Foster Engagement in Introductory Computing Courses

Fatemeh Jamshidi, Daniela Marghitu, Auburn University

Sorting Out Algorithms: What Makes One Better than Another?

Connor Bain, Uri Wilensky, Northwestern University

Four Scope-Related Misconceptions Held by Computer Science Students

Wynne Becker, Kayley James, Scripps College; Maya Minier, Harvey Mudd College

Snap! A Look at 5 Years, 250,000 Users and 2 Million Projects

Michael Ball, University of California, Berkeley; Jens Mönig; Bernat Romagosa; Brian Harvey, University of California, Berkeley

ECS4Alabama: A State-Wide Effort to Provide Access to Authentic Computer Science Education in Predominantly Rural and High Minority Schools

Mohammed A. Qazi, Tuskegee University; Jeff Gray, Melody Russell, David M. Shannon, Auburn University

Don't Forget About Us: Understanding Rural and Small Town Principals' Values Toward Computer Science

Chris Shively, Sarbani Banerjee, Neal Mazur, Joseph Zawicki, SUNY College at Buffalo State

Integrated STEM+C Learning for K-2 Aged Children: CT Competencies as a Precursor to K-2 Computer Science Education

Tikyna M. Dandridge, Hoda Ehsan, Elizabeth Gajdzik, Tony Lowe, Carson Ohland, Ibrahim Yeter, Sean Brophy, Monica Cardella, Purdue University

Using an Intelligent Tutoring System to Teach Red Black Trees

Chun Wai Liew, Lafayette College; Huy Nguyen, Carnegie Mellon University

Code For Her: Exploring Female and Gender-Diverse Computing Workshops for Faculty, Staff, and Students

Joslenne Pena, Carmen Cole, Mary Beth Rosson, Pennsylvania State University

Rubric to Evaluate Programming Learning of Elementary School Students

Daisuke Saito, Hironori Washizaki, Yoshiaki Fukazawa, Waseda University; Mariko Tamura, Yuki Sakuragi, D2C inc

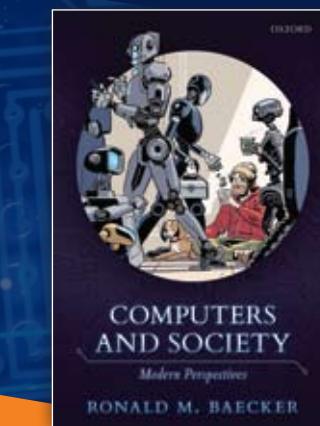
Giving Students Canned Code using Typing Exercises

Adam M. Gaweda, Collin F. Lynch, North Carolina State University

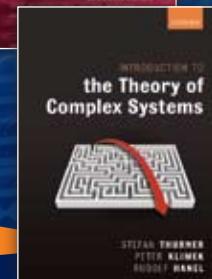
Using an Art Show in CS1 to Spark Interest in Computer Science

David L. Largent, Ball State University

The latest
Computer Science
textbooks
from Oxford University Press



▲ To see this text at SIGCSE,
email ron@taglab.ca



Order now at:
<https://bit.ly/2A1sgAs>

OXFORD
UNIVERSITY PRESS

Turing's Craft and the Paradigm

In 2001, interactive on-line programming exercises were not only NOT part of the CS teaching paradigm— they simply didn't exist. Turing's Craft changed that.

Turing's Craft introduces **CodeLab**: online, interactive programming exercises focused on basic language forms and programming patterns. 200 exercises per course.

The Great CS1 Enrollment Trough

2002

"Can online exercises really be an important part of a programming course?"

Graduated Complexity: topics with exercises incrementally moving from the simplest to the more sophisticated. 300 exercises per course.

2004

"Hmmm. Can I write some too?"

Faculty-authored unit exercises.

Era of the Brave Early Adopters

2006

Automated markup of code errors.

2007

The CS1 enrollment recovery begins.

Interactive test case tables.

2008

The Exercise Explosion— many hundreds per course and new languages.

2010

CS1 enrollments explode, publishers show interest, the Paradigm Shift Starts

Support for instructor review of student submissions, after correctness checks; flexible grade sheets—with instructor overrides of lateness; plagiarism checking; Canvas integration; extensive student-instructor communication and tools.

Faculty-authored snippet exercises and support for full program projects.

2012

2017-2018

The Paradigm Has Shifted, The Imitators Come and Go, The Leader Remains.

- CodeLab **Notes** With Checkpoint Exercises— Free!
- Unparalleled support for Homework Programs.
- And more— come to booth 329 to find out more.

2019

NSF SHOWCASE

NSF Project Showcase Sessions feature recipients of education-related National Science Foundation grants
NSF Showcase will take place in The Hyatt Exhibit Hall.

NSF SHOWCASE #1

Thursday, February 28
10:00 am - 10:45 am

Collaborative Learning in Cloud-based Virtual Computer Labs
Xiaolin Hu, Hai Le, Yuan Long, Anu G. Bourgeois, Yi Pan, *Georgia State University*

Online Interactive Learning Platforms in STEM Education: A Study of Motivation and Engagement

Darina Dicheva, Keith Irwin, Christo Dichev, Breonte Guy, *Winston-Salem State University*; Lillian (Boots) Cassel, *Villanova University*

PRIME: Engaging STEM Undergraduate Students in Computer Science with Intelligent Tutoring Systems

James C. Lester, Bradford W. Mott, Eric Wiebe, *North Carolina State University*; Kristy Elizabeth Boyer, *University of Florida*

Promoting a Growth Mindset Using Automated Feedback

Matthew Jadud, *Bates College*; Stephen H. Edwards, *Virginia Tech*; Manuel A. Pérez-Quiñones, *University of North Carolina at Charlotte*

NSF SHOWCASE #2

Thursday, February 28
3:00 pm - 3:45 pm

Understanding the Implications of Gamification on Women Computer Science Students' Engagement and Women-CS Fit
Monique Ross, Leila Zahedi, Jasmine Batten, *Florida International University*

Collaborative Research: Transforming Computer Science Education Research Through Use of Appropriate Empirical Research Methods: Mentoring and Tutorials

Jeffrey C. Carver, *University of Alabama*; Mark Sherriff, *University of Virginia*; Sarah Heckman, *North Carolina State University*

Scaling Project-Based STEM Learning Through Novel Interactive Systems for In-Class Peer Feedback

Amy Cook, Jessica Hammer, *Carnegie Mellon University*; Steven Dow, *University of California San Diego*

NSF SHOWCASE #3

Friday, March 1
10:00 am - 10:45 am

Living-Learning Community for Women in Computer Science at Rutgers

Rebecca N. Wright, Sally J. Nadler, Thu D. Nguyen, Cynthia N. Sanchez Gomez, *Rutgers University*; Heather M. Wright, *Computing Research Association*

Pencil Puzzles as an Inclusive Domain for Learning Computer Science Concepts

Zack Butler, *Rochester Institute of Technology*

BRAID: A Mixed-Methods Longitudinal Study of 15 Universities Engaged in Efforts to Diversify Undergraduate Computing

Linda J. Sax, Kathleen J. Lehman, *University of California; Los Angeles*

NSF SHOWCASE #4

Friday, March 1
3:00 pm - 3:45 pm

Secure Mobile Software Development

Fan Wu, Cassandra Thomas, *Tuskegee University*; Kai Qian, Hossain Shahriar, *Kennesaw State University*; Emmanuel Agu, *Worcester Polytechnic Institute*

Using csedresearch.org to Improve Research and Evaluation for Pre-college Computing Education

Adrienne Decker, *University at Buffalo*; Monica M. McGill, *Knox College*

On Writing Competitive NSF CS Education Research Proposals

Stephanie E. August, *National Science Foundation & Loyola Marymount University*; Mark Pauley, *National Science Foundation*; S. Megan Che, Eileen T. Kraemer, Murali Sitaraman, *Clemson University*

Retaining and Engaging CS Majors Using BRIDGES

Kalpathi Subramanian, *University of North Carolina at Charlotte*; Jamie Payton, *Temple University*; Erik Saule, *University of North Carolina at Charlotte*

NSF SHOWCASE #5

Saturday, March 2
10:35 am - 11:15 am

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

Leen-Kiat Soh, *University of Nebraska-Lincoln*

LEGO for Software Engineering

Stan Kurkovsky, *Central Connecticut State University*; Stephanie Ludi, *University of North Texas*

Broadening the Path to the STEM Profession Through Cybersecurity Learning

Kaiqi Xiong, Mohamed Rahouti, *University of South Florida*

ACM STUDENT RESEARCH COMPETITION

2019 ACM STUDENT RESEARCH COMPETITION

Chairs:

Stephen Hughes, *Coe College*

Jessica Schmidt, *North Carolina State University*

The ACM Student Research Competition (SRC) at SIGCSE awards prizes to the top three graduate and undergraduate students determined by faculty judges. 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 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 Closing Lunch session.

UNDERGRADUATE

Posters:

Thursday, February 28 • 1:45 pm - 5:00 pm

Hyatt Exhibit Hall

Subgoals, Problem Solving Phases, and Sources of Knowledge: A Complex Mangle

Kevin Lin, David DeLiema, *University of California, Berkeley*

Young Aspirants Developer Contest

Petterson Nguyen Pham, Jordan Fite, Jacob McInite, Vinitha Subburaj, *West Texas A&M University*

Problem Decomposition in Introductory Computer Science and Spatial Reasoning

Ka Ki Fung, *Claremont McKenna College*; Thitaree Tanprasert, *Harvey Mudd College*

Accessible American Sign Language Recognition with the Leap Motion Controller

Sarah Garanganao Almeda, *The College of New Jersey*

Visualizing Classic Synchronization Problems: Dining Philosophers, Producers-Consumers, and Readers-Writers

Elizabeth Koning, Joel C. Adams, *Calvin College*; Christiaan D. Hazlett, *University of Illinois, Urbana-Champaign*

Understanding the Usage and Familiarity of Home Network Terminology Using Open Card Sorting Analysis

Jackie Chan, Kirby Mitchell, *Carleton College*

A Qualitative Analysis of Students' Understanding of Conditional Control Structures

Shannon Collier, Mara Downing, *Harvey Mudd College*

The Adventures of ScriptKitty: Teaching Middle School Students Cyber Awareness with Comics on the Raspberry Pi

Ovidiu-Gabriel Baciu-Ureche, Carlie Sleeman, Karlee Scott, William Moody, Suzanne J Matthews, *United States Military Academy*

A Qualitative Study of Wisconsin Computer Science in K-12

Darren Jefferson, Tina Boyle Whyte, *Marquette University*

Semifinalists:

Friday, March 1 • 3:45 pm - 5:00 pm

Hyatt Greenway F

GRADUATE

Posters:

Thursday, February 28 • 1:45 pm - 5:00 pm

Hyatt Exhibit Hall

Improving Student Self-efficacy in CS 1 Using Examples of Erroneous Code

Adam Koehler, *University of California, Riverside*

A Corpus-assisted Discourse Analysis of Chiptune-related Practices Discussed within Chipmusic.org.

Jared O'Leary, *Arizona State University*

Analyzing User Interactions with Cybersecurity Games

Valdemar Švábenský, *Masaryk University*

Applying Alignment to Improve the Effectiveness of CS Education

Noha Elsherbiny, *Virginia Tech*

Reinforcement Learning: Improve Feedback Mechanism with Indicator based Reward, VirtualTA towards Growth Mindset

Zhiyi Li, *Virginia Tech*

Engaging African American Elementary School Children in Code Understanding

Olivia Mambo Nche, *Clemson University*

Empirical Assessment of Software Documentation Strategies: A Randomized Controlled Trial

Scott Kolodziej, *Texas A&M University*

Online Mob Programming: Effective Collaborative Project-Based Learning

Sreecharan Sankaranarayanan, *Carnegie Mellon University*

Deconstructing Successful and Unsuccessful CS Undergraduate Interns

Amanpreet Kapoor, *University of Florida*

Using Touch and Sound to Program Scratch

Zirui Wang, *Birmingham-Southern College*

Semifinalists:

Friday, March 1 • 3:45 pm - 5:00 pm

Hyatt Greenway H

LIGHTNING TALKS

Chairs:

Lina Battestilli, *North Carolina State University*
Peter-Michael Osera, *Grinnell College*

LIGHTNING TALKS #1

Thursday, February 28

3:45 pm - 5:00 pm

Room **Hyatt Lake Bemidji**

**Building a Community of Undergraduate Women:
Ambassadors for Computing Outreach**
Kathryn Laurel Atchison, Jandelyn Plane, *University of Maryland*

Introduction to Ipsative Assessment

Jared O'Leary, *Arizona State University*

**Every Marathon Starts with the First Mile: Early Successes in
Broadening Participation in K-12 CS**

Carol L. Fletcher, *University of Texas at Austin*

**Thinking about Computational Thinking: Lessons from
Education Research**

Shuchi Grover, *Looking Glass Ventures, LLC.*

**Sports Analytics as a Context for Computational Thinking in
K-12 Education**

Steven Paul Floyd, *Western University*; Luigi Sorbara, *Boston Celtics*,
Fanshawe College

**Adapting Mob Programming for Collaborative Project-Based
Learning in the Classroom**

Michael Hilton, Sreecharan Sankaranarayanan, *Carnegie Mellon
University*

**Programming Politics: Using p5.js to Create Interactive Art
Connected to Current Events**

Jeremy H. Sarachan, *St. John Fisher College*

**Assessing the Impact of Sustainability-Themed Programming
Assignments**

Jeffrey A. Stone, *Pennsylvania State University*

**More than a Bootcamp, Less than a Degree: A One-Year
Program to Retrain Industry Employees as Developers**
Gail Carmichael, *Shopify*

**Experiences using Discord as Platform for Online Tutoring
and Building a CS Community**

Kenrick Mock, *University of Alaska Anchorage*

**A Research-Oriented EPIC Course - Applying Mobile
Technologies to Biomedical Research Questions**

Chen-Hsiang Yu, *Wentworth Institute of Technology*

LIGHTNING TALKS #2

Saturday, March 2

9:45 am - 10:35 am

Room **Hyatt Lake Bemidji**

**Micro-Volunteering and Virtual-Volunteering as Pedagogical
Tools in Computer Science Instruction**
Valerie Summet, *Rollins College*

5 Lessons on Supporting CSforAll in K12 School Districts
Rafi Santo, *CSforALL*

**Promoting Mastery Learning in an Introductory Programming
Course**

Paul Salvador Inventado, *California State University, Fullerton*

**Teaching RSA: What Happens When One of Your Primes
Isn't?**

Barry Fagin, *United States Air Force Academy*

Recognizing and Questioning the CT Education Paradigm
Vance Kite, Soonhye Park, Eric Wiebe, *North Carolina State
University*

**Consistency when Teaching Multiple Sections: Live Lecture
Recordings Reviewed and Discussed with Students**
Olivera Grujic, *University of Southern California*

**Improving Access to Internships with an On-Campus
Software Development Center**

Zachary J. Oster, *University of Wisconsin-Whitewater*

Increase K-12 Cyber Competency to Prevent Cyberbullying
Rachel Stange, *Sherando High School & Lord Fairfax Community
College*

**Historical High School Computer Science Curriculum and
Current K-12 Initiatives**

Steven Paul Floyd, *Western University*

**Improving Retention through Team-Based Learning Finch
Labs and Peer-Educators in Intro to Programming**
Sotirios Kentros, Manish Wadhwa, Lakshmidevi Sreeramareddy,
Komalpreet Kaur, *Salem State University*

THE 2019 ABET SYMPOSIUM
GENERATION CYBER
APRIL 10-13 | DALLAS, TX



VISIT SYMPORIUM.ABET.ORG

 **ABET**



Network with colleagues - Get Curriculum Guidance!

Special Session - Cybersecurity Guidelines

Thursday, February 28, 1:45 PM @ Hyatt, Northstar B

Community College Reception

Friday, March 01, 7:00 PM @ Hyatt, Regency Room

Community College Breakfast

Saturday, March 02, 7:00 AM @ Hyatt, Regency Room

Visit us in the Exhibit Hall
@ ACM Booth # 525



*Celebrating 40++ years
of service to computing education*

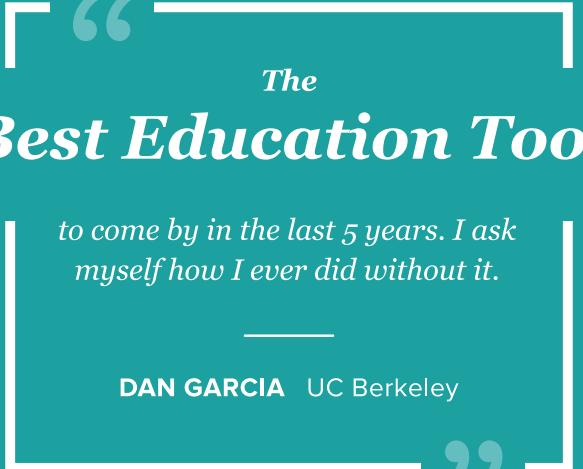
Like us on **Facebook:** ACMccecc

Follow us on **Twitter:** @ACMCCECC

CCECC.ACML.org



Grade homework, exams, and programming projects all in one place.



*The
Best Education Tool*

to come by in the last 5 years. I ask myself how I ever did without it.

DAN GARCIA UC Berkeley

87 Million
Questions Graded

500+
Universities & Colleges

18,000+
Instructors

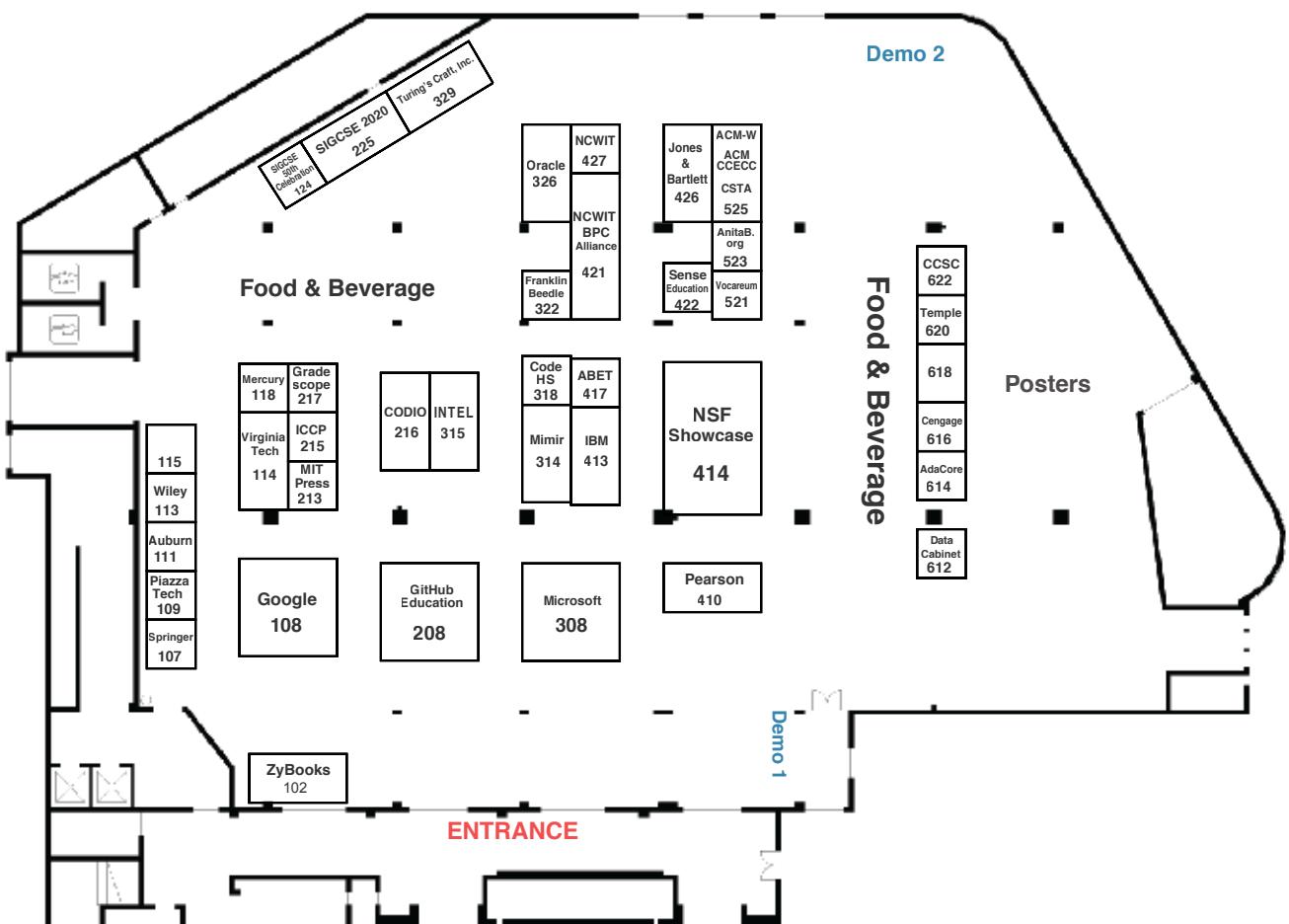
Quality of Feedback to Students?

The Gold Standard.



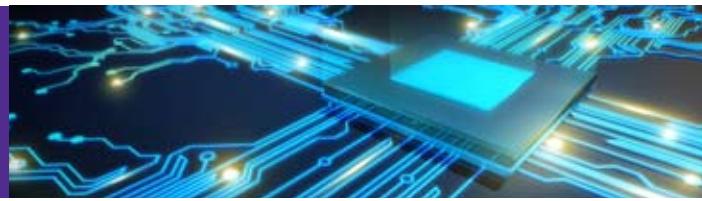
Find out more at Booth 329.

HYATT REGENCY MINNEAPOLIS EXHIBIT HALL



Exhibitor	Booth	Exhibitor	Booth	Exhibitor	Booth
ABET	417	Franklin, Beedle & Associates, Inc.	322	NSF Showcase	414
AccessComputing	421	Github Education	208	Oracle Academy	326
AccessCSforAll	421	Google	108	Pearson	410
ACM-W, ACM CCECC	525	Gradescope by Turnitin	217	Piazza Technologies, Inc	109
AdaCore	614	IAAMCS	421	SciGirls Code	421
AnitaB.org	523	IBM	413	Sense Education	422
ARC Network	421	ICCP	215	SIGCSE 2020	225
ASSECT	421	INTEL	315	SIGCSE 50th Celebration	124
Auburn University jGRASP.	111	Jones & Bartlett Learning	426	Springer	107
CCSC	622	Lighthouse	421	STARS Computing Corps	421
Cengage	616	Mercury Learning	118	Temple University, Department of Computer & Information Sciences	620
CodeHS	318	Microsoft	308	Turing's Craft, Inc.	329
CODIO	216	Mimir	314	Virginia Tech	114
CRA-W/CDC	421	MIT Press	213	Vocareum	521
CSTA	525	NCWIT	421	Wiley	113
CS Unplugged	421	NCWIT EngageCSEdu	427	zyBooks	102
DataCabinet	612				

SIGCSE 2019 GUIDE TO EXHIBITORS



SILVER SUPPORTER

ABET

Booth 417

415 N. Charles Street
Baltimore, MD 21201
www.abet.org

ABET is a nonprofit, non-governmental organization that accredits college and university programs in applied and natural science, computing, engineering and engineering technology. Our approach, the standards we set and the quality we guarantee, inspires confidence in those who aim to build a better world—one that is safer, more efficient, comfortable and sustainable.

AccessComputing

Booth 421

University of Washington
Box 354842
Seattle, WA 98195-4842
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.

AccessCSforAll

Booth 421

University of Washington
Box 354842
Seattle, WA 98195-4842
www.uw.edu/accesscomputing/
accesscsforall.org

AccessCSforAll works to increase the participation of students with disabilities in K-12 computing education through accessible tools and curricular units. Through a research practitioner partnership with schools that serve students with disabilities, we are testing the effectiveness of an accessible version of AP Computer Science Principles.

ACM CCECC

Booth 525

2 Penn Plaza, Suite 701
New York, NY 10121
www.women.acm.org

The ACM Committee for Computing Education in Community Colleges (CCECC) serves and supports community and technical college educators in all aspects of computing education. The Committee engages in curriculum and assessment development, community building, and advocacy in service to this sector of higher education.

ACM-W

Booth 525

2 Penn Plaza, Suite 701
New York, NY 10121
<http://www.women.acm.org>

ACM-W supports, celebrates, and advocates internationally for the full engagement of women in computing. With a wide range of programs and services to ACM members, ACM-W works in the larger community to advance the contributions of women in technology.

AdaCore

Booth 614

150 W. 30th Street
16th Floor
New York, NY 10001
www.adacore.com

AdaCore is the leading provider of commercial software solutions designed to help developers build safe, secure and reliable software. Products include a compilation solution for native and cross systems, a code generator, as well as tools for testing, code coverage, debugging, static analysis and formal proof. AdaCore is committed to encouraging safe and secure programming in academia and offers a free GNAT Academic Program (GAP) to educators and graduate students wanting to use Ada and SPARK. Visit Booth #614 to learn more about AdaCore and GAP, or to register for membership.

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

Booth 421

BATEC Center for IT
University of Massachusetts Boston
100 Morrissey Boulevard
Boston, MA 02125
www.batec.org

Advancing the Successful IT Student through Enhanced Computational Thinking (ASSECT) is a project of Broadening Advanced Technological Education Connections (BATEC), an NSF ATE National Center of Excellence for Computing and Information Technologies. ASSECT has developed a rubric for computational thinking in Information Technology and industry-relevant scenarios bundled into an entry level course to help students envision what it is like to be an IT Professional.

BRONZE SUPPORTER

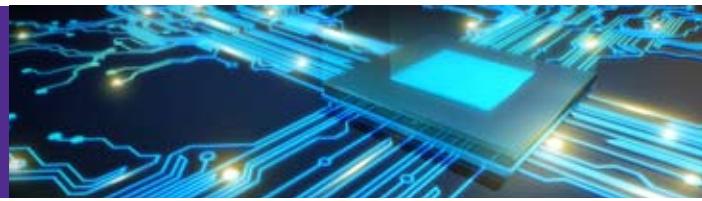
AnitaB.org

Booth 523

1501 Page Mill Road
MS 1105
Palo Alto, CA 94304
www.AnitaB.org

At AnitaB.org, we envision a future where the people who imagine and build technology mirror the people and societies for whom they build it. We connect, inspire, and guide women in computing, and organizations that view technology innovation as a strategic imperative. Our social enterprise supports women in technical fields, the organizations that employ them, and the academic institutions training our next generation. We offer programs to support women technologists as they grow, learn, and develop to their highest potential.

SIGCSE 2019 GUIDE TO EXHIBITORS



Association for Women in Science – The ARC Network

Booth 421

1667 K Street NW
Suite 800
Washington, DC 20006
www.equityinSTEM.org

The ARC Network creates and cultivates a broad community that bridges the gap between researchers and practitioners. As the STEM equity brain trust, the ARC Network works to promote systemic change for faculty in higher education. The ARC Network is funded by the National Science Foundation, Award HRD-1740860.

Auburn University- jGRASP

Booth 111

Computer Science and Software Engineering

3101 Shelby Center
Auburn, AL 36849-5347

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. A new jGRASP plugin for Eclipse includes the dynamic viewers and canvas integrated with the Eclipse debugger for Java.

CCSC

Booth 622

Huntington University
2303 College Avenue
Huntington, IN 46750
www.ccsc.org

The Consortium for Computing Sciences in Colleges (CCSC) sponsors ten regional conferences offering a high-quality, affordable venue for faculty to share research including pedagogical approaches, meet colleagues, and publish their work. Papers are double-blind, peer-refereed and published in the Journal of Computing Sciences in Colleges included in the ACM Digital Library. Conferences include keynote and banquet speakers, papers, tutorials, panels, vendors, nifty assignments, and workshops.

Cengage

Booth 616

303 Second Street
Suite 500 South
San Francisco, CA 94107
www.cengage.com

Cengage is the education and technology company built for learners. As the largest US-based provider of teaching and learning materials for higher ed, we offer valuable options at affordable price points. Our industry-leading initiatives include Cengage Unlimited, the first-of-its-kind all-access digital subscription service. We embrace innovation to create learning experiences that build confidence and momentum toward the future students want. Visit us at www.cengage.com

CodeHS

Booth 318

1328 Mission Street, Suite 8
San Francisco, CA 94110
<https://codehs.com>

CodeHS is a comprehensive teaching platform for helping schools teach computer science. We provide web-based curriculum, teacher tools and resources, and professional development. There are over 800,000 students using the platform and 10,000 classrooms on CodeHS every month. Come visit our booth to learn more about our newest courses and professional development opportunities including Cybersecurity and Interdisciplinary Coding Projects.

GOLD SUPPORTER

CODIO

Booth 216

177 Huntington Avenue
Suite 1703 #45670
Boston, MA 02115
www.codio.com

Codio is the leading web-based learning platform for CS education. We raise the performance of CS programs, giving faculty & instructors the tools to teach more effectively & creating a more engaging learning experience for students. Used globally by universities and MOOCs, Codio saves faculty time, reduces IT costs, boosts student engagement & unlocks new previously inaccessible learning insights. Learn more about Codio at www.codio.com and visit the team at booth #216.

CSTA

Booth 525

332 S. Michigan Avenue, 9th Floor
Chicago, IL 60604
www.csteachers.org

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

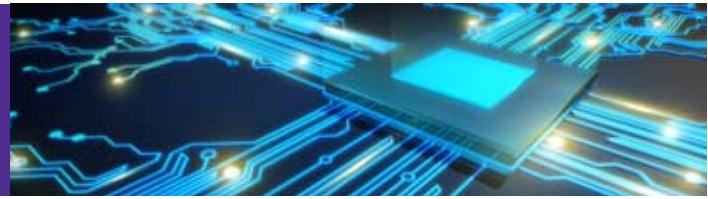
SIGCSE 2020

50th TECHNICAL SYMPOSIUM on COMPUTER SCIENCE EDUCATION

March 10 -14, 2020
Portland, Oregon



SIGCSE 2019 GUIDE TO EXHIBITORS



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

Booth 421

Auburn University
338 Shelby Technology Center
345 W. Magnolia Street
Auburn, AL 36830

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.

DataCabinet

Booth 612

404 Bryant Street
San Francisco, CA 94107
<https://datacabinet.info/index.html>

DataCabinet provides a social browser-based programming environment for computer classrooms. Using DataCabinet, computer classrooms can develop and share complex programming environments as assignments. Students get access to programming environment through industry standard notebooks. Instructors can manage grading and reporting and can also detect plagiarism. For more information about DataCabinet, please visit booth number 612.

Franklin, Beedle & Associates Inc.

Booth 322

2154 NE Broadway, Suite 100
Portland, OR 97232
www.fbeedle.com

Established in 1985, Franklin, Beedle is an independent publisher of computer science textbooks and course materials.

PLATINUM SUPPORTER

GitHub Education

Booth 208

88 Colin P. Kelly Jr St
San Francisco , CA 94107
<http://education.github.com>

Real-world tools, engaged students.

PLATINUM SUPPORTER

Google

Booth 108

1600 Amphitheatre Parkway
Mountain View, CA 94043
edu.google.com/computer-science/advanced

There's a reason why it's called higher education. It elevates people - their aspirations, and potential. Google Cloud provides an intelligent suite of tools that powers IT, researchers, faculty, and learners.

SILVER SUPPORTER

Gradescope by Turnitin

Booth 217

2101 Webster Street #1800
Oakland, CA 94612
www.gradescope.com

Gradescope is the leading assessment and feedback platform in higher education. By leveraging AI, we help reduce grading times by up to 80%, increase grading consistency and quality of feedback, and dramatically improve workflow versus traditional pen and paper grading. Gradescope was founded by former UC Berkeley TAs who were trying to reduce the pain that instructors experience with grading while also increasing the quality and timeliness of feedback for students.

SILVER SUPPORTER

IBM

Booth 413

2455 South Road
Poughkeepsie, NY 12601
www.research.ibm.com/university/

IBM University Programs include the Academic Initiative, Skills Academy and University Awards. The Academic Initiative focuses on making it easier for you to teach the latest technologies, providing access to open source and IBM software, hardware, course materials, and other resources. The Skills Academy is an integrated program providing faculty training, cloud infrastructure for labs, testing, and badge credentials. The Awards Program provides funding and resources for approved research.

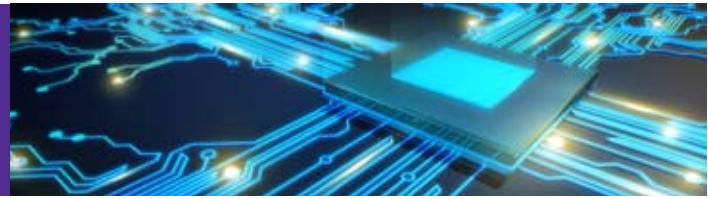
ICCP

Booth 215

224 South Randall Road, #116
Elgin, IL 60123

Stop by our booth 215 and learn how ICCP's outcome assessment program for Computer Science and Information Systems, based on ACM Model curriculum, can help your school with a national benchmarking performance evaluation. Sample reports will be available to look at. ICCP is a non-profit organization based out of Chicago, IL.

SIGCSE 2019 GUIDE TO EXHIBITORS



Institute for African American Mentoring in Computing Sciences (iAAMCS)

Booth 421

University of Florida
Department of Computer and Information
Science and Engineering
301 CISE Building
Gainesville, FL 32611
www.cise.ufl.edu/~juan/iAAMCS/index.html

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.

GOLD SUPPORTER

INTEL

Booth 315

2111 NE 25th Avenue
Mail Stop: JF5-202
Hillsboro, OR 97124
www.Intel.com

Intel® Corporation (booth #315) is redefining what it means to be an innovator, by ensuring the next generation of innovators are empowered, diverse and inclusive in harnessing the full power of technology to enable the best future possible for everyone. Intel® will share training materials for K-12 STEM initiatives, academic curriculum (undergraduate and graduate levels), and scientific research using real case study examples for hands-on experiments.

Jones & Bartlett Learning

Booth 426

5 Wall Street
Burlington, MA 01803
www.jblearning.com

Jones & Bartlett Learning is a world-leading provider of instructional, assessment, and learning-performance management solutions for the secondary education, post-secondary education, and professional markets. Our educational programs and services improve learning outcomes, enhance student achievement, and increase career readiness.

Lighthouse

Booth 421

Program in Science, Technology & Society
Department of Engineering & Society
University of Virginia Charlottesville,
VA 22904
www.LH4CS.org

Lighthouse is focused on developing effective educators who promote diversity in computing. **Tapestry** uses face-to-face learning workshops with high school teachers to increase the number and diversity of enrollments in HS computing. **Lighthouse CC** provides online and face-to-face diversity-focused professional development for community college computing instructors. **Lighthouse EC** promotes diverse engagement in undergraduate computing courses using enhanced collaborative learning strategies.

Mercury Learning and Information

Booth 118

22883 Quicksilver Drive
Sterling, VA 20166
www.merclearning.com

MERCURY LEARNING AND INFORMATION provides content in the areas of science and health, technology and computing, engineering, and mathematics (STEM disciplines) designed for the professional/reference, trade, library, higher education, career school, and online training markets. Our affordable and up-to-date texts are flexible and professor-friendly.

PLATINUM SUPPORTER

Microsoft

Booth 308

One Microsoft Way
Redmond, WA 98052
www.microsoft.com

Microsoft's mission is to empower every person and organization to achieve more. Our strategy is to build best-in-class platforms and productivity services for a mobile-first, cloud-first world. We develop and support a wide range of products, services, and devices that deliver new opportunities, greater convenience, and enhanced value to people's lives.

SILVER SUPPORTER

Mimir

Booth 314

10 W. Market Street, Suite 820
Indianapolis, IN 46204
www.mimirhq.com

Mimir is a software company that grows the software engineering workforce. The company's core product, Mimir Classroom, helps computer science instructors scale and automate curriculum without compromising quality for students. For more information about Mimir or Mimir Classroom, visit booth 314.

MIT Press

Booth 213

One Rogers Street
Cambridge , MA 02142
www.mitpress.mit.edu

The MIT Press is a leading publisher of books and journals at the intersection of science, technology, and the arts. MIT Press books and journals are known for their intellectual daring, scholarly standards, and distinctive design. Visit booth #213 and receive 30% off all books.

**Easy Autograded
Homework Program
Creation?**

The easiest.



Find out more
at Booth 329.

**IMPLEMENT
ASSIGNMENTS OR USE
PRE-LOADED COURSE
MATERIALS WITH
MIMIR CLASSROOM.
LEARN HOW AT
BOOTH 314**



Visit Us at Intel Booth #315

Intel is redefining what it means to be a technology innovator by working to ensure the next generation is empowered, diverse, and inclusive to enable a better future for everyone. Intel will share training materials for K-12 STEM initiatives, academic curricula, and scientific research using real case study examples for hands-on experiments.

Join Our SIGSCE 2019 Workshop

Jump Start Parallel Programming in Data Science, Artificial Intelligence, and More 10:45 a.m.-12:00 p.m.
Friday, March 1 in Lakeshore A

@intelnews www.intel.com

**SCALE YOUR
INNOVATION**

SIGCSE 2019 GUIDE TO EXHIBITORS



National Center for Women & Information Technology (NCWIT)

Booth 421

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

The National Center for Women & Information Technology (NCWIT) is a non-profit community of more than 1,100 universities, companies, non-profits, and government organizations nationwide working to increase girls' and women's meaningful participation in computing. NCWIT equips change leaders with resources for taking action in recruiting, retaining, and advancing women from K-12 and higher education through industry and entrepreneurial careers.

NCWIT EngageCSEdu

Booths 427

National Center for Women & Information Technology (NCWIT)
University of Colorado
Campus Box 417 UCB
Boulder, CO 80309
www.engage-csedu.org

Foster diversity in your introductory computer science courses with quality content and engaging pedagogy. EngageCSEdu is a platform for CS faculty teaching introductory level courses to find and share engaging materials for their courses. All materials in the collection make use of at least one "Engagement Practice": Research-based techniques for engaging ALL students. Because it is peer-reviewed, being published in EngageCSEdu offers another way for faculty to demonstrate teaching excellence.

NSF Showcase

Booth 414

85 Engineer's Way
Box 400740
Charlottesville, VA 22904
www.nsfshowcase.org

Every year, twenty projects that are currently being sponsored by NSF are asked to present their work in an interactive, personal format during the break sessions and open slots at SIGCSE. The goal of the showcase is to share information about programs and research opportunities that attendees might not otherwise hear about.

GOLD SUPPORTER

Oracle Academy

Booth 326

Oracle Corporation Headquarters
500 Oracle Parkway
Redwood City, CA 94065
academy.oracle.com

As Oracle's flagship philanthropic educational program, Oracle Academy advances computing education globally to drive knowledge, innovation, skills development, and diversity in technology fields. Through Oracle Academy, students receive hands-on experience with the latest technologies, helping make them college and career ready in the era of big data, artificial intelligence, machine learning, cloud computing, Internet of Things, and beyond.

Pearson

Booth 410

400 Center Ridge Drive, Suite F
Austin, TX 78753
www.pearson.com/us

Pearson, the world's leading learning company, partners with K-20 institutions and educators to provide educational solutions and services that help to improve learning outcomes. Pearson serves learners of all ages around the globe, employing 41,000 people in more than 70 countries. For more information, visit www.pearson.com/us.

Piazza Technologies

Booth 109

101 University Ave. Suite 300
Palo Alto, CA 94301
www.piazza.com

Piazza is the premier social learning platform used by 2.5 million students helping them learn beyond the classroom in more than 2000 universities in 90 countries. Students from all areas of STEM can work together collaboratively despite differences in gender, ethnicity, or socioeconomic status.

SciGirls Code

Booth 421

Twin Cities PBS
scigirlsconnect.org

SciGirls Code uses principles of connected learning with partners nationwide to provide middle school girls and their educators with computational thinking and coding skills. The program features: a nine-month curriculum; role-model training; professional development for STEM educators; and research that investigates girls' computational thinking and attitudes toward computer science.

Sense Education

Booth 422

1 W 85th Street
New York, NY 10024
sense.education

The future of education lies in preserving the learning dynamics of a small class, while accommodating massively more students. Sense lets educators virtually review and analyze every student's open-ended work, regardless of how many students there are. - Students receive the personal feedback they need to flourish - Faculty delivers assessments that are precise, unbiased, and fast - Educators continuously gain insights into what students understand. Courses improve. Outcomes improve. Everyone wins.

SIGCSE 2019 GUIDE TO EXHIBITORS



SIGCSE 50th Celebration

Booth 124

2 Penn Plaza, Suite 701
New York, NY 10121
www.sigcse.org

Come celebrate the 50th SIGCSE with your fellow attendees. Reminisce about conferences past and discuss what the future of the conference should become. View the historical information gathered while preparing for this year's celebration.

SIGCSE 2020

Booth 225

2 Penn Plaza, Suite 701
New York, NY 10121
www.sigcse.org

The 51st Technical Symposium will be held March 10 -14, 2020 on Portland, Oregon.

Springer

Booth 107

233 Spring Street
New York, NY 10013
www.springernature.com

Springer Nature is one of the world's leading global research, educational + professional publishers, home to respected + trusted brands providing quality content via a range of innovative products + services. Springer Nature is the world's largest academic book publisher in over 50 countries. www.springernature.com.

STARS Computing Corps

Booth 421

Director, STARS Computing Corps
Associate Professor and Chair
Department of Computer and Information Sciences
Temple University
1925 N. 12th Street
Philadelphia, PA 19122
www.starscomputingcorps.org

The STARS Computing Corps is a national alliance of over 50 academic institutions that develops college students and faculty as leaders who take action to broaden participation of underrepresented groups in computing. STARS members work with regional K-12 schools, industry, and community partners to inform, engage, and prepare future students for entry and success in college computing programs. Since 2006, STARS students have reached over 140,000 K-12 students in workshops, camps, and after school programs that introduce computer science concepts.

Sustainable Diversity in the Computing Research Pipeline (CRA-W/CDC) Alliance Computing Research Association

Booth 421

1828 L Street NW
Suite 800
Washington, DC 20036
www.cra-w.org

The Sustainable Diversity in the Computing Research Pipeline (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.

Temple University, Department of Computer & Information Sciences

Booths 620

Temple University, Department of Computer & Information Science (SERC 304)
1925 N. 12th St.
Philadelphia, PA 19122
<http://www.cis.temple.edu>

The Department of Computer and Information Sciences at Temple University is committed to excellence in computer science research and education. CIS has made significant strides in recent years, tripling annual research expenditures and ranking among the top 50 computer science departments in the US in terms of research productivity (ARWU Shanghai) and degree programs (ComputerScience.org). We are hiring to expand our strengths in research and education and to support future visions of computing.

GOLD SUPPORTER

Turing's Craft

Booth 329

671 E. 17th Street
Brooklyn, NY 11230
www.turingcraft.com

Turing's Craft, the company behind CodeLab and MyProgrammingLab – offers hundreds of online, instant feedback, coding exercises in each of Java, C++, C, C#, VB, Javascript, and Python. To date, over 140 million student code submissions have been checked. With the best student feedback in the industry, along with plagiarism checking, LMS integration, homework grading tools, easier-than-ever customization tools, and low pricing, there's never been a better time for trying us out.

SIGCSE 2019 GUIDE TO EXHIBITORS



Virginia Tech

Booths 114

2202 Kraft Drive
Blacksburg, VA 24060
www.vt.edu

Hear the latest developments from CS education researchers at Virginia Tech, and ask for live demonstrations of projects including CodeWorkout (small programming exercise), OpenDSA (eTextbook system), Web-CAT (automated program grading), BlockPy (transitioning from block-based to Python programming), and more. Learn about next-generation efforts in student feedback, including how feedback can encourage a growth mindset, support students, and encourage better time management. Learn about community infrastructure efforts for CS education tool builders.

SILVER SUPPORTER

Vocareum Inc.

Booth 521

2025 Gateway Place, Suite 205
San Jose, CA 95110
www.vocareum.com

Vocareum offers the leading cloud-based learning and assessment labs for a broad range of courses that require computation. Trusted by top tier universities, online MOOCs and industry partners, our platform capabilities include grading automation, plagiarism detection, team projects, and peer reviews for improved assignment management, assessment efficiency and student engagement.

Wiley

Booths 113

111 River Street
Hoboken, NJ 07030
www.wiley.com

For over 200 years Wiley has been helping people succeed. We develop digital education solutions to help universities and individuals move between education and employment and achieve their ambitions. In Education, we bring learning to life, delivering content solutions in new and innovative ways to enrich the learning experience. Wiley is a proven leader in strategic higher education consulting, partnering with educators and institutions globally to achieve success.

GOLD SUPPORTER

zyBooks

Booth 102

41 Main Street
Los Gatos, CA 95030
www.zyBooks.com

zyBooks is pioneering a new kind of learning content, created specifically for the modern web. A zyBook is web-native interactive content that helps students learn challenging topics, with auto-grading that saves instructors time and leads to better-prepared students in class — putting the fun back in learning. Our mission is to help STEM students gain the confidence and skills they need to graduate and succeed beyond the classroom.

LTI Integration?
LMS Support?

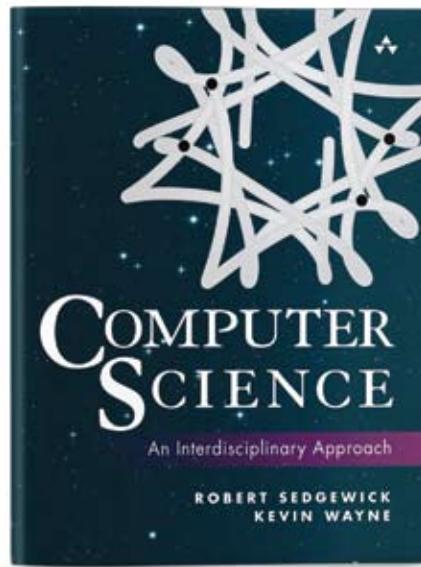
But of course!

Find out more
at Booth 329.

Robert Sedgewick & Kevin Wayne

authors of the bestselling text *Algorithms*

now offer a
comprehensive new
Computer Science
textbook...



...and a 21st-century model for the dissemination of knowledge, with video lectures and online content accompanying the books



Two of Princeton's most popular courses ...also reaching millions of teachers and learners worldwide.

coursera

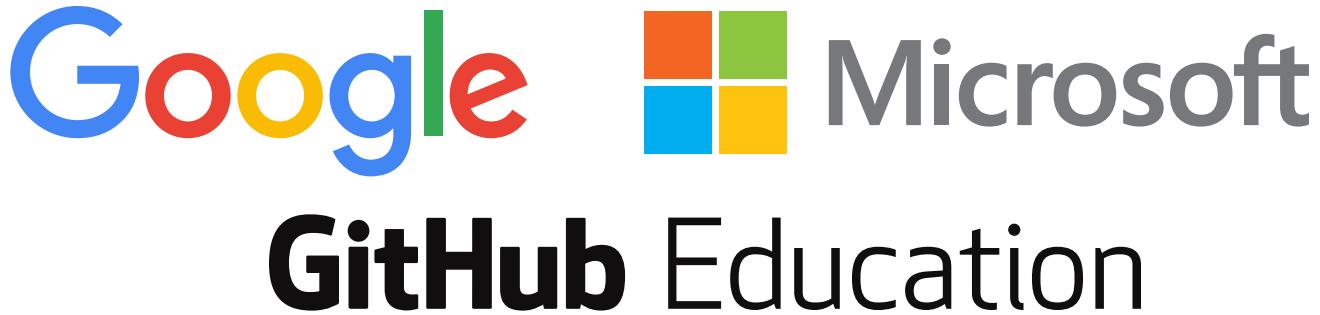
introcs.cs.princeton.edu
algs4.cs.princeton.edu

Pearson

THANK YOU

to our generous supporters for helping make SIGCSE 2019 a success!

PLATINUM SUPPORTERS



GOLD SUPPORTERS



SILVER SUPPORTERS



BRONZE SUPPORTER



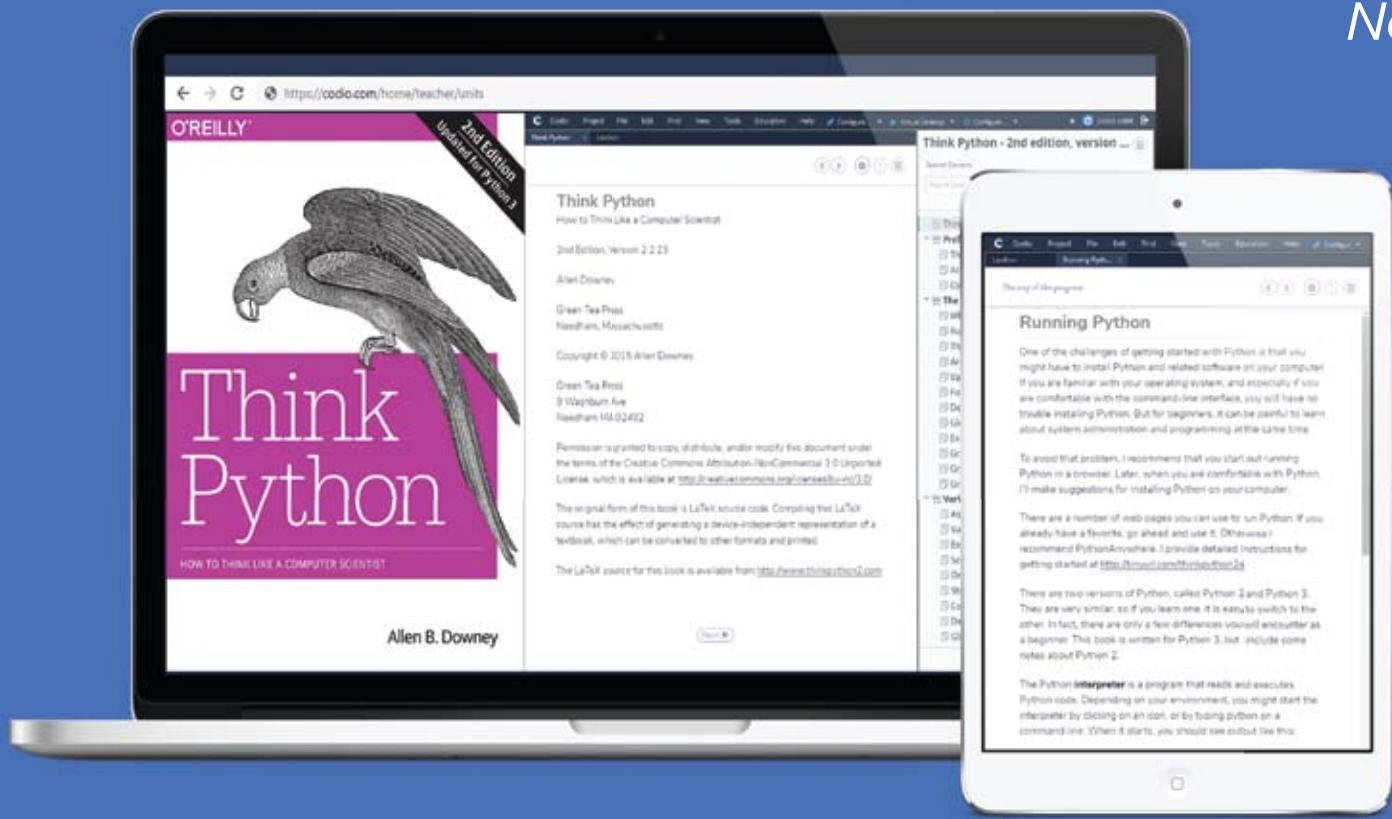
IN-KIND SUPPORT

GitHub Education
Lanyards
Conference Bags
Student Pizza Party

Turing's Craft
Volunteer T-Shirts

Oracle Academy
Refreshment Break

Microsoft
Conference Badges



“The most complete CS learning experience”

With Codio’s “Think Python” C-Book, you have complete support for your Introduction to Programming Python courses, including:

- ▶ Access to the full “Think Python” text book
- ▶ A full syllabus for a semester long course including all modules and teaching units mapped to the original text
- ▶ Set up of your Codio organization and classroom
- ▶ All assessments and interactivities presented within the Codio IDE and auto-gradable
- ▶ Supplementary practical labs, auto-graded where relevant
- ▶ Instructor and student dashboards of progress / completion
- ▶ Ability to use LTI to integrate your Codio class with your institution’s LMS
- ▶ Full 9am-6pm free technical support across all US time zones
- ▶ Full use of Codio project workspaces (Ubuntu VMs in the cloud)
- ▶ On-boarding support

Boost your students' interest, comprehension and commitment with zyBooks.



When you use zyBooks, you're not just providing students with interactive learning material. You're giving them instant autograded feedback in activities and programming labs. Increasing their participation, learning retention, and even their grade (yes, we have a study validating that). And, championing the cause of better computer science education. zyBooks is proud to be a SIGCSE Gold Sponsor for many years.

Complex CS Courses zyBooks Speakers.

Is your CS course too complex? How are you handling growth? We are hosting a 75-minute session to talk about it.

Location: Hyatt Lakeshore A, 1st Floor
Date: Thursday, February 28th
Time: 3:45 - 5:00 PM

SOME OF OUR MOST POPULAR LOWER DIVISION COMPUTER SCIENCE TITLES.



Give us your feedback at Booth 102.

We're seeking a few fans to leave a video testimonial about your experience with zyBooks.

zyBooks