SIGCSE 2017

48th TECHNICAL SYMPOSIUM on COMPUTER SCIENCE EDUCATION

Inspire, Innovate, Improve!

March 8-11, 2017

Washington State Convention Center
Seattle, Washington, USA

Conference Program
Exhibit Guide

Inspire the next generation of technologists with open and accessible CS education for all

CS education provides students with critical thinking skills, creativity, and the skills to drive innovation - in any field.

Our goal is to make CS engaging and accessible for students, parents, and educators worldwide. **Learn more at google.com/edu/cs**

Connect with Google at SIGCSE 2017

Meet the people behind the CS education tools, funding and programs at Google. **Visit us in Booth 102 for information on CS education resources.**

Inspire passion for CS

Make CS accessible

Be a part of the discussion:

Holistic Development of Underrepresented Students through Academic – Industry Partnerships
Thursday, March 9 from 1:45 - 3:00pm in Room 607

New Tools and Solutions to Address the CS Capacity Crunch
Thursday, March 9 from 3:45 - 5:00pm in Room 618-619

Improving Effectiveness of CS Teacher Professional Development
Thursday, March 9 from 6:30 - 7:20pm in Room 205

Curriculum and Interview Recommendations for Software Engineering Preparedness
Friday, March 10 from 10:45am - 12:00pm in Room 618-619

Diversity Barriers in K-12 Computer Science Education: Structural and Social
Friday, March 10 from 3:45 - 5:00pm in Room 612

Google

Conference Program & Exhibit Guide

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Message from the Symposium and Program Chairs 2017

Welcome to Seattle and SIGCSE 2017! Seattle is a vibrant, forward-thinking city that offers the perfect backdrop for SIGCSE. We are sure that together, the Symposium and Seattle's many attractions, such the Space Needle and Pike Place Market, will engage your mind and your sense of adventure.

The SIGCSE 2017 conference theme—Inspire, Innovate, Improve!—highlights our aim to inspire computing educators to innovate new teaching strategies, and to improve those strategies by engaging in the self-reflection and evaluation necessary to deliver the best possible learning outcomes for all. Our program showcases computer science education efforts in K-12, lower- and upper-level undergraduate courses, open-source software, outreach, and education research. A variety of sessions are sure to help you find what you are looking for, from Papers on experience reports, new curricula, and research studies, to Panels, Special Sessions, Workshops, Posters, Demonstrations, Birds of a Feather and the ACM SIGCSE Student Research Competition. We encourage you to visit our exciting Exhibits showcasing the latest in hardware, software tools, textbooks, educational programs, and educational research.

On Thursday, Jeannette Wing, Corporate Vice President for Microsoft Research, will deliver our opening plenary address. Jeannette will challenge us to embrace uncertainty in computing, which abounds in the real world where data drives discovery, as she helps us understand what implications this has for undergraduate computer science curricula. During our Saturday lunch, Mitchel Resnick, Professor of Learning Research at the MIT Media Lab, will discuss strategies for fulfilling Seymour Papert's dream of using programming as a new way for all children to explore, experiment, and express themselves. This year's recipient of the SIGCSE Award for Lifetime Service to the Computer Science Education Community, Mats Daniels (Associate Professor and director of undergraduate studies at the Department of Information Technology, Uppsala University, Sweden), will speak at the First Timers' Lunch on Friday and Gail Chapman (Director of Outreach for Exploring Computer Science), recipient of the SIGCSE Award for Outstanding Contributions to Computer Science Education, will give the Friday morning plenary address. We look forward to hearing the keynotes by these valued members of the SIGCSE community.

The SIGCSE Symposium strives to promote high-quality scholarship and community engagement around computer science education. 916 volunteers provided each Paper, Panel, Special Session, and Workshop with at least 5 reviews, and each Poster, Birds of a Feather, Demonstration, Lightning Talk, and ACM Student Research Competition submission with at least 3 reviews. These reviewers, along with 50 Associate Program Chairs (APC) and 8 Track Chairs, discussed the papers to come to consensus and resolve misunderstandings. The Program Chairs made final selections based on Track Chair and APC recommendations as well as importance to the SIGCSE community, novelty, and timeliness. The table at right shows the number of submissions received and accepted in each submission category.

Proposal Type	Accepted	Received	Acceptance Rate
Exemplary Paper	26	348	24.8% of accepted 7.5% of papers
Paper	105	348	30.2%
Panel	16	29	55.2%
Special Session	12	22	54.5%
Workshop	30	45	66.7%
Poster	48	140	34.3%
Birds of a Feather	36	74	48.6%
Demos	10	34	29.4%
Lightning Talks	12	18	66.7%
Student Research Competition	33	25	75.7%

This year we recognize a new category of the top 25% of accepted papers as "Exemplary papers", highlighted by the Program Chairs for their accomplishment of high quality, novelty and broad appeal to reviewers. The Program Chairs also selected three best papers, that each received at least 2 of the highest rankings from reviewers. The Best CS Education Research Paper is "Computing with CORGIS: Diverse, Real-world Datasets for Introductory Computing" by Austin Bart, Ryan Whitcomb, Dennis Kafura, Cliff Shaffer and Eli Tilevich. The Best New Program Paper is "Infrastructure for Continuous Assessment of Retained Relevant Knowledge" by Kathleen Timmerman and Travis Doom. The Best Experience Report Paper is "Making Noise: Using Sound-Art to Explore Technological Fluency" by Erik Brunvand and Nina McCurdy.

The 2017 Pre-symposium Events include: POGIL in CS: Small Steps & Giant Leaps (Clif Kussmaul, et al); Managing the Early Academic Career for Women Graduate Students Pursuing Faculty Positions in Undergraduate Computing Programs (CRA-W); Managing the Early Academic Career for Women Faculty in Undergraduate Computing Programs (CRA-W); Strategies for Integrating Driverless Cars into the Computing Curricula (SIGCAS); Aligning to the ACM Cybersecurity-infused CS Transfer Curriculum (CCECC); Making K-12 CS Accessible (Access10K); POSSE Roundup—Student Participation in Humanitarian Open Source Software (Gregory Hislop, et al); NSF UP CS Ed Research Event for Emerging CS Education Researchers at SIGCSE (Eileen Kraemer, et al); Seeking Global, Industry and Training Provider Perspectives to Inform the ACM Joint Task Force for Cybersecurity Education (ACM JTF for Cybersecurity Education); and the Department Chairs Roundtable (SIGCSE).

A symposium as large as SIGCSE 2017 involves the efforts of many people and we wish to thank all of them for their help in making the event a success. Our program committee members (Ruth Anderson, Bo Brinkman, Alison Clear, Tom Cortina, Michelle Craig, Lynn Degler, Paul Denny, Brian Dorn, Phil East, Charles Hardnett, Rachelle Kristof Hippler, Sarah Heckman, Matt Jadud, Cary Laxer, Sara Melnick, Brad Miller, Larry Merkle, Christine Moore, David Musicant, Jill Pieritz, S. Monisha Pulimood, Ann Sobel, Leenkiat Soh, Leigh Ann Sudol-DeLyser, Valerie Henderson Summet, Paul Tymann, Steven Wolfman, and Jian Zhang) have worked tirelessly on many details.

This year the Associate Program Chairs and Track Chairs served as discussion leaders to help reviewers resolve differences in individual perspectives to create a more comprehensive review process (Eric Aaron, Liz Adams, Joel Adams, Rajeev Agrawal, Carl Alphonce, Christine Alvarado, Ruth Anderson, Marie Bienkowski, Don Blaheta, Kristy Elizabeth Boyer, Bo Brinkman, Alistair Campbell, Lilian Cassel, Michael Clancy, Steve Cooper, Adrienne Decker, Leigh Ann Sudol-DeLyser, John Dougherty, Kathi Fisler, Judith Gal-Ezer, Don Goelman, Elizabeth Hawthorne, Sarah Heckman, Cecily Heiner, Sharon Hsiao, Daniel Joyce, Andrew Ko, Michael Kölling, David Levine, Colleen Lewis, Lester McCann, Robert McCartney, Kris Nagel, Jody Paul, Manuel Pérez-Quiñones, S. Monisha Pulimood, Samuel Rebelsky, Brad Richards, Judy Sheard, Mark Sherriff, Beth Simon, Jaime Spacco, Luther Tychonievich, Paul Tymann, Jan Vahrenhold, Tammy Vandegrift, Henry Walker, Ellen Walker, Steven Wolfman, Ursula Wolz, and Jian Zhang).

The International Liaison Committee (Craig Anslow, Karen Bradshaw, Paul Denny, Daniel Fokum, Mehdi Jazayeri, Carsten Kleiner, Tsunenori Mine, Kazushi Ohya, Marco Silva, Ben Stephenson, Claudia Szabo, Gary Wong, and Ming Zhang) ensures that attendees from all over the world find SIGCSE 2017 a welcoming and rewarding experience.

The many student volunteers, led this year by Sarah Heckman, are the engine that makes the Symposium go, by preparing conference bags, checking registration badges, distributing t-shirts, and counting attendance at sessions,

Our supporters, vendors, exhibitors and in-kind donors make the Symposium possible. We especially wish to thank our platinum supporters: Google, IBM, Intel, Microsoft, and Vocareum; our gold supporters: Oracle Academy and ZyBooks; our silver supporters: ABET, Codio, GitHub, Gradescope, LEGO Education and Terradata University Network; and our bronze supporter: NVIDIA.

Your experience at SIGCSE 2017 is influenced in countless ways by the planners at Executivevents: Cara Candler, Elizabeth Taggart, Brooke Daley, Roxane Rose, and Shannon Cunningham. Your experience has been further enhanced by the SIGCSE 2017 Puzzle Challenge by Zach Butler (Rochester Institute of Technology) and the CONNECT networking app by Tracy Camp and her CONNECT Team (Colorado School of Mines).

A debt of gratitude is owed to Amber Settle (President) and the entire SIGCSE Board. Additional thanks go to Bob Beck and Scott Grissom (SIGCSE Symposium Site Coordinators), April Mosqus and Donna Cappo (ACM staff), Lisa Tolles (Sheridan Publishing), Bill Guckert (WRG Design), Sun Kim (Washington State Convention Center), Emily Elkind and Meaghan Fox (Sheraton Seattle), and Kelly Amig (Grand Hyatt). We'd also like to extend a special thank you to Aaron Davis of Visit Seattle, who went above and beyond to help support the conference committee and representatives of all the organizations involved. These outstanding individuals have contributed a myriad of details that go into the planning of a successful conference and we are grateful to each and every one of them.

Our home institutions (Aarhus University, NC State University, UC Berkeley, and Virginia Tech) have generously supported our service to the SIGCSE community as Symposium organizers.

We are inspired and humbled by the engagement and support of the SIGCSE community and volunteers. We thank you for your contributions, and we are excited to welcome you to SIGCSE 2017, where we hope you will connect with friends and colleagues old and new, and Inspire, Innovate, and Improve computer science education.

Stephen Edwards

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Virginia Tech

Michael Caspersen

Symposium Co-Chair
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Lightning Talks
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SIGCSE 2017 Symposium At-A-Glance

WiFi Network:
SIGCSE2017
Access Code:
seattle2017

Wednesday • March 8

8:30 am - 5:30 pm	Pre-symposium Events	See page 12
3:00 pm - 9:30 pm	Registration	Atrium Lobby, Exhibit Hall
7:00 pm - 10:00 pm	Workshops 101-110	See pages 12-13

Thursday • March 9

7:30 am - 5:50 pm	Registration	Atrium Lobby, Exhibit Hall
8:30 am - 10:00 am	Opening Keynote: Jeanette Wing	Room 6E
10:00 am - 10:45 am	Break, Exhibits & Demos	Exhibit Hall
10:00 am - 11:30 am	NSF Showcase #1	Exhibit Hall
10:45 am - 12:00 pm	Technical Sessions	See pages 14-15
12:00 pm - 1:45 pm	First Timer's Lunch & Lifetime Service Awardee Keynote: Mats Daniels	Room 6B
12:00 pm - 1:45 pm	Lunch Break	On your own
1:45 pm - 3:00 pm	Technical Sessions	See pages 16-17
1:45 pm - 5:00 pm	Student Research Posters	Exhibit Hall
3:00 pm - 3:45 pm	Break, Exhitits & Demos	Exhibit Hall
3:00 pm - 4:30 pm	NSF Showcase #2	Exhibit Hall
3:45 pm - 5:00 pm	Technical Sessions	See pages 18-19
5:30 pm - 6:20 pm	Birds of a Feather: Flock 1	See page 36
6:30 pm - 7:20 pm	Birds of a Feather: Flock 2	See page 37
7:30 pm - 9:30 pm	SIGCSE Reception	Sheraton Grand Ballroom

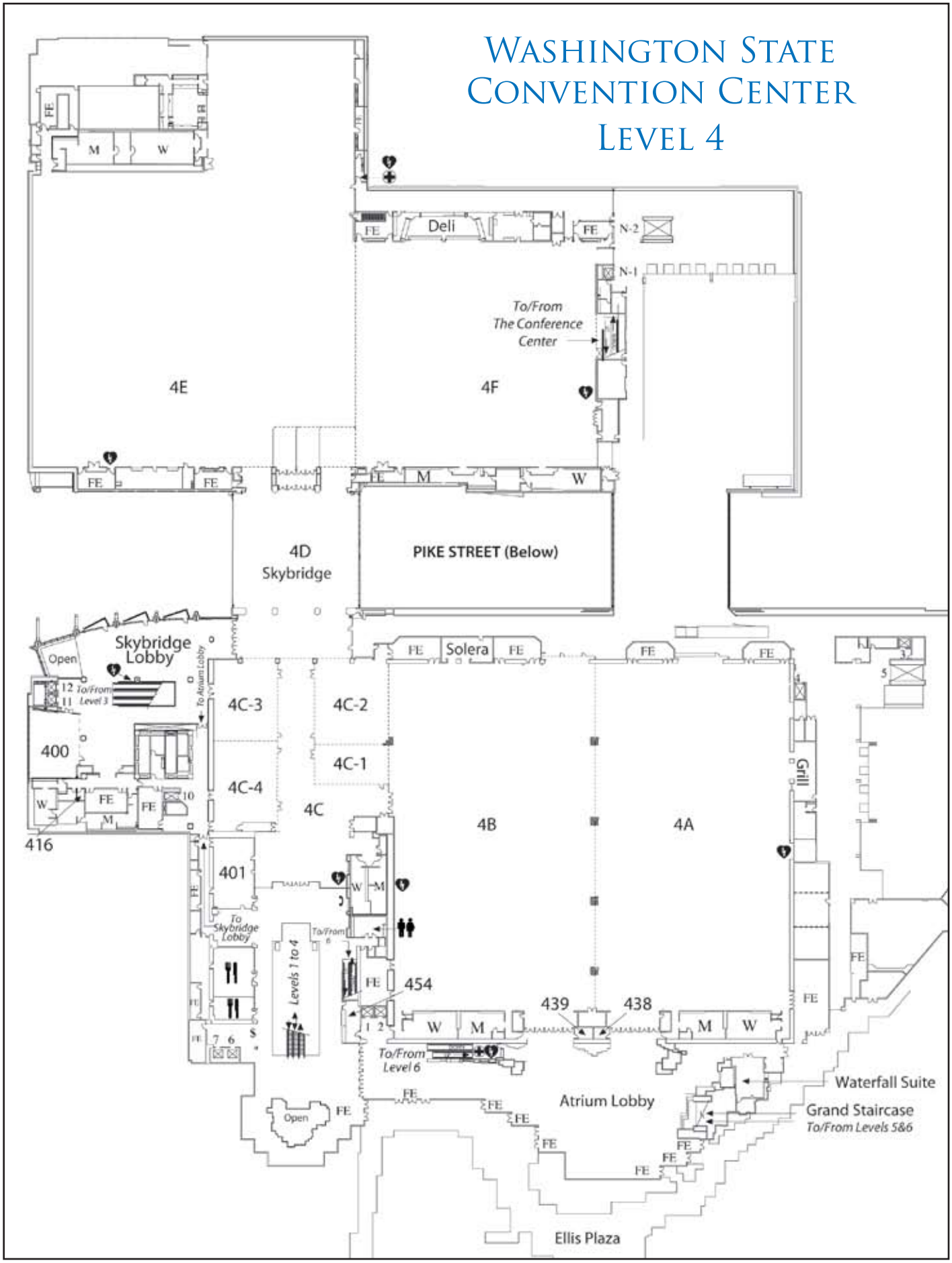
Friday • March 10

7:00 am – 8:30 am	Breakfast with BlueJ and Greenfoot	6B
8:00 am - 5:00 pm	Registration	Atrium Lobby, Exhibit Hall
8:30 am – 10:00 am	Outstanding Contributor Awardee Keynote: Gail Chapman	Room 6E
10:00 am – 10:45 am	Break, Exhibits & Demos	Exhibit Hall
10:00 am – 11:30 am	NSF Showcase #3	Exhibit Hall
10:00 am – 12:00 pm	Poster Session #I	Exhibit Hall
10:45 am – 12:00 pm	Technical Sessions	See pages 21-22
12:00 pm – 1:45 pm	Lunch Break	On your own
12:00 pm – 1:45 pm	CRA Faculty Lunch	Room 6B
12:00 pm – 1:45 pm	International Lunch	TBD
1:45 pm – 3:00 pm	Technical Sessions	See pages 23-24
3:00 pm – 3:45 pm	Break, Exhibits & Demos	Exhibit Hall
3:00 pm – 4:30 pm	NSF Showcase #4	Exhibit Hall
3:00 pm – 5:00 pm	Poster Session #2	Exhibit Hall
3:45 pm – 5:00 pm	Technical Sessions	See pages 25-26
5:10 pm – 6:00 pm	SIGCSE Business Meeting	Room 6E
6:00 pm - 7:00 pm	NCWIT Reception	Sheraton, Cirrus Ballroom
6:10 pm – 7:00 pm	CCSC Business Meeting	Room 6E
7:00 pm - 8:00 pm	Community College Reception	Sheraton Diamond Room
7:00 pm – 10:00 pm	Workshops 301-310	See pages 26-27

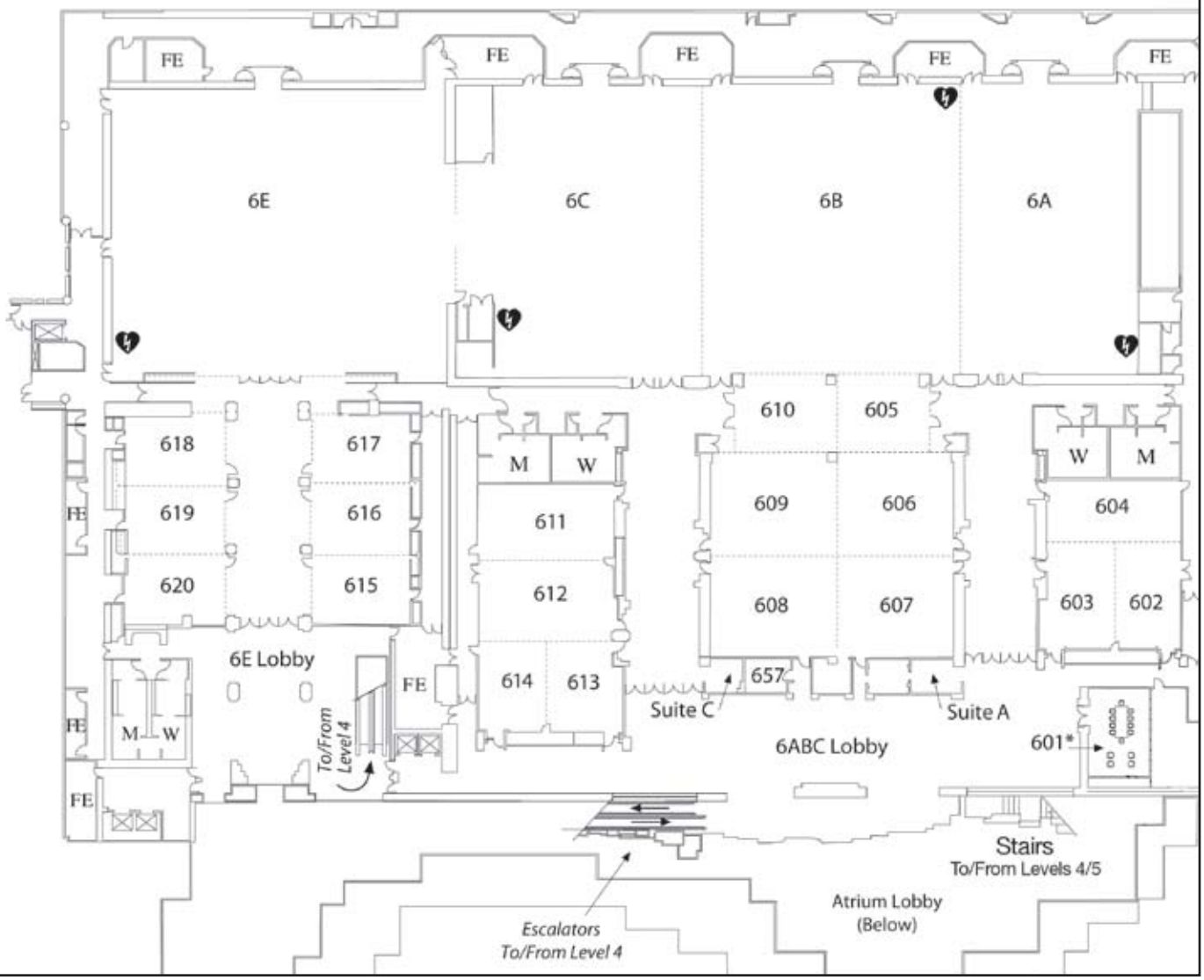
Saturday • March 11

8:30 am - 11:45 am	Registration	Atrium Lobby, Exhibit Hall
8:45 am – 10:00 am	Undergraduate ACM SRC Semifinalists	Room 611
8:45 am – 10:00 am	Graduate ACM SRC Semifinalists	Room 612
8:45 am – 10:00 am	Technical Sessions	See page 25
10:00 am – 10:45 am	Break, Exhibits & Demos	Exhibit Hall
10:00 am – 11:30 am	NSF Showcase #5	Exhibit Hall
10:45 am – 12:00 pm	Technical Sessions	See pages 28-29
10:45 am – 12:00 pm	Lightning Talks	Room 609
12:00 pm – 2:00 pm	Luncheon & Closing Keynote Mitchel Resnick	Room 6B-6C
3:00 pm – 6:00 pm	Workshops 401-410	See page 29

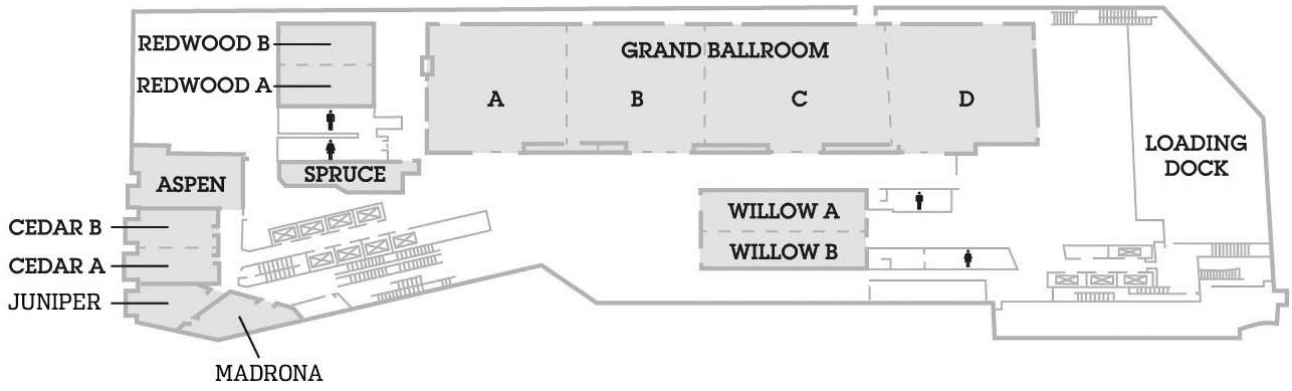
Washington State Convention Center Level 4



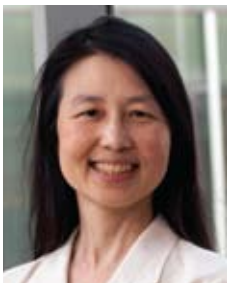
Washington State Convention Center - Level 6



Sheraton Hotel - 2nd Floor



Keynote Presentations



Thursday, March 9 - Opening Keynote

8:30 am - 10:00 am
Room: 6E

Embracing Uncertainty

Jeannette Wing, *Corporate Vice President, Microsoft Research*

Sources of uncertainty abound. Noisy sensor data. Machine learning methods. Hardware and software failures. The physical world. Human behavior. In the past, computer science handled uncertainty by abstracting it away or avoiding it. In the future, instead, computer science needs to embrace uncertainty as a first-class entity. How do we represent uncertainty in our computational models? Probabilities. Thus, we need to make sure that every computer science student learns probability and statistics.

Data science, where data drives discovery and decision-making in all fields of study, underscores the importance of having a command of probability and statistics. At the heart of data science is data analytics whose methods such as machine learning rely on probabilistic and statistical reasoning. And since data serve as the currency of any data analytics workflow, explicit representation of probability distributions can help us calculate the degrees of uncertainty throughout a flow. Programming and software engineering courses will need to elevate the status of such data flows to that given to algorithms, data structures, and modular design.

In this talk I will discuss the implications of embracing uncertainty on undergraduate computer science curricula.

Thursday, March 9 - First Timer's Lunch Keynote & 2017 SIGCSE Award for Lifetime Service to the Computer Science Education Community

12:00 pm - 1:45 pm
Room: 6B

The Educator Identity and its Impact

Mats Daniels, *Associate Professor, Department of Information Technology*
Uppsala University, Uppsala,Sweden

I'm going to address the educator identity from two perspectives. The first is my own perspective, where I will present what my educator identity means to me and what this has led me to devote time and energy on. My vision is that I want to be part of creating learning environments that benefit both the learner as an individual and society in general from many dimensions and purposes. As an educator I want to support our students on a route to become able and conscious graduates who will have a positive impact and be seen as truly professionally competent wherever their career takes them. This sounds hunky-dory, but how can it be achieved? I don't think there are any silver bullets that will lead to such a setting, but I do believe that knowing more is a way forward. Having no clear way forward was frustrating and this is where involvement in educator communities, like the SIGCSE community, became essential. Giving time and effort to such communities is, in my opinion, rewarding itself manyfold, not least, in my case, for aiding to understand the issues and opportunities involved in pursuing my vision. Developing my identity as educator through being part of the SIGCSE community, with its abundance of role models, has been invaluable for me. I hope my work will be an inspiration for others.

Computing and engineering education research is the other big part in my strive for fulfilling my educator dreams. Or should I say pipe dreams as in the title of my thesis "Developing and Assessing Professional Competencies: a Pipe Dream? Experiences from an Open-Ended Group Project Learning Environment", which I defended on the day thirty years after I enrolled as a PhD student? No, I don't see it as a pipe dream even though there are much more to look into and understand regarding education in our field. This research area is the second perspective I want to bring up regarding educator identity, and I will use the research lens to look at the impact we as educators have on our students. My focus will be on the influence educators have on students learning with regard to aspects beyond pure computing skills. I will in the presentation build on work in our research group (UpCERG), which lately has included studying issues related to identity, both students and educators. I especially want to draw attention to the potential impact we as educators have on the "gap" between graduating truly professionally competent persons and merely technically competent persons.

Keynote Presentations

Friday, March 10 - Morning Keynote & 2017 SIGCSE Award for Outstanding Contributions to Computer Science Education

8:30 am - 10:00 am
Room: 6E

Inspire, Innovate, Improve! What does this mean for CS for All?

Gail Chapman, *Director of Outreach, Exploring Computer Science*

In January 2016, President Obama unveiled the CS for All initiative. With all the attention and publicity surrounding CS for All and increased support from a variety of corners over the ensuing year, it is easy to become complacent and start believing that we have "arrived".

During her 2016 SIGCSE keynote, Jan Cuny talked about catching the wave and using it to our advantage. This talk will focus on where we go from here. We caught the wave; now what do we do to ensure that we don't get swallowed by it? What lessons can be learned from an election that featured the likes of fake news, Wiki leaks, rogue email servers, runaway tweets and showed in stark relief the divides that exist in our country.

Computer science represents one of those divides. Given this and the fact that addressing the educational inequities prevalent in computer science was front and center in the CS for All announcement, what better time is there to renew our commitment to broadening participation in computing?

As educators we have a powerful opportunity and responsibility in the wake of the blowback from the election - to educate, to listen, to remind ourselves constantly that we live in a very diverse country. We have no shortage of innovation in computer science, but who are we inspiring, what impact are those innovations having, and what can we do to learn from the lessons of the past to improve CS education? And above all, how do we respond to the challenges before us with empathy for those who are impacted by the decisions we make?

Saturday, March 11 - Luncheon & Closing Keynote

12:00 pm - 2:00 pm
Room: 6B-6C

Fulfilling Papert's Dream: Computational Fluency for All

Mitchel Resnick, *Professor of Learning Research, MIT Media Lab*

Fifty years ago, Seymour Papert and colleagues developed Logo as the first programming language for children. Today, millions of children are participating in learn-to-code initiatives, but Papert's dream remains unfulfilled. Papert (who passed away last summer) saw programming not as a set of technical skills but as a new form of fluency — a new way for all children to explore, experiment, and express themselves. In this presentation, I will examine strategies for fulfilling Papert's dream. Drawing on examples from our Scratch online coding community, I will discuss how we can design programming environments and activities to help all children, from all backgrounds, to develop their thinking, develop their voices, and develop their identities.

SIGCSE 2017 Schedule of Events

Wednesday, March 8

Pre-Symposium Events

8:30 am - 5:00 pm	**Department Chairs Roundtable** Mary Lou Maher, *University of North Carolina at Charlotte*	**Room 616-617**
8:30 am - 5:00 pm	**Making K-12 Computer Science Accessible** Richard Ladner, *University of Washington;* Andreas Stefik, *University of Nevada Las Vegas;* Brianna Blaser, *University of Washington*	**Room 604**
8:30 am - 5:00 pm	**Managing the Early Academic Career for Women Faculty in Undergraduate Computing Programs** Sheila Castaneda, *Clarke University;* Susan Rodger, *Duke University*	**Room 606**
8:30 am - 5:00 pm	**Managing the Early Academic Career for Women Graduate Students Pursuing Faculty Positions in Undergraduate Computing Programs** Sheila Castaneda, *Clarke University;* Susan Rodger, *Duke University*	**Room 607**
8:30 am - 5:00 pm	**POGIL in CS: Small Steps & Giant Leaps** Clifton Kussmaul, *Muhlenberg College;* Helen Hu, *Westminster College;* Chris Mayfield, *James Madison University*	**Room 602**
8:30 am - 5:30 pm	**POSSE Roundup – Student Participation in Humanitarian Open Source Software** Gregory Hislop, Drexel University	**Room 613-614**
8:30 am - 5:00 pm	**Seeking Global, Industry and Training Provider Perspectives to Inform the ACM Joint Task Force for Cybersecurity Education** Diana Burley, *The George Washington University;* Matt Bishop, *University of California, Davis;* Siddharth Kaza, *Towson University;* Elizabeth Hawthorne, *Union County College;* David Gibson, *United States Air Force Academy;* Scott Buck, *Intel Corp.*	**Room 618-619**
1:00 pm - 5:00 pm	**Strategies for Integrating Driverless Cars into the Computing Curricula** Michael Goldweber, *Xavier University;* Karla Carter, *Bellevue University;* Shannon Conley, Michael Kirkpatrick, Dee Weikle, Emily York, *James Madison University;* Michael Quinn, *Seattle University*	**Room 603**
1:30 pm - 5:00 pm	**Aligning to the ACM Cybersecurity-infused Computer Science Transfer Curriculum** Elizabeth Hawthorne, *Union County College;* Cara Tang, *Portland Community College;* Cindy Tucker, *Bluegrass Community and Technical College;* Christian Servin, *El Paso Community College*	**Room 612**
1:30 pm - 5:00 pm	**NSF UP CS Ed Research Event for Emerging CS Education Researchers at SIGCSE** Eileen Kraemer, Russ Marion, Murali Sitaraman, *Clemson University*	**Room 611**

Wednesday Workshops 7:00 pm - 10:00 pm

Workshop 101	**GP: A General Purpose Blocks-Based Language** John Maloney, Michael Nagle, Jens Mönig, *Human Advancement Research Community;* Mark Guzdial, *Georgia Institute of Technology*	**Room 618-619**
Workshop 102	**Designing Empirical Education Research Studies (DEERS): Creating an Answerable Research Question** Sarah Heckman, *North Carolina State University;* Jeffrey Carver, *University of Alabama;* Mark Sherriff, *University of Virginia*	**Room 616-617**
Workshop 103	**A Web-Based IDE for Teaching with Any Language** David Malan, *Harvard University;* Nikolai Onken, *Amazon,* Dan Armendariz, *Harvard University*	**Room 613-614**

Workshop 104	**Increasing Student Interest in Data Structures Courses with Real-World Data and Visualizations Using BRIDGES** Kalpathi Subramanian, *The University of North Carolina at Charlotte;* Jamie Payton, *Temple University*	Room 606
Workshop 105	**Using AppVis to Build Data-rich Apps with MIT App Inventor** Fred Martin, *University of Massachusetts Lowell;* Samantha Michalka, *Olin College;* Harry Zhu, *University of Massachusetts Lowell;* Jere Boudell, *Clayton State University*	Room 611
Workshop 106	**An Introduction to the Weka Data Mining System** Ingrid Russell, *University of Hartford;* Zdravko Markov, *Central Connecticut State University*	Room 607
Workshop 107	**What's New in BlueJ 4: Git, Stride and More** Neil Brown, Amjad Altadmri, *University of Kent*	Room 612
Workshop 108	**Micro Projects: Putting Light and Magic into Learning Computer Systems Concepts** Frank Barry, *Appalachian State University*	Room 603
Workshop 109	**Teaching Distributed Computing with WorkQueue** Aaron Dingler, *Seattle Pacific University;* Peter Bui, *University of Notre Dame*	Room 604
Workshop 110	**Peer Instruction in Practice** Cynthia Taylor, Joe Hummel, *University of Illinois-Chicago;* David Hovemeyer, *York College;* David Bunde, John Dooley, Jaime Spacco, *Knox College*	Room 602

For a full list of workshops and descriptions visit: http://sigcse2017.sigcse.org/attendees/workshops.html

KEYNOTE SESSION

8:30 am -10:00 am	**Welcome:** Michael E. Caspersen, *Symposium Co-Chair, Aarhus University,* Stephen H. Edwards, *Symposium Co-Chair, Virginia Tech* **Plenary Session: Embracing Uncertainty** Jeanette Wing, *Microsoft Research*	**Room 6E**

10:00 am - 10:45 am	**Break, Exhibits & Demos**	**Exhibit Hall**
10:00 am - 10:45 am	**Demo Session #1**: Sarah Heckman, *Chair* **The Micro:bit: Hands-on Computing for the New Generation** Thomas Ball, *Microsoft Research;* Judith Bishop, *University of Stellenbosch;* Jonathan De Halleux, *Microsoft Research* **Elegit: Git Learning Tool for Students** Eric Walker, Julia Connelly, David Musicant, *Carleton College*	**Exhibit Hall**
10:00 am - 11:30 am	**NSF Showcase #1** *(See page 41 for a complete listing of NSF Showcases)*	**Exhibit Hall**

Sessions Themes are Grouped by the Following Color Codes:

K-12/Novice Learners | CS1 | Learning/Instructional Styles | TOCE Sessions | Workshops, Special Sessions, Panels

Diversity | Advance Topics | Supporter Sessions

THURSDAY SESSIONS 10:45 am - 12:00 pm

PAPER SESSIONS	10:45 AM	11:10 AM	11:35 AM
Computational Thinking Chair: Marie Bienkowski, *SRI International* **Room 611**	**Assessing Children's Understanding of the Work of Computer Scientists: The Draw-a-Computer-Scientist Test** Alexandria K. Hansen, University of California at Santa Barbara; Hilary Dwyer, CU Boulder; Ashley Iveland, Mia Talesfore, Lacy Wright, University of California, Santa Barbara; Danielle Harlow, University of California at Santa Barbara; Diana Franklin, UC Santa Barbara	**Assessing Computational Thinking in CS Unplugged Activities** Brandon Rodriguez, Stephen Kennicutt, Cyndi Rader, Tracy Camp, *Colorado School of Mines*	**Recommendations for Designing CS Resource Sharing Sites for All Teachers** Mackenzie Leake, *Stanford University;* Colleen M. Lewis, *Harvey Mudd College*
Robots & Wearables Chair: Kathi Fisler, *WPI* **Room 612**	**Making Robot Challenges with Virtual Robots** Kevin J. Gucwa, Harry H. Cheng, *UC Davis*	**A Modern Wearable Devices Course for Computer Science Undergraduates** Chris Gregg, Raewyn Duvall, Kate Wasynczuk, *Tufts University*	**Computer Science Outreach with End-User Robot-Programming Tools** Vivek Paramasivam, Justin Huang, Sarah Elliott, Maya Cakmak, *University of Washington*
Novice Learners Chair: Luther Tychonievich, *University of Virginia* **Room 613-614**	**Measuring Student Learning in Introductory Block-Based Programming: Examining Misconceptions of Loops, Variables, and Boolean Logic** Shuchi Grover, Satabdi Basu, *SRI International*	**Variable Evaluation: an Exploration of Novice Programmers' Understanding and Common Misconceptions** Tobias Kohn, *ETH Zurich*	**Semantic Reasoning in Young Programmers** David Touretzky, *Carnegie Mellon University;* Christina Gardner-McCune, Ashish Aggarwal, *University of Florida*

THURSDAY SESSIONS 10:45 am - 12:00 pm

PAPER SESSIONS	10:45 AM	11:10 AM	11:35 AM
Data Chair: Sharon Hsiao, *Arizona State University* **Room 608**	**Teaching Big Data and Cloud Computing with a Physical Cluster** Jesse Eickholt, Sharad Shrestha, *Central Michigan University*	**Using Programming Process Data to Detect Differences in Students' Patterns of Programming** Adam Carter, *Humboldt State University;* Christopher Hundhausen, *Washington State University*	**Introducing Data Science to School Kids** Shashank Srikant, Varun Aggarwal, *Aspiring Minds*
Analytics Chair: David Levine, *Saint Bonaventure University* **Room 609**	**Exemplary Paper** **Deconstructing the Discussion Forum: Student Questions and Computer Science Learning** Mickey Vellukunnel, *University of Florida;* Philip Buffum, *North Carolina State University;* Kristy Elizabeth Boyer, *University of Florida;* Jeffrey Forbes, *Duke University;* Sarah Heckman, *North Carolina State University;* Ketan Mayer-Patel, *University of North Carolina*	**Exposed! CS Faculty Caught Lecturing in Public: A Survey of Instructional Practices** Scott Grissom, *Grand Valley State University;* Sue Fitzgerald, *Metropolitan State University;* Renée McCauley, *College of Charleston;* Laurie Murphy, *Pacific Lutheran University*	**Investigating Student Plagiarism Patterns and Correlations to Grades** Jonathan Pierce, Craig Zilles, *University of Illinois at Urbana-Champaign*
***Transactions on Computing Education* 1** Chair: Christopher Hundhausen, *Washington State University* **Room 615**	**Security Injections@Towson: Integrating Secure Coding into Introductory Computer Science Courses** Blair Taylor, Siddharth Kaza, *Towson University*	**Heuristic Evaluation for Novice Programming Systems** Michael Kölling, Fraser McKay, *University of Kent*	**Novice Java Programming Mistakes: Large-Scale Data vs. Educator Beliefs** Neil C.C. Brown, Amjad Altadmri, *University of Kent*

SPECIAL SESSIONS, PANELS, SUPPORTER SESSIONS 10:45 am - 12:00 pm

Panel Session	**The Role of CS Departments in The US President's "CS for All" Initiative** Mark Guzdial, Barbara Ericson, *Georgia Institute of Technology;* W. Richards Adrion, *U. Mass Amherst;* Meagan Garvin, *U. Maryland, Baltimore County/CSEE Dept*	**Room 6E**
Panel Session	**Community Engagement with Free and Open Source Software** Christian Murphy, *University of Pennsylvania;* Kevin Buffardi, *California State University, Chico;* Josh Dehlinger, *Towson University;* Lynn Lambert, *Christopher Newport University;* Nanette Veilleux, *Simmons College*	**Room 606**
Special Session	**CS 1: Beyond Programming** Douglas Baldwin, *SUNY Geneseo;* Valerie Barr, *Union College;* Amy Briggs, *Middlebury College;* Jessen Havill, *Denison University;* Bruce Maxwell, *Colby College;* Henry M. Walker, *Grinnell College*	**Room 602-604**
Special Session	**CS Education Research Knowledge Forum** Kelsey Finkel, *CSNYC;* Kenneth Graves, *Columbia University;* Leigh Ann DeLyser, *NYC Foundation for CS Education*	**Room 607**
Vocareum Supporter Session	**Assessment Strategies For Large CS Classes** (See page 31 for abstract) Christine Alvarado, *University of California, San Diego;* Sanjay Srivastava, *Vocareum*	**Room 616-617**
Intel Supporter Session	**Learn How Intel Can Help Your Students Gain Expertise in Parallel Programming** (See page 31 for abstract) James Reinders, *HPC Enthusiast*	**Room 618-619**

12:00 pm - 1:45 pm	**First Timer's Lunch: The Educator Identity and Its Impact** Mats Daniels, *Uppsala University*	**Room 6B**
12:00 pm - 1:45 pm	**Lunch Break**	**On Your Own**
1:45 pm - 5:00 pm	ACM **Student Research Competition Poster Session** *(See page 42 for a complete listing of ACM Student Research Competition Posters)*	**Exhibit Hall**

THURSDAY SESSIONS 1:45 pm - 3:00 pm

Paper Sessions	1:45 pm	2:10 pm	2:35 pm
K-12 Professional Development Chair: Colleen Lewis, *Harvey Mudd College* **Room 611**	**Reflecting on Three Offerings of a Community-Centric MOOC for K-6 Computer Science Teachers** Katrina Falkner, Rebecca Vivian, Nick Falkner, *The University of Adelaide;* Sally-Ann Williams, *Google Australia*	**Exemplary Paper** **Preparing STEM Teachers to offer New Mexico Computer Science for All** Irene Lee, *Massachusetts Institute of Technology;* Maureen Psaila Dombrowski, *Los Alamos National Laboratory;* Ed Angel, *University of New Mexico*	**A Comparative Analysis of Online and Face-to-Face Professional Development Models for CS Education** David Webb, Hilarie Nickerson, Jeffrey Bush, *University of Colorado Boulder*
Making Chair: Jian Zhang, *Texas Woman's University* **Room 612**	**Toward Computational Making with Madeup** Chris Johnson, *University of Wisconsin, Eau Claire*	**Understanding High School Students' Reading, Remixing, and Writing Codeable Circuits for Electronic Textiles** Breanne K. Litts, *Utah State University;* Yasmin B. Kafai, Debora Lui, Justice Walker, Sari Widman, *University of Pennsylvania*	**Creating Cool Stuff - Pupils' Experience of the BBC micro:bit** Sue Sentance, Jane Waite, *King's College London;* Steve Hodges, *Microsoft Research;* Emily MacLeod, Lucy Yeomans, *King's College London*
Addressing Motivation Chair: Jody Paul, *Metropolitan State University of Denver* **Room 613-614**	**Gamifying Course Modules for Entry Level Students** Yin Pan, Sumita Mishra, David Schwartz, *Rochester Institute of Technology*	**Exemplary Paper** **Improving Students' Learning and Achievement in CS Classrooms through Computational Creativity Exercises that Integrate Computational and Creative Thinking** Duane Shell, Leen-Kiat Soh, Abraham Flanigan, Markeya Peteranetz, Elizabeth Ingraham, *University of Nebraska-Lincoln*	**Getting Students to Earnestly Do Reading, Studying, and Homework in an Introductory Programming Class** Alex Edgcomb, *zyBooks/UC Riverside;* Frank Vahid, *UC Riverside/zyBooks;* Roman Lysecky, *University of Arizona/ zyBooks;* Susan Lysecky, *zyBooks*
Architecture Chair: S. Monisha Pulimood, *The College of New Jersey* **Room 608**	**Impact of Prior Exposure to the PLP Instruction Set Architecture in a Computer Architecture Course** Sohum Sohoni, Scotty D. Craig, Shaowen Lu, *Arizona State University*	**A Collaborative Approach to Teaching Software Architecture** Arie van Deursen, Maurício Aniche, Joop Aué, Rogier Slag, Michael de Jong, Alex Nederlof, Eric Bouwers, *Delft University of Technology*	**MIPSUnit: A Unit Testing Framework for MIPS Assembly** Zachary Kurmas, *Grand Valley State University*

THURSDAY SESSIONS 1:45 pm - 3:00 pm

Paper Sessions	1:45 pm	2:10 pm	2:35 pm
Performance Analytics Chair: Don Blaheta, *Longwood University* **Room 609**	**Using Learning Analytics to Investigate Patterns of Performance and Engagement in Large Classes** Hassan Khosravi, *University of British Columbia;* Kendra Cooper	**Automatically Classifying Students in Need of Support by Detecting Changes in Programming Behaviour** Anthony Estey, *University of Victoria;* Hieke Keuning, *Open University of the Netherlands;* Yvonne Coady, *University of Victoria*	**Exemplary Paper** **Evaluating Neural Networks as a Method for Identifying Students in Need of Assistance** Karo Castro-Wunsch, *University of Toronto Mississauga;* Alireza Ahadi, *University of Technology Sydney;* Andrew Petersen, *University of Toronto Mississauga*
Transactions on Computing Education 2 Chair: Karthik Umapathy, *University of North Florida* **Room 615**	**EarSketch: A STEAM-based Approach for Underrepresented Populations in High School Computer Science Education** Brian Magerko, Jason Freeman, *Georgia Institute of Technology,* Tom McKlin, *Sagefox Consulting Group LLC;* Mike Reilly, *Lanier High School;* Elise Livingston, *Microsoft;* Scott McCoid, *Ableton Inc.;* Andrea Crews-Brown, *Sagefox Consulting Group LLC*	**Undergraduate Students' Perceptions of the Impact of Pre-college Computing Activities on Choices of Major** Monica McGill, *Bradley University;* Adrienne Decker, *Rochester Institute of Technology;* Amber Settle, *DePaul University*	**Early Break**

SPECIAL SESSIONS, PANELS, SUPPORTER SESSIONS 1:45 pm - 3:00 pm

Panel Session	**Increasing Diversity in the Face of Enrollment Increases** Wendy Dubow, *NCWIT;* Ignatios Vakalis, *Cal Poly, San Luis Obispo;* Amber Benton, *Michigan State University;* Helen Hu, *Westminster College, Salt Lake City*	**Room 6E**
Panel Session	**Building CS Teaching Capacity: Comparing Strategies for Achieving Large Scale Impact** Carol Fletcher, *UT Austin Center for STEM Ed;* Leigh Ann DeLyser, *CSNYC;* Anthony Owen, *Arkansas Department of Education;* Kimberly Hughes, *Moderator, UTeach, The University of Texas at Austin*	**Room 602-604**
Special Session	**Teaching Accessibility** Richard Ladner, *University of Washington;* Matt May, *Adobe*	**Room 606**
Special Session	**Holistic Development of Underrepresented Students Through Academic – Industry Partnerships** Marlon Mejias, Legand Burge, *Howard University;* Kamar Galloway, *Google;* Kinnis Gosha, *Morehouse College;* Jean Muhammad, *Hampton University*	**Room 607**
IBM Supporter Session	**Blockchain in the Enterprise** (See page 31 for abstract) Misty Decker, *IBM*	**Room 616-617**
Intel Supporter Session	**A Deep Experience on Parallel Programming Techniques and Industry Best Practices** (See page 31 for abstract) Jennifer Dimatteo, *Intel Corporation*	**Room 618-619**

3:00 pm - 3:45 pm	**Break, Exhibits & Demos**	**Exhibit Hall**
3:00 pm - 3:45 pm	**Demo Session #2:** Sarah Heckman, *Chair* **BlockPy Interactive Demo: Dual Text/Block Python Programming Environment for Guided Practice and Data Science** Austin Bart, Dennis Kafura, *Virginia Tech* **Writing Autograders for Snap! And Integrating them Into Your Course** Michael Ball, *UC Berkeley*	**Exhibit Hall**
3:00 pm - 4:30 pm	**NSF Showcase #2** *(See page 41 for a complete listing of NSF Showcases)*	**Exhibit Hall**

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

Paper Sessions	3:45 pm	4:10 pm	4:35 pm
CS for All Chair: Leigh Ann DeLyser, *NYC Foundation for CS Education* **Room 611**	**Pre-College Computing Outreach Research: Towards Improving the Practice** Adrienne Decker, *Rochester Institute of Technology;* Monica M. McGill, *Bradley University*	**Visions of Computer Science Education: Unpacking Arguments for and Projected Impacts of CS4All** Sara Vogel, *City University of New York;* Rafi Santo, *Indiana University;* Dixie Ching, *New York University*	**Defining a Discipline or Shaping a Community: Constraints on Broadening Participation in Computing** Joanna Weidler-Lewis, *University of Colorado Boulder;* Wendy Dubow, *NCWIT;* Alexis Kaminsky, *Kaminsky Consulting, LLC*
Blocks Programming Chair: Samuel A. Rebelsky, *Grinnell College* **Room 612**	**From Blocks to Text and Back: Programming Patterns in a Dual-Modality Environment** David Weintrop, *Northwestern University;* Nathan Holbert, *Teachers College, Columbia University*	**A Visual Programming Environment for Learning Distributed Programming** Brian Broll, Akos Ledeczi, Peter Volgyesi, Janos Sallai, Miklos Maroti, Alexia Carrillo, Stephanie Weeden-Wright, Chris Vanags, *Vanderbilt University;* Joshua Swartz, *Hillsboro High School;* Melvin Lu, *Vanderbilt University*	**Using Upper-Elementary Student Performance to Understand Conceptual Sequencing in a Blocks-based Curriculum** Diana Franklin, Gabriela Skifstad, Reiny Rolock, Isha Mehrotra, Valerie Ding, *University of Chicago;* Alexandria Hansen, *UC Santa Barbara;* David Weintrop, *University of Chicago;* Danielle Harlow, *UC Santa Barbara*
Collaborative Exams Chair: Elizabeth Hawthorne, *Union County College* **Room 613-614**	**Exemplary Paper** **Evaluating Student Learning from Collaborative Group Tests in Introductory Computing** Yingjun Cao, Leo Porter, *UC San Diego*	**In-Lab Programming Tests in a Data Structures Course in C for Non-Specialists** Edwin Knorr, *University of British Columbia;* Christopher Thompson, *British Columbia Institute of Technology*	**Exemplary Paper** **Interactions of Individual and Pair Programmers with an Intelligent Tutoring System for Computer Science** Rachel Harsley, *University of Illinois at Chicago;* Davide Fossati, *Emory University;* Barbara Di Eugenio, Nick Green, *University of Illinois at Chicago*
Beginning Cybersecurity Chair: Jan Vahrenhold, *Westfälische Wilhelms-Universität Münster* **Room 608**	**Cybersecurity for Future Presidents: An Interdisciplinary Non-majors Course** Aparna Das, David Voorhees, Cynthia Choi, Carl Landwehr, *Le Moyne College*	**Scenario-Based Inquiry for Engagement in General Education Computing** David Kerven, Kristine Nagel, Stella Smith, Sherly Abraham, Laura Young, *Georgia Gwinnett College*	**Capture the Flag Unplugged: An Offline Cyber Competition** Vitaly Ford, Ambareen Siraj, Ada Haynes, Eric Brown, *Tennessee Tech University*

THURSDAY SESSIONS 3:45 pm - 5:00 pm

Paper Sessions	3:45 pm	4:10 pm	4:35 pm
Feedback Chair: Robert McCartney, *University of Connecticut* **Room 609**	**Exemplary Paper** **Generating Hints and Feedback for Hilbert-style Axiomatic Proofs** Josje Lodder, Bastiaan Heeren, *Open University Netherlands;* Johan Jeuring, *Open University Netherlands and Utrecht University*	**A Curriculum Model Featuring Oral Communication Instruction and Practice** Jennifer Polack, Karen Anewalt, *University of Mary Washington*	**Do Enhanced Compiler Error Messages Help Students? Results Inconclusive.** Raymond Pettit, John Homer, Roger Gee, *Abilene Christian University*
Transactions on Computing Education 3 Chair: Brian Magerko, *Georgia Institute of Technology* **Room 615**	**Seeing Myself Through Someone Else's Eyes: The Value of In-Classroom Coaching for Computer Science Teaching and Learning** Jane Margolis, *UCLA;* Joanna Goode, *University of Oregon;* Jean J. Ryoo, *Exploratorium;* David Bernier, *UCLA*	**A Meta-Analysis of Pair-Programming in Computer Programming Courses: Implications for Educational Practice** Karthikeyan Umapathy, *University of North Florida;* Albert D. Ritzhaupt, *University of Florida*	**Early Break**

SPECIAL SESSIONS, PANELS, SUPPORTER SESSIONS 3:45 pm - 5:00 pm

Special Session	**Broadening Participation in Computer Science: Key Strategies from International Findings** Rebecca Vivian, Katrina Falkner, Claudia Szabo, The University of Adelaide	**Room 6E**
Panel Session	**Teaching the Global Impact of Computing** Jeff Gray, *University of Alabama;* Jennifer Rosato, *College of St. Scholastica;* Bradley Beth, *University of Texas at Austin;* Nigamanth Sridhar, *Cleveland State University*	**Room 602-604**
Panel Session	**Bringing Undergraduate Research Experience in Non-R1 Institutions** Farzana Rahman, *James Madison University;* Helen Hu, *Westminster College;* Dennis Brylow, *Marquette University;* Clif Kussmaul, *Muhlenberg College*	**Room 606**
Special Session	**Computing in the Arts: Curricular Innovations and Results** Renee McCauley, *College of Charlston;* Bill Manaris, *College of Charleston;* David Heise, *Lincoln University;* Cate Sheller, *Kirkwood Community College;* Jennifer Jolley, Alan Zaring, *Ohio Wesleyan University*	**Room 607**
Google Supporter Session	**New Tools and Solutions to Address the CS Capacity Crunch** (See page 31 for abstract) Chris Stephenson, *Google;* Kinga Doboli, *George Mason University;* Jeff Forbes, *Duke University;* Kristy Boyer, *University of Florida;* Heather Pon-Barry, *Mount Holyoke;* Josh Hug, *University of California Berkeley*	**Room 618-619**
zyBooks Supporter Session	**The Power of Integrated Learning for CS -- Teach Concepts, not Logins** (See page 32 for abstract) Smita Bakshi, *CEO/Co-Founder, Zybooks;* Frank Vahid, *Co-Founder, Zybooks and University of California, Riverside;* Roman Lysecky, *Authoring Co-Lead, Zybooks and University of Arizona;* Scott Sirowy, *Director of Engineering, Zybooks;* Alex Edgcomb, *Sr. Software Engineer/Research Specialist, Zybooks and University of California, Riverside*	**Room 616-617**

5:30 pm - 6:20 pm	**Birds of a Feather Flock #1** *(See page 36 for a complete listing of Birds of a Feather Flock #1 presentations and room numbers)*	
6:30 pm - 7:20 pm	**Birds of a Feather Flock #2** *(See page 37 for a complete listing of Birds of a Feather Flock #2 presentations and room numbers)*	
7:30 pm - 9:30 pm	**SIGCSE Reception**	**Sheraton Grand Ballroom**

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SESSIONS

THURSDAY, MARCH 9
10:45 a.m.–noon
Learn How Intel Can Help Your Students Gain Expertise in Parallel Programming
Rooms 618/619

THURSDAY, MARCH 9
1:45–3:00 p.m.
A Deep Experience on Parallel Programming Techniques and Industry Best Practices
Rooms 618/619

FRIDAY, MARCH 10
1:45–3:00 p.m.
Artificial Intelligence on Intel Architecture
Room 615

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7:00 am - 8:30 am	**Breakfast with BlueJ and Greenfoot — Introducing Greenfoot 3, BlueJ 4, and Stride** Michael Kölling, Amjad Altadmri, Neil Brown, Ian Utting, *University of Kent*	Room 6B

KEYNOTE SESSION

8:30 am -10:00 am	**Welcome:** Michael E. Caspersen, *Conference Co-Chair, Aarhus University*; Stephen Edwards, *Conference Co-Chair, Virginia Tech* **Plenary Session: Inspire, Innovate, Improve! What does this mean for CS for All?** Gail Chapman, *Exploring Computer Science*	Room 6E

10:00 am - 10:45 am	**Break, Exhibits & Demos**	Exhibit Hall
10:00 am - 10:45 am	**Demo Session #3:** Sarah Heckman, *Chair* **Distributed Programming with NetsBlox is a Snap!** Brian Broll, Akos Ledeczi, *Vanderbilt University* **Submitty: An Open Source, Highly-Configurable Platform for Grading of Programming Assignments** Matthew Peveler, Jeramey Tyler, Samuel Breese, Barbara Cutler, Ana Milanova, *Rennselaer Polytechnic Institute*	Exhibit Hall
10:00 am - 11:30 am	**NSF Showcase #3** *(See page 41 for a complete listing of NSF Showcases)*	Exhibit Hall
10:00 am - 12:00 pm	**Poster Session #1:** J. Philip East, *Chair* *(See page 38 for a complete listing of Poster Session #1)*	Exhibit Hall

FRIDAY SESSIONS 10:45 am - 12:00 pm

Paper Sessions	10:45 am	11:10 am	11:35 am
K-8 Chair: Paul Tymann, *RIT* **Room 611**	**A Literature Review through the Lens of Computer Science Learning Goals Theorized and Explored in Research** Kathryn Rich, Carla Strickland, Diana Franklin, *University of Chicago STEM Education*	**Evaluating the Effect of Using Physical Manipulatives to Foster Computational Thinking in Elementary School** Ashish Aggarwal, Christina Gardner-McCune, *University of Florida;* David Touretzky, *Carnegie Mellon University*	**Arts Coding for Social Good: A Pilot Project for Middle-School Outreach** Anita Dewitt, Julia Fay, Madeleine Goldman, Eleanor Nicolson, Linda Oyolu, Lukas Resch, Jovan Saldaña, Soulideth Sounalath, Tyler Williams, Kathryn Yetter, Elizabeth Zak, Narren Brown, Samuel Rebelsky, *Grinnell College*
Novice Programmers Chair: Christine Alvarado, *UC San Diego* **Room 612**	**Just the Numbers: An Investigation of Contextualization of Problems for Novice Programmers** Ellie Lovellette, John Matta, Dennis Bouvier, Roger Frye, *Southern Illinois University Edwardsville*	**An Empirical Study of Debugging Patterns Among Novices Programmers** Basma Alqadi, Jonathan Maletic, *Kent State University*	**Exemplary Paper** **iSnap: Towards Intelligent Tutoring in Novice Programming Environments** Thomas Price, Yihuan Dong, Dragan Lipovac, *North Carolina State University*
Collaborative Learning Chair: Henry Walker, *Grinnell College* **Room 613-614**	**POGIL Activities in Data Structures: What Do Students Value?** Tammy VanDegrift, *University of Portland*	**Exemplary Paper** **Student Perspectives of Team-Based Learning in a CS Course: Summary of Qualitative Findings** Michael Kirkpatrick, *James Madison University*	**Exemplary Paper** **Exploring the Pair Programming Process: Characteristics of Effective Collaboration** Fernando J. Rodríguez, Kimberly Michelle Price, Kristy Elizabeth Boyer, *University of Florida*

(continued on next page)

FRIDAY SESSIONS 10:45 am - 12:00 pm

Paper Sessions	10:45 am	11:10 am	11:35 am
Software Engineering Chair: Eric Aaron, *Vassar College* **Room 608**	**Innovative Pedagogical Approaches to a Capstone Laboratory Course in Cyber Operations** Mike O'Leary, *Towson University*	**A Study of the Use of a Reflective Activity to Improve Students' Software Design Capabilities** John Coffey, *University of West Florida*	**Exemplary Paper** **Incorporating Human Error Education into Software Engineering Courses via Error-based Inspections** Vaibhav Anu, Gursimran Walia, *North Dakota State University;* Gary Bradshaw, *Mississippi State University*
Mobile Chair: Jaime Spacco, *Knox College* **Room 609**	**SAFE: Smart Authenticated Fast Exams for Student Evaluation in Classrooms** Kameswari Chebrolu, Bhaskaran Raman, Vinay Chandra Dommeti, Akshay Veer Boddu, Kurien Zacharia, Arun Babu, Prateek Chandan, *IIT Bombay*	**Choosing Face-to-face or Video-based Instruction in a Mobile App Development Course** Matthew Boutell, *Rose-Hulman Institute of Technology*	**Creating Engaging Exercises With Mobile Response System (MRS)** Debzani Deb, Mohammad Fuad, Mallek Kanan, *Winston-Salem State University*

SPECIAL SESSIONS, PANELS, SUPPORTER SESSIONS 10:45 am - 12:00 pm

Special Session	**Converting Your Teaching (or Even Your Whole Department!) to Active Learning via POGIL** Helen H. Hu, *Westminster College;* Chris Mayfield, *James Madison University;* Janice L. Pearce, *Berea College*	**Room 6E**
Panel Session	**Volunteer Best Practices for K12 CS** Leigh Ann DeLyser, *NYC Foundation for CS Education;* Tom O'Connell, *Code Interactive;* Rebecca Novak, *ScriptEd;* Kevin Wang, *TEALS;* Diane Levitt, *Cornell Tech*	**Room 602-604**
Panel Session	**Computer Science Topics in First- and Second - Year Seminar Courses** Valerie Barr, *Union College;* Bryan Catron, *Furman University;* Christopher Healy, *Furman University;* Kate Lockwood, *St. Paul Academy;* Anil M. Shende, *Roanoke College;* Andrea Tartaro, Kevin Treu, *Furman University*	**Room 606**
Special Session	**Computing Education in Liberal Arts Colleges: A Status Report of the SIGCSE Committee** Doug Baldwin, *SUNY Geneseo;* Grant Braught, *Dickinson College;* Amanda Holland-Minkley, *Washington & Jefferson College*	**Room 607**
Microsoft Supporter Session	**Dos and Don'ts of Partnering Software Professionals and Computer Science Classrooms and Why It Matters To You** (See page 32 for abstract) Brett Wortzman, *Instruction and Training Manager, Microsoft TEALS;* Kasey Champion, *Computer Science Curriculum Developer, Microsoft Learning*	**Room 616-617**
Google Suppoter Session	**Curriculum and Interview Recommendations for Software Engineering Preparedness** (See page 32 for abstract) Pierre St. Juste, *Google*	**Room 618-619**

12:00 pm - 1:45 pm	**CRA Teaching Track Faculty Lunch**	Room 6B
12:00 pm - 1:45 pm	**Lunch Break**	On Your Own
12:00 pm - 1:45 pm	**International Lunch: contact sigcse2017-international@cs.vt.edu for information**	

FRIDAY SESSIONS 1:45 pm - 3:00 pm

Paper Sessions	1:45 pm	2:10 pm	2:35 pm
AP CSP Chair: Tammy VanDeGrift, *University of Portland* **Room 611**	**From Professional Development to the Classroom: Findings from CS K-12 Teachers** Lori Pollock, Chrystalla Mouza, Amanda Czik, Alexis Little, Debra Coffey, Joan Buttram, *University of Delaware*	**Exemplary Paper** **Preparing and Supporting Industry Professionals as Volunteer High School Computer Science Co-Instructors** Anthony Papini, TEALS; Leigh Ann DeLyser, NYC Foundation for CS Education; Nathaniel Granor, Kevin Wang, TEALS	**Getting Principled: Reflections on Teaching CS Principles at Two College Board University Pilots** Jeff Gray, *University of Alabama;* Michele Roberts, *IUPUI;* Jonathan Corley, *University of West Georgia*
Computers and Music; Undergraduate TAs Chair: Bo Brinkman, *Miami University* **Room 612**	**Using Undergraduate Teaching Assistants in Small Classes** Paul Dickson, Toby Dragon, Adam Lee, *Ithaca College*	**Creativity in Authentic STEAM Education with EarSketch** Shelly Engelman, *The Findings Group, LLC;* Brian Magerko, *Georgia Institute of Technology;* Tom McKlin, Morgan Miller, *The Findings Group, LLC;* Doug Edwards, Jason Freeman, *Georgia Institute of Technology*	**Exemplary Paper** **Integrating Computer Science into Music Education** John Peterson, Greg Haynes, *Western State Colorado University*
CS1 Chair: Joel Adams, *Calvin College* **Room 613-614**	**Exemplary Paper** **Exam Wrappers: Not a Silver Bullet** Ben Stephenson, *University of Calgary;* Michelle Craig, Daniel Zingaro, Diane Horton, Danny Heap, Elaine Huynh, *University of Toronto*	**Exemplary Paper** **The Code Mangler: Evaluating Coding Ability Without Writing any Code** Nick Cheng, Brian Harrington, *University of Toronto Scarborough*	**Comparing Outcomes Across Different Contexts in CS1** Bruce Maxwell, Stephanie Taylor, *Colby College*
Algorithms Chair: Mark Sherriff, *University of Virginia* **Room 608**	**Exemplary Paper** **Evaluating the Effectiveness of Algorithm Analysis Visualizations** Mohammed F. Farghally, *Virginia Tech;* Kyu Han Koh, *California State University Stanislaus;* Hossameldin Shahin, *Virginia Tech;* Clifford A. Shaffer, *Virginia Tech*	**Towards a Concept Inventory for Algorithm Analysis Topics** Mohammed F. Farghally, *Virginia Tech;* Kyu Han Koh, *California State University Stanislaus;* Jeremy V. Ernst, Clifford A. Shaffer, *Virginia Tech*	**Assessment of Introducing Algorithms with Video Lectures and Pseudocode Rhymed to a Melody** Ben Schreiber, Swarthmore College; John Dougherty, *Haverford College*
Peers & Large Classes Chair: Judy Sheard, *Monash University* **Room 609**	**Micro-Classes: A Structure for Improving Student Experience in Large Classes** Christine Alvarado, Mia Minnes, Leo Porter, *UC San Diego*	**Impact of Class Size on Student Evaluations for Traditional and Peer Instruction Classrooms** Soohyun Nam Liao, William Griswold, Leo Porter, *University of California at San Diego*	**My Digital Hand: A Tool for Scaling Up One-to-One Peer Teaching in Support of Computer Science Learning** Aaron Smith, *University of North Carolina;* Kristy Elizabeth Boyer, *University of Florida;* Jeffrey Forbes, *Duke University;* Sarah Heckman, *North Carolina State University;* Ketan Mayer-Patel, *Univeristy of North Carolina*

SPECIAL SESSIONS, PANELS, SUPPORTER SESSIONS 1:45 PM - 3:00 PM

Panel Session	**CSPd Week: A Scalable Model for Preparing Teachers for CS for All** Tracy Camp, *Colorado School of the Mines;* Emmanuel Schanzer, *Bootstrap;* Joanna Goode, *University of Oregon;* Owen Astrachan, *Duke University;* Ed Campos, *Orosi High School*	**Room 6E**
Panel Session	**Beyond Autograding: Advances in Student Feedback Platforms** John Denero, Sumukh Sridhara, *UC Berkeley;* Manuel Pérez-Quiñones, *UNC Charlotte;* Aatish Nayak, *Carnegie Mellon University;* Ben Leong, *National University of Singapore*	**Room 606**
Panel Session	**Teaching To Increase Diversity and Equity in STEM** Helen H. Hu, *Westminster College;* Douglas Blank, *Bryn Mawr College;* Albert Chan, *Fayetteville State University;* Travis Doom, *Wright State University*	**Room 607**
Special Session	**The Code of Ethics Quiz Show** Bo Brinkman, *Miami University;* Keith Miller, *University of Missouri, St. Louis*	**Room 602-604**
IBM Supporter Session	**Addressing the Cybersecurity Skills Gap** (See page 32 for abstract) Heather (H.Y.) Ricciuto, *Transformation and Academic Initiatives Leader, PMP®, IBM*	**Room 616-617**
Vocareum Supporter Session	**The Next Frontier For Large Online Classes** (See page 32 for abstract) Sanjay Srivastava, *Vocareum;* David Joyner, *Georgia Tech*	**Room 618-619**
Intel Supporter Session	**Artificial Intelligence on Intel Architecture** (See page 33 for abstract) Nagib Hakim, *Intel Corporation;* Prof. Pedro Domingos, *University of Washington*	**Room 615**

3:00 pm - 3:45 pm	**Break, Exhibits & Demos**	Exhibit Hall
3:00 pm - 3:45 pm	**Demo Session #4:** Sarah Heckman, *Chair* **Interactive Problem Solving Using Mobile Devices in the Classroom** Mohammad Fuad, *Winston-Salem State University* **The Quorum Programming Language** Andreas Stefik, *University of Nevada, Las Vegas;* Richard Ladner, *University of Washington*	Exhibit Hall
3:00 pm - 4:30 pm	**NSF Showcase #4** *(See page 41 for a complete listing of NSF Showcases)*	Exhibit Hall
3:00 pm - 5:00 pm	**Poster Session #2:** J. Philip East, *Chair* *(See page 39 for a complete listing of Poster Session #2)*	Exhibit Hall

FRIDAY SESSIONS 3:45 pm - 5:00 pm

Paper Sessions	3:45 pm	4:10 pm	4:35 pm
K-12 Professional Development Chair: Judith Gal-Ezer, *The Open University of Israel* **Room 611**	**Professional Recognition Matters: Certification for In-service Computer Science Teachers** Sue Sentance, *King's College London;* Andrew Csizmadia, *Newman University*	**Exemplary Paper** **Building a Statewide Computer Science Teacher Pipeline** Helen Hu, *Westminster College;* Cecily Heiner, *Southern Utah University;* Thomas Gagne, *University of Puget Sound;* Carl Lyman, *Utah State Office of Education*	**Teaching CS to CS Teachers: Addressing the Need for Advanced Content in K-12 Professional Development** Dan Leyzberg, Christopher Moretti, *Princeton University*
Diversity Chair: Ellen Walker, *Hiram College* **Room 612**	**Diversity Barriers in K–12 Computer Science Education: Structural and Social** Jennifer Wang, Sepehr Hejazi Moghadam, *Google*	**Folk Pedagogy and the Geek Gene: Geekiness Quotient** Robert McCartney, *University of Connecticut;* Jonas Boustedt, Hogskolan i Gavle; Anna Eckerdal, *Uppsala University;* Kate Sanders, *Rhode Island College;* Carol Zander, *University of Washington Bothell*	**Exemplary Paper** **Examining the Relationship Between Introductory Computing Course Experiences, Self-Efficacy, and Belonging Among First-Generation College Women** Jennifer Blaney, *UCLA;* Jane Stout, *Computing Research Association*
Non-CS Students Chair: Alistair Campbell, *Hamilton College* **Room 613-614**	**Increasing the Capacity of STEM Workforce: Minor in Bioinformatics** Sami Khuri, Miri Vanhoven, *San Jose State University;* Natalia Khuri, *Stanford University*	**Exemplary Paper** **Evaluation and Impact of a Required Computational Thinking Course for Architecture Students** Nick Senske, *Iowa State University*	**Examining the Enrollment Growth: Non-CS Majors in CS1 Courses** Linda J. Sax, Kathleen J. Lehman, Christina Zavala, *UCLA*
Capstone Chair: Lillian "Boots" Cassel, *Villanova University* **Room 608**	**CORP: Co-operative Remote Practicum Work Experience Model for Software Engineering Education** Dannie Stanley, *Taylor University*	**Exemplary Paper** **Understanding Student Interactions in Capstone Courses to Improve Learning Experiences** Andres Neyem, Juan Diaz-Mosquera, Jorge Munoz-Gama, Jaime Navon, *Pontificia Universidad Catolica de Chile*	**Exemplary Paper** **A Two-Course Sequence of Real Projects for Real Customers** Christian Murphy, Swapneel Sheth, Sydney Morton, *University of Pennsylvania*
Online Learning Chair: Daniel Joyce, *Villanova University* **Room 609**	**A Pedagogical Analysis of Online Coding Tutorials** Ada S. Kim, Andrew J. Ko, *University of Washington*	**Lessons Learned in the Design and Delivery of an Introductory Programming MOOC** J Michael Fitzpatrick, Ákos Lédeczi, Gayathri Narasimham, Vanderbilt University; Lee Lafferty, Réal Labrie, Paul T Mielke, Independent Consultant; Aatish Kumar, University of Amsterdam; Katherine A Brady, Vanderbilt University	**Exemplary Paper** **Employing Retention of Flow to Improve Online Tutorials** Ashok Basawapatna, *SUNY College At Old Westbury;* Alexander Repenning, *University of Applied Sciences and Arts Northwestern Switzerland*

SPECIAL SESSIONS, PANELS, SUPPORTER SESSIONS 3:45 pm - 5:00 pm

Panel Session	**Social Justice and Equity in CS Education: Inaugural Launch of AP Computer Science Principles** Lien Diaz, *College Board;* Frances Trees, *Rutgers University;* Dale Reed, *University of Illinois, Chicago;* Richard Kick, *Newbury Park High School;* Andrew Kuemmel, *Madison West High School*	**Room 6E**
Panel Session	**The Passion, Beauty, and Joy of Teaching and Learning Cybersecurity** Richard Weiss, *The Evergreen State College;* Xenia Mountrouidou, *College of Charleston;* Jens Mache, *Lewis and Clark College;* Casey O'Brien, *National Cyber League*	**Room 602-604**
Panel Session	**Scaling Introductory Courses Using Undergraduate Teaching Assistants** Jeffrey Forbes, *Duke University;* David Malan, *Harvard University;* Heather Pon-Barry, *Mt. Holyoke College;* Stuart Reges, *University of Washington;* Mehran Sahami, *Stanford University*	**Room 606**
Special Session	**ICER UP CS Ed Research Workshop Summary - Essence of Illustrative Projects** Eileen Kraemer, Aubrey Lawson, Murali Sitaraman, *Clemson University*	**Room 607**
Microsoft Supporter Session	**Physical and Game-based Computing for CS Education** (See page 33 for abstract) Thomas Ball, *Principal Researcher/Research Manager, Microsoft Research;* Peli de Halleux, *Principal Research Software Engineer, Microsoft Research;* Eric Anderson, *Senior Software Engineer, Microsoft*	**Room 616-617**
Oracle Academy Supporter Session	**Computer Science Curriculum for K12 and Beyond** (See page 33 for abstract) Tyra Crockett, *Sr. Manager, Oracle Academy*	**Room 618-619**

5:10 pm - 6:00 pm	**SIGCSE Business Meeting**	**Room 6E**
6:00 pm - 7:00 pm	**NCWIT Academic Alliance Reception**	**Sheraton Cirrus Ballroom**
6:10 pm - 7:00 pm	**CCSC Business Meeting**	**Room 6E**
7:00 pm - 8:00 pm	**Community College Reception**	**Sheraton Diamond Room**

FRIDAY WORKSHOPS 7:00 pm - 10:00 pm

Workshop 301	**An Iota of IoT** Bill Siever, *Washington University;* Michael Rogers, *Northwest Missouri State University*	**Room 602-604**
Workshop 302	**How to Collect, Analyze and Act on Learning Data in Computer Science Courses** Ananda Gunawardena, *Princeton University*	**Room 616-617**
Workshop 303	**How to Plan and Run Computing Summer Camps - Logistics** Krishnendu Roy, *Valdosta State University;* Kristine Nagel, *Georgia Gwinnett College;* Sarah Dunton, *University of Massachusetts Amherst*	**Room 618-619**
Workshop 304	**Engaging Students with Algorithms** Crystal Furman, *The College Board;* Sandy Czajka, *Riverside Brookfield High School;* Adrienne Decker, *Rochester Institute of Technology;* Dianna Xu, *Bryn Mawr College*	**Room 613-614**
Workshop 305	**Two Birds - Teaching Coding and Math in Primary Schools and Beyond** Victor Winter, Betty Love, *University of Nebraska at Omaha*	**Room 611**
Workshop 306	**Hands-on Cybersecurity Exercises That Are Easy to Access and Assess** Richard Weiss, *The Evergreen State College;* Jens Mache, *Lewis & Clark College;* Michael Locasto, *SRI International;* Franklyn Turbak, *Wellesley College*	**Room 608**
Workshop 307	**Guiding Students to Discover CS Concepts and Develop Process Skills Using POGIL** Clifton Kussmaul, *Muhlenberg College;* Chris Mayfield, *James Madison University;* Helen Hu, *Westminster College*	**Room 609**

Friday, March 10 Schedule of Events

Friday Workshops 7:00 pm - 10:00 pm

Workshop 308	**Modules for Integrating Cryptography in Introductory CS and Computer Security Courses** Yesem Kurt Peker, *Columbus State University*	Room 607
Workshop 309	**Testing Across the Curriculum** Zachary Kurmas, *Grand Valley State University*	Room 606
Workshop 310	**Using and Customizing Open-Source Runestone Ebooks for Computer Science Classes** Brad Miller, *Luther College;* Paul Resnick, *University of Michigan;* Barbara Ericson, *Georgia Tech*	Room 612

For a full list of workshops and descriptions visit: ***http://sigcse2017.sigcse.org/attendees/workshops.html***

Saturday, March 11 Schedule of Events

8:45 am - 10:00 am	**Undergraduate ACM Student Research Competition Semi-finalist Presentations** *(See page 42 for all ACM SRC Entries)*	Room 611
8:45 am - 10:00 am	**Graduate ACM Student Research Competition Semi-finalist Presentations** *(See page 42 for all ACM SRC Entries)*	Room 612

Special Sessions, Panels, Supporter Sessions 8:45 am - 10:00 am

Special Session	**Nifty Assignments** Nick Parlante, Julie Zelenski, Dave Feinberg, Kunal Mishra, Josh Hug, Kevin Wayne, Michael Guerzhoy, Jackie Chi Kit Cheung, François Pitt	Room 6E
ABET Supporter Session	**Computing and Computer Science Accreditation – What You Should Know** (See page 33 for abstract) J.J. Ekstrom, *Brigham Young University;* Allen Parrish, *US Naval Academy;* Ed Sobiesk, *Army Cyber Institute;* Rajendra Raj, *Rochester Institute of Technology*	Room 616-617
Codio Supporter Session	**An Online Solution to Authoring of Student Code Tests of Any Complexity and IDE Based Tutorial Content** (See page 34 for abstract) Freddy May, *Founder of Codio*	Room 618-619
IBM Supporter Session	**Introduction to Watson Internet of Things - Learn to build your IoT app** (See page 34 for abstract) Gayathri Magie, *WW Academic Initiatives Lead, IBM*	Room 608
Gradescope Supporter Session	**Grading Both Written and Programming Assignments on One Platform** (See page 34 for abstract) Ibrahim Awwal, *Gradescope;* Sergey Karayev, *Gradescope*	Room 609
LEGO Education Supporter Session	**Developing Computational Thinking Skills Through Hands-on, Playful Learning** (See page 34 for abstract) Mitch Resnick, Professor of Learning Research, MIT Media Lab; Yannick Dupont Educational Content Development Manager, LEGO Education	Room 606

10:00 am - 10:45 am	**Break, Exhibits & Demos**	Exhibit Hall
10:00 am - 10:45 am	**Demo Session #5:** Sarah Heckman, *Chair* **App Lab - A Powerful JavaScript IDE for Rapid Prototyping of Small Data-backed Web Applications** Sarah Filman, Alice Steinglass, Baker Franke, *Code.org* **EarSketch, a Web-application to Teach Computer Science through Music** Jason Freeman, Doug Edwards, Lea Ikkache, *Georgia Institute of Technology*	Exhibit Hall
10:00 am - 11:30 am	**NSF Showcase #5** *(See page 41 for a complete listing of NSF Showcases)*	Exhibit Hall

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

Paper Sessions	10:45 am	11:10 am	11:35 am
K-12, CS forAll Chair: Christina Gardner-McCune, *University of Florida* **Room 611**	**Interested in Class, but Not in the Hallway: A Latent Class Analysis (LCA) of 2015-16 CS Student Surveys** Kenny Graves, *Columbia University;* Leigh Ann DeLyser, *NYC Foundation for CS Education*	**Teaching Computer Science in the Victorian Certificate of Education: A Pilot Study** Richard Cox, *Monash University;* Steven Bird, *University of Melbourne;* Bernd Meyer, *Monash University*	**Concepts and Practices: Designing and Developing A Modern K–12 CS Framework** Miranda Parker, *Georgia Institute of Technology;* Leigh Ann DeLyser, *CSNYC*
Gender Chair: Manuel A. Perez Quinones, *University of North Carolinaat Charlotte* **Room 612**	**Gender Differences in Students' Behaviors in CS Classes throughout the CS Major** Christine Alvarado, Yingjun Cao, Mia Minnes, *UC San Diego*	**Exploring Gender Diversity in CS at a Large Public R1 Research University** Monica Babes-Vroman, Isabel Juniewicz, Bruno Lucarelli, Nicole Fox, Thu Nguyen, Andrew Tjang, Georgiana Haldeman, Ashni Mehta, Risham Chokshi, *Rutgers University*	**Eliminating Gender Bias in Computer Science Education Materials** Vahab Pournaghshband, *California State University, Northridge;* Paola Medel, *University of California, Los Angeles*
CS1 Chair: Brad Richards, *University of Puget Sound* **Room 613-614**	**Successful First-Year Experience for At-Risk Students** Alice Armstrong, *Shippensburg University*	**Evaluating an Alternative CS1 for Students with Prior Programming Experience** Michael Kirkpatrick, Chris Mayfield, *James Madison University*	**Exemplary Paper** **Pencil Puzzles for Introductory Computer Science: an Experience-and Gender-Neutral Context** Zack Butler, Ivona Bezakova, *Rochester Institute of Technology;* Kimberly Fluet, *St. John Fisher College*
Advanced Concepts Chair: Andrew Ko, *University of Washington* **Room 608**	**On the (Mis) Understanding of the "this" Reference** Noa Ragonis, *Beit Berl College;* Ronit Shmallo, *SCE-Shamoon College of Engineering*	**Assessing and Teaching Scope, Mutation, and Aliasing in Upper-Level Undergraduates** Kathi Fisler, WPI; Shriram Krishnamurthi, Preston Tunnell Wilson, *Brown University*	**Multiple Levels of Abstraction in Algorithmic Problem Solving** David Ginat, Yoav Blau, *Tel-Aviv University*
Best Papers Chairs: Tiffany Barnes, *NC State;* Dan Garcia, *UC Berkeley* **Room 6E**	**Best CER Paper** **Computing with CORGIS: Diverse, Real-world Datasets for Introductory Computing** Austin Bart, Ryan Whitcomb, Eli Tilevich, Dennis Kafura, Cliff Shaffer, *Virginia Tech*	**Best Experience Report Paper** **Making Noise: Using Sound-Art to Explore Technological Fluency** Erik Brunvand, Nina McCurdy, *University of Utah*	**Best New Program Paper** **Infrastructure for Continuous Assessment of Retained Relevant Knowledge** Kathleen Timmerman, Travis Doom, *Wright State University*

SPECIAL SESSIONS, PANELS, SUPPORTER SESSIONS 10:45 am - 12:00 pm

Panel Session	**Technology We Can't Live Without!, revisited** Ria Galanos, *Thomas Jefferson High School for Science and Technology;* Whitaker Brand, *University of Washington;* Sumukh Sridhara, *University of California Berkeley;* Mike Zamansky, *Hunter College;* Evelyn Zayas, *One Schoolhouse*	Room 602-604
Panel Session	**CC2020: A Vision on Computing Curricula** Alison Clear, *EIT;* John Impagliazzo, *Hofstra University;* Allen Parrish, *United States Naval Academy;* Gerrit Van Der Veer, *Vrije Universiteit Amsterdam;* Ming Zhang, *Peking University*	Room 606

SPECIAL SESSIONS, PANELS, SUPPORTER SESSIONS 10:45 am - 12:00 pm

Special Session	**ACM Joint Task Force on Cybersecurity Education** Diana Burley, *George Washington University;* Matt Bishop, *University of California, Davis;* Scott Buck, *Intel Corporation;* David Gibson, *United States Air Force Academy;* Elizabeth Hawthorne, *Union County College;* Siddharth Kaza, *Towson University*	**Room 607**
GitHub Supporter Session	**How I Implemented GitHub In My Classroom: CS50, Automated Testing and GitHub for Large Courses** (See page 35 for abstract) David Malan, *Harvard University;* Omar Shaikh, *San Francisco State University;* S. Monisha Pulimood, *College of New Jersey;* Vanessa Gennarelli, *GitHub Education*	**Room 616-617**
Teradata University Network Supporter Session	**Exciting Ways To Engage Your Students With the Power of Data** (See page 35 for abstract) Susan Baskin, *Teradata Corporation;* Karen Davis, *University of Cincinnati*	**Room 618-619**

10:45 am - 12:00 pm	**Lightning Talks:** Steven Wolfman, *Chair* *(See page 43 for complete list of Lightning Talks)*	**Room 609**

KEYNOTE SESSION

12:00 pm - 2:00 pm	**Fulfilling Papert's Dream: Computational Fluency for All** Mitchel Resnick, *MIT Media Lab*	**Room 6B-6C**

SATURDAY WORKSHOPS 3:00 pm - 6:00 pm

Workshop 401	**Evidence Based Teaching Practices in CS** Briana Morrison, *University of Nebraska at Omaha;* Mark Guzdial, *Georgia Institute of Technology;* Cynthia Lee, *Stanford University;* Leo Porter, Beth Simon, *University of California, San Diego*	**Room 618-619**
Workshop 402	**Teaching Parallel Computing with OpenMP on the Raspberry Pi** Suzanne Matthews, *United States Military Academy;* Joel Adams, *Calvin College;* Richard Brown, *St. Olaf College;* Elizabeth Shoop, *Macalester College*	**Room 616-617**
Workshop 403	**CS Discoveries: An introductory CS Course For Late Middle and Early High School** Josh Caldwell, Dani McAvoy, Gt Wrobel, *code.org*	**Room 613-614**
Workshop 404	**How to Plan and Run Effective Teacher Professional Development** Barbara Ericson, *Georgia Tech;* Rebecca Dovi, *Code Virginia;* Ria Galanos, *Thomas Jefferson High School for Science and Technology*	**Room 612**
Workshop 405	**Creating Peer Grading Videos** Shawn Lupoli, Karan Budhraja, *UMBC*	**Room 611**
Workshop 406	**Designing Blended Learning Models to Support Computational Learning: Minecraft Edition** Dominic Amato, Ugochi Acholonu, *DePaul University*	**Room 608**
Workshop 407	**From Lightbulbs to Logic: Teaching Hardware in Intro to CS** Sean Hickey, *The Blake School*	**Room 609**
Workshop 408	**How to Integrate Interactive Learning into Large Classes** Stephan Krusche, Andreas Seitz, Nadine von Frankenberg, Bernd Bruegge, *Technische Universität München*	**Room 607**
Workshop 409	**UTeach CS Principles: Broadening Participation Through K–12 Computer Science Education and Teacher Professional Learning and Support** Bradley Beth, Amy Moreland, *UTeach CS, The University of Texas at Austin*	**Room 606**
Workshop 410	**C-STEM: Engaging Students in Computing with Robotics** Tasha Frankie, Duane Wesley, James Gappy, *San Diego Mesa College;* Harry Cheng, *UC Davis*	**Room 602-604**

For a full list of workshops and descriptions visit: ***http://sigcse2017.sigcse.org/attendees/workshops.html***

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Supporter Sessions

Thursday, March 9

Presented courtesy of ***Vocareum***

Assessment Strategies for Large CS Classes

▶ **10:45 am - 12:00 pm**
Room: 616-617

Speakers: Christine Alvarado, *University of California, San Diego;* Sanjay Srivastava, *Vocareum*

As demands for CS education has increased exponentially, often universities have had no choice but to increase the class sizes to meet this demand. Inevitably teachers have looked to technology to help manage these large classes. In this session we will discuss how Vocareum has been deployed to help teachers meet the challenge.

Presented courtesy of ***Intel***

Learn How Intel Can Help Your Students Gain Expertise in Parallel Programming

▶ **10:45 am - 12:00 pm**
Room: 618-619

Speaker: James Reinders, *HPC Enthusiast*

Solving the biggest challenges in science, industry and society requires dramatic increases in computing efficiency. Today's applications must be parallelized to unlock the potential of current and future hardware. Educating the next generation of programmers and researchers on parallel programming will help gain insights on how to execute their code faster and gain advantage of inherent system architecture.

In this session, we will be sharing resources including hardware, free software for educators and students, hands-on training materials and more. By attending this session, you will receive real academic curriculum examples that includes hands-on labs experiments.

Presented courtesy of ***IBM***

Blockchain in the Enterprise

▶ **1:45 pm - 3:00 pm**
Room: 616-617

Speaker: Misty V. Decker, *z Systems Academic Initiative Program Manager, IBM*

Blockchain is the technology underneath Bitcoin but now a wide variety of industries are researching ways to use the technology to transform business to business transactions. Come learn what Blockchain is and how you and your students can be a part of innovating the future. We'll look at real world scenarios in development today such as identifying conflict-free diamonds, determining the safety of fish, tracing property ownership for title searches, and exchanging property or managing contracts without an intermediary.

Presented courtesy of ***Intel***

A Deep Experience on Parallel Programming Techniques and Industry Best Practices

▶ **1:45 pm - 3:00 pm**
Room: 618-619

Speakers: Jennifer Dimatteo, *Intel Corporation*

Solving the biggest challenges in science, industry and society requires dramatic increases in computing efficiency. Today's applications must be parallelized to unlock the potential of current and future hardware. Educating the next generation of programmers and researchers on parallel programming will help gain insights on how to execute their code faster and gain advantage of inherent system architecture.

In this session, you will be able to get an overview of Intel® Parallel Studio XE and a deep dive to Intel® Advisor. Intel® Advisor overview will include what changes with AVX-512 and how Intel® Advisor can help you optimize for both AVX-512 and older instruction sets both with and without access to the latest hardware. See how to get accurate repeatable FLOPS metrics, measure the loop footprint to see if it fits into cache, detect unneeded gather/scatters that reduce performance and much more. We will demonstrate vectorization techniques and a new way to visualize performance optimization tradeoffs on existing code to help you apply this in your classroom.

Presented courtesy of ***Google***

New Tools and Solutions to Address the CS Capacity Crunch

▶ **3:45 pm - 5:00 pm**
Room: 618-619

Speakers: Chris Stephenson*, Google;* Kinga Doboli*, George Mason University;* Jeff Forbes, *Duke University;* Kristy Boyer, *University of Florida;* Heather Pon-Barry, *Mount Holyoke;* Josh Hug, *University of California Berkeley*

Increasing enrollment in CS programs is prompting the need for a variety of interventions that enable institutions to expand high-quality Computer Science (CS) programs at the undergraduate level while additionally ensuring better engagement of women and underrepresented minority students. This will be a two-part session. It will begin with a panel of faculty from Google's Computer Science Capacity Awards program sharing the results of their current interventions. The panelists will follow by chairing roundtable discussions focused on specific interventions, including self-paced learning, training for undergraduate peer mentors, course analytics and software for online courses, tools for real-time distance TA support, and student and TA online communications tools.

Supporter Sessions

Thursday, March 9

Presented courtesy of ***zyBooks***

The Power of Integrated Learning for CS - Teach Concepts, Not Logins

▶ **3:45 pm - 5:00 pm**
Room: 616-617

Speakers: Smita Bakshi, *CEO/Co-Founder, zyBooks;* Frank Vahid, *Co-Founder, zyBooks and University of California, Riverside;* Roman Lysecky, *Authoring Co-Lead, zyBooks and University of Arizona;* Scott Sirowy, *Director of Engineering, zyBooks;* Alex Edgcomb, *Sr. Software Engineer/Research Specialist, zyBooks and University of California, Riverside*

CS courses often include the additional need to learn a complex set of support tools involving LMS's, discussion boards, e-book logins, homework systems, program submission systems, clickers, web links, online announcements, OS'es, IDEs, and other items, often involving poorly-designed UI's and workflows, making today's CS classes unnecessarily hard, and stressful. In this session, we will introduce: (1) zyBooks: Highly-interactive web-native CS learning material for nearly any lower-division CS course, featuring animations of challenging concepts, learning questions for engaged learning, and concise text for lucidity. Instructors can award points for completion, rearrange sections to match their syllabus, and add notes to content; (2) Our challenge activities ("homework"), fully integrated within each zyBook section, many algorithmically-generated, all auto-graded; (3) Our zyLabs system, "The easiest program submission and grading system on the planet", and seamlessly integratable with a zyBook, or usable standalone; and (4) Our user-experience focus that guides how the content and platform are designed, how we provide support and respond to feedback, and more. We will show how instructors use those items to eliminate non-essential complexity and help focus students on learning concepts and programming, and summarize research showing improved learning outcomes as well as happier, less-stressed students.

Friday, March 10

Presented courtesy of ***Google***

Curriculum and Interview Recommendations for Software Engineering Preparedness

▶ **10:45 am - 12:00 pm**
Room: 618-619

Speaker: Pierre St. Juste, *Google*

Join Google as we demystify the journey of software engineers from their undergraduate studies to Google. Google Software engineer and former CS professor, Pierre St Juste, will host the discussion and review how faculty can better prepare students that would like to apply or gain entry into the CS field. During the session, we'll review best times to apply for internships, resume tips including a good example of a software engineering resume and how to prepare for a technical interview. We'll provide curriculum guidance for Freshman-Senior year that can best prepare students for internships and full time roles at companies like Google. Toward the end of the session, we'll open it up for Q&A and help answer your questions.

Presented courtesy of ***Microsoft***

Dos and Don'ts of Partnering Software Professionals and Computer Science Classrooms and Why It Matters To You

▶ **10:45 am - 12:00 pm**
Room: 616-617

Speakers: Brett Wortzman, *Instruction and Training Manager, TEALS/Microsoft Philanthropies;* Kasey Champion, *Computer Science Curriculum Developer, Microsoft Learning*

Come hear from professionals with experience in both engineering and education about how to create the most effective partnerships between industry and classrooms. Led by members of Microsoft Philanthropies' TEALS program (http://www.tealsk12.org) and the Microsoft Learning group (http://www.microsoft.com/learning), we'll discuss both general philosophies and specific practices that can help avoid common pitfalls when partnering engineers with schools, students, and teachers; and demonstrate how you can take what we've learned and apply it at any level.

Since 2010, Microsoft Philanthropies' TEALS program has recruited, trained, and placed software professionals from over 200 companies in more than 300 high schools across the US. Meanwhile, the Microsoft Learning group has deployed a wide range of computer science curriculum to thousands of students of diverse backgrounds all over the world.

Presented courtesy of ***IBM***

Addressing The Cybersecurity Skills Gap

▶ **1:45 pm - 3:00 pm**
Room: 616-617

Speaker: Heather (H.Y.) Ricciuto, *Transformation and Academic Initiatives Leader, PMP®, IBM*

With a projection of 1.5 million unfilled cybersecurity jobs expected by 2020 (Frost & Sullivan Report, 2015), the cybersecurity skills gap simply cannot be ignored. IBM is taking action, and you can too. Get inspired! Learn about the steps that IBM is taking to address this gap, including partnering with academia and government, embracing the cognitive era with Watson for Cyber Security, opening a state-of-the-art Cyber Range in Cambridge, Massachusetts and addressing the gender gap through middle-school outreach programs.

Presented courtesy of ***Vocareum***

The Next Frontier For Large Online Classes

▶ **1:45 pm - 3:00 pm**
Room: 618-619

Speakers: Sanjay Srivastava, *Vocareum;* David Joyner, *Georgia Tech*

MOOCs are changing the landscape of education. While the first generation of classes significantly increased access to education from top institutions and teachers, the focus now needs to shift to improving engagement and learning outcomes. We will discuss how Vocareum is being deployed on an EdX MOOC platform to deliver CS education.

Supporter Sessions

Friday, March 10

Presented courtesy of ***Intel***

Artificial Intelligence on Intel Architecture

▶ **1:45 pm - 3:00 pm**
Room: 615

Speaker: Nagib Hakim, *Intel Corporation;* Prof. Pedro Domingos, *University of Washington*

Artificial Intelligence (AI) is the next big revolution in computing, contributing to cutting-edge innovations such as precision medicine, injury prediction and autonomous cars. Intel is the partner for AI today and in the future, and is committed to driving this transformation by offering a complete portfolio to deliver end-to-end AI solutions. Intel is democratizing AI innovations by increasing the accessibility of data, tools, training, and intelligent machines, while collaborating with academia to foster the next generation of technology leaders.

In this session, you will learn about Intel's AI solutions and how computer science faculty and students are utilizing Intel's AI portfolio for education and research. You will also explore Intel® Deep Learning SDK, a free set of tools to develop, train, and deploy deep learning solutions.

Presented courtesy of ***Microsoft***

Physical and Game-based Computing for CS Education

▶ **3:45 pm - 5:00 pm**
Room: 616-617

Speakers: Thomas Ball, *Principal Researcher/Research Manager, Microsoft Research;* Peli de Halleux, *Principal Research Software Engineer, Microsoft Research;* Eric Anderson, *Senior Software Engineer, Microsoft*

Physical Computing for CS Education with PXT

Thanks to Moore's Law, embeddable microcontroller-based devices continue to get cheaper, faster, and include more integrated sensors and networking options. In 2016, the BBC and a host of technical partners, including Microsoft, delivered such a physical computing device, the BBC micro:bit, to every 5th grader in the UK. The non-profit Micro:bit Education Foundation (http://microbit.org), of which Microsoft is a founding partner, was recently created to take the micro:bit global. Over the last year, Microsoft has invested in a new web-based programming platform for physical computing, called PXT, with the micro:bit being the first target (http://pxt.microbit.org). Come hear about Microsoft's plans for bringing physical computing to CS education across a wide range of devices.

Game-based Computing with Kodu and the BBC micro:bit

Microsoft's Kodu Game Lab (http://kodugamelab.com) is a game creation tool and visual programming environment for children. The micro:bit (http://microbit.org) is a card-sized microcomputer and sensor board designed to bring physical computing to kids and classrooms. What if we were to combine the two? In this session you will create a Kodu game controlled by the micro:bit, and you will learn first-hand the different ways Kodu and the micro:bit work together to blend virtual-and real-world computing.

Presented courtesy of ***Oracle Academy***

Computer Science Curriculum for K12 and Beyond

▶ **3:45 pm - 5:00 pm**
Room: 618-619

Speaker: Tyra Crockett, *Sr. Manager, Oracle Academy*

Join the Oracle Academy team to learn the many benefits available to teachers through free membership to Oracle Academy. In this session you will learn of the many benefits available through the free Oracle Academy program, learn how to join the Oracle Academy program, and explore and get hands on in mini workshops with free Oracle Academy curriculum designed by educators for educators. We will also present our Short Byte curriculum designed for both younger learners making their first steps into programming, robotics and databases, and we will also present our comprehensive curriculum in Java programming and database development.

Saturday, March 11

Presented courtesy of ***ABET***

Computing and Computer Science Accreditation – What You Should Know

▶ **8:45 am - 10:00 am**
Room: 616-617

Speakers: J.J. Ekstrom, *Brigham Young University;* Allen Parrish, *U.S. Naval Academy;* Ed Sobiesk, *Army Cyber Institute;* Rajendra Raj, *Rochester Institute of Technology*

This session will provide an introduction to ABET as the leading organization in the world that provides accreditation of undergraduate computing programs. ABET accredits programs in computer science, information systems and information technology, and provides a flexible infrastructure for accrediting programs in emerging computing disciplines. The session will discuss ABET's contributions to these academic computing disciplines and to the standardization of computing education. The session will also articulate the benefits of obtaining program accreditation in the computing field.

ABET continues to evolve its computing accreditation criteria as the computing disciplines evolve. During 2016, ABET provided initial approval to new computing accreditation criteria, that—in final form--will be rolled out over the next several years for both new accreditations and re-accreditations. These criteria, which are currently undergoing public review, include revisions to the general computing criteria and to program criteria for computer science, information technology and information systems. This session will discuss the new criteria and provide an opportunity for audience feedback to be considered in the final revision that is currently in progress.

ABET is also developing new program criteria to accredit cybersecurity programs. This session will provide a progress report on that effort and will provide an opportunity for audience feedback on the proposed cybersecurity program criteria.

Supporter Sessions

Saturday, March 11

Presented courtesy of ***Codio***

An Online Solution to Authoring of Student Code Tests of Any Complexity and IDE Based Tutorial Content

▶ **8:45 am - 10:00 am**
Room: 618-619

Speaker: Freddy May, *Founder of Codio*

This presentation shows how CS lecturers can author and publish a rich library of tutorial content (including re-purposing existing lecture materials) as well as both simple and highly complex auto-graded code tests. Everything is done with just a browser and without the need for any in-house infrastructure.

You will see how students are able to write everything from simple functions right up to highly complex projects using databases and any other components that might be required. This code can be tested and displayed to lecturers and assistants who are able to monitor their progress. We will demonstrating seamless integration with all major LMS platforms, and how course leaders can significantly reduce wasted administration time and system administration overheads, as well as enhance the overall student experience.

Presented courtesy of ***IBM***

Introduction to Watson Internet of Things - Learn to Build Your IoT app

▶ **8:45 am - 10:00 am**
Room: 608

Speaker: Gayathri Magie, *WW Academic Initiatives Lead, IBM*

Learn the platform for all of your Internet of Things development and application needs. Learn about IBM's Watson IoT platform on IBM Bluemix that will help you rapidly connect your devices, and also infuse capabilities around device management, information management, real-time analytics, risk management and cognitive computing. Create and deploy your IoT application on the cloud using Node-Red with ease. You will also learn to use a variety of "recipes" provided by our device partners and individual users to connect your devices to the cloud. You can take the knowledge and contribute yourself to the developerWorks recipes community.

Presented courtesy of ***Gradescope***

Grading Both Written and Programming Assignments on One Platform

▶ **8:45 am - 10:00 am**
Room: 609

Speakers: Ibrahim Awwal, *Gradescope;* Sergey Karayev, *Gradescope*

You will learn how to manually grade both paper-based exams and programming projects in our rubric-based interface. Additionally, you will see how you can build your own autograders to automatically grade programming projects. Lastly, we will show a recent feature we call AI-assisted grading: for question types such as simple math questions, Gradescope AI groups student answers by content, so that you can review and grade answer groups instead of individual submissions.

Gradescope has been used to grade over ten million pages of handwritten work and over half a million programming projects. Ibrahim Awwal (ECE MS from UCSD) is a co-founder who has developed Gradescope since it was a humble TA-developed side project. Sergey Karayev (Computer Science PhD from Berkeley) is a co-founder who has been focusing on applying his research in computer vision and machine learning to AI-assisted grading.

Presented courtesy of ***LEGO Education***

Developing Computational Thinking Skills Through Hands-on, Playful Learning

▶ **8:45 am - 10:00 am**
Room: 606

Speakers: Mitch Resnick, *Professor of Learning Research, MIT Media Lab;* Yannick Dupont Educational Content Development Manager, *LEGO Education*

Digital technologies are changing the ways in which we play, learn and create. These tend to take on an even greater force when it comes to their potential impact on the lives of students. For over 35 years LEGO Education has been working with teachers and educational specialists to deliver playful learning experiences that bring subjects to life in the classroom and make learning fun and impactful. By bridging physical and digital educational resources, students are encouraged to think creatively, reason systematically and release their potential to shape their own future.

This session will provide an introduction to LEGO Education, where learning is at the very core of the LEGO Group's values. Get an in-depth overview of the LEGO Education learning philosophy and our approach to computational thinking and the design engineering process. Learn more about how LEGO Education uniquely combines the familiarity of the simple, easy-to-use bricks with easy-to-use computer science, coding resources and engaging STEM challenges designed to meet curriculum standards. LEGO Education empowers teachers and their students to explore, learn and apply coding to the real world.

SATURDAY, MARCH 11

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

Exciting Ways To Engage Your Students With the Power of Data

▶ **10:45 am - 12:00 pm**
Room: 618-619

Speakers: Susan Baskin, *Teradata Corporation;* Karen Davis, *University of Cincinnati*

Teradata University Network (TUN) provides computer science and information systems faculty members and students with a rich variety of FREE resources for teaching and learning about data and database management, data warehousing, data science, data analytics, and information management. These resources include software (both from Teradata and its partners, such as Fuzzy Logix, IBM Watson Analytics, MicroStrategy, NetApp, SAS, and Tableau), teaching materials (exercises, assignments, tutorials, case studies, etc.), and access to real-world data sets. This session will provide information on our 2017 TUN student competitions, an introduction to TUN resources, and demonstrate how these resources can be used to support your computer science courses. In addition, you will learn how you can contribute to TUN to make it an even better community for CS faculty.

Presented courtesy of ***GitHub***

How I Implemented GitHub In My Classroom: CS50, Automated Testing and GitHub for Large Courses

▶ **10:45 am - 12:00 pm**
Room: 616-617

Speakers: David Malan, *Harvard University;* Omar Shaikh, *San Francisco State University;* S. Monisha Pulimood, *College of New Jersey;* Vanessa Gennarelli, *GitHub Education*

In this session, we will present three examples of GitHub in the classroom: GitHub for CS50 (the largest course at Harvard) that collects assignments, enables portfolios and promotes project-based learning; an automated testing framework, Travis CI, with GitHub Classroom to support students and teaching assistants for large courses; and GitHub for group projects in a service learning course. Learn from the speakers' specific experiences and variations, reflections and recommendations. After a brief presentation, there will be time for Q&A. Following the hour-long program will be a GitHub classroom lab, where teachers can work with an instructional designer to use GitHub classroom themselves and see how it works.

Birds of a Feather

Flock #1: Thursday, March 9

5:30 pm - 6:20 pm

SIGCSE Reads: Time for Book Discussion

Room 612

Rebecca Bates, *Minnesota State University, Mankato;* Valerie Summet, *Rollins University;* Nanette Veilleux, *Simmons College*

Teaching and Learning Under Pressure: Intensive (Accelerated, Block) Computer Science Courses

Room 605

Janet Burge, *Colorado College;* Bo Brinkman, *Miami University*

Advancing Data Science for Students of All Majors

Room 616-617

Lillian N. Cassel, Michael Posner, *Villanova University;* Darina Dicheva, *Winston Salem State University;* Don Goelman, *Villanova;* Heikki Topi, *Bentley University;* Christo Dichev, *Winston Salem State University*

Communicating What Liberal Arts Colleges Contribute to Computer Science

Room 609

Janet Davis, *Whitman College;* Angela Berardinelli, *Mercyhurst University;* Amanda Holland-Minkley, *Washington & Jefferson College;* Ellen Walker, *Hiram College*

Sustainable Methods for Impactful Service Learning in Computer Science

Room 201

Nate Derbinsky, Durga Suresh, *Wentworth Institute of Technology*

High School CS Teacher Certification: Standards, Assessments, and Professional Development

Room 611

Carol L. Fletcher, William Wesley Monroe, *The University of Texas at Austin*

Practical Systems Programming in Computer Science Education

Room 615

Peter Froehlich, *Johns Hopkins University;* Borja Sotomayor, University of Chicago

Process Oriented Guided Inquiry Learning (POGIL) in the CS Classroom

Room 310

Saturnino Garcia, *University of San Diego*

Computer Science Curricular Guidelines for Associate-Degree Transfer Programs

Room 203

Elizabeth Hawthorne, *Union County College;* Cara Tang, *Portland Community College;* Cindy Tucker, *Bluegrass Community and Technical College;* Christian Servin, *El Paso Community College*

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

Room 606

Josh Hug, *UC Berkeley;* Cynthia Lee, *Stanford University*

GitHub, Tutors, Relatives, and Friends: The Wide Web of Plagiarism

Room 607

Amardeep Kahlon, *Austin Community College;* Bonnie MacKellar, *St. John's University;* Anastasia Kurdia, *Tulane University*

Weaving Diversity and Inclusion into CS Content

Room 608

Justin Li, *Occidental College*

Using Tangible Manipulatives for Hands-on Activities in Undergraduate Computer Science Classes

Room 204

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

Perspectives on Teaching Humanitarian Free and Open Source Software

Room 211

Becka Morgan, *Western Oregon University;* Heidi Ellis, *Western New England University;* Gregory Hislop, *Drexel University;* Grant Braught, *Dickinson College;* Lori Postner, *Nassau Community College*

Strengthening Informal CS Education Program Delivery Through Evaluation Capacity Building

Room 620

Jason Ravitz, *Google;* Karen Peterson, *National Girls Collaborative Project;* Kathy Haynie, *Haynie Research and Evaluation;* Juliet Tiffany-Morales, *Google*

CSTA K-12 CS Standards for All

Room 602-604

Deborah Seehorn, Lissa Clayborn, CSTA

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

Room 618-619

Gloria Townsend, *DePauw University*

Researching the K–12 Computer Science Framework

Room 613-614

Pat Yongpradit, *Code.org*

Birds of a Feather

Flock #2: Thursday, March 9

6:30 pm - 7:20 pm

The ACM Code of Ethics and Professional Conduct: Teaching Strategies and the Coming Update

Room 612

Bo Brinkman, *Miami University;* Karla Carter, *Bellevue University*

The Power of Analogies in Introductory CS Education

Room 607

Yingjun Cao, *University of California, San Diego;* Scott Anderson, *Wellesley College*

Evaluating the Long-Term Impact of Pre-college Computing Activities

Room 203

Adrienne Decker, *Rochester Institute of Technology;* Monica McGill, *Bradley University;* Alan Peterfreund, *Sage Fox Group*

Alternative Publishing and Dissemination of CS Education Research

Room 620

Nickolas Falkner, *The University of Adelaide;* Elizabeth Patitsas, *University of Toronto;* Colleen Lewis, *Harvey Mudd College*

Strategies for Including Soft Skills and Interdisciplinary Content in CS Education

Room 204

Amanda Holland-Minkley, *Washington Jefferson College;* Thomas Lombardi, *University of the Virgin Islands;* Madeline Smith, *Colgate University*

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

Room 211

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

Access to Computing Education for Students with Disabilities

Room 611

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

Surviving "Open-ended Projects" in Project-Based Learning: A Teacher's Perspective

Room 201

Tina Ostrander, *Green River College;* Ruby ElKharboutly, *Quinnipiac University;* Karen Jin, *University of New Hampshire*

Improving Effectiveness of CS Teacher Professional Development

Room 205

Karen Parker, Sloan Davis, Chris Stephenson, Jason Ravitz, *Google*

Collaborative Research into Game Jams, Hackathons and Event-Based Teaching in Higher Education

Room 615

Ian Pollock, Lonny Brooks, *California State University, East Bay*

Sharing and Using Programming Log Data

Room 310

Thomas W. Price, *North Carolina State University;* Neil C. C. Brown, *University of Kent;* Chris Piech, *Stanford University;* Kelly Rivers, *Carnegie Mellon University*

Can We Really Do It? - Conducting Significant Computer Science Research in Primarily Undergraduate Institutions (PUIs)

Room 613-614

Farzana Rahman, *James Madison University;* Suzanne Matthews, *United States Military Academy, West Point;* Kelly Shaw, *University of Richmond;* Andrea Danyluk, *Williams College*

An IoT BOF

Room 602-604

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

CS4What? A Game-based Discussion about the Purposes of Universal Computer Science Education

Room 616-617

Rafi Santo, *Indiana University;* David Phelps, *University of Washington*

Teaching Track Faculty in CS

Room 606

Mark Sherriff, *University of Virginia;* Christopher Gregg, *Stanford University;* Shawn Lupoli, *University of Maryland, Baltimore County*

Mapping Alice Curriculum to Standards: A BOF for the Alice Community

Room 618-619

Donald Slater, Eric Brown, Wanda Dann, *Carnegie Mellon University*

Forming Strong and Effective Student Teams

Room 608

Anya Tafliovich, *University of Toronto Scarborough;* Jennifer Campbell, *University of Toronto;* Daniel Zingaro, *University of Toronto Mississauga;* Francisco Estrada, *University of Toronto Scarborough;* Leo Porter, *University of California, San Diego*

Building and Supporting a Community of CS Educators Teaching Cybersecurity in 2017

Room 609

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

Poster Session #1

Friday, March 10

J. Philip East, *Chair*

10:00 am - 12:00 pm

Exhibit Hall

Building Tools, Gathering Data: Precursors for Assessing Students' Programming Process
Carl Alphonce, Jacob Condello, Bina Ramamurthy, Simran Singh, *University at Buffalo*

Using Static Analysis for Automated Assignment Grading in Introductory Programming Classes
Samuel Breese, Ana Milanova, Barbara Cutler, *Rensselaer Polytechnic Institute*

Can We Conduct A Social Construction Based Epistemology for CS1 and CS2 Students?
Frisque Brennen, Ankur Chattopadhyay, *University of Wisconsin - Green Bay*

CS for SC: A Landscape Report of K-12 Computer Science in South Carolina
Quinn Burke, *College of Charleston;* Madeleine Schep, Travis Dalton, *Columbia College*

Analysis of Associations between Motivation and Previous Computer Science Experience, Gender, Ethnicity and Privilege as Observed in a Large Scale Survey of Middle School Students
Jeffrey Bush, Susan Miller, *University of Colorado*

Investigating the Impact of Unsolicited Next-Step and Subgoal Hints on Dropout in a Logic Proof Tutor
Christa Cody, Behrooz Mostafavi, *North Carolina State University*

ThoTh Lab: A Personalized Learning Framework for CS Hands-on Projects
Yuli Deng, Dijiang Huang, *Arizona State University;* Chun-Jen Chung, *Athena Network Solutions*

Broadening Participation Research Project: Exploring Computing Careers through a Virtual Career Exploration Fair Using Embodied Conversational Agents
Kinnis Gosha, Kamal Middlebrook, *Morehouse College*

A Final Project Report on CS4Alabama: A Statewide Professional Development Initiative for CS Principles
Kathleen Haynie, *Haynie Research and Evaluation;* Jeff Gray, *University of Alabama;* Sheryl Packman, *Gator Analytics;* Carol Crawford, Mary Boehm, *A+ College Ready;* Jonathan Corley, *University of West Georgia*

Progsnap: Sharing Programming Snapshots for Research
David Hovemeyer, *York College of Pennsylvania;* Arto Hellas, *University of Helsinki;* Andrew Petersen, *University of Toronto,* Mississauga; *Jaime Spacco,* Knox College

Learning and Identity in YWIC - An Analysis of Program Implementation and Design as Promoting Agency in Computing
Sarah Hug, *Colorado Evaluation & Research Consulting;* Enrico Pontelli, Raena Cota, *New Mexico State University;* Suzanne Eyerman, *Colorado Evaluation & Research Consulting*

What Should Cybersecurity Students Learn in School? Results from Interviews with Cyber Professionals
Keith Jones, Akbar Siami-Namin, Miriam Armstrong, *Texas Tech University*

Agile Development in Project-based Curriculum at Scale for Middle and High School Girls
Sarah Judd, Megan Sullivan, Jeff Stern, *Girls Who Code*

CS1: Computation & Cognition – An Evidence-based Course to Broaden Participation
Clifton Kussmaul, *Muhlenberg College*

Should Your College Computer Science Program Partner with a Coding Boot Camp?
Louise Ann Lyon, *ETR;* Quinn Burke, *College of Charleston;* Jill Denner, *ETR;* James Bowring, *College of Charleston*

Examining PhD Student Interest in Teaching: An Analysis of 19 Years of Historical Data
Travis Mandel, *University of Washington;* Jens Mache, *Lewis & Clark College*

Using Professional Development to Move Toward a Guided Discovery Approach in the Classroom
Susan B. Miller, *University of Colorado*

CodeBox64: A Tactile Input Modality for Block Programming
Max Paulk, Amber Wagner, *Kennesaw State University*

Cracking the Code: Bringing Introductory Computer Science to a Charleston Middle School
Clare Rumsey, Quinn Burke, *College of Charleston;* Christopher Thurman, *Charleston, SC School District*

Coding for All: Computer Science Outreach for All Ages and Budgets
Jennifer Sabourin, Lucy Kosturko, Scott Mcquiggan, *SAS Institute*

Cyber Crime Investigators: Pathways from High School to Cybersecurity Careers for First Generation College-Bound Students
Nicole Simon, Megan Banford, *City University of New York, John Jay College of Criminal Justice*

Motivating K-12 Students Toward Computer Science, and Computer Science Students Toward Teaching
Peter Tucker, *Whitworth University;* Robert Bryant, *Gonzaga University*

A Game-Driven Approach to Teaching Bit Manipulation
Paul Voelker, Chris Johnson, *University of Wisconsin-Eau Claire*

Enhancing Cybersecurity Education Using POGIL
Xiaohong Yuan, *North Carolina A&T State University;* Li Yang, *The University of Tennessee at Chattanooga;* Wu He, *Old Dominion University;* Jennifer Ellis, *The University of Tennessee at Chattanooga;* Jinsheng Xu, Cynthia Waters, *North Carolina A&T State University*

Poster Session #2

Friday, March 10

J. Philip East, *Chair*

3:00 pm - 5:00 pm

Exhibit Hall

Merging MyCS: Lessons from a District-wide Middle-school CS Pilot
Sam Andow, Kaitlyn Eng, *Harvey Mudd College;* Julia McCarthy, *Claremont McKenna College;* Olivia Palenscar, *Scripps College;* Thomas Schneider, Adam Schulze, Zachary Dodds, *Harvey Mudd College;* Bryan Twarek, *San Francisco USD*

Implementing "In-Lab" Autograding for Snap*!*
Michael Ball, *UC Berkeley*

Studying Implementation of Secondary Introductory Computer Science: Pilot Results
Marie Bienkowski, Eric Snow, *SRI International*

Measuring Learning of Code Patterns in Informal Learning Environments
Sayamindu Dasgupta, *Massachusetts Institute of Technology;* Benjamin Mako Hill, *University of Washington*

On the Integration of Big Data and Cloud Computing Topics
Debzani Deb, *Winston-Salem State University*

What We Say vs. What They Do: A Comparison of Middle-School Coding Camps in the CS Education Literature and Mainstream Coding Camps
Anita DeWitt, Julia Fay, Madeleine Goldman, Eleanor Nicolson, Linda Oyolu, Lukas Resch, Jovan Martinez Saldaña, Soulideth Sounalath, Tyler Williams, Kathryn Yetter, Elizabeth Zak, Narren Brown, Samuel A. Rebelsky, *Grinnell College*

Early Intervention to Enhance Female Interest in Computing Sciences
Jean French, Hailey Crouse, *Coastal Carolina University*

Computer Science Teaching Knowledge: A Framework and Assessment
Aleata Hubbard, Yvonne Kao, *WestEd*

Open Extensible System for Dynamic Problem Creation for Computer Science
Keith Irwin, Darina Dicheva, Christo Dichev, *Winston-Salem State University*

An Interactive Web Application Visualizing Memory Space For Novice C Programmers
Ryosuke Ishizue, *Waseda University;* Kazunori Sakamoto, *National Institute of Informatics;* Hironori Washizaki, Yoshiaki Fukazawa, *Waseda University*

Emerging Learning Progressions in K-5 Integrated Mathematics and Computer Science Lesson Plans
Maya Israel, Todd Lash, George Reese *University of Illinois at Urbana Champaign*

Hopper's Fables: A Mathematical Storytelling Adventure
Deja Jackson, Cindi Simmons, Kate Zelaya, Erica Pantoja, Amber Wagner, *Kennesaw State University*

Hopper's Fables: A Mathematical Storytelling Adventure
Deja Jackson, Cindi Simmons, Kate Zelaya, Erica Pantoja, Amber Wagner, *Kennesaw State University*

Computational Thinking App Design Mat: Supporting the Development of Students' Computational Thinking Skills
Yerika Jimenez, *University of Florida;* Theodore Hays, *Clemson University;* Christina Gardner-McCune, *University of Florida*

Building Bridges: How the Southeast is Increasing the Representation of Students with Disabilities in STEM
Daniela Marghitu, *Auburn University;* Amber Wagner, *Kennesaw State University*

Implementing CS Principles as a Breadth-First Survey Course
Chris Mayfield, *James Madison University*

Can Undergraduate Computing Research Be Student-Driven?
Chelsea Patek, Ankur Chattopadhyay, *University of Wisconsin - Green Bay*

Broadening Secure Mobile Software Development (SMSD) Through Curriculum
Kai Qian, Hossain Shahriar, *Kennesaw State University;* Fan Wu, Cassandra Thomas, *Tuskegee University;* Emmanuel Agu, *Worcester Polytechnic Institute*

Applications of Specifications Grading in Computer Science Courses
Christian Roberson, *Florida Southern College*

Do Computer Science Exposure Activities and Courses Influence the Pursuit of Computing Majors in Higher Education among Underrepresented High School Students?
Allison Scott, *Kapor Center for Social Impact;* Alexis Martin, Frieda McAlear, *Level Playing Field Institute*

Curricular Guidance for Associate-Degree Transfer Programs in Computer Science with Contemporary Cybersecurity Concepts
Cara Tang, *Portland Community College;* Cindy Tucker, *Bluegrass Community and Technical College;* Elizabeth K. Hawthorne, *Union County College;* Christian Servin, *El Paso Community College;* Teresa Moore, *Volunteer State Community College*

CS OPEN: Building Evaluative Capacity for Out of School Organizations that Engage Girls in Computer Science
Juliet Tiffany-Morales, *Google;* Kathy Haynie, *Haynie Research and Evaluation;* Jason Ravitz, *Google;* Karen Peterson, *National Girls Collaborative Project*

A Flexible Late Day Policy Reduces Stress and Improves Learning
Jeramey Tyler, Matthew Peveler, Barb Cutler, *Rensselaer Polytechnic Institute*

Finding Exercise Equilibrium: How to Support the Game Balance at the Very Beginning?
Jan Vykopal, Jakub Čegan, *Masaryk University*

Collecting Participation Data Across NSF CS10K-funded Professional Development Providers
Rebecca Zarch, Alan Peterfreund, *SageFox Consulting Group*

NSF Showcase

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

NSF Showcase #1

Thursday, March 9
10:00 am - 11:30 am

EDURange: An Easy-to-use Framework For Cybersecurity Education
Jens Mache, *Lewis and Clark College;* Richard Weiss, *Evergreen State College;* Michael Locasto, *University of Calgary*

A New Tool for Guiding Faculty in Customizing Database Visualizations for Learners of Many Majors
Suzanne W. Dietrich, *Arizona State University;* Don Goelman, *Villanova University*

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

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

NSF Showcase #2

Thursday, March 9
3:00 pm - 4:30 pm

CyberPaths: Broadening the Path to STEM Professions through Cybersecurity Learning
Xenia Mountrouidou, *College of Charleston;* Xiang-Yang Li, *Illinois Institute of Technology*

CS Principle Ebooks for Teachers and Students Building On Educational Psychology Principles
Barbara Ericson, Mark Guzdial, Miranda Parker, *Georgia Tech*

Activity-Based Logical Code Reasoning
Michelle Cook, Jason O. Hallstrom, Joseph E. Hollingsworth, Murali Sitaraman, *Clemson University*

Design Challenges and Stories: Integrating Reflective Design Learning in Computer Science
John Georgas, *Northern Arizona University*

NSF Showcase #3

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

Information Assurance and Security Education on Portable Labs
Dan Lo, *Kennesaw State University*

Increasing Student Interest in Data Structures Courses with Real-World Data and Visualizations Using BRIDGES
Kalpathi Subramanian, *UNC Charlotte;* Jamie Payton, *Temple University;* Michael Youngblood, *PARC;* Robert Kosara, *Tableaux Software;* Paula Goolkasian, David Burlinson, Mihai Mehedint, Dakota Carmer, *UNC Charlotte*

Automated Laboratory Generation for Yakama Nation Students
Brent Lagesse, *University of Washington*

On Beyond Sudoku: Pencil Puzzles for Introductory Computer Science
Zack Butler, Ivona Bezakova, *Rochester Institute of Technology*

NSF Showcase #4

Friday, March 10
3:00 pm - 4:30 pm

Collaborative Research: Capacity Building in Cybersecurity-literacy: An Inter-disciplinary Approach
Shamik Sengupta, *University of Nevada, Reno*

Authentic STEAM-based Computer Science Education for Non-Majors
Brian Magerko, Tom McKlin, Lea Ikkache, *Georgia Tech*

Puzzle-Based Learning Approach to Teaching Cyber Security Concepts
Joshua Britt, *Jackson State Community College*

Integration of Computing with Electronic Textiles to Improve Teaching and Learning of Electronics in Secondary Science
Colby Tofel-Grehl, *Utah State University*

NSF Showcase #5

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

Designing and Studying of Maker Oriented Learning to Transform Advanced Computer Science
Zane Cochran, *Georgia Tech*

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

Middle-years Computer Science
Sam Andow, Kaitlyn Eng, Julia McCarthy, Olivia Palenscar, Adam Schulze, Tommy Schneider, Zachary Dodds, *Harvey Mudd College;* Bryan Twarek, *San Francisco Unified School District*

Collaborative Research: Developing Course Modules to Teach Service-Oriented Programming Through Exemplification and Visualization
Rajendra Raj, *Rochester Institute of Technology*

2017 ACM Student Research Competition@SIGCSE

First Round of Competition - Posters

Thursday, March 9 • 1:45 pm - 5:00 pm

Exhibit Hall

Semi-Finalist Oral Presentations

Saturday, March 11 • 8:45 am - 10:00 am

Undergraduate Room 611

Graduate Room 612

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

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

GRADUATE STUDENT RESEARCH PROJECTS

Neo-Piagetian Classification of Reasoning Ability and Mental Simulation in Microsoft's Kodu Game Lab
Ashish Aggarwal, *University of Florida*

Managing the Internet of Things
Ben Romano, *The University of Alabama*

Sniffing Through Millions of Block-Based Programs for Bad Smells
Peeratham Techapalokul, *Virginia Tech*

Scaling Up Automated Verification: A Case Study and Formal-IDE for the Construction of High Integrity Software
Daniel Welch, *Clemson University*

UNDERGRADUATE STUDENT RESEARCH PROJECTS

The Application of 2D Structure Tensor in Visual Arts Design
Alec Battles, Jian Zhang, *Texas Woman's University*

The Urban Archivist Application
James Belford, *St Martins University*

Tapped-based Authentication for Mobile Device Security
Lukasz Brodowski, Cameron Dziurgot, Donald Moretz, *Central Connecticut State University*

Mixed-initiative Personal Assistant Agents
Joshua Buck, Saverio Perugini, *University of Dayton*

Time Lord: Covert Timing Channel Implementation and Realistic Experimentation
Eduardo J. Castillo, *Wofford College;* Xenia Mountrouidou, Xiangyang Li, *College of Charleston*

ORC2A: A Proof Assistant for Undergraduate Education
Jianting Chen, Medha Gopalaswamy, Prabir Pradhan, Sooji Son, Peter-Michael Osera, *Grinnell College*

Raising Flags: Detecting Covert Storage Channels using Relative Entropy
Josephine Chow, *University of Maryland, College Park;* Xiangyang Li, *Johns Hopkins University;* Xenia Mountrouidou, *College of Charleston*

Identifying and Exploiting Vulnerabilities in Civilian Unmanned Aerial Vehicle Systems and Evaluating and Countering Potential Threats Against the United States Airspace
Philip Costello, *Randolph-Macon College*

Quadrilateral Mesh Generation with a Provably Good Aspect Ratio Bound
Christopher Gillespie, Mark Moore, Colin Brown, *Rutgers University, Camden, NJ*

Applying Machine Learning to Predict Davidson College's Admissions Yield
Joseph Jamison, *Davidson College*

Optimizing Kinect® Depth Sensing Using Dynamic Polarization
Jakub Jancek, Darya Aleinikava, Grace Mirsky, *Benedictine University*

One Size Doesn't Fit All
Zane Johnston, *Kennesaw State University*

Recursive Convergence
Amy MacDonough, *Haverford College*

Creative Computing and Society: When Undergraduates Design a Curriculum For an Introductory Computing Course
Sierra Magnotta, Anushikha Sharma, Jingya Wu, Darakhshan Mir, *Bucknell University*

Digitalizing Paper-Based Exams: An Assessment of Programming Grading Assistant
Hannah Murphy, *Arizona State University*

A Pathway to Strengthening Support for BJC Teachers
Meghana Subramaniam, Veronica Catete, *North Carolina State University*

Teacher Configurable Coding Challenges for Block Languages
Nath Tumlin, *University of Alabama*

Improving SAT-Solving with Machine Learning
Haoze Wu, *Davidson College*

Quadrilateral Mesh Boundary Classification and Editing
Ziyan Yang, *Bryn Mawr College*

Using Scratch and Female Role Models While Storytelling Improves Fifth-Grade Students' Attitudes toward Computing
Raza Zaidi, Isabel Freihofer, Gloria Townsend, *DePauw University*

SATURDAY, MARCH 11

Chair: Steve Wolfman, *University of British Columbia*
10:45 am - 12:00 pm

Room 609

Teach Global Impact: A Resource for CSP (or Any CS Class!)
Julia Bernd, *International Computer Science Institute;* Jonathan Corley, *University of West Georgia*

Bringing Real-Time Collaboration to Visual Programming
Brian Broll, Akos Ledeczi, *Vanderbilt University*

Establishing Conventions for Citing Educational Materials
Douglas H. Fisher, *Vanderbilt University*

Moving from Business Education to Computer Science Concepts in the Middle Grades
Patty Hicks, *Indian Prairie School District*

Teach Access: Preparing Computing Students for Industry
Megan Lawrence, Mary Bellard, *Microsoft*

Seeking Evidence for Basing the CS Theory Course on Non-decision Problems
John MacCormick, *Dickinson College*

Developing Big Data Curriculum with Open Source Infrastructure
Anurag Nagar, *University of Texas at Dallas*

Curriculum Design for 'Explorations in Computing' (a New General Education Course at USC)
Saty Raghavachary, *University of Southern California*

Accessibility as a First-Class Concern in Teaching GUIs and Software Engineering
Joel Ross, Andrew Ko, David Stearns, *University of Washington iSchool*

Class-Sourcing Exams: Student-Generated Exam Questions
Kendra Walther, *University of Southern California*

Using the 5 Practices to Improve Facilitation of POGIL Activities
Dee Weikle, *James Madison University*

Lessons learned from an EPIC Course - Mobile Application Development for Mobile Health
Chen-Hsiang Yu, *Wentworth Institute of Technology*

Vocareum

See Why Leading Universities are Using Vocareum

Assignment Management
Set up rules and resources for assignments with easy deployment of strategies like peer review and team projects.

Plagiarism Detection
Deploy sophisticated and configurable algorithms to measure similarity with other students' code.

Cloud IDE
No installation – work in the browser with access to all required tools and resources.

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Simplify grading by running your scripts against the students' work in our cloud computing infrastructure.

Learning Analytics
Visualize, measure and predict learning outcomes based on your student assessment data.

Native Jupyter Notebook Support
Provide code comment, auto grade, and run plagiarism detection on notebook assignments.

Some of the Classes Using Vocareum

CSCI 561
Foundations of Artificial Intelligence

APMA E4301
Numerical Methods / PDEs

CMPSC 465
Data Structures and Algorithms

CBE 30338
Chemical Process Control

CS 180x
AP Computer Science A on edX

SIGCSE 2017 Vocareum Supporter Session Times

Thursday . March 9 . 10:45am - noon
Room 616-617 Assessment strategies for large CS classes
Christine Alvarado (UC San Diego) & Sanjay Srivastava (Vocareum)

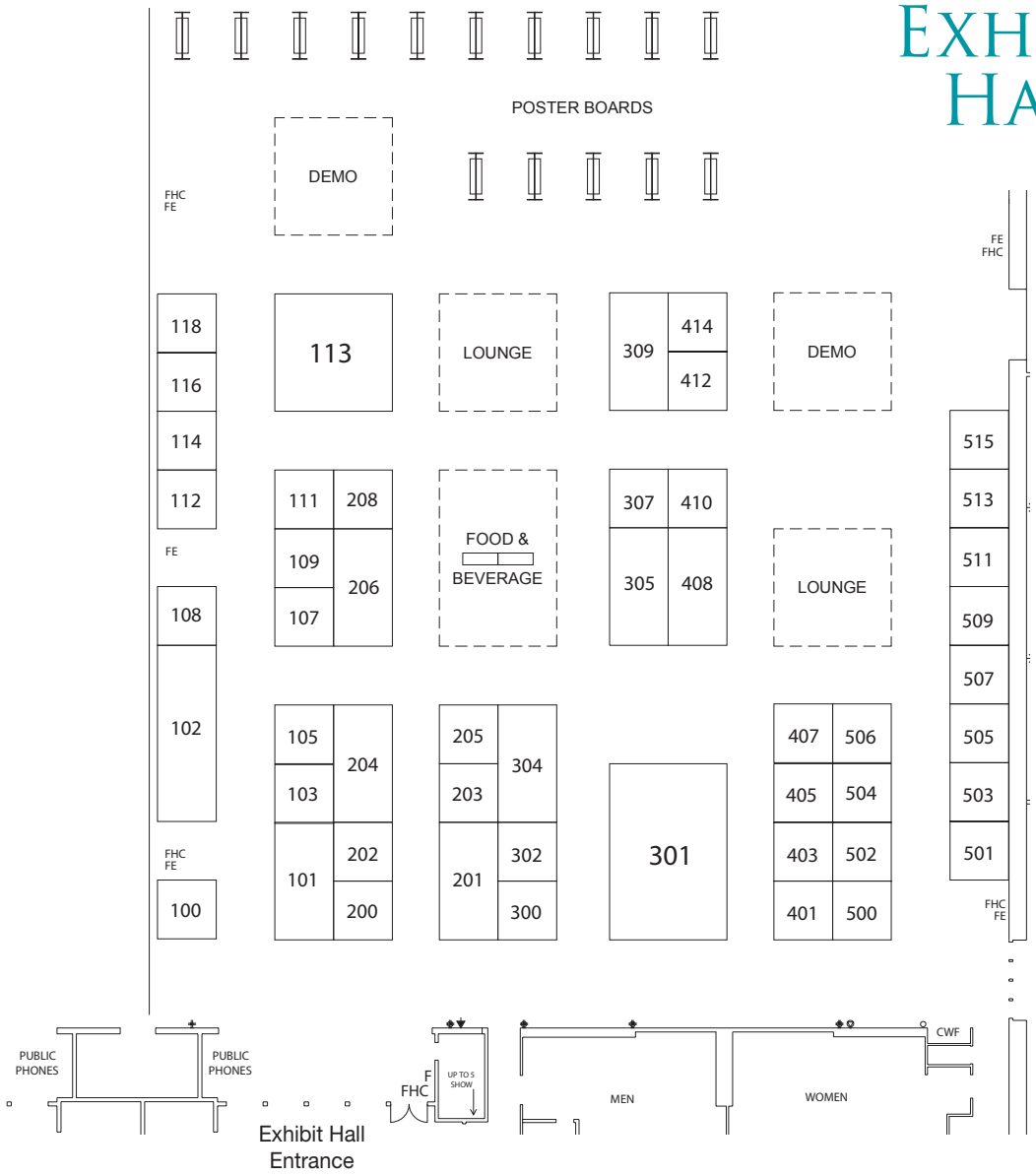
Friday . March 10 . 1:45 - 3:00pm
Room 618-619 The Next Frontier For Large Online Classes
David Joyner (Georgia Tech) & Sanjay Srivastava (Vocareum)

Our Platform Supports

python Java JS jupyter MySQL php C++ hadoop ERLANG Google R Scala C

www.vocareum.com

Washington State Convention Center - Level 4



Exhibitor	Booth
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ACM-W, ACM CCECC	414
Auburn University	307
AutoGradr	108
CCSC	505
CISSE	202
CODIO	200
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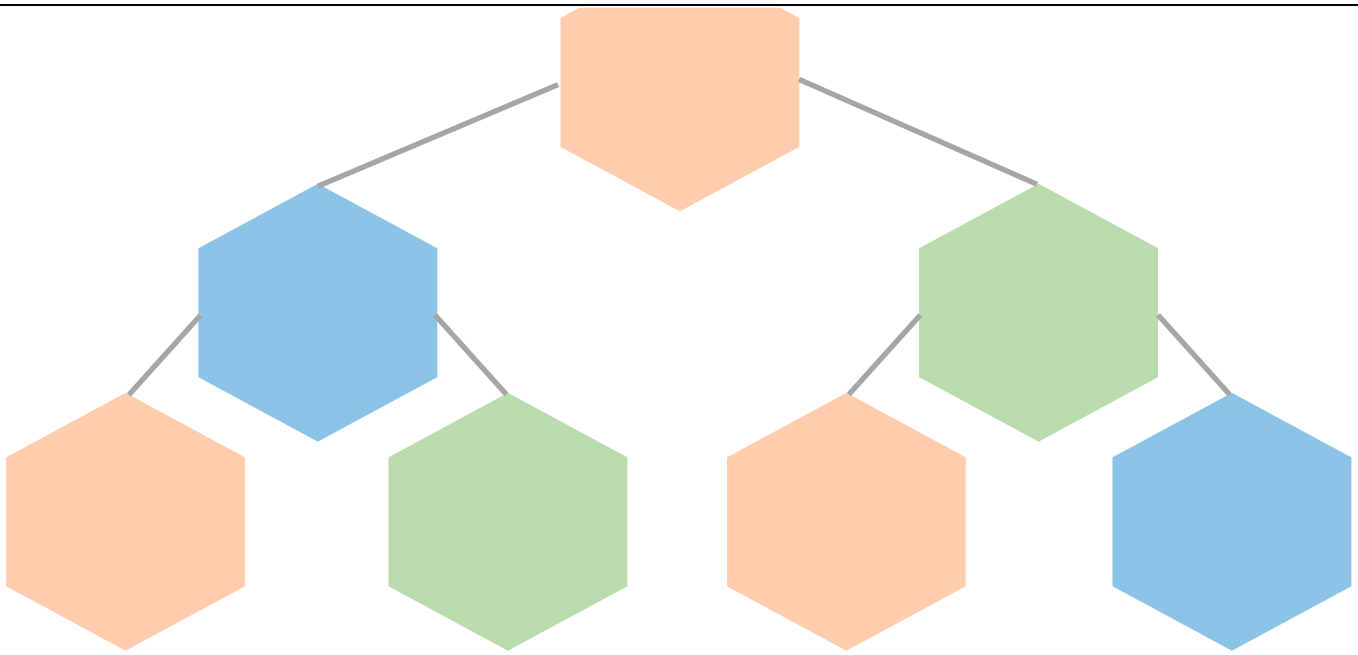
zyBooks	408



THANK YOU

to the members of the computer science education community

from all of your former students at Microsoft who are teaching the next generation of computer scientists through TEALS and other programs.

Learn about Microsoft programs and technologies at these sessions:

Keynote: Embracing Uncertainty (Jeanette Wing)	Thursday, 8:30am-10:00am
The Micro:bit: Hands-on Computing for the New Generation	Thursday, 10:00am-10:45am
Creating Cool Stuff—Pupils' Experience of the BBC micro:bit	Thursday, 1:45pm-3:00pm
Dos and Don'ts of Partnering Software Professionals and Computer Science Classrooms	Friday, 10:45am-12:00pm
Preparing and Supporting Industry Professionals as Volunteer High School Computer Science Co-Instructors	Friday, 1:45pm-3:00pm
Physical and Game-based Computing for CS Education	Friday, 3:45pm-5:00pm
Teach Access: Preparing Computing Students for Industry	Saturday, 10:45am-12:00pm

Come visit us at booth #309

Microsoft

TEALS
computer science in every high school
Microsoft Philanthropies tealsk12.org

SILVER SUPPORTER

ABET

Booth 506

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

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

AccessComputing

Booths 401, 403, 405

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

Booths 401, 403, 405

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

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

ACM CCECC

Booth 414

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

Booths 414

2 Penn Plaza, Suite 701
New York, NY 10121
http//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.

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

Booths 401, 403, 405

University of Massachusetts Boston
100 Morrissey Boulevard
Boston, MA 02125
www.batec.orgl

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, 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.

AP Computer Science Principles Phase II

Booths 401, 403, 405

AP Computer Science Principles introduces students to the foundational concepts of computer science and challenges them to explore how computing and technology can impact the world. With a unique focus on creative problem solving and real-world applications, AP Computer Science Principles prepares students for college and career in multiple disciplines.

Auburn University - jGRASP

Booth 307

3101 Shelby Center
Auburn, AL 36849-5347
www.jgrasp.org

jGRASP is a freely available integrated development environment with vizualizations for improving the comprehensibility of software. Features include: Control Structure Diagrams (CSDs) for Jave, 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.

AutoGradr

Booth 108

360 Market St.
San Jose, CA 95113
www.autoGradr.com

AutoGradr is the complete automated grading solution for your CS course. Use our marketplace to find high quality course material, or create your own labs and projects. Instructors see auto-graded results, code quality and plagiarism reports. Students make attempts directly on AutoGradr, while the system automatically runs the submissions against test cases to provide instant feedback. Come see a demo at exhibit next to Google to Stop Grading, and Start Automating.

SIGCSE 2017
Guide to Exhibitors

CCSC

Booth 505

421 N. Woodland Blvd.
DeLand, FL 32723
www.ccsc.org

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

SILVER SUPPORTER

CODIO

Booth 200

51 Queens Rd.
Wimbledon Greater London
United Kingdom SW19 8NP
www.codio.com

Codio for Faculty and Teachers

Codio is designed for computer science education and is a unique combination of technologies that you will find hard to match. It is the entire infrastructure stack in the cloud - students access their code at any time, on any device. The professional grade IDE progresses with the student making it perfect for beginners and experts. It offers you great visibility - with tools to monitor progress, provide support, LMS integration and plagiarism detection. Plus, create new course content or spin up a project in 5 seconds to use in your class.

Say goodbye to 2 am email exchanges. Unlock the Code with Codio.

Colloquem for Information Systems Security Education (CISSE)

Booth 202

49004 Packard Ct.
Belleville, MI 48111
www.cisse.info

In 1996 the Colloquium for Information Systems Security Education (CISSE) was created to define requirements for Information Assurance (IA) Education. We have aided in the implementation of IA Courses in K-12, Community Colleges, Universities and governmental training for the last 21 years. Join us for our 21st Conference at the JW Marriott in Las Vegas, June 12-14, 2017.

CRC Press/Taylor & Francis

Booth 302

6000 Broken Sound Parjkway
Boca Raton, FL 33487
www.crc.press.com

CRC Press is a premier global publisher of science, technology, and medical resources. We offer unique, trusted content by expert authors, spreading knowledge and promoting discovery worldwide. We aim to broaden thinking and advance understanding in the sciences, providing researchers, academics, professionals, and students with the tools they need to share ideas and realize their potential.

CSTA

Booth 412

230 Washington Avenue
Extension, Suite 101
Albany, New York 12203
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.

CS Teaching Tips

Booth 503

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

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

CS Unplugged: Encourage Computing without Computers

Booths 401, 403, 405

Colorado School of Mines
1500 Illinois St
Golden CO 80401
www.toilers.mines.edu/CS-Unplugged

We seek to broaden participation in computing by deploying CS Unplugged activities in middle school classrooms. We have developed detailed lesson plans and have conducted studies which show that students are learning fundamental computing concepts (e.g., binary numbers) and teachers are able to deploy the activities themselves.

Elsevier

Booth 501

50 Hampshire Street
Cambridge, MA 02139
www.elsevier.com

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

Expanding Computing Education Pathways (ECEP)

Booths 401, 403, 405

School of Interactive Computing
85 5th Street NW
Atlanta, Georgia 30332-0760
www.ecepalliance.org

ECEP seeks to increase the number and diversity of students in the pipeline to computing and computing-intensive degrees by promoting state-level CS education reform. We support 16 states and Puerto Rico in the development of effective and replicable interventions while helping to expand state-level infrastructure that drives educational policy change.

Exploring Computing Careers through a Virtual Career Fair Using Embodied Conversational Agents

Booths 401, 403, 405

Morehouse College
Department of Computer Science
830 Westview Drive, S.W.
Atlanta, GA 30314
www.morehouse.edu

Exploring Computing Careers is a Broadening Participation Research Project aimed at increasing the number of underrepresented minorities, particularly African Americans, entering into computing majors and subsequently into computing-related careers. To achieve this vision, rural and urban high school students will interact with embodied conversational agents in virtual career exploration fairs.

Fostering Retention in STEM Disciplines at Minority Serving Institutions

Booths 401, 403, 405

Tuskegee University
College of Arts and Sciences
1200 W Montgomery Road
70-353 - Kenney Hall
Tuskegee, AL 36088

This NSF-funded project examines the psychosocial and structural factors affecting retention in STEM fields at partnering HBCUs and Hispanic Serving Institutions (HSIs). Data is gathered through focus groups and surveys at partnering institutions. Partners are guided to create their own action plans to improve STEM retention on their campuses.

Franklin, Beedle & Associates Inc.

Booth 111

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

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

SILVER SUPPORTER

GitHub Education

Booth 112-114

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

GitHub is how people build software. With a community of 19 million people, GitHub offers tools for code sharing and review on any device. We want to help teachers and students produce the best code possible. Students have access to AWS, Travis CI and Stripe for free with the Student Developer Pack. We offer free repositories to Instructors and a tool to manage assignments called GitHub Classroom.

Instructors, request free repositories at education.github.com

PLATINUM SUPPORTER

Google

Booths 102

1600 Amphitheater Parkway
Mountain View, CA 94043
www.google.com/edu/cs/

Google for CS education

Computer science education is a pathway that provides students with critical thinking skills needed to solve complex problems, creativity that fosters new ideas, and skills to drive innovation in tech and other fields. We believe that all students deserve an opportunity to learn and create using these skills.

By creating accessible learning opportunities through our programs, resources, tools and community partnerships, our goal is to make CS engaging and accessible for students, parents and teachers worldwide

SILVER SUPPORTER

Gradescope

Booth 507

2030 Addison St, Suite 500
Berkeley, CA 94707
www.gradescope.com

Gradescope saves instructors time when grading exams, homework assignments, and programming projects. Student work can be scanned in, or uploaded digitally. Grading is then done online, and can be easily parallelized using a shared and adaptable rubric. The rubric ensures grader consistency, helps students understand their score, and allows rapid grading via keyboard shortcuts. Programming projects can be autograded using your own autograders. Over 10M pages of work have been graded at over 200 universities and colleges.

PLATINUM SUPPORTER

IBM

Booth 101

1385 NW Amberglen Parkway
Hillsboro OR 97006
www.ibm.com

IBM is a global technology and innovation company headquartered in Armonk, NY. It is the largest technology and consulting employer in the world, with more than 375,000 employees serving clients in 170 countries. Just completing its 22nd year of patent leadership, IBM Research has defined the future of information technology with more than 3,000 researchers in 12 labs located across six continents. Scientists from IBM Research have produced six Nobel Laureates, 10 U.S. National Medals of Technology, five U.S. National Medals of Science, six Turing Awards, 19 inductees in the National Academy of Sciences and 20 inductees into the U.S. National Inventors Hall of Fame. Today, IBM is much more than a “hardware, software, services” company. IBM is now emerging as a cognitive solutions and cloud platform company. Our work and our people can be found in all sorts of interesting places. IBMers are helping transform healthcare, improving the retail shopping experience, rerouting traffic jams and even designing the next generation fan experience in sports stadiums around the world. It’s the kind of thing we’ve been doing for more than 100 years.

ICCP

Booth 504

2400 E. Pevon Ave. Ste. 281
Chicago, IL 60625
www.iccp.org

ICCP provides a national benchmarking exam for Computer Science, Information Systems, and Information Technology 4-year and 2-year academic programs. The reports we provide help assess your students and programs against the national ACM curriculum. ICCP is a non-profit organization based out of Chicago, IL.

Institute for African American Mentoring in Computing Sciences (iAAMCS)

Booths 401, 403, 405

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.

Institute of International Education (IIE), Fulbright Scholar Program

Booth 118

1400 K Street, NW, Ste. 700
Washington, DC 20005
www.iie.org/cies

The Fulbright Scholar Program provides grants in over 125 countries to support teaching and research in a variety of academic and professional fields. Recently, Fulbright has introduced new options to better accommodate the interests and commitments of today's scholars, including innovations that increase flexibility, impact and scope of the program.

PLATINUM SUPPORTER

INTEL

Booth 201

1631 NW Thurmman Rd.
Portland, OR 97213
www.intel.com

We are passionate about helping students harness the power of our world class technologies to create innovative solutions. From our very first days, Intel has fostered and promoted the next generation of technology innovators and leaders. From teaching resources and student courseware to world-class research collaborations and technology competitions, we have invested over $1 billion in higher education programs since our founding.

Intel supports educators of high performance compute and artificial intelligence to help teach students new skills in cutting edge technologies in science and engineering. We will be sharing resources including hardware, free software for educators and students, hands-on training materials and more.

Jones & Bartlett Learning

Booth 204

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 and enhance student achievement by combining authoritative content with innovative, proven, and engaging technology applications.

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Guide to Exhibitors

SILVER SUPPORTER

LEGO Education

Booth 509

501 Boylston Street #4103
Boston, MA 02116
www.LEGOeducation.com

For over 35 years, LEGO® Education has been working with teachers and educational specialists like you to deliver playful learning experiences that bring subjects to life in the classroom and make learning fun and impactful. LEGO® Education has a wide range of physical and digital educational resources that encourage students to think creatively, reason systematically and release their potential to shape their own future.

Lighthouse

Booths 401, 403, 405

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

Lighthouse is a set of projects for developing effective educators who promote diversity in computing. Tapestry successfully uses face-to-face learning workshops with high school teachers to increase the number and diversity of female enrollments in high school computing. CC will provide a comparable on-line environment for community college instructors.

Mercury Learning and Information

Booth 107

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

Mercury Learning and Information provides content in the STEM disciplines designed for the professional/reference, trade, library, higher education, career school, and on-line training markets. Most texts include instructor's materials. Instructor's exam copies are available upon approval at www.merclearning.com/reviewcopy.html

PLATINUM SUPPORTER

Microsoft

Booth 309

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

Microsoft seeks to empower all young people, especially those most vulnerable to being left behind, by providing access to computer science education and digital skills they need to participate in a world that's being transformed by technology. Through partnerships around the world with nonprofits, governments, educators and businesses, millions of youth have gained the problem-solving, critical-thinking and coding skills they can use to build better careers and lives.

The MIT Press

Booth 205

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

The MIT Press is the only university press in the United States whose list is based in science and technology. This does not mean that science and engineering are all we publish, but it does mean that we are committed to the edges and frontiers of the world - to exploring new fields and new modes of inquiry. We publish about 200 new books a year and 150 issues from over 30 journals. Our goal is to create content that is challenging, creative, attractive, and yet affordable to individual readers.

National Center for Women & Information Technology (NCWIT)

Booths 401, 403 & 405

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 change leaders who represent more than 850 universities, companies, non-profits, and government organizations nationwide working to increase girls' and women's meaningful participation in computing by utilizing NCWIT resources for taking action in recruitment, retention, and advancement.

NCWIT EngageCSEdu Project

Booths 407

1111 Engineering Dr.,
NCWIT ECCE 1B36
Boulder, CO 80309
www.ncwit.org

EngageCSEdu is a platform for instructors of introductory computer science courses to find and share high quality course materials to engage all students. All materials are peer reviewed for both quality and use of at least one research-based "Engagement Practice." Visit our booth to learn more.

NSF Showcase

Booth 301

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

Every year, twenty sponsored NSF projects are asked to present their work in an interactive, personal format during the break sessions at SIGCSE. The goal of the showcase is to share information about programs and research that attendees might not otherwise hear about.
http://www.cs.virginia.edu/~sherriff/nsfshowcase/

SIGCSE 2017
Guide to Exhibitors

BRONZE SUPPORTER

NVIDIA

Booth 105

2701 San Tomas Expressway
Santa Clara, CA 95050
www.nvidia.com

The GPU has proven effective at solving the most complex problems in computer science, from simulating human intelligence and running deep learning algorithms, to acting as the brain of supercomputers, robots, and self-driving cars. NVIDIA supports academia with teaching resources and training through the NVIDIA Deep Learning Institute (DLI).

GOLD SUPPORTER

Oracle Academy

Booths 305

500 Oracle Parkway
Redwood Shores, CA 94065
650-633-7332
www.oracle.com/academy

The Oracle Academy works globally to expand knowledge, skills, innovation and diversity in technology fields through computer science education.

Pearson

Booth 113

221 River Street
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The STARS Computing Corps is an NSF-funded national alliance of over 50 colleges and universities that engages a diverse group of college students in service learning projects 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 130,000 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

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1828 L Street NW, Suite 800
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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.

SILVER SUPPORTER

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Turing's Craft is the provider of the CodeLab service, the web-based interactive programming exercise system for intro programming classes in Python, Java, C++, C, JavaScript, C#, VB, SQL and MATLAB. First offered in 2002 to reduce attrition and raise the overall level of instruction in CS classes, it is a seasoned system that has been used in over 400 institutions in 20 countries and analyzed over one hundred and fifteen million exercise submissions from more than 300,000 students.

University of Puerto Rico

Booth 109

Computer Science Department
P.O. Box 77377
San Juan, PR 00936-8377

UPR-RP is a public, research-oriented Hispanic Serving Institution. The Department of Computer Science offers an ABET-accredited B.S. degree. The main goal of the EIP project is to enhance the delivery of the introductory computer science programming course through a set of well-structured online laboratory experiences.

Virginia Tech

Booth 304

Virginia Tech – Department of Computer Science
Balcksbury, VA 24061
www.vt.edu

The Department of Computer Science at Virginia Tech is a world leader in Computer Science Education Research. Notable projects include the Web-CAT autograder system for large class projects, the OpenDSA open eTextbook system, CodeWorkout for small programming exercises, and BlockPy for transitioning students from blocks-based languages to Python.

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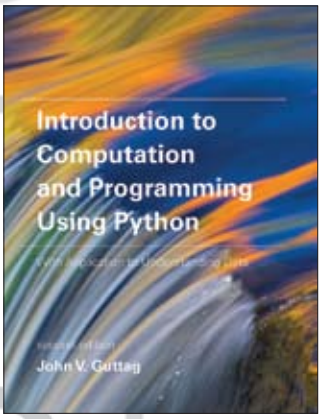

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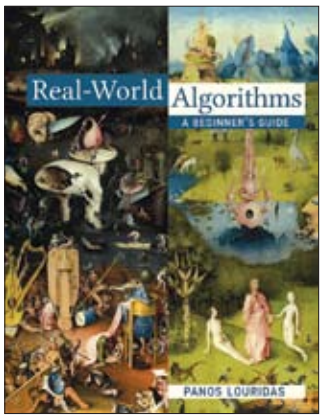

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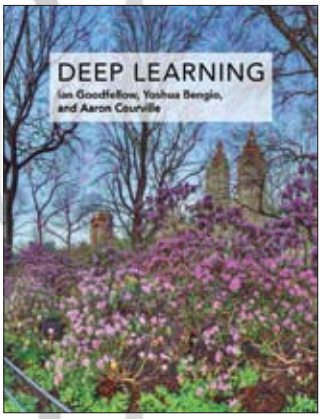

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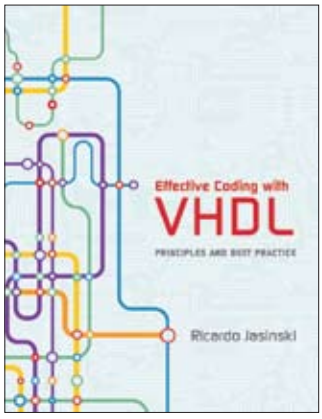

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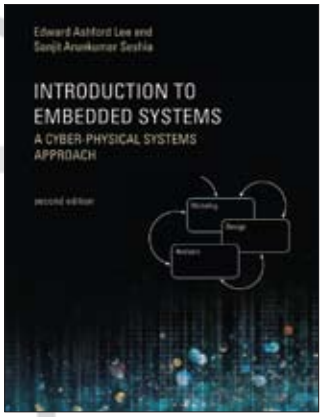

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