SIGCSE Annual Report

July 2018 - July 2019
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The scope of SIGCSE is to provide a global forum for educators to discuss research and practice related to the learning, and teaching of computing, the development, implementation, and evaluation of computing programs, curricula, and courses at all education levels, as well as broad participation, educational technology, instructional spaces, and other elements of teaching and pedagogy related to computing.

Awards

The 2019 SIGCSE Award for Outstanding Contribution to Computer Science Education was presented to Mark Guzdial at the University of Michigan in the United States. Mark has worked to transform wide-scale teaching practice through contextualized computing education, most notably with the Media Computation curriculum, advocated and supported policy changes supporting computing for all in many states in the U.S., published core research in computing education over decades, and helped to foster the next generation of computing educators through his mentorship. It is difficult to find someone in the SIGCSE community who has not read something written by Mark, including the thousands of regular readers of his long-standing blog on computing education. He has also contributed significantly as an organizer of two SIGCSE conferences and served on the SIGCSE Board.

The 2019 SIGCSE Award for Lifetime Service to the Computer Science Education Community was given to Gloria Childress Townsend at DePauw University in the United States. Gloria has worked tirelessly on behalf of diversity and inclusion in computing. She was a co-founder and co-facilitator of the SIGCSE Committee on Expanding the Women-in-Computing Community, a committee that has led birds-of-a-feather sessions at the Technical Symposium annually since 2005. Gloria worked for decades with ACM-W serving on the Executive Board and as ACM-W chair. She conceived of the idea of small regional celebrations of women in computing and worked as a guide and leader for these celebrations as they spread from the United States across the globe.

The SIGCSE Board created an award to honor the 50th anniversary of the SIGCSE Technical Symposium (celebrated February 27-March 2, 2019 in Minneapolis, Minnesota) that would honor the Top 10 Symposium Papers of All Time from the first 49 proceedings of the SIGCSE Technical Symposia.

The Top Ten Symposium Papers are:

1. “Identifying student misconceptions of programming” (2010)
   Lisa C. Kaczmarczyk, Elizabeth R. Petrick, University of California, San Diego; Philip East, University of Northern Iowa; Geoffrey L. Herman, University of Illinois at Urbana-Champaign
2. “Improving the CS1 experience with pair programming” (2003)
   Nachiappan Nagappan, Laurie Williams, Miriam Ferzli, Eric Wiebe, Kai Yang, Carol Miller, Suzanne Balik, North Carolina State University
3. “Undergraduate women in computer science: experience, motivation and culture” (1997)
   Allan Fisher, Jane Margolis, Faye Miller, Carnegie Mellon University

4. “A Multi-institutional Study of Peer Instruction in Introductory Computing” (2016)
   Leo Porter, Beth Simon, University of California, San Diego; Dennis Bouvier, Southern Illinois University; Quintin Cutts, University of Glasgow; Scott Grissom, Grand Valley State University; Cynthia Lee, Stanford University; Robert McCartney, University of Connecticut; Daniel Zingaro, University of Toronto
5. "The introductory programming course in computer science: ten principles" (1978)
   G. Michael Schneider, University of Minnesota
6. “Constructivism in computer science education” (1998)
   Mordechai Ben-Ari, Weizmann Institute of Science
7. “Using software testing to move students from trial-and-error to reflection-in-action” (2004)
   Stephen H. Edwards, Virginia Tech
8. “What should we teach in an introductory programming course” (1974)
   David Gries, Cornell University
9. “Contributing to success in an introductory computer science course: a study of twelve factors” (2001)
   Brenda Cantwell Wilson, Murray State University; Sharon Shrock, Southern Illinois University
10. “Teaching objects-first in introductory computer science” (2003)
    Stephen Cooper, Saint Joseph's University; Wanda Dann, Ithaca College; Randy Pausch Carnegie Mellon University

Significant papers on new areas that were published in proceedings

The 2018 ACM International Computing Education Research Conference (ICER 2018) had two best paper awards.

The Chair's Award is selected by the organizing committee and was presented to Jack Parkinson and Quintin Cutts for "Investigating the Relationship Between Spatial Skills and Computer Science." The John Henry Award is selected by the conference attendees and was presented to Greg L. Norman and Andrew J. Ko for "On Use of Theory in Computing Education Research."

In 2019 the SIGCSE Technical Symposium gave best paper awards for three different categories of papers. In each category the top three papers were identified.

In the Experience Report and Tools category the Best paper was “Computer Science Principles for Teachers of Blind and Visually Impaired Students” by Andreas Stefik, Richard E. Ladner, William Allee, Sean Mealin. The Second Best paper was “Developing Soft and Technical Skills Through Multi-Semester, Remotely Mentored, Community-Service Projects” by Janet Davis, Samuel A. Rebelsky. The Third Best paper was “Visualizing Classic Synchronization Problems: Dining Philosophers, Producers-Consumers, and Readers-Writers” by Joel C. Adams, Elizabeth R. Koning, Christiaan D. Hazlett.

In the Curricula Initiatives category the Best paper was “An Argument for SQL Injection Coverage in Database Textbooks” by Cynthia Taylor, Saheel Sakharkar. The Second Best paper was “A Flexible Curriculum for Promoting Inclusion through Peer Mentorship” by Heather Pon-Barry, Audrey St. John, Becky Wai-Ling Packard, Barbara Rotundo. The Third Best paper was “PythonSneks: An OpenSource, Instructionally-Designed Introductory Curriculum with ActionDesign Research” by Austin Cory Bart, Allie Sarver, Michael Friend, Larry Cox.

In CS Education Research category the best paper was “First Things First: Providing Metacognitive Scaffolding for Interpreting Problem Prompts” by James Prather, Raymond Pettit, Brett A. Becker, Paul Denny, Dastyni Loksa, Alani Peters, Zachary Albrecht, Krista Masci. The Second Best paper was “Assessing Incremental Testing Practices and Their Impact on Project Outcomes” by Ayaan M. Kazerouni, Clifford A. Shaffer, Stephen H. Edwards, Francisco Servant. The Third Best paper was “Exploring the Value of Different Data Sources for Predicting Student Performance in Multiple CS Courses” by Soohyun Nam Liao, Daniel Zingaro, Christine Alvarado, William G. Griswold, Leo Porter.

The inaugural ACM Global Computing Education (CompEd) Conference gave two awards. The Best Paper Award was given to Ilenia Fronza, Arto Hellas, Petri Ihantola, and Tommi Mikkonen for their paper “An Exploration of Cognitive Shifting in Writing Code.” The Program Chair’s Award, which is given to the best paper where the lead author is a student, went to Sadia Sharmin, Daniel Zingaro, Lisa Zhang, and Clare Brett for their paper “Impact of Open-Ended Assignments on Student Self-Efficacy in CS1.”

There was a single Best Paper Award given at ITiCSE 2019. It was awarded to Quintin Cutts, Matthew Barr, Mireilla Bikanga Ada, Peter Donaldson, Steve Draper, Jack Parkinson, Jeremy Singer, and Lovisa Sundin for “Experience Report: Thinkathon – Countering an ‘I Got It Working’ Mentality with Pencil-and-Paper Exercises.” The ACM Europe Council sponsored the award and presented the winner with a certificate and a 1000 Euro cheque.

Significant programs that provided a springboard for further technical efforts

The SIGCSE Special Projects Fund provides grants up to $5000 per project and has a call for proposals in November and May of each year.

The November 2018 call resulted in 27 applications of which 4 were funded for an acceptance rate of 15%. Colleen Lewis from Harvey Mudd College in the USA was awarded $5000 for a project entitled “Interactive resources for training CS TAs.” Kristin Stephens-Martinez from Duke University, USA was awarded $5000 for a project titled “The CS-Ed Podcast”. Kim Tracy from Rose-Hulman Institute of Technology, USA was awarded $5000 for a project entitled “Software History Examples.” Olga Glebova from Georgia State University, USA was awarded $5000 for a project entitled “Active Learning Materials for Machine Learning.”

The May 2019 call resulted in 39 applications, a 44% increase over the previous round and a new record. A total of four regular projects and one project for the special theme “SIGCSE: 50 Years and Beyond” were funded, for an acceptance rate of 13%. Mark Goadrich from Hendrix College, USA was awarded $4598 for a project entitled “Developing Physical Manipulatives and Games for Teaching Advanced Data Structures.” Kari George from UCLA, USA was awarded $3500 for a project entitled “Decoding Doctoral Student Departure: Faculty and Student Perspectives.” Tia Newall from Swarthmore College, USA and co-applicants Suzanne Matthews and Kevin C. Webb were awarded $5000 for a project entitled “Dive into Systems - A Free Online Textbook for Introductory Computer Systems Topics.” Lori Carter from Point Loma Nazarene University, USA and co-applicants Catherine Crockett, Whitney Featherston, and Morgan Wheeler were awarded $2900 for a project entitled “Developing Ethics Modules for Core CS and DS Courses.” And Farah Tokmic was awarded $5000 for the project entitled “ A 50 year retrospective on academic integrity and computer ethics in CS Education.”

ITiCSE 2019 had ten working groups on the following topics: (1) 1.5 Degrees of Separation: Computer Science Education in the Age of the Anthropocene, (2) Fostering Program Comprehension for Novice Programmers – Learning Activities and Learning Trajectories, (3) Pass Rates in Computing and in other STEM Disciplines, (4) Data Science Education: Global Perspectives and Convergence, (5) A Periodic Table of CS Education Learning Theories: Is it possible, is it useful, and what forms could it take? (6) An International Benchmark Study of K-12 Computer Science Education in Schools, (7) Toward Developing a Cloud Computing Model Curriculum, (8) Securing The Human: Attracting More, Diverse Students in the Cybersecurity Field, (9) Towards an Ability to Direct College Students to an Appropriately Paced Introductory Computer Science Course , and (10) Compiler Error Messages: Difficulties, Design Guidelines and Effectiveness . CompEd 2019 had three working groups on the following topics: (1) An International Investigation into Online Judge Systems for Programming Education, (2) A Multi-National Investigation of the Barriers to Adopting the Peer Instruction Pedagogical Approach in Computing Courses, and (3) Teaching of computing ethics: an international review prompted by the new ACM code of ethics and professional conduct. The participants in the working groups develop a research project that culminates in a peer-reviewed paper. The projects foster international research collaborations.

Innovative programs which provide service to some part of your technical community

Every other year the SIGCSE Board runs a workshop for department chairs. The SIGCSE Department Chairs Roundtable features small group discussions on challenges of being a Department Chair and finishes with a panel of diverse and experienced Department Chairs. The group discussions tackle topics such as the significant administrative and personnel issues that chairs must handle; leadership and management styles, time management, legal issues, establishing priorities, and communication. The Department Chairs Roundtable took place on February 27, 2019 as a pre-symposium event before the 2019 Symposium. The workshop was organized by Mary Lou Maher (UNC Charlotte) and Ran Libeskind-Hadas (Harvey Mudd College). There were 28 participants in the workshop.

On alternate years the SIGCSE Board runs a workshop for graduate students and new academics. The next New Educator's Workshop will be held in Portland, Oregon in February 2020.

The 2019 SIGCSE Symposium held thirty three-hour workshops for professional development. In addition, the SIGCSE Symposium provided meeting space for fifteen events: RESPECT/RPPforCS, Integrating Cloud Computing into the Computer Science Curriculum: Beginner Level, Integrating Cloud Computing into the Computer Science Curriculum: Advanced Topics, 2019 CSAB Computing Accreditation Workshop, CS Education Infrastructure for All II: Enabling the Change, POSSE Roundup, Professional Development Workshop for Teaching-Track Faculty, Computing for the Social Good in, Computer Science Education, Peer Teaching Summit, Teaching Cybersecurity in CSP (or Any CS Class): Introducing the Security Mindset, Development and Visualization of Computing Competencies, What to Teach about Accessibility, What!? You want me to include computing ethics, too!??!! Using the ACM Code of Ethics in technical computing topics, Computer Science Principles Providers and Teachers Forum, and FREE Cybersecurity Curriculum.

SIGCSE has a Travel Grant Program for faculty and teachers who have never attended the SIGCSE Technical Symposium. The 50th anniversary of the SIGCSE Technical Symposium took place in 2019, and in celebration of the event the SIGCSE Board sponsored 50 travel grants for attendees of the conference.

There were two doctoral consortia associated with SIGCSE conferences during this year.

A doctoral consortium ran in Espoo, Finland just prior to the 2018 The International Computing Education Research Conference (ICER) which was attended by 20 graduate students in computer science education. Nine of the participants were women, and eleven were men. Eleven participants were from the United States, seven from Europe, and two from India. SIGCSE provided travel grants to the students and partial funding for lodging to the discussants. The students presented their work at the workshop and also during ICER 2018. The SIGCSE Board will continue to fund up to twenty Doctoral Consortium grants for participants of the ICER conference in 2019.

There was also a doctoral consortium in Aberdeen, Scotland associated with ITiCSE 2019. Ten students attended the event, which was supported by the Scottish Informatics and Computer Science Alliance. The doctoral consortium was organized by Mark Zarb and Angela Siegel and focused on nurturing students' research and orienting them in the ITiCSE community. For example, students heard from a panel on imposter syndrome and worked for an hour with members of a working group to understand the dynamics of that research situation.

Events or programs that broadened participation either geographically, or among under-represented members of your community

SIGCSE established a new conference in 2019. The ACM Global Computing Education Conference (CompEd) will be offered initially once every two years and will be hosted in countries that do not currently have an annual SIGCSE conference. The first CompEd conference was held in Chengdu, China in May 2019. The conference included several pre-conference events, including a Computing Curricula steering committee meeting, and ACM-W workshop, and three working groups (as reported above). Conference attendance was 154, and the conference received 100 papers, 3 panels, 8 working group applications, 4 birds-of-a-feather sessions, and 10 posters. In total, more than 320 authors from 25 countries submitted work for review. From these submissions, 33 full papers (33%), 1 panel (33%), 3 working groups (38%), 2 birds-of-a-feather sessions (50%), and 8 posters (80%) were accepted.

The CompEd steering committee will continue to work to support the organizers of the future conferences and to shape the direction that the conference will take in the next six years. The steering committee has an active proposal from organizers in India for 2021. There has also been interest in hosting from SIGCSE members in Brazil and an inquiry from computing educators in Mexico.

SIGCSE held an election in 2019. A diverse set of candidates was placed on the slate, and the resulting Board has four men and four women including two men of color. One slot in the slate of candidates was reserved for SIGCSE members residing outside the United States, and Andrew Luxton-Reilly from New Zealand was elected as SIGCSE Treasurer.

Key Issues for the Next 2-3 Years

Several SIGCSE-sponsored conferences have experienced rapid growth in the past few years. The SIGCSE Technical Symposium had attendance of 1253 in 2016, 1501 in 2017, 1735 in 2018, and 1809 in 2019. ICER had attendance of 79 in 2015, 119 in 2015, 105 in 2016, 157 in 2017, and 127 in 2018. ITiCSE had

attendance of 228 in 2017, 180 in 2018, and over 280 in 2019. This growth continues even with the creation of a new conference in 2019. The SIGCSE Board is working with conference volunteers to manage the growth of the conferences in a positive way that retains the character of the conferences.

The largest SIGCSE conference, the Technical Symposium, was reorganized several years ago. Previously it was the case that volunteers first served as program co-chair and then moved to conference co-chair. Since the roles require different skill sets, the roles were separated. However, since then it has become more difficult to recruit for the conference co-chair position. The SIGCSE Board and Symposium liaison will work with conference organizers to ensure that there is a wider pipeline of possible conference co-chair volunteers.

SIGCSE is in the process of implementing a new award to recognize excellence in computing education research in the community. The Top Five ITiCSE Papers ranking and award will be presented in conjunction with the 25th annual ITiCSE conference in 2020, and this award was announced at the 2019 (24th annual) ITiCSE conference. A committee is currently being formed to implement the award which was previously approved by ACM.