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Chengdu, Sichuan, China



Association for  
Computing Machinery

*Advancing Computing as a Science & Profession*



# CompEd'19

Proceedings of the ACM Conference on  
Global Computing Education

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**Association for  
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*Advancing Computing as a Science & Profession*

**The Association for Computing Machinery  
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# Welcome from the SIGCSE Chair

Welcome to the inaugural Association for Computing Machinery (ACM) Global Computing Education Conference (CompEd). CompEd is sponsored by the ACM Special Interest Group for Computer Science Education (SIGCSE).

When it was created by the SIGCSE Board, CompEd was envisioned as an opportunity for SIGCSE to reach new audiences around the globe. The proposal was inspired by the very positive reaction to temporarily moving one of our other conferences from Europe to South America. That experience made it clear to the SIGCSE Board that there were people who wanted to be a part of our community but who could not travel to any of our existing conferences on a regular basis. It was our hope that CompEd would serve those people by expanding and connecting the computing education community around the globe.

It is difficult to imagine now, but the SIGCSE Board voted to create CompEd in February 2017. It is a testament to the dedication and hard work of the CompEd steering committee, organizing committee, and program committee that the conference has come together in the way that it has. I would especially like to thank steering committee chair Brett Becker, steering committee members Susan Rodger, Boots Cassel, Alison Clear, and Ming Zhang, conference co-chairs Ming Zhang and Bo Yang, and program co-chairs Steve Cooper and Andrew Luxton-Reilly. You have created something that was only a dream fifteen months ago, and I and the rest of the SIGCSE Board are in your debt.

As an attendee at the first CompEd you have a unique experience ahead of you. The conference offers all of the things you would expect at a SIGCSE conference, including paper, poster, panel, and birds-of-a-feather sessions, a keynote, and working groups taking place prior to the start of the conference. CompEd is also co-located with the 2019 ACM Turing Celebration Conference (TURC), which gives you the opportunity to see talks by Turing laureates and other notable computer scientists. Finally the conference offers the opportunity to see the Chengdu Research Base of Giant Panda Breeding, something that I highly recommend. I expect that we will all leave the conference energized about the experience.

CompEd 2019 is the first conference of its kind for SIGCSE. The conference organizers and the SIGCSE Board would appreciate hearing what you enjoyed about it, and you should complete your evaluation so that we can use your ideas to shape the next conference in 2021. We anticipate that this will be the first of many wonderful experiences in computing education communities around the globe.

**Amber Settle**

*SIGCSE Chair, 2016-2019*

# CompEd 2019 Program Chairs' Welcome

Welcome to the inaugural ACM Global Computing Education Conference (CompEd 2019) being held May 17-19, 2019 in Chengdu, China! Slightly more than 20 years ago, SIGCSE made the decision to expand its successful annual US conference, the SIGCSE Symposium, and to offer an annual conference in Europe. The first Innovation and Technology in Computer Science Education conference (ITiCSE) was held in Barcelona, Spain, in June, 1996. Nearly 15 years ago, SIGCSE started supporting a third conference, the International Computing Education Research (ICER) conference. Held alternating years in the US, every fourth year in Europe, and every fourth year in Australasia, ICER focuses exclusively on computing education research. And now, SIGCSE is starting the offering of CompEd, to be held alternating years in different locations in the developing world. There is a growing worldwide interest in computing education, and we are thrilled with SIGCSE's decision to start regularly offering a fourth conference.

The CompEd conference, to be held May 17-19, 2019 (with working groups starting on May 14) will be a conference similar to ITiCSE and the SIGCSE Symposium. It will consist of paper, panel, working group, poster and birds of a feather (which will focus on international collaborations) sessions. The target audience for the conference will be both researchers in computer science education and practitioners. The conference will run approximately 2.5 days, with breaks for attendees to attend the Turing Award Celebration in China (TURC) keynote addresses. CompEd will be co-located with the TURC conference. The ACM SIGCSE China chapter traditionally meets at TURC and will instead be participating in CompEd. The Computing Curriculum 2020 task force (building from CC2005) will be held immediately prior to CompEd in Chengdu.

The topics of the new CompEd conference are:

1. Computing education research
2. Computing education experience reports and tools
3. New curricula, programs, and degrees

We quote from former SIGCSE Board chair Susan Rodger's original note to the SIGCSE community, in August 2018 (with minor corrections since in August 2018, the new conference had yet to be named):

*"Think about attending CompEd, SIGCSE's newest conference. That's right, the SIGCSE Board is starting SIGCSE's fourth conference. CompEd will be held in Chengdu, China May 17-19, 2019. Chengdu is the capital of China's Sichuan province. CompEd will be co-located with the annual ACM Turing Celebration Conference - China (ACM TURC). If you are not familiar with ACM TURC, it usually has several Turing award winners as keynote speakers. CompEd will overlap with ACM TURC so that CompEd attendees can attend ACM TURC keynote sessions.*

*Why start another SIGCSE conference? First, our other three conferences are quite healthy. The SIGCSE Symposium in 2018 had over 1500 attendees, its largest number ever. The ICER conference has more than doubled in size since it started back in 2005. And the ITiCSE conference has been steady with around 200 or more attendees each year.*

*Second, the SIGCSE Board would like to reach the computer science education community in all parts of the world. The SIGCSE Symposium is only held in North America. ITiCSE is only held in or*

*near Europe, with one exception. In 2016 ITiCSE was held in Peru with great success. With ITiCSE quite successful in Europe, we would like ITiCSE to stay in Europe. ICER is held in North America every other year, in Europe every fourth year and in Australasia every fourth year.*

*CompEd will be held in countries where SIGCSE does not have annual conferences. So it will not be held in North America or Europe. For its first three offerings, we are planning on holding CompEd every other year. The first CompEd will be held in China in 2019. We are considering India for the second CompEd conference in 2021. We'd love to hear from possible hosts for the third CompEd, perhaps in South America.*

*What is the focus of CompEd? We plan for it to focus on research and practice, and to have several ways to participate with papers (research, experience, curricula, position, etc), posters, working groups, birds of a feather sessions, and likely more. More information and the conference call for participation will be out soon."*

We believe that Chengdu, China is the perfect location to host the first ever CompEd conference. Especially well known for its cooking and its Pandas, Chengdu is an old and historic city, and serves as the capital of Sichuan province, in southwestern China. While perhaps not as well-known as the cities of Beijing and Shanghai, Chengdu is a vibrant city that offers a multitude of sights and experiences for attendees to explore when not attending the CompEd conference.

The conference brings together the global computing education community with 125 total submissions. Authors of accepted papers come from Canada, China, Costa Rica, Finland, Hong Kong, Italy, Netherlands, New Zealand, Spain, Sweden, United States.

**Table 1: CompEd 2019 Submission and Acceptance Statistics**

Track	Submitted (N)	Accepted (N)	Acceptance Rate (%)
Papers	100	33	33%
Panels	3	2	67%
Birds of a Feather	4	2	50%
Posters	10	8	80%
Working Groups	8	3	38%

All papers were blind-reviewed by 5 reviewers, who then engaged in discussion led by one of the associate program chairs who also provided a meta-review and recommendation to the program chairs. In total, 87 reviewers and 13 associate program chairs contributed to a high-quality review process that ensured fair reviews for all papers.

This year, 33 papers (33%) were selected for presentation and inclusion in the proceedings, along with 3 panels, 4 birds of a feather sessions, and 10 posters. We were very pleased to be able to support 3 working groups immediately prior to the main conference. The working groups addressed topics related to online judge systems, barriers to adopting peer instruction, and teaching of computing ethics. As working group reports are among the most read and cited works published by the SIGCSE community, these groups are well positioned to make a valuable contribution. We anticipate that the working groups will be a major strength of the CompEd conference in future years and will continue to develop connections between computing education researchers globally.

The keynote address will be delivered by Dr Paul Denny from the University of Auckland. Typically, teachers and other subject experts create the learning resources that students use, such as textbooks, lecture notes, assignments and lab activities. However, there may be advantages in having students create some of these materials themselves. The keynote address will present the motivation for having students generate their own learning resources, discuss both practical challenges and measurable benefits, and summarise recent research involving tools such as PeerWise which hosts millions of student-generated practice questions.

Two awards were established to recognize the high quality of work published at CompEd. The Best Paper is awarded to An Exploration of Cognitive Shifting in Writing Code by Ilenia Fronza, Arto Hellas, Petri Ihantola and Tommi Mikkonen. The Program Chairs' Award goes to Impact of Open-Ended Assignments on Student Self-Efficacy in CS1 by Sadia Sharmin, Daniel Zingaro and Clare Brett. The Program Chairs' Award is given to the best paper in which the first author is a student.

The CompEd conference chairs would like to thank the SIGCSE community and the team of volunteers who have contributed to the organization and running of this event. We would particularly like to thank the steering committee for their tireless efforts, and the submission chair, Simon, for keeping the submissions and reviewing running so smoothly.

**Steve Cooper**

*Program Co-Chair*

*University of Nebraska-Lincoln, USA*

**Andrew Luxton-Reilly**

*Program Co-Chair*

*University of Auckland, New Zealand*

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