SIGCSE *Bulletin*
Vol. 53, No. 2

Contents

SIGCSE Board

Chair – Adrienne Decker, University at Buffalo, New York, USA
Vice-Chair – Dan Garcia, University of California Berkeley, California, USA
Secretary – Leo Porter, University of California San Diego, California, USA
Treasurer – Andrew Luxton-Reilly, University of Auckland, New Zealand
At Large – MaryAnne L. Egan, Siena College, New York, USA
At Large – Manuel A. Pérez-Quiñones, University of North Carolina at Charlotte, North Carolina, USA
At Large – Laurie Murphy, Pacific Lutheran University, Washington, USA
Immediate Past Chair – Amber Settle, DePaul University, Illinois, USA

SIGCSE News in Brief

Welcome to the second issue of the SIGCSE *Bulletin* in 2021.

As we are wrapping up the second semester at many universities, many of us are reflecting on the past year. Some changes will remain and others will not. When I hear people say "when we return to some sense of normalcy," I always question whether that is what's best. Do we want to act as if this year never existed? Or do we want to learn from the past year to improve society so we are able to cope with situations like this in the future without as much impact? I don't think we should merely be pushing to try to get

all students back in the classroom for in-person lectures, but we should instead look to understand the best way students learn. This will provide a plethora of options for students based on the subject, and no single teaching pedagogy should be pushed as the *only* way we should teach in the future. Some classes may be best-suited for in-person lectures, but others may benefit from active learning, remote asynchronous instruction, hybrid strategies, or perhaps some methods that we have not even yet considered. As we start to emerge from the pandemic, let's try to continue advancing and not merely revert to our previous comfort level. Advancement always comes with some degree of temporary discomfort.

This issue of the *Bulletin* contains a range of articles that are hopefully of general interest to many of you. Manuel Pérez-Quiñones discusses tracks of collaboration among sister societies in ACM and how our conferences and symposia can further expand that collaboration. Koli Calling and ITiCSE both discuss some upcoming deadlines they have, while SIGCSE continues their solicitation of special project grants. The continuation of our regular column on equity in computing education highlights some thoughts from Fay Cobb Payton of North Carolina State University and Saty Raghavachary of the University of Southern California.

We wrap up this issue of the *Bulletin* with an interview with Leo Porter of the University of California, San Diego, who is also the Secretary of the SIGCSE Board and a former co-editor of the *Bulletin*.

We hope you enjoy this issue of the *Bulletin*.

Upcoming Dates and Deadlines

Conference	Location	Dates	Full Paper Submission Deadline
Koli Calling 2021	virtual	November 18-21, 2021	July 23, 2021
ITiCSE 2021	virtual	June 26-July 1, 2021	already passed
ICER 2021	virtual	August 16-19, 2021	already passed
SIGCSE TS 2022	Providence, Rhode Island	March 2-5, 2022	August 6, 2021

Other conferences operate in cooperation with SIGCSE and are posted on the SIGCSE web site at https://sigcse.org/sigcse/events/incoop.html.
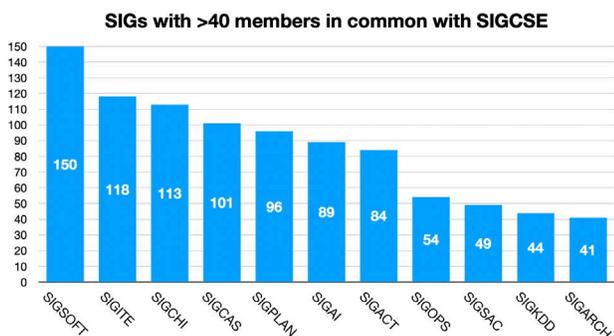
Common Membership across SIGs
By Manuel Pérez-Quiñones

Conferences allow for sharing of knowledge in a particular domain, computing education for us. Many of us tend to participate in different conferences. CS Educators, after all, teach CS covering all areas of CS. This means that many of us are also members of other ACM SIGs.

In recognition of this overlap of interest, the Technical Symposium has been inviting educational papers published in other ACM conferences to present in our conference. The invitation is usually with an arrangement that the other conference will reciprocate and invite a paper presented in our conference to be presented at theirs. We have been calling this the SISTER track.

The success of the SISTER track led us to explore the overlap between our SIG and other ACM SIGs. The chart below shows the number of members in common between SIGCSE and the other ACM SIGs. There is a total of 39 ACM SIGs with at least 5 members in common with SIGCSE. The top 10 SIGs in terms of membership overlap are: SIGSOFT, SIGITE, SIGCHI, SIGCAS, SIGPLAN, SIGAI, SIGACT, SIGOPS, SIGSAC, and SIGKDD. The chart below shows all the SIGs with at least 40 members in common with SIGCSE. These SIGs afford us additional options for collaboration in expanding exchange of ideas and increasing networking opportunities for our members.

SIGs with >40 members in common with SIGCSE

SIGSOFT 150, SIGITE 118, SIGCHI 113, SIGCAS 101, SIGPLAN 96, SIGAI 89, SIGACT 84, SIGOPS 54, SIGSAC 49, SIGKDD 44, SIGARCH 41

Koli Calling International Conference Call for Papers
By Otto Seppälä, Nickolas Falkner

We invite you to submit a paper or poster for the 21st Koli Calling International Conference on Computing Education Research (Koli Calling 2021) for the second virtual Koli, hosted around the world and from Finland, 18-21 November 2021.

Koli Calling is one of the leading international conferences dedicated to the scholarship of teaching and learning and to education research in the computing disciplines. Koli Calling is a single-track conference for original and novel work with research, practice and systems presentations as well as a keynote and invited talks. The conference is known for its moderate size, intimate atmosphere, and lively discussions.

Due to the continuing pandemic and travel restrictions around the world, we will again meet online. We will be combining an on-line academic presentation and discussion program with local clusters of researchers around the world. We are strongly committed to maintaining the essence of Koli, facilitating online interaction, with many feedback opportunities.

Submitting to Koli will still mean full peer review, presentation at the Koli Conference, publication in the conference proceedings, and connections to the Koli community, but will not require you to travel at a time when international travel is both challenging and a little concerning. This will be an excellent, informative, and worthwhile online conference at a much lower price than usual.

We welcome submissions in the area of **computing education**: the teaching and learning of computing topics. Within that broad scope, contributions may involve one or more of the following:

- Empirical studies of computing education
- Teaching approaches and assessment in computing education
- Development, use, and evaluation of tools to support computing education
- Theory in computing education
- The learning of computing in any context; e.g., higher education, K-12, informal learning, lifelong learning, teachers' professional development
- Distance, online, and blended learning of computing topics
- Learning analytics and educational data mining in the area of computing education
- Methodological development and instruments for computing education research
- Reviews to support computing education or computing education research
- Any other aspects of the teaching and/or learning computing topics

Please note that generic educational technology and applications of computing for educational purposes are not in scope, except where they are used for computing education.

Research papers (up to 10 pages) present high-quality research. Most research papers can be described as empirical, theoretical, system, or review papers.

- *Empirical papers* report on studies that collect and analyse empirical data and employ methods rigorously, whether qualitative, quantitative, or mixed.
- *Theoretical papers* formulate, extend, apply, critically evaluate, or otherwise discuss theory for the purpose of improving computing education or computing education research. The discussion is grounded in the research literature and advances the field.
- *System papers* present a software system or other tool. System papers in the research-papers category must not only describe the tool and its purpose but also evaluate it.

Evaluation will typically involve empirical data collection, but other incisive forms of evaluation (e.g., critical argumentation derived from theory) can be considered.
- *Review papers* survey the literature on a particular topic.

Short papers (up to 5 pages) disseminate and discuss new ideas and promising initiatives in computing education practice or research. Examples of short papers include:

- *Short empirical papers*, which are limited in scope or produce tentative results but are nevertheless of interest to the computing education research community and suggest paths for future research.
- *Short system papers*, which describe a tool that has perhaps not yet been evaluated in practice or has only been evaluated with a simple opinion survey.
- *Discussion papers*, which propose an innovation, debate a theoretical issue, or advance a cause. The argumentation must be solidly grounded in the research literature. A discussion paper must provide fresh perspectives or insights and present a compelling case to indicate how it promotes discussion and raises questions for future research to answer.

Poster/demo papers (2-page abstract) are presentations of emerging ideas for research, teaching practice, or tools. Where this has previously been interactive, we welcome video recordings for this year showing the tool or idea in action.

The due dates for the submissions are:
23rd July: papers, research and short papers
22nd September: posters and demos

For more information see the conference website https://www.kolicalling.fi/ or contact Otto Seppälä <otto.seppala@aalto.fi>

Koli National Park, Finland
photo credit: Nick Falkner

ITiCSE 2021 Preview
By Carsten Schulte and Brett Becker, ITiCSE 2021 Conference Chairs

This year, ITiCSE will come to you from a virtual Paderborn, Germany. Not being bound by normal constraints, the conference will run from June 26th to the 1st of July. Paderborn is a University and Cathedral city, dating back more than 1,200 years. It is home to over 150,000 people and is the second largest, but most beautiful city, in the East Westphalia-Lippe region in Germany. Walking through Paderborn is like walking through the centuries. The cityscape unmistakably mirrors the city's eventful history. The centre alone contains more than twenty historical buildings of all architectural epochs.

We are planning a special way to let you experience Paderborn even though you cannot be here with us. The conference will include a virtual tour to the Heinz Nixdorf Museums Forum, the world's largest computer museum, which looks back on 5,000 years of information technology history: from the beginning of writing, via the first calculating machines and typewriters, to the development of computer technology, and the latest technologies.

This year, an ITiCSE record of 275 papers were submitted, of which 84 were accepted, giving an acceptance rate of 31%. Of these papers, 51% are from US or Canadian authors and 36% are from European authors. We also have papers from Australia, New Zealand, Singapore, Brazil, India, China, Nigeria, Taiwan, and South Africa. We are very happy to see that all six continents are represented (sorry Antarctica, we aren't counting you)!

In addition to the Paper, Poster and Panel submissions, and Tips, Techniques and Courseware presentations, we have five virtual Working Groups investigating topics including post COVID educational landscapes; a curricula framework to support the design of e-sports courses; chronicling the evidence in broadening participation; exploring and assessing practical computing competencies; and planning a conceptual framework approach for teaching cloud fundamentals. In keeping with ITiCSE tradition, working groups will present preliminary findings during the conference allowing the community a chance to see progress and provide feedback.

This year, ITiCSE is again running a Doctoral Consortium to provide PhD students studying computing education with an opportunity to explore and develop their research interests. This will take place in an online workshop environment guided by a panel of established researchers. We intend for this to support and encourage newer members of our community. This year there are 9 early-stage doctoral students from 7 countries in the DC, to be held on June 26-27.
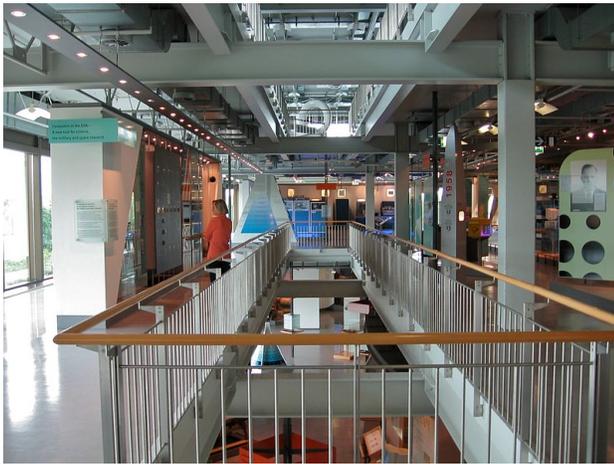
We are delighted to announce three keynotes from Catherine D'Ignazio (Massachusetts Institute of Technology, USA), Katharina Rohlfing (Paderborn University, Germany) and Martina Sasse (Ruhr University, Bochum, Germany).

Registration is now open at iticse.acm.org. We hope you will join us virtually in Paderborn this summer and look forward to seeing you online!

Heinz Nixdorf Museums Forum
photo credit: Marcin Wichary, Flickr, CC 2.0

As a CS Educator, How Do You Think We Can Address Inequity Issues That Exist in the Field?
By Jeffrey Miller and Karen C. Davis, SIGCSE *Bulletin* Co-editors, Fay Cobb Payton, Saty Raghavachary

We asked several CS education researchers to offer brief remarks (about 200 words) to spark discussion and provide ideas for actions we can all take to address inequity issues. Two responses are included below.

Fay Cobb Payton, Ph.D., North Carolina State University

This is a loaded question. I will begin, however, with the premise that CS does not exist in a vacuum. A broader ecosystem exists that impacts, adds to and often perpetuates inequities. Technology and innovation are apparent in other disciplines, yet CS is often positioned as the mechanism to "save" Black and Brown students, particularly in K-12 education. Rather K-12, higher education, how CS teaches warrants more attention – as traditional methods often lack cultural connections or associations to lived experiences.

To identify, address and *eliminate* inequity issues, the field itself should embrace different (and new) voices for design, solutioning, thought leadership, creation, policy development, etc. This means a disruption in who is participating in CS by eliminating structural inequities and embracing an equity mindset. For example, what are academic departments doing to implement a sea change?

Lastly, CS should embrace and value sociotechnical models in the research space. This provides opportunities to intentionally examine issues of social justice, linguistics (words matter), race, racism, sexism, ableism, intersectionality, just to name a few.

This effort will take all of us.

Saty Raghavachary, University of Southern California

"Underrepresentation is a much greater danger to the health of the nation than it is to the health of the discipline" - Dr. Richard A. Tapia

In our case, "the" discipline would be, of course, computer science. The goal of addressing inequity is to eventually eliminate it in our classrooms and beyond, instead replacing it with its opposite - equity.

But we need to take care to not conflate equality and equity, which are also "opposites" of sorts! How? Equality is about giving all kids in a classroom the same stool to climb on, to reach and pick as many fruits as they can from a tree in the schoolyard; equity is giving taller stools to the shorter kids so that all kids get an equal number of fruit. In other words, the focus is on equal output (outcome), not so much on the input. At the other extreme, it's not about giving the short kids much taller stools so they get more fruit. Experience, common sense, and data can guide us as to what proper stool heights need to be.

In CS, striving for equity could include serving as a faculty member who oversees a campus club for computing meant for women (trans and non-

binary inclusive); writing letters of recommendation for GHC scholarships; encouraging and helping minorities to participate in the annual Tapia conference; expanding the core curriculum (especially of undergrad courses) to include topics related to ethics and fairness. Considered alongside with diversity ("a mixture of differing voices") and inclusion ("distributed uniformly throughout"), *DEI* is a compact reminder of what each one of us can, and should be, doing - in order to make the workforce of tomorrow, reflect society as a whole.

Member Spotlight

In this feature of the *Bulletin*, we highlight members of the SIGCSE community. In this issue, *Bulletin* co-editor Karen Davis interviewed Leo Porter, an Associate Teaching Professor of Computer Science at the University of California, San Diego, the current Secretary on the SIGCSE Board, and a former SIGCSE *Bulletin* Co-Editor.

How did you first get involved with the CS education community?

I was fortunate enough to work as a Teaching Assistant with Beth Simon while I was a graduate student. She invited me to participate in a couple of projects of hers and the first project I had a large role in was our ICER 2011 paper on the value of peer discussion in Peer Instruction. My first computing education conference was that ICER conference and I remember being so impressed by the community of researchers and the papers discussed at that conference. I went on to attend the SIGCSE Technical Symposium and ITiCSE in later years and remain so delighted to be part of a community that is dedicated to improving computing education.

Leo Porter
photo credit: Leo Porter

How did you get involved in Peer Instruction and where do you see it heading?

Again, Beth Simon had a huge role there. She'd seen Peer Instruction in physics classes at the University of British Columbia and started using it in our CS1 class at UC San Diego. I was skeptical at first, but when I overheard the quality of conversations between students during peer discussion I was immediately hooked. I remember talking to Beth after class about all the misconceptions I'd heard from the students and although I think she already knew the misconceptions from her time teaching, she could also see the change in student thinking from those discussions.

I adopted Peer Instruction in my classes and helped mentor some other faculty through the adoption process, but I also thought we could bring about some real change through research. So we began studying Peer Instruction as carefully as we could and between our many collaborators (Quintin Cutts, Cynthia Lee, Dan Zingaro, and many others), we began seeing some impressive results: 5% better final exam scores, 66% drop in failure rates, 30+ percent increase in retention of majors from classes with Peer Instruction versus standard lecture. Between those results, a score of hosted workshops, some strong advocates of Peer Instruction in the community, and a lot of one-on-one mentoring, we really saw a jump in adoption.

These days, I think there's still work to be done to study the efficacy of Peer Instruction in computing and I am always pleased to see the good work on Peer Instruction being published each year. But much of my effort now is on adoption - finding ways to help faculty adopt better teaching practices (including Peer Instruction).

I saw your paper on the Basic Data Structures Inventory (BDSI), can you say a bit about how long it took to create the BDSI and how you want folks to use it?

That was a huge project and I can't thank the NSF enough for funding the work and for having such a great team to work with on the project. The project took over 5 years, which was over two years longer than the three years we originally planned, but we learned so much through the process including: assembling a set of learning goals for basic data structures, uncovering student misconceptions through interviews, and ultimately producing the assessment and gathering evidence for its validity.

We hope the instrument will be used by researchers and teachers. For researchers, we hope it'll provide a benchmark of student learning that can be used in studies to compare different pedagogies, languages, the impact of tools, etc. As an instructor, I learned a lot from reviewing results from the BDSI and we hope other CS instructors will too. The nice thing for instructors is that they can compare their class results against our findings in our ICER 2019 paper to see how their students compare. For example, maybe their students did better on BSTs but worse on linked lists and they can use that information to possibly adjust their teaching. But a quick reminder: please don't use the BDSI as a graded assessment and be sure to use the instrument as a whole. We have more guidance in our ICER 2019 paper on how we've been able to run the instrument at our institutions.

Where do you think computer science education is headed in the next 5-10 years?

There are so many things in the community I'm excited about, whether that is new validated assessments, our emphasis on DEI efforts, the use of machine learning to predict student success or develop Intelligent Tutoring Systems, or ongoing work to understand the socio-emotional pressures our students face.

I'm optimistic about where we're headed. I think we're at a real turning point for the research community because of the rise of CER PhDs over the past decade, our vibrant ICER community, and our ability to build on the seminal work that's been done over the past 50 years. I think we'll see more CER specific theories generated, like those on spatial reasoning by Jack Parkinson and Quintin Cutts, for other areas of student learning of computing. I also think we'll see some large-scale replication studies that will confirm or refute our existing beliefs about how students learn computing.

As educators, I think we're so fortunate that computing is having the huge impact it's having

on society as that means we have so many students eager to learn computing and to make a difference in the world. But, as the saying goes, with great power comes great responsibility. So, I'm overjoyed at the papers coming out in our conferences and journals on teaching ethics. I think some of the scandals with machine learning and social networks have made us realize what physicists learned in the 1940s: we have to think deeply about what our creations can do to society. As such, I hope we'll prioritize producing well rounded scholars who aren't just amazing software developers, but are going to do the right thing when they have the opportunity.

What do you think are the biggest challenges facing the community?

For educating our students, I think one of our biggest challenges is the ethical one I just mentioned. And I think we're going to need some guidance from experts outside computing to make a real difference. For example, I think I know how to teach linked lists and caches, but I feel my three ethics classes in college aren't sufficient training to teach it yet. So I can't wait to learn more from the community about how I can do better.

The second biggest issue in my mind is adoption. We, as a community, aren't short of innovators. Paper after paper at the Technical Symposium propose new ideas to improve how and what we teach. But while many of us in this community are trying new things and studying how they impact our students, a lot of our ideas aren't accepted by our colleagues. And that's important because I suspect our colleagues outside the SIGCSE community likely teach a lot more students than we do.

That's why I'm proud of the work that Mark Guzdial, Beth Simon, Cynthia Lee, and I have done on creating an annual New Computer Science Faculty Teaching Workshop whose goal is to educate all faculty on best practices in teaching with the hope that, over time, substantive change can happen. I'm thrilled the workshop has grown in number of participants and by engaging more hosts like Ben Shapiro, Colleen Lewis, and Helen Hu. But as a community, I think we need to do more to prioritize and value dissemination work. We need to make sure that our innovations are designed with adoption in mind and I think our community would benefit from following the guidance from the groups who study faculty adoption, such as the Increase the Impact project.

What are the biggest challenges for diversity, equity, and inclusion in CS education today? And what can CS educators do to help encourage diversity?

I think we have to keep our momentum going and work to avoid becoming discouraged. Over the past decade I've been in SIGCSE, I've been so proud of our community in how we've embraced this challenge. In the United States, we know that there is deep systemic discrimination against women, ethnic and racial minorities, LGBTQ people, and those of lower socioeconomic status. And if we've learned anything this past year, it's just how deep seated the issues are and how far we have left to go.

At the same time, I know we've all been working hard to make our classes more inclusive, by doing things like adopting active learning pedagogies that, in STEM, have been shown to narrow the achievement gap for underrepresented groups. But despite all these efforts, minus a couple of exceptions, we've only seen the needle move a little bit. This just means there is so much more work to be done. We know prior experience is a predictor of success, so we need to make sure all students in K-12 schools have access to quality computing instruction. And based on Colleen Lewis's ICER 2019 paper, we need to find ways to convey to our students that computing can be a way of making meaningful societal change so

folks who hold those goals are inclined to study computing. There's clearly a lot of work to be done. We need to keep it as a priority and work together to find a path forward.

What do you enjoy doing when you are not working?

I love spending time with my wife and our two kids. Our kids are 5 and 9 years old now and I know these are special years for us as a family. We love to play board games which has been a real source of fun during the pandemic. Our favorite games include Castle Panic, Incan Gold, Ticket to Ride, Just One, Uno, and Love Letter. My wife and I are both big into exercise as well. We enjoy running together and I enjoy swimming in the ocean and cycling.

One last thing, as a former *Bulletin* Editor, I want to thank you, Karen, for all your work on the bulletin. I know this is your last year and you'll be moving on, but I've enjoyed the articles from you and Jeff over the past couple years and I hope to work with you again soon.