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SIGCSE News in Brief

Welcome to the first issue of the SIGCSE *Bulletin* in 2022.

Happy New Year! Although the COVID-19 pandemic has not yet subsided, there is optimism that things will be different than they were during the pandemic. Although I don't believe they will (or should) ever return to the pre-pandemic state, the restrictions, mandates, and divisiveness the pandemic has caused will hopefully become a lesson our children learn in future history classes. One takeaway most people may have from the past two years is the importance of elected officials. Although we are not electing government officials, we do have an announcement about the 2022 SIGCSE Board elections.

Koli Calling 2021 ran successfully, and the organizers have provided us with a summary report. The SIGCSE Technical Symposium organizers are hoping to have an amazing turn out in 2022 with attendance either in-person in Rhode Island or remote.

A website focused on CS education research is live and thriving, and we are honored to have Monica McGill, the CEO and Founder of CSEdResearch.org contributing to the *Bulletin*.

Maria Klawe, the President of Harvey Mudd College and an ACM Fellow, provided an

answer to our regular column addressing inequity issues that exist in computer science.

And lastly, our member spotlight is Prof. Frank Vahid, who is a very active SIGCSE member, the founder of ZyBooks, and a professor of computer science and engineering at the University of California at Riverside.

This was an enjoyable issue to assemble, and we hope you enjoy the first issue of the *Bulletin* in 2022.

Upcoming Dates and Deadlines

Conference	Location	Dates	Full Paper Submission Deadline
SIGCSE TS 2022	Providence, Rhode Island, USA	March 2-5, 2022	(Passed)
ITiCSE 2022	Dublin, Ireland	July 8-13, 2022	(Passed)
ICER 2022	Lugano, Switzerland	August 7-11, 2022	March 18, 2022
Koli Calling 2022	Hybrid (Koli, Finland)	November 17-20, 2022	TBD

Other conferences operate in cooperation with SIGCSE and are posted on the SIGCSE web site at sigcse.org/events/incoop.html.

Koli Calling 2021 Report

By Andrew Petersen and Otto Seppälä



Photo Credit: Ilkka Jormanainen

Koli Calling is a single-track conference covering a range of topics related to education in the computing disciplines. The 21st Koli Calling International Conference on Computing Education Research was held virtually from November 18-21, 2021. An affiliated Doctoral Consortium, “AI Education for All,” was held in-person immediately prior to the conference. This year, the conference was held in cooperation with the ACM and SIGCSE and was organized by the University of Eastern Finland, Aalto University, and the University of Toronto Mississauga.

While Koli is always held in one of the most beautiful places in Finland, it is a truly international conference. 76 papers were submitted by authors from 30 different countries. A total of 28 papers (20 full and 8 short) and 11 posters were accepted, with a paper acceptance rate of 37%.

103 virtual participants from 15 countries attended the conference. To welcome attendees from around the world, each paper was presented twice, so that attendees could discuss each paper at a time convenient to them. The schedule was designed so that attendees from different continents were able to interact with each other in social events and paper

discussions. In addition to the paper and poster presentations, attendees enjoyed a keynote provided by Dr. Sue Sentance, presentations from the associated Doctoral Consortium, and social events including a surprise wine tasting and the Koli Virtual Sauna.

Attendees enjoyed a keynote presentation by Dr. Sue Sentance, Chief Learning Officer at the Raspberry Pi Foundation and Director of the Raspberry Pi Computing Education Research Centre at the University of Cambridge. Dr. Sentance delivered an active and engaging participation entitled “Teaching computing in school: is K-12 research reaching classroom practice?” that challenged participants to consider how their research could impact teaching practice.

The conference was preceded by a 2-day Doctoral Consortium (DC), “AI Education for All.” The DC brought together six students and four faculty with an interest in using or teaching machine learning, artificial intelligence, data science, or related fields. The DC was arranged by Professor Matti Tedre, Professor Arnold Pears, Dr. Tapani Toivonen, Dr. Henriikka Vartiainen, and Dr. Ilkka Jormanainen.

Several attendees received special recognition for their contributions:

- The *Best Paper Award* was given to Philipp Kather and Jan Vahrenhold for “Exploring Algorithm Comprehension: Linking Proof and Program Code.” Their work links the process of reasoning about algorithms to the code used to develop the reasoning and the proof that results and has potential links to the process of developing comprehension of programs.
- Two other papers were noted for their excellence: Luca Chiodini and Matthias Hauswirth’s “Wrong Answers for Wrong Reasons: The Risks of Ad Hoc Instruments” and Ethel Tshukudu, Quintin Cutts and Mary Ellen Foster’s “Evaluating

a Pedagogy for Improving Conceptual Transfer and Understanding in a Second Programming Language Learning Context.”

- Finally, Paul Denny, Stephen Edwards, Shriram Krishnamurthi, and Juho Leinonen were recognized for their contributions as reviewers. All four provided consistently high-quality guidance to authors in their review and were recognized as *Superb Reviewers*.

The conference could not have been held without strong support from the local organizing committee, led by Dr. Ilkka Jormanainen; the DC organizers; and the Program Committee. We are truly thankful for their service to the Koli community.

We look forward to welcoming the community back to Koli in 2022. The organizers intend to hold the conference and social events in-person, with opportunities provided for virtual participants to be engaged in the research program. We will also offer a special track for tool demos and research to support the continued participation of tool designers and builders at Koli Calling. We hope to see you there!

SIGCSE Technical Symposium 2022 Call for Participation

By Larry Merkle and Maureen Doyle, SIGCSE TS 2022 Symposium Co-Chairs

The 2022 Technical Symposium is scheduled for March 2-5, 2022 at the Rhode Island Convention Center in Providence (RICC), RI, USA, and we are excited to offer the conference for the first time ever in a hybrid modality. The theme is computing education’s role in contributing to society’s hope for a better future. There are a number of hotels within 0.1 miles (160 m) of the RICC, including the Omni Providence Hotel, which has skybridge access to the convention center.

A hybrid SIGCSE TS will be different from our past Symposia, and we believe it gives us the opportunity to grow our community of passionate CS educators while also keeping the atmosphere and experience of a traditional SIGCSE TS. With that in mind, we will be using a virtual conference platform for all attendees. Three rooms will support hybrid presentations, with the remaining rooms offering a traditional experience. Virtual attendees can fully participate in keynotes and in the hybrid room presentations. All research papers will be pre-recorded and available on the platform. Sessions will be set aside daily for virtual attendees to meet with the authors whose presentations are not in the streaming rooms.

For those attending in person, we are making some adjustments for health and safety, as well as to support our virtual attendees. The rooms will be set up to support attendees needing six feet (2 m) of separation, while other sections will be set up in a typical conference fashion. In accordance with SIGCSE policy for all 2022 events, proof of vaccination will be required for in-person attendees. Registrants will be provided a link to an app and verification will be handled prior to registration. We will also follow all CDC, state, and local guidelines in force at the time of the Symposium.

Providence, located in the northeast United States, offers the history and architecture found in Boston without the crowds. The city is easily accessible via T. F. Green International Airport or through Amtrak and Boston Logan airport. Providence is home to a number of well-known universities, including Johnson and Wales. We mention them because they offer a College of Culinary arts, thereby providing our in-person participants with the welcome fringe benefit of excellent dining throughout the city. The city also houses multiple museums including the Rhode Island School of Design (RISD) Museum and the John Brown House Museum, a restored 18th century mansion.

We cannot wait to see you in March either in-person in Providence, online, or both, for the 2022 Technical Symposium! Register now at <http://sigcse2022.org/register> to get the best possible rates. Then be on the lookout for an email in early March to set up your account and start watching the amazing presentations, set up meetings with other attendees, and get into the exhibit hall early!

Thank you for supporting our dedicated volunteer program, organizing, and steering committees, as well as our amazing paid support staff, as we explore what it means to put together a hybrid conference. We welcome constructive feedback and ideas, and we hope to provide you with an enlightening and thought-provoking experience.

Larry Merkle and Maureen Doyle
SIGCSE TS 2022 Symposium Co-Chairs

Judithe Sheard, Brian Dorn, and Leen-Kiat Soh
SIGCSE TS 2022 Program Co-Chairs

Kristin Stephens-Martinez
SIGCSE TS 2022 Hybrid Experience Chair

SIGCSE 2022 Board Election By Amber Settle, SIGCSE Immediate Past Chair

ACM's Policy and Procedures on SIG Elections require that those SIGs holding elections notify their membership of candidates for elected offices. Additional candidates may be placed on the ballot by petition. All candidates must be ACM Professional Members, as well as members of the SIG. Anyone interested in petitioning must inform ACM Headquarters, Pat Ryan (ryanp@hq.acm.org), and the Secretary of SIGCSE of their intent to petition by **15 March 2022**. Petitions must be submitted to ACM Headquarters for verification by **1 April 2022**.

The slate of candidates for the 2022 SIGCSE board is as follows. Note that candidates for each position are listed alphabetically by last name.

Chair

- Alison Clear, Eastern Institute of Technology, New Zealand
- Judith Gal-Ezer, Open University, Israel

Vice Chair

- Brett Becker, University College Dublin, Ireland
- Paul Denny, University of Auckland, New Zealand

Treasurer

- Mark Bailey, Hamilton College, USA
- Jill Denner, Education, Training, Research, USA

Secretary

- Mary Anne Egan, Siena College, USA
- Dan Garcia, University of California at Berkeley, USA

At-Large

- Bedour Alshaigy, UK
- Rodrigo Silva Duran, Federal Institute of Science and Technology of Mato Grosso do Sul, Brazil
- Catherine Lang, Swinburne University of Technology, Australia
- Anne-Kathrin Peters, KTH Royal Institute of Technology, Sweden
- Yolanda Rankin, Florida State University, USA
- Judy Sheard, Monash University, Australia
- Cheryl Swainer, University of Massachusetts, USA

CSEdResearch.org Announcement

By Monica McGill, CEO and Founder of
CSEdResearch.org

In this issue, we're highlighting two survey instruments with evidence of reliability and validity that might help you in your next study:

- [Elementary Computer Science Attitudes \(E-CSA\)](#). Created in 2021 by Vandenberg, Rachmatullah, Lynch, Boyer, and Weibe, this carefully worded survey measures 4th and 5th graders self-efficacy and outcome expectancy towards computers.
- The [Lean Computational Thinking Abilities Test](#) (Wiebe, London, Aksit, Mott, Boyer, and Lester) consists of items originally contained in the CTt and Bebras UK 2016 instruments. CTt was developed by M. Román-González and colleagues. CTt items are redistributed with the permission of M. Román-González. Appropriate development and validation citations include: Román-González, M., Pérez-González, J.-C., & Jiménez-Fernández, C. (2016). Which cognitive abilities underlie computational thinking? Criterion validity of the Computational Thinking Test. *Computers in Human Behavior*, 72, 678-691. Román-González, M., Pérez-González, J.-C., Moreno-León, J., & Robles, G. (2018). Can computational talent be detected? Predictive validity of the Computational Thinking Test.

We'll also be launching our revised website soon--the site may look a little different, but all of our resources (article summaries, evaluation instruments, and research tips) will still be on the site.

And, don't forget--if you have an instrument you've created and would like to share with others, you can submit those [here](#). We are particularly interested in hosting instruments that have evidence of reliability and/or validity.

17th Workshop in Primary and Secondary Computing Education (WiPSCE 2022) Call for Papers

By Maureen Grillenberger, WiPSCE 2022 Conference Chair

We invite you to submit a paper, report, or poster for the 17th Workshop in Primary and Secondary Computing Education organized by the Schwyz University of Teacher Education and to join us in Morschach, Switzerland.

Research in primary and secondary computing education is a young field with strong ties to national educational systems. Nevertheless, its theories, methods, and results are internationally applicable and of interest to researchers and practitioners in the field. WiPSCE aims at improving the exchange of research and practice relevant to teaching and learning in primary and secondary computing education, teacher training, and related research.

WiPSCE has its roots in a long-running workshop of the German computing education community and is run in cooperation with ACM SIGCSE.

Topics of interest include, but are not limited to research on:

- Learning & Teaching: student motivation and engagement, attitudes and beliefs, student conceptions, learning difficulties, educational approaches, methods, contests, technologies, and tools
- Foundations of Computing Education: competence modelling and measurement, assessment, curricula and standards, emerging topics for computing education
- Teacher Education & Institutional Aspects: pedagogical content knowledge in computing, establishing and enhancing computing education, (continued) professional development, communities of practice

PRE-REVIEW SUBMISSIONS

In 2022, for the first time WiPSCE will have a pre-review submission option. Authors who wish to get feedback and advice on their work prior to the actual submission to the conference are invited to submit a structured extended abstract of their work. Each submission will be read and commented on by at least two of the WiPSCE program committee members. In this way, we intend to help authors by providing feedback that can still be considered for the papers that are to be submitted for the conference.

This option is voluntary: everyone may use it, nobody must; authors, who make use of this opportunity are not favored in the actual review process, a recommendation by the PC members is no guarantee that the paper will be accepted.

IMPORTANT DATES

Pre-review submission deadline (all categories):
April 03, 2022

Pre-review submission feedback (all categories):
April 24, 2022

Submission deadline (full/short paper abstracts): May 29, 2022

Re-submission deadline (full/short papers): June 05, 2022

Notification of acceptance (full/short papers):
July 04, 2022

Submission deadline (poster abstracts): July 17, 2022

Notification of acceptance (poster abstracts):
August 01, 2022

As a CS Educator, How Do You Think We Can Address Inequity Issues That Exist in the Field?

By Jeffrey Miller and Charles Wallace, SIGCSE
Bulletin Co-editors, Maria Klawe, President of
Harvey Mudd College

We have been inviting CS education researchers to offer brief remarks to spark discussion and provide ideas for actions we can all take to address inequity issues.

Maria Klawe, President of Harvey Mudd College

We need to make introductory CS courses at the post-secondary level engaging and interesting for everyone. Key approaches include separate sections for students with different levels of prior experience with CS, homework assignments in which students can see how theoretical concepts are important in solving real world problems, encouraging pair programming and other forms of teamwork, and ensuring that students from different sections are equally well prepared and encouraged to take the next course in the CS sequence. It is also important to provide meaningful internships and research opportunities for students after their first year in college since research shows that such experiences make underrepresented students more likely to choose CS as their major. Other helpful strategies include having outstanding and diverse teachers in the introductory courses, as well as highly supportive, diverse and well-trained teaching assistants.

Member Spotlight

By Jeffrey Miller and Charles Wallace, SIGCSE
Bulletin Co-editors, Frank Vahid

In this feature of the *Bulletin*, we highlight members of the SIGCSE community. This issue's spotlight is Frank Vahid, a professor of computer science and engineering at the University of California at Riverside.

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

I was heartbroken when I learned most CS majors don't make it to the junior year, which I discovered while CS undergraduate advisor for my university in the early 2000s. The country is doing a great job bringing enthusiastic young people into the CS major, with about 5x growth in the past decade -- and then we crush them. CS departments across the U.S. have been failing about 30% of CS1 students for several decades. Students leaving CS were often the very students folks were rooting for: low income, first-gen, minorities, women. I couldn't take it anymore. So around 2010 I shifted much of my career focus to CS education, hoping to make a dent. I attended my first SIGCSE in 2013, and discovered such a wonderful, kind, talented group of people!

Can you describe some of the ways you have been involved in developing and enhancing computer science education?

I started with an NSF-funded OER project around 2010, focused on a web-based interactive system to learn programming. It was gaining traction at about 10 universities, but I quickly realized that a team of full-time professionals was needed to scale. So with Smita Bakshi, I co-founded zyBooks in 2012. With 5 of my former PhDs students and many other talented people, and over \$2 million in NSF SBIR support (thank you NSF!!!), we worked day and night building new interactive online learning content for all of lower-division of CS and more, and built a new cloud platform for such content. The company

now has nearly 200 employees (acquired by Wiley in 2019, but still operating as a unit), and this year will have served about 300,000 students at over 1,000 universities, mostly in lower-division CS, including the now #1 college "textbooks" in Python, Java, and C++ with about 15-20% of the market each. Most research by us and others, and tons of feedback, suggest CS students are having much greater success, and CS teachers are having more fun and saving time too.

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

It's kind of crazy that for each of the thousands of offerings of a CS course in a given semester (e.g., CS1 in Java, or Discrete Math), each teacher arranges the topics, creates assignments, prepares exams, grades, etc. With so much today being cloud-based, the time is ripe for teachers to work in larger teams. I see "common courses" evolving, such that dozens or hundreds of schools offer essentially the same course -- same topics and ordering, same assignments, same exams, lots of auto-grading. Not only will those items become much better quality via economies of scale (carefully designed, improved via feedback and data, randomized, auto-graded, etc.), but this frees instructors from grunt work, elevating them to be able to spend more time doing examples, facilitating group activities, answering questions, motivating students, grading authentic assessments (custom projects), and more. Students get a more robust, consistent, efficient, effective learning experience, and teachers save time and have more fun too. And we can compare our student outcomes and instructor experiences too and grow from that. We just need to be willing to let go of our pet ways of covering topics, realizing there is much higher ground if we cooperate. I believe the CS education community can not only achieve this, but can lead other communities -- Math, Physics, Engineering -- towards this more cooperative "common course" approach, which IMO is inevitable, so we may as well speed it up.

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

Cheating. Period. And imagine that answer coming halfway through your question -- no need to think about it. The internet today makes it so easy to find solutions on the web or via back-door class channels (e.g., Discord), or to hire people, mostly from other countries, to do your coursework (under \$100 for an entire course). In fact, a major national bookstore company upsells students onto their cheating website -- yes, right there in the college bookstore. Students (often legitimately) don't really see getting code from websites/classmates/online-tutors as "cheating", any more than all us speeders consider ourselves "criminals" -- today, everyone does it, and sometimes it's even foolish/dangerous not to. I think the next 5-10 years will see a transformation in CS to ensure students rely less on such "help" and are actually learning -- more focus on loosely or tightly proctored settings during assignments or exams (like today's English labs where students write their essays in labs with non-networked computers), more highly-randomized objective-focused assessments (like Univ. of Illinois is pioneering in their "computer-based testing facilities" approach), more mastery-based learning (students keep trying until they get it), and authentic assignments (custom projects). I see a lot less "go program this standard assignment and do it on your own or else it's cheating" -- that's a tall order in the internet era for a 19-year-old with a still-developing prefrontal cortex -- if you leave hungry kids alone in a candy store, you don't call what happens next an epidemic in shoplifting. It's upon the CS education community to adapt to the internet, pushing ourselves to develop and adopt known better ways that ensure students are really learning.

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

Research on college success shows that, although we spend so much time talking about improving curriculum and pedagogy (both important), some of the biggest student success factors center around whether students feel supported, have a sense of belonging, and have self-efficacy, and if a class is well-organized, predictable, and fair. Such factors impact some students far more than others -- often the very students we think about in DEI initiatives. Thus, CS departments must ensure CS teachers are not just knowledgeable in CS but are also supportive and motivating humans who establish rapport with the specific students that were admitted to their university (and stop pining for ideal students). This means hiring for *talent* (yes, CS education is a talent business), training CS teachers, and frankly, moving many existing CS teachers on to other endeavors.

What do you enjoy doing when you are not working?

Family and friends are wealth, IMO. My wife and I take every opportunity to visit our kids and their families, our siblings, and our cousins around the world. Oh, and I absolutely love riding dirtbikes, been riding since I was 12. Now, if I could somehow combine those two things, I'd be in heaven.