



ITiCSE 20
TRONDHEIM

25th Annual Conference on Innovation and Technology
in Computer Science Education

Program

Please note, all times are in Central European Time (CET). All sessions will have an associated discussion board for asynchronous communication.

Wed 17 June

Session Length	US Pacific	US Eastern	UK/Ireland	Central European	Eastern European	Beijing	Tokyo	Sydney	NZ	Session A	Session B
60m	23:00	02:00	07:00	08:00	09:00	14:00	15:00	16:00	18:00	Lean Coffee	
75m	00:00	03:00	08:00	09:00	10:00	15:00	16:00	17:00	19:00	Opening and Keynote	
15m	01:15	04:15	09:15	10:15	11:15	16:15	17:15	18:15	20:15	Coffee break (15 mins)	
60m	01:30	04:30	09:30	10:30	11:30	16:30	17:30	18:30	20:30	1A: Paper Session 1	1B: Open Discussion
30m	02:30	05:30	10:30	11:30	12:30	17:30	18:30	19:30	21:30	Coffee break -- Open Space (30 mins)	
60m	03:00	06:00	11:00	12:00	13:00	18:00	19:00	20:00	22:00	2A: Paper Session 2	2B: TTC Session 1
30m	04:00	07:00	12:00	13:00	14:00	19:00	20:00	21:00	23:00	Coffee break -- Open Space (30 mins)	
60m	04:30	07:30	12:30	13:30	14:30	19:30	20:30	21:30	23:30	3A: Paper Session 3	3B: Panel 1
15m	05:30	08:30	13:30	14:30	15:30	20:30	21:30	22:30	00:30	Coffee break (15 mins)	
60m	05:45	08:45	13:45	14:45	15:45	20:45	21:45	22:45	00:45	4A: Paper Session 4	4B: Open Discussion

Thu 18 June

Session Length	US Pacific	US Eastern	UK/Ireland	Central European	Eastern European	Beijing	Tokyo	Sydney	NZ	Session A	Session B
60m	01:00	04:00	09:00	10:00	11:00	16:00	17:00	18:00	20:00	Lean Coffee	
75m	02:00	05:00	10:00	11:00	12:00	17:00	18:00	19:00	21:00	5A: Paper Session 5	5B: Open Discussion
15m	03:15	06:15	11:15	12:15	13:15	18:15	19:15	20:15	22:15	Coffee break (15 mins)	
60m	03:30	06:30	11:30	12:30	13:30	18:30	19:30	20:30	22:30	6A: Paper Session 6	6B: Panel 2
30m	04:30	07:30	12:30	13:30	14:30	19:30	20:30	21:30	23:30	Coffee break -- Open Space (30 mins)	
75m	05:00	08:00	13:00	14:00	15:00	20:00	21:00	22:00	00:00	7A: Paper Session 7	7B: TTC Session 2
30m	06:15	09:15	14:15	15:15	16:15	21:15	22:15	23:15	01:15	Coffee break -- Open Space (30 mins)	
30m	06:45	09:45	14:45	15:45	16:45	21:45	22:45	23:45	01:45	Posters	
15m	07:15	10:15	15:15	16:15	17:15	22:15	23:15	00:15	02:15	Coffee break (15 mins)	
60m	07:30	10:30	15:30	16:30	17:30	22:30	23:30	00:30	02:30	Keynote and Closing	

Wed 17 June 2020, 08:00-15:45 CET

Lean Coffee Hour: June 17, 08:00-09:00 CET

- 08:00-09:00 According to leancoffee.org, Lean Coffee is a structured, but agenda-less meeting. Participants gather, build an agenda, and begin talking. Conversations are directed and productive because the agenda for the meeting was democratically generated.

Opening Session: June 17, 09:00-10:15 CET

- 9:00-09:15 Welcome and Opening Keynote by the Conference Chairs
- 09:15-10:00 Keynote by Judy Sheard and Simon: *Australia, New Zealand, and ITiCSE: What's the Story?*
- 10:00-10:15 Keynote Q&A Session

Session 1A: June 17, 10:30-11:30 CET

Papers 1: Understanding Student Psychology

Session Chairs: Brett A. Becker and [TBC]

- 10:30-10:45 *Twenty-Four Years of ITiCSE Papers* (Simon and Judy Sheard) **[Best Paper Finalist]**
- 10:45-11:00 *Promoting a Growth Mindset in CS1: Does One Size Fit All? A Pilot Study* (Keith Quille and Susan Bergin)
- 11:00-11:15 *Resilience and Effective Learning in First-Year Undergraduate Computer Science* (Tom Prickett, Julie Walters, Longzhi Yang, Morgan Harvey, Tom Crick)
- 11:15-11:30 *Towards Self-motivated Learning in Computer Science Education: Results of a Questionnaire Study* (Christian Werner and Boris Girnat)

Session 1B: June 17, 10:30-11:30 CET

Open Discussion

- 10:30-11:30 Feel free to join the open discussion! These slots are available for attendees to meet up and chat. Authors for unscheduled papers may elect to schedule a time where they will be available for live chat. Times and topics may be posted on the session discussion board.

Session 2A: June 17, 12:00-13:00 CET

Papers 2: Tools and Assessments

Session Chairs: [TBC]

- 12:00-12:15 *Developing an Assessment to Profile Students based on their Understanding of the Variable Programming Concept* (Julie Henry and Bruno Dumas)

- 12:15-12:30 *Automated Assessment of Android Exercises with Cloud-native Technologies* (Daniel Bruzual Balzan, Maria L. Montoya Freire and Mario Di Francesco)
- 12:30-12:45 *Depth of Use: An Empirical Framework to Help Faculty Gauge the Relative Impact of Learning Management System Tools* (Taha Hassan, Bob Edmison, Larry Cox, Matthew Louvet, Daron Williams, D. Scott McCrickard)
- 12:45-13:00 *Unproductive Help-seeking in Programming: What it is and How to Address it* (Samiha Marwan, Anay Dombe and Thomas Price)

Session 2B: June 17, 12:00-13:00 CET

TT&C Session 1

Session Chairs: Bedour Alshaigy and Marc Berges

- 12:00-12:10 *Learning Theoretical Computing from the Mathematical Impossibility Results of the CS Curriculum* (Rafael Del Vado Vírveda)
- 12:10-12:20 *DIY Smart Home: the Development of an Exemplary Internet of Things Infrastructure for Computer Science Education* (Anatolij Fandrich, Tobias Stuckenberg and Ira Diethelm)
- 12:20-12:30 *Encouraging Student Participation in online Tutorials: A Tutor's Perspective* (Bobby Law and Iain Lambie)
- 12:30-12:40 *Coding and Music Creation in a Multi-agent Environment* (Sven Anderson and Siv Anderson)
- 12:40-12:50 *Fun maths for all game development students* (Diogo de Andrade and Nuno Fachada)

Session 3A: June 17, 13:30-14:30 CET

Papers 3: Specific Courses

Session Chairs: Andreas Mühlning and Cheryl Brown

- 13:30-13:45 *Aiding an Introduction to Formal Reasoning Within a First-Year Logic Course for CS Majors Using a Mobile Self-Study App* (David Cerna, Martina Seidl, Wolfgang Schreiner, Wolfgang Windsteiger and Armin Biere)
- 13:45-14:00 *Hands-on Security Testing in a University Lab Environment* (Phillip James, Lauren Powell, Liam O'Reilly and Faron Moller)
- 14:00-14:15 *Developing a Computer Graphics Course with a Game Development Engine* (Dimitrij (Mitja) Hmeljak and Holly Zhang)
- 14:15-14:30 *Infusing Principles and Practices for Secure Computing Throughout an Undergraduate Computer Science Curriculum* (Jean R. S. Blair, Christa M. Chewar, Rajendra K. Raj, and Edward Sobiesk)

Session 3B: June 17, 13:30-14:30 CET

Panel 1

Session Chairs: Bedour Alshaigy and Marc Berges

- 13:30-14:15 *Integrating Computing into K-16 Education: Scaffolding teacher and student learning in STEM disciplines* (Tor Odden, Aman Yadav, Cathrine Tellefsen and Elisa Caeli)
- 14:15-14:30 Panel Q&A Session

Session 4A: June 17, 14:45-15:45 CET

Papers 4: Computing in Schools I

Session Chairs: Neena Thota and [TBC]

- 14:45-15:00 *Common Bugs in Scratch Programs* (Christoph Frädriich, Florian Obermüller, Nina Körber, Ute Heuer and Gordon Fraser)
- 15:00-15:15 *Designing One Year Curriculum to Teach Artificial Intelligence for Middle School* (Alpay Sabuncuoğlu)
- 15:15-15:30 *Tools, Languages, and Environments Used in Primary and Secondary Computing Education* (Monica McGill and Adrienne Decker)
- 15:30-15:45 *Bring the Page to Life: Engaging Rural Students in Computer Science Using Alice* (Brittany Terese Fasy, Stacey Hancock, Barbara Komlos, Brendan Kristiansen, Samuel Micka and Allison Theobold)

Session 4B: June 17, 14:45-15:45 CET

Open Discussion

- 14:45-15:45 Feel free to join the open discussion! These slots are available for attendees to meet up and chat. Authors for unscheduled papers may elect to schedule a time where they will be available for live chat. Times and topics may be posted on the session discussion board.

Thurs 18 June 2020, 10:00-18:45 CET

Lean Coffee Hour: June 18, 10:00-11:00 CET

- 10:00-11:00 According to leancoffee.org, *Lean Coffee is a structured, but agenda-less meeting. Participants gather, build an agenda, and begin talking. Conversations are directed and productive because the agenda for the meeting was democratically generated.*

Session 5A: June 18, 11:00-12:15 CET

Papers 5: Computing in Schools II

Session Chairs: Monica Divitini and Nasser Giacaman

- 11:00-11:15 *An International Pilot Study of K-12 Teachers' Computer Science Self-Esteem* (Rebecca Vivian, Keith Quille, Monica McGill, Katrina Falkner, Sue Sentance, Sarah Barksdale, Leonard Busuttil, Elizabeth Cole, Christine Liebe and Francesco Maiorana)
- 11:15-11:30 *Evaluation and Assessment Needs of Computing Education in Primary Grades* (Rebecca Vivian, Diana Franklin, Dave Frye, Alan Peterfreund, Jason Ravitz, Florence Sullivan, Melissa Zeitz and Monica McGill)
- 11:30-11:45 *Towards a Holistic Reservoir of Research-Based PCK Segments of K-12 Computer Science Teachers* (Ofra Brandes and Michal Armoni)
- 11:45-12:00 *SCAPA: Development of a Questionnaire Assessing Self-Concept and Attitudes Toward Programming* (Luzia Leifheit, Katerina Tsarava, Manuel Ninaus, Klaus Ostermann, Jessika Golle, Ulrich Trautwein and Korbinian Moeller)
- 12:00-12:15 *Developing an Inclusive K-12 Outreach Model* (Karen Nolan, Roisin Faherty, Keith Quille, Brett A. Becker and Susan Bergin)

Session 5B: June 18, 11:00-12:15 CET, Open Discussion

Open Discussion

11:00-12:15 Feel free to join the open discussion! These slots are available for attendees to meet up and chat. Authors for unscheduled papers may elect to schedule a time where they will be available for live chat. Times and topics may be posted on the session discussion board.

Session 6A: June 18, 12:30-13:30 CET

Papers 6: Student Understanding

Session Chairs: Cruz Izu and [TBC]

- 12:30-12:45 *Postponing the Concept of Class When Introducing OOP* (Nicolas Passerini and Carlos Lombardi)
- 12:45-13:00 *Engage Against the Machine: Rise of the Notional Machines as Effective Pedagogical Devices* (Paul E. Dickson, Neil C. C. Brown and Brett A. Becker)
- 13:00-13:15 *Misconception-Based Peer Feedback: A Pedagogical Technique for Reducing Misconceptions* (Cazembe Kennedy, Aubrey Lawson, Yvon Feaster and Eileen Kraemer)
- 13:15-13:30 *Using Peer Code Review as an Educational Tool* (Xinagyu (Eric) Song, Seth Goldstein and Majd Sakr)

Session 6B: June 18, 12:30-13:30 CET

Panel 2

Session Chairs: Bedour Alshaigy and Marc Berges

- 12:30-13:15 *ACM Taskforce Efforts on Computing Competencies for Undergraduate Data Science Curricula* (Paul Leidig and Lillian Cassel)
- 13:15-13:30 Panel Q&A Session

Session 7A: June 18, 14:00-15:15 CET

Papers 7: Unconventional Approaches

Session Chairs: Francesco Maiorana and [TBC]

- 14:00-14:15 *Introducing a Paper-Based Programming Language for Computing Education in Classrooms* (Aditya Mehrotra, Christian Giang, Noé Duruz, Julien Dedelley, Andrea Mussati, Melissa Skweres and Francesco Mondada)
- 14:15-14:30 *Through the Lens: Enhancing Assessment with Video-Based Presentation* (Mark Zarb and Jen Birtles Kelman)
- 14:30-14:45 *The Use of DJing Tasks as a Pedagogical Bridge to Learning Data Structures* (David James)
- 14:45-15:00 *A Case Study and Call to Action: Incorporating the ACRL Framework for Information Literacy in Undergraduate CS Courses* (Holly Hendrigan, Keshav Mukunda and Diana Cukierman)
- 15:00-15:15 *Twenty-Four Years of ITiCSE Authors* (Simon) **[Best Paper Finalist]**

Session 7B: June 18, 14:00-15:15 CET

TT&C Session 2

Session Chairs: Bedour Alshaigy and Marc Berges

- 14:00-14:10 *A feedback-oriented platform for deliberate programming practice* (Mario Sanchez and Pedro Salazar)
- 14:10-14:20 *Notes on Using Google Colaboratory in AI Education* (Mark J. Nelson and Amy K. Hoover)
- 14:20-14:30 *Auditing the COMPAS Recidivism Risk Assessment Tool: Predictive Modeling and Fairness in Machine Learning in CS1* (Claire Lee, Jeremy Du and Michael Guerzhoy)
- 14:30-14:40 *Towards Flexible and Extensible Git-based Course Management with RepoBee* (Richard Glassey and Simon Larsén)
- 14:40-14:50 *Tools for Analysis of Curricula Evolution Across Computer Science Curriculum Guidelines* (Vangel Ajanovski)

Posters: June 18, 15:45-16:15 CET

Posters:

- *Introducing Data Analytics Concepts in a CS Course for Non-Majors* (Ingrid Russell, Zhuojun Duan and Andrew Jung)
- *An Interactive Tutoring System for Learning Language Processing and Compiler Design* (Rafael Del Vado Vírseda)
- *VU-BugZoo: A Persuasive Platform for Teaching Software Testing* (Natalia Silvis-Cividjian, Rob Limburg, Niels Althuisius, Emil Apostolov, Viktor Bonev, Robert Jansma, Glenn Visser and Marc Went)
- *Diagramming Encouragement in CS1 Textbooks* (Syeda Fatema Mazumder, Celine Latulipe and Manuel Perez-Quinones)
- *Opportunities and Challenges for Scaling a Systems-Approach CS Education Adoption* (Ines Fernandez Dionis, Stephanie Wortel-London, Leigh Ann Delyser and Anisa Bora)
- *Conversational Learning using Artificial Intelligence* (Michael Gavin and Frank G. Glavin)
- *Different Approaches to Teaching a Database Course to Graduate and Undergraduate Students* (Samah Senbel)
- *Open-Ended Exercises in CS1: The Impact on Female, Non-Major and Inexperienced Computer Science Students* (Sadia Sharmin)
- *Towards an Implementation of a Peer-Learning and Peer-Teaching Group in Programming* (Corinna Kröhn, Sara Hinterplattner and Barbara Sabitzer)
- *Automatic Test Generation for Haskell Programming Assignments* (Vladimír Štill)
- *Teaching Lab: Training Novice Computer Science Teachers* (Martin Ukrop, Valdemar Švábenský and Imrich Nagy)
- *Pre-Bachelor's Curricular Guidance For Cybersecurity Programs* (Melissa Stange, Cara Tang, Cindy Tucker, Christian Servin and Markus Geissler)
- *Exploring Sense of Belonging in Computer Science Students* (Catherine Mooney, Anna Antoniadi, Ioannis Karvelas, Lana Salmon and Brett Becker)
- *FGPE AuthorKit - A Tool for Authoring Gamified Programming Educational Content* (José Carlos Paiva, Ricardo Queirós, José Paulo Leal and Jakub Swacha)
- *Assessing the Value of Professional Body Accreditation of Computer Science Degree Programmes: A UK Case Study* (Tom Crick, Tom Prickett, James H. Davenport and Alastair Irons)

- *Designing a Collaborative Game-Based Learning Environment for AI-Infused Inquiry Learning in Elementary School Classrooms* (Seung Lee, Bradford Mott, Anne Ottenbriet-Leftwich, Adam Scribner, Sandra Taylor, Krista Glazewski, Cindy E. Hmelo-Silver and James Lester)
- *Demystifying and Decluttering Participation in Software Engineering Education Programmes* (Joseph Maguire, Quintin Cutts and Steve Draper)
- *The Martian Movie and Introducing Programming and Robotics with the Sphero Bolt Robot* (Steve Hadfield)

DC Posters:

- *Impacts of Block-based Programming on Young Learners' Programming Skills and Attitudes in the Context of Smart Environments* (Mazyar Seraj)
- *Teaching computational thinking with interventions adapted to undergraduate students' proficiency levels* (Imke de Jong)
- *The Design, Development, and Evaluation of a Novel Computer-based Competency Assessment of Computational Thinking* (Rina PY Lai)
- *Investigating the Socially Shared Regulation of Learning in the Context of Programming Education* (Leonardo Silva)
- *Using Spatial-Algorithmic Problem Solving Strategies to Increase Access to Data Structures* (Seth Poulsen)
- *A Comprehensive Analysis of Students' Experiences of Belonging to the CS Community* (Sercan Erer)
- *The Impact of English Language on Non-Native English Speaking Students' Performance in Programming Class* (Suad Alaofi)
- *Efficient Instructional Design of Programming Examples* (Albina Zavgorodniaia)
- *Frame Based Novice Programming* (Joe Dillane)
- *Supporting computer science teaching beyond syllabus: ICT for cooperation and reflection* (Vojislav Vujošević)
- *The Importance of Embedding Meta Skills in Computer Science Graduate Apprenticeship Programmes* (Tiffany Young)

Closing Session: June 18, 16:30-18:30 CET

- 16:30-17:15 Keynote by Professor Matti Tedre: *From a Black Art to a School Subject: Computing Education's Search for Status*
- 17:15-17:30 Keynote Q&A Session
- 17:30-18:30 Closing - Awards and ITiCSE 2021
 - SIGCSE Chair
 - SIGCSE Test of Time Award for 2020
 - ITiCSE Steering Committee
 - ACM Europe Council Best Paper Award
 - ITiCSE Community Award for poster and TTC
 - Awards for Top 5 Papers in 25 years of ITiCSE
 - ITiCSE 25 challenge
 - ITiCSE 2021

Papers without scheduled presentations

Pre-recorded presentations are available for some papers. Live discussion may be scheduled by the authors during one of the open discussion sessions.

Session 8: Broadening Participation

- *Get Paid to Program: Evaluating an Employment-Aware After-School Program for High School Women of Color* (Dana McFarlane and Elissa Redmiles) **[Recording available]**
- *Promoting Diversity-Inclusive Computer Science Pedagogies: A Multidimensional Perspective* (Vahab Pournaghshband and Paola Medel) **[Recording available] [Best Paper Finalist]**
- *The Relationship of Gender, Experiential, and Psychological Factors to Achievement in Computer Science* (Madeline Hinckle, Arif Rachmatullah, Bradford Mott, Kristy Boyer, James Lester and Eric Wiebe) **[Recording available] [Best Paper Finalist]**
- *The Power of Female Athletes to Level the Computer Science Playing Field* (Gloria Townsend, Khadija Stewart and Sharmin Tunguz) **[Recording available]**
- *Global and Local Agendas of Computing Ethics Education: Viewpoints and Provocations* (Janet Hughes, Ethan Plaut, Feng Wang, Elizabeth von Briesen, Cheryl Brown, Gerry Cross, Viraj Kumar and Paul Myers)

Session 9: Creative Computing

- *Exploring Creativity and Learning through the Construction of (Non-Digital) Board Games in HCI Courses* (Milene Silveira) **[Recording available]**
- *Creative Choice in Fifth Grade Computing Curriculum* (Kirsten Mork, John Wilcox and Zoe Wood) **[Recording available] [Best Paper Finalist]**
- *Problem Solving and Creativity: Complementing Programming Education with Robotics* (Dennis Komm, Adrian Regez, Urs Hauser, Marco Gassner, Pascal Lüscher, Rico Puchegger, and Tobias Kohn)
- *Program a Hit - Using Music as Motivator for Introducing Programming Concepts* (Christian Köppe)
- *The Art of the Demo: Investigating the Design of Demonstrator Code for Creative Computing Education* (Matthew Yee-King, Louis McCallum, Maria Teresa Llano, Vit Ruzicka, Mark d'Inverno and Mick Grierson) **[Recording available]**

Session 10: Developing Transferable Skills

- *A Methodology to Integrate Professional Skill Development throughout an ICT Curriculum* (Nicole Herbert, Kristy De Salas, Tina Acuna and Erik Wapstra)
- *Soft Skills: What do Computing Program Syllabi Reveal About Non-Technical Expectations of Undergraduate Students?* (Wouter Groeneveld, Brett A. Becker and Joost Vennekens) **[Recording available]**
- *Developing Industry-Relevant Higher Order Thinking Skills in Computing Students* (Shekhar Kalra, Charles Thevathayan and Margaret Hamilton) **[Recording available]**

Session 11: Curriculum

- *Top-down Design of a CS Curriculum for a Computer Games BA* (Nuno Fachada and Nélio Códices) **[Recording available]**

- *Semantic Transfer in Programming Languages: Exploratory Study of Relative Novices* (Ethel Tshukudu and Quintin Cutts) **[Recording available]**
- *Seamless Integration of NoSQL class into the Database Curriculum* (Suneuy Kim) **[Recording available]**
- *CS in Schools: Developing a sustainable Coding Programme in Australian Schools* (Hugh Williams, Selina Williams and Kristy Kendall) **[Recording available]**
- *Service-Learning for Web Technology: Observations from a Small Case Study* (Joost Vennekens) **[Recording available]**
- *Attitudinal Trajectories in an Online CS1 Class: Demographic and Performance Trends* (David A. Joyner, Lily Bernstein, Maria-Isabelle Dittamo, Ben Engelman, Alysha Naran, Amber Ott, Jasmine Suh and Abby Thien) **[Recording available]**
- *Design and Evaluation of a Collaborative Online Computational Thinking Course* (Rebecca Smith and Scott Rixner) **[Recording available]**

Session 12: Tools

- *Crowdsourcing Content Creation for SQL Practice* (Juho Leinonen, Nea Pirttinen and Arto Hellas) **[Recording available]**
- *ProgSnap2: A Flexible Format for Programming Process Data* (Thomas Price, David Hovemeyer, Kelly Rivers, Ge Gao, Austin Bart, Ayaan M. Kazerouni, Brett Becker, Andrew Petersen, Luke Gusukuma, Stephen H. Edwards and David Babcock) **[Recording available]**
- *Compigorithm: An Interactive Tool for Guided Practice of Complexity Analysis* (Rebecca Smith and Scott Rixner) **[Recording available]**
- *A Dynamic Visualisation of the DES Algorithm and a Multi-faceted Evaluation of Its Educational Value* (Rachid Anane and Mohammad T. Alshammari)
- *Using DevContainers to Standardize Student Development Environments: An Experience Report* (Sander Valstar, William G. Griswold and Leo Porter) **[Recording available]**
- *UserFlow: A Tool for Visualizing Fine-grained Contextual Analytics in Teaching Documents* (Shaveen Singh, Bernd Meyer and Michael Wybrow) **[Recording available] [Best Paper Finalist]**
- *Step Tutor: Supporting Students through Step-by-Step Example-Based Feedback* (Wengran Wang, Yudong Rao, Rui Zhi, Samiha Marwan, Ge Gao and Thomas W. Price) **[Recording available]**
- *Effects of Competitive and Cooperative Classroom Response Systems on Quiz Performance and Programming Skills in a Video Game Programming Course* (Adrián Domínguez Díaz, Luis De-Marcos and José-Javier Martínez Herráiz) **[Recording available]**

Session 13: Understanding Our Students

- *Insights from Student Solutions to SQL Homework Problems* (Seth Poulsen, Liia Butler, Abdussalam Alawini and Geoffrey Herman) **[Recording available]**
- *Achievement Goal Orientation Profiles and Performance in a Programming MOOC* (Kukka-Maaria Polso, Heta Tuominen, Arto Hellas and Petri Ihantola) **[Recording available]**
- *What are We Asking our Students? A Literature Map of Student Surveys in Computer Science Education* (Brian Harrington and Angela Zavaleta Bernuy) **[Recording available]**

Session 14: Introductory Programming

- *Are Variable, Array and Object Diagrams in Java Textbooks Explanative?* (Syeda Fatema Mazumder, Celine Latulipe and Manuel Perez Quinones) **[Recording available]**
- *Assessing CS1 Design Skills with a String Manipulation Task* (Cruz Izu and Amali Weerasinghe) **[Recording available]**
- *The Effect of a Spatial Skills Training Course in Introductory Computing* (Jack Parkinson and Quintin Cutts) **[Recording available]**
- *Can Students' Spatial Skills Predict Their Programming Abilities?* (Ryan Bockmon, Stephen Cooper, Jonathan Gratch, Jian Zhang and Mohsen Dorodchi) **[Recording available]**
- *Evaluating the Effectiveness of Flipped Teaching in a Mixed-Ability CS1 Course* (Abdallah Mohamed)

Session 15: Code Quality and Code Understanding

- *Towards a Competence Model for the Novice Programmer Using Bloom's Revised Taxonomy - An Empirical Approach* (Natalie Kiesler)
- *Comparing Small Programs for Equivalence: A Code Comprehension Task for Novice Programmers* (Cruz Izu and Claudio Mirolo) **[Recording available]**
- *If They Build It, Will They Understand It? Exploring the Relationship between Student Code and Performance* (Jean Salac and Diana Franklin) **[Recording available]**
- *Error Message Readability and Novice Debugging Performance* (Paul Denny, James Prather and Brett Becker) **[Recording available] [Best Paper Finalist]**
- *An Open-Source, API-Based Framework for Assessing the Correctness of Code in CS50* (Chad Sharp, Jelle van Assema, Brian Yu, Kareem Zidane and David J. Malan) **[Recording available]**
- *CompareCFG: Providing Visual Feedback on Code Quality Using Control Flow Graphs* (Lucy Jiang, Robert Rewcastle, Paul Denny and Ewan Tempero)

Additional TT&C Papers

- *Plethora of Skills* (Judith Gal-Ezer, Smadar Szekely and Rami Marelly) **[Recording available]**
- *Applying pair programming practice in the improvement of software design skills, in an undergraduate course.* (Hernan Quintana and Billy Grados) **[Recording available]**
- *Keeping Students Occupied with the Course Contents After Leaving the Classroom* (Muztaba Fuad, Monika Akbar and Lynn Zubov) **[Recording available]**
- *Extending a CPU design project to reinforce learning and deter cheating* (Cruz Izu)
- *eduFUSE a Visualizer for User-Space File Systems* (Luke Thompson, Joel Clarke and Robert Sheehan)

Working Groups

- WG 1: *Choosing Code Segments to Exclude from Code Similarity Detection* (Simon, Judy Sheard, Oscar Karnalim, Michael Liut, Amey Karkare, Ilir Dema, Juho Leinonen and Renee McCauley)
- WG 2: *Capturing and Characterising Notional Machines* (Colleen Lewis, Johan Jeuring, Matthias Hauswirth, Andrew Petersen, Sally Fincher, Arto Hellas, Felienne Hermans, Craig Miller, Ben du Boulay, Peter Donaldson, Andreas Mühling and Jan Pearce)
- WG 3: *Toward High-Performance Computing Education* (Rajendra K. Raj, John Impagliazzo, Carol J. Romanowski, Sherif G. Aly, Brett A. Becker, Juan (Jenny) Chen, Cruz Izu, Sheikh Ghafoor, Steven Gordon, Sharam Rahimi, Michael Robson and Neena Thota)
- WG 4: *Assessing How Pre-requisite Skills Affect Learning of Advanced Concepts* (Greg L. Nelson, Filip Strömbäck, Ari Korhonen, Marjahan Begum, Bonnie MacKellar, Ibrahim Albluwi, Ben Blamey, Mattia Monga, Karen H. Jin and Violetta Lonati)
- WG 5: *Developing a Model Augmented Reality Curriculum* (Mikhail Fominykh, Fridolin Wild, Ralf Klamma, Marius Preda, Eleni Mangina, Aljosa Smolic, Lia Costiner, Andrey Karsakov, Ian Pollock, Mark Billingham and Judith Molka-Danielsen)
- WG 7: *Cloud Computing Curriculum: Developing Exemplar Modules for General Course Inclusion* (Joshua Adams, Brian Hainey, Laurie White, Sajid Nazir, Majd Sakr, Lee Stott, Derek Foster, Karthik Kuber, Narine Hall, Carmen Taglienti, Sara Hooshangi and Mark Hills)
- WG 8: *Meaningful Assessment at Scale: Helping Instructors to Assess Learning* (Nickolas Falkner, Rebecca Vivian, Katrina Falkner, Vangel V. Ajanovski, Christine Liebe, Alistair Morrison and Miranda Parker)
- WG 9: *Reviewing Computing Education Papers* (Robert McCartney, Marian Petre, Kate Sanders, Marzieh Arhmadzadeh, Sally Hamouda, Brian Harrington, Jérémie Lumbroso, Joseph Maguire, Lauri Malmi, Monica McGill, Jan Vahrenhold and Cornelia Connolly)
- WG 10: *Developing Competency Statements for Computer Science Curricula: The Way Ahead* (Alison Clear, Abhijat Vichare, Tony Clear, François Pitt, Thea Charles, Charles Riedesel, Barry Lunt, Stephen Frezza, Arnold Pears, Justyna Szykiewicz and Mirela Gutica)

Tues 16 June 2020

Doctoral Consortium

- Impacts of Block-based Programming on Young Learners' Programming Skills and Attitudes in the Context of Smart Environments (*Mazyar Seraj*)
- Teaching Computational Thinking with Interventions Adapted to Undergraduate Students' Proficiency Levels (*Imke de Jong*)
- The Design, Development, and Evaluation of a Novel Computer-based Competency Assessment of Computational Thinking (*Rina P.Y. Lai*)
- Investigating the Socially Shared Regulation of Learning in the Context of Programming Education (*Leonardo S. Silva*)
- Using Spatio-Algorithmic Problem Solving Strategies to Increase Access to Data Structures (*Seth Poulsen*)
- A Comprehensive Analysis of Students' Experiences of Belonging to the CS Community (*Sercan Erer*)
- Efficient Instructional Design of Programming Examples (*Albina Zavgorodniaia*)
- Frame-Based Novice Programming (*Joe Dillane*)
- The Impact of English Language on Non-Native English Speaking Students' Performance in Programming Class (*Suad Alaofi*)
- Supporting Computer Science Teaching Beyond Syllabus: ICT for Cooperation and Reflection (*Vojislav Vujošević*)
- The Importance of Embedding Meta Skills in Computer Science Graduate Apprenticeship Programmes (*Tiffany M. Young*)