Day 1: 2 June 2021 (Wednesday) 0830 Conference Sessions Open for Entry: 0830 0900 Introductory Daynote: 0845-0900 Keynote 1 0900 Designing for More Learner Agency using Computational Tools in STEM Speaker: Dr Sherry Hsi (Principal Scientist, BSCS Science Learning) 1000 Session Chair: Professor Ju-Ling Shih 1000 Break 1030 Introductory remarks by Conference Chair, Professor Looi Chee Kit 1030 Welcome address by NTU President, Professor Subra Suresh 1045 Opening by Guest-of-Honour: Minister for Education of Singapore, Mr Chan Chun Sing Panel Discussion Computational Thinking, Digital Literacy and AI Readiness in University Education Speakers: Professor Bernard Tan Cheng Yian, Senior Vice Provost, National University of Singapore (NUS) Professor Chua Kee Chaing, Deputy President (Academic) and Provost, Singapore Institute of Technology (SIT) Professor Venky Shankararaman, Vice Provost (Undergraduate Matters) and Professor of 1045 Information Systems (Education), Singapore Management University (SMU) 1200 Professor Cheah Horn Mun, Assistant Provost and Dean (College of Lifelong & Experiential Learning), Singapore University of Social Sciences (SUSS) Professor Chong Tow Chong, President, Singapore University of Technology and Design (SUTD) Professor Gan Chee Lip, Associate Provost for Undergraduate Education, Nanyang Technological University (NTU) Moderator: Professor Christine Goh, NIE Director, Nanyang Technological University

(NTU)

Programme Schedule

Day 1: 2 June 2021 (Wednesday)	
	Academic Paper Session 1A Session Chair: Ibrahim H. Yeter
1200 1300	Session Login: 1200-1205 1205-1225 <u>Track 3: Computational Thinking and Subject Learning and Teaching in K-12</u> Using the Beginners Computational Thinking Test to Measure Development on Computational Concepts Among Preschoolers (Paper 6F) María ZAPATA-CÁCERES, Nardie FANCHAMPS 1225-1245 <u>Track 3: Computational Thinking and Subject Learning and Teaching in K-12</u> Storytelling through Programming in Scratch: Interdisciplinary Integration in the Elementary English Language Arts Classroom (Paper 27F) Emrah PEKTAŞ, Florence R. SULLIVAN
1300 1400	Break
1400 1500	Keynote 2 <i>The Two Types of Computational Thinking</i> Speaker: Mr Miles Berry (Principal Lecturer and the Subject Leader for Computing Education at the University of Roehampton) Session Chair: A/P Bimlesh Wadhwa
1500 1600	Academic Paper Session 1B Session Chair: Nardie Fanchamps Session Login: 1500-1505 1505-1525 <u>Track 1: Computational Thinking and Coding Education in K-12</u> <i>Achievement and Effort in Acquiring Computational Thinking Concepts: A log-based</i> <i>Analysis in a Game-based Learning Environment (Paper 23F)</i> Shuhan ZHANG, Gary K. W. WONG, Peter C. F. CHAN

Day 1: 2 Ju	ne 2021 (Wednesday)
	 1525-1545 <u>Track 3: Computational Thinking and Subject Learning and Teaching in K-12</u> A Hybrid Approach to Teaching Computational Thinking at a K-1 and K-2 Level (Paper 5F) Damien ROMPAPAS, Steven YOON, Jonothan CHAN 1545-1555 <u>Track 10: Computational Thinking and Special Education Needs</u> Proposal for the Production of Virtual Reality Environments in Elementary Education with a Constructivist Approach (Paper 43S) José E. GUZMÁN-MENDOZA, Héctor CARDONA-REYES, M. Lorena BARBA-GONZÁLEZ, Klinge O. VILLALBA-CONDORI, Dennis ARIAS-CHAVEZ, M. Luisa Fernanda RÁBAGO-GONZÁLEZ
1600 1615	Meetings / Unconference
1615 1630	Break
1630 1730	Academic Paper Session 1C Session Chair: María Zapata-Cáceres Session Login: 1630-1635 1635-1655 <u>Track 1: Computational Thinking and Coding Education in K-12</u> <i>Exploring the Effectiveness of Pair Programming in Developing Students' Computational</i> <i>Thinking Skills through Scratch (Paper 9F)</i> Wee Meng Frankie LEOW, Wendy HUANG 1655-1715 <u>Track 9: Computational Thinking Development in Higher Education</u> <i>Making the Thinking Results of Programming Visible and Traceable with a Multi-layer</i> <i>Board Game (Paper 29F)</i> YungYu ZHUANG, Andito SAPUTRO, Mahesh LIYANAWATTA, Jen-Hang WANG, Su-Hang YANG, Gwo-Dong CHEN 1715-1725 <u>Track 18: STEM Pedagogies and Curriculum</u> <i>A Co-design Approach for Developing Computational Thinking Skills in Connection to</i> <i>STEM Related Curriculum in Swedish Schools (Paper 50S)</i> Rafael ZEREGA, Ali HAMIDI, Sepideh TAVAJOH, Marcelo MILRAD

Day 2: 3 Ju	ne 2021 (Thursday)
0830 0900	Conference Sessions Open for Entry: 0830 Introductory Daynote: 0845-0900
0900 1000	Keynote 3 <i>Teacher Development in Computational Thinking Education in K12: Design of Pedagogy</i> <i>and Scaling</i> Speaker: Professor Kong Siu Cheung (Professor of the Department of Mathematics and Information Technology (MIT); and Director of Centre for Learning, Teaching and Technology (LTTC), the Education University of Hong Kong) Session Chair: Professor Looi Chee Kit
1000 1030	Break
1030 1100	Meetings/Unconference
1100 1200	Academic Paper Session 2A Session Chair: Anika Saxena Session Login: 1100-1105 1105-1115 <u>Track 3: Computational Thinking and Subject Learning and Teaching in K-12</u> <i>Students' Learning of Computational Thinking in Schools with Different Curriculum</i> <i>Approaches Including Individual Student Characteristics (Paper 17S)</i> Amelie LABUSCH, Birgit EICKELMANN 1115-1125 <u>Track 3: Computational Thinking and Subject Learning and Teaching in K-12</u> <i>A Standard Decomposition Process to Inform the Development of Game-Based Learning</i> <i>Environments Focused on Computational Thinking (Paper 28S)</i> Elizabeth L. ADAMS, Ching-Yu TSENG, Paul FOSTER, Vinson LUO, Leanne R. KETTERLIN-GELLER, Eric C. LARSON, and Corey CLARK 1125-1135 <u>Track 9: Computational Thinking Development in Higher Education</u> <i>A Framework for Integrating Computational and Design Thinking Processes (Paper 18S)</i> Riccardo CHIANELLA, Diego REITANO, Ettore MORDENTI, George BARITSCH

Day 2: 3 June 2021 (Thursday)		
	 1135-1145 <u>Track 9: Computational Thinking Development in Higher Education</u> <i>The Effects of an AR Programming Game on Students' Different Prior Computational</i> <i>Thinking Skills (Paper 31S)</i> Huai-hsuan HUANG, Vandit SHARMA, Kaushal Kumar BHAGAT, Wen-min HSIEH, Nian-shing CHEN 	
1200 1300	Academic Paper Session 2B Session Chair: Huai Hsuan Huang Session Login: 1200-1205 1205-1215 <u>Track 1: Computational Thinking and Coding Education in K-12</u> <i>Cultivating Computational Thinking through Game-based Scratch Programming (Paper 145)</i> Xiaoqian LI, Jing LI, Jiansheng LI 1215-1225 <u>Track 15: STEM Learning in the Classroom</u> <i>An Evolving Definition of Computational Thinking in Science and Mathematics Classrooms (Paper 33S)</i> Amanda PEEL, Sugat DABHOLKAR, Sally WU, Michael HORN, Uri WILENSKY 1225-1235 <u>Track 15: STEM Learning in the Classroom</u> <i>Action research on Engineering Design-oriented and Project-based STEM Teaching Model (Paper 38S)</i> Hong YU, Lu ZOU 1235-1245 <u>Track 15: STEM Learning in the Classroom</u> <i>A Case Study of 7th Grade Students Learning Programming to Solve Mathematics Problems (Paper 41S)</i> Wendy HUANG, Chee-Kit LOOI, Mi Song KIM	
1300 1400	Break	

Day 2: 3 June 2021 (Thursday)	
1400 1500	Invited Talk 1 Building AI Readiness Speaker: Mr Anshul Sonak (Senior Director, Intel Corporation, Global AI and Digital Readiness, Global Partnerships & Initiatives Group) Session Chair: A/P Bimlesh Wadhwa
1500 1600	Poster Session Session Chair: Peter Seow Session Login: 1500-1505 Pre-recorded videos (3 mins each) - 1505-1535 Track 1: Computational Thinking and Coding Education in K-12 Developing Girls' Computational Thinking by Playing Programming Games (Paper 13P) Jing LI, Jiansheng LI Track 1: Computational Thinking and Coding Education in K-12 Programming Socio-scientific Games: A Computational Thinking Approach to Real-world Problems (Paper 61P) Marianthi GRIZIOTI, Chronis KYNIGOS Track 2: Computational Thinking and Unplugged Activities in K-12 Research on the Design of Unplugged Computer Science Teaching Activities in Elementary School—Taking the Fruit Delivery Game Course as an Example (Paper 22P) Bingqing YANG Track 6: Computational Thinking and STEM/STEAM Education ARTEC Logic Puzzle: The Role of Computational Thinking with Extension to Extended Logic (Paper 2P) Chung-Oi KOK Track 7: Computational Thinking and Data Science Infusing Computational Thinking and Data Science VizBlocks: A Data Visualization Literacy Education Tool (Paper 47P) Track 9: Computational Thinking bevelopment in Higher Education A Systematic Review of Distributed Pair Programming Based on the Team Effectiveness Model (Paper 37P) Fan XU, Ana-Paul

Day 2: 3 June 2021 (Thursday)	
	Track 19: STEM Teacher Education and Professional DevelopmentTeacher Sensemaking on Computational Thinking in a Community of Math Teachers(Paper 45P)Chung Yiu SIU, Mi Song KIM, Wendy HUANG, Chee-Kit LOOITrack 19: STEM Teacher Education and Professional DevelopmentA Systematic Review of Teachers' Preparedness towards Computational ThinkingIntegration in Mathematics (Paper 49P)Shiau-Wei CHAN, Chee-Kit LOOI, Shivani MAHEDIRATA, Mi Song KIM
1600 1615	Meetings/Unconference
1615 1630	Break
1630 1730	Academic Paper Session 2C Session Chair: Misong Kim Session Login: 1630-1635 1635-1655 <u>Track 12: Computational Thinking and Non-formal Learning</u> <i>Bringing Physical Computing to an Underserved Community in an Informal Learning</i> <i>Space (Paper 48F)</i> Chin-Lee KER, Bimlesh WADHWA, Peter, Sen-Kee SEOW, Chee-Kit LOOI 1655-1715 <u>Track 12: Computational Thinking and Non-formal Learning</u> <i>Combining Maker Technologies to Promote Computational Thinking and Heart-ware</i> <i>skills through Project-based Activities: Design Considerations and Empirical Outputs</i> (<i>Paper 51F</i>) Ali HAMIDI, Sepideh TAVAJOH, Marcelo MILRAD 1715-1725 <u>Track 16: STEM Activities in Informal Contexts</u> <i>Developing STEM Makers with Mentoring and Authentic Problem-Solving Strategies</i> (<i>Paper 10S</i>) Xiaojing WENG, Thomas K.F. CHIU, Morris S.Y. JONG

Day 3: 4 June 2021 (Friday)	
0830	Conference Sessions Open for Entry: 0830
0900	Introductory Daynote: 0845-0900
0830	Conference Sessions Open for Entry: 0830
0900	Opening Address- Teachers Forum: 0845-0900
0900 1000	Keynote 4 <i>Computational Thinking Through the Lens of a Mathematics Educator</i> Speaker: A/P Ho Weng Kin (Associate Professor of Mathematics at the National Institute of Education, Nanyang Technological University) Session Chair: Dr Jon Mason
	Academic Paper Session 3A Session Chair: Emrah Pektaş
	Session Login: 1000-1005
Parallel Sessions 1000 1100	 1005-1025 <u>Track 4: Computational Thinking and Teacher Development</u> <i>Different Paths, Same Direction: How Teachers Learn Computational Thinking in STEM</i> <i>Practices through Professional Development (Paper 30F)</i> Sally WU, Amanda PEEL, Connor BAIN, Michael HORN, Uri WILENSKY 1025-1045
	<u>Track 11: Computational Thinking and Evaluation</u> <i>A Preliminary, Systematic Review of Teaching and Learning</i> <i>Computational Thinking in Early Childhood Education (Paper 35F)</i> Anika SAXENA, Gary WONG
1000 1015	Break
Parallel Sessions 1015 1030	Lightning Talks
Parallel Sessions 1030 1100	Teachers Experience Sharing Session Session Chair: Dr Liew Beng Keat 1030-1045 <i>Computational Thinking and Computer Science: From Standards to Practice</i> Speaker: Dr Janice Mak (USA)

Day 3: 4 June 2021 (Friday)		
Parallel Sessions 1030 1100	1045-1100 Sharing my Journey on CT with Bebras Indonesia and Google Gerakan PANDAI Speaker: Ms Connieta Theotirta (Indonesia)	
Parallel Sessions 1100 1200	 Teachers Forum Session 3B Session Chair: Kester Yew Chong Wong Session Login: 1100-1105 1105-1115 Track 1: Computational Thinking and Coding Education in K-12 Teaching Computational Thinking and Coding Education in K-12 Teaching Computational Thinking and Subject Learning and Teaching in K-12 Designing a Computational Thinking and Subject Learning and Teaching in K-12 Designing a Computational Thinking and Subject Learning and Teaching in K-12 Designing a Computational Thinking and Subject Learning and Teaching in K-12 Post 3: Computational Thinking and Subject Learning and Teaching in K-12 Pedagogical Design of Flowcharts and Tasks to Teach Computational Thinking to Lower Secondary Students (Paper 59S) Kester Yew Chong WONG 1135-1145 Track 3: Computational Thinking and Subject Learning and Teaching in K-12 Rethinking Computational Thinking and Subject Learning and Teaching in K-12 Rethinking Computational Thinking and Subject Learning and Teaching in K-12 Rethinking Computational Thinking and Subject Learning and Teaching in K-12 Rethinking Computational Thinking and Subject Learning and Teaching in K-12 Rethinking Computational Thinking and Subject Learning and Teaching in K-12 Rethinking Computational Thinking and Subject Learning and Teaching in K-12 Rethinking Computational Thinking and Subject Learning and Teaching in K-12 It45-1155 Track 3: Computational Thinking and Subject Learning and Teaching in K-12 Integration of Computational Thinking in Upper Primary (Grade 6-8) Math in Tamil Nadu, India (Paper 81S) Malarvizhi PANDIAN, Krithika KRISHNAMOORTHY 	

Day 3: 4 Jun	ue 2021 (Friday)
Parallel Sessions 1100 1200	 Teachers Forum Session 3C Session Chair: Cora Ka Yuk Siu Session Login: 1100-1105 1105-1115 <u>Track 6: Computational Thinking and STEM/STEAM Education</u> <i>Computational Thinking in the Mathematics Classroom (Paper 11S)</i> Tzi Yew Samuel LEE, Wen Qi Jovita TANG, Hee Tee Robin PANG 1115-1125 <u>Track 6: Computational Thinking and STEM/STEAM Education</u> <i>Making Maths Imaginable and Visible: Integrating STEM Education with Spatial</i> <i>Reasoning (Paper 15S)</i> Chi-Cheung CHING, Ka-shing CHUI, Jessica Tsz-shan SO, Wing-man CHIU, Mei-yin LO 1125-1135 <u>Track 6: Computational Thinking and STEM/STEAM Education</u> <i>Computational Thinking in Mathematics (Grade 2-6): Developing CT Skills and 21st</i> <i>Century Competencies (Paper 55S)</i> Felicia CHOON, Staphni SIM 1135-1145 <u>Track 6: Computational Thinking and STEM/STEAM Education</u> <i>Computational Thinking in Mathematics: Calculating Riemann Sums with Graphical</i> <i>Calculator and beyond (Paper 56S)</i> Xiajuan YE 1145-1155 <u>Track 6: Computational Thinking and STEM/STEAM Education</u> <i>Computational Thinking in Statistics (Paper 63S)</i> Frank NG
Parallel Sessions 1100 1200	Teachers Forum Session 3D (Chinese) Session Chair: Ting-Chia Hsu Session Login: 1100-1105 1105-1115 Track 6: Computational Thinking and STEM/STEAM Education 運算思維模組化教學活動設計:幾何之美 Modeling Instruction Design for Computational Thinking Activities: Geometric Beauty (Paper 68S) 楊心淵,許庭嘉,溫韋妮 Hsin-Yuan YANG, Ting-Chia HSU, Wei-Ni WEN

Day 3: 4 June 2021 (Friday)		
Parallel Sessions 1100 1200	1115-1125 Track 8: Computational Thinking and Artificial Intelligence Education 運算思維教育的教學反思: 運用運算思維結合人工智能提升學生的創意解難能力 Using Computational Thinking Combined with Artificial Intelligence to Enhance Students' Creative Problem-Solving Ability (Paper 64S) 陳景康, 許文星, 賴家豪 King Hong Chan, Man Sing Hsu, Ka Ho Lai 1125-1135 Track 17: STEM Education Policies 中国西部地区STEAM 与创客整合课程的现状调查与策略研究 Research on the Current Situation and Strategies of STEAM and Maker Integrated Curriculum in Western China (Paper 79S) 贾越, 陈梅 Yue JIA, Mei CHEN 1135-1145 Track 18: STEM Pedagogies and Curriculum 初中生STEM学习观念调查研究 An Investigation on STEM Learning Conceptions of Junior School Students (Paper 71S) 马媛媛, 周颖, 朱丹琪 Yuan-yuan MA, Ying ZHOU, Dan-qi ZHU	
1200 1215	Break	
1215 1300	Invited Talk 2 Intergenerational Learning with AI for Kids (AI4K)® Speaker: Mr Koo Sengmeng (Senior Deputy Director, AI Innovation Team, AI.SG) Session Chair: Dr Liew Beng Keat	
1300 1400	Break	
Parallel Sessions 1400 1500	Academic Paper Session 3E Session Chair: Anders Berglund Session Login: 1400-1405 1405-1415 <u>Track 4: Computational Thinking and Teacher Development</u> <i>An Experience of Conducting Online Teacher Development for Computational Thinking</i> <i>Teaching in a Primary School Context (Paper 7S)</i> Siu-cheung KONG	

Day 3: 4 Jur	ne 2021 (Friday)
Parallel Sessions 1400 1500	 1415-1425 <u>Track 13: Computational Thinking and Psychological Studies</u> <i>Influential Factors of Hong Kong Secondary School Students' Intrinsic Motivation to Coding Education during the COVID-19 Epidemic: A Correlational Analysis (Paper 34S)</i> Xin ZHANG, Gary K. W. WONG, Qiaobing WU, Bill Y. P. TSANG 1425-1435 <u>Track 17: STEM Education Policies</u> <i>Euro-Asia Collaboration for Enhancing STEM Education (Paper 46S)</i> Anders BERGLUND, Valentina DAGIENE, Mats DANIELS, Vladimiras DOLGOPOLOVAS, Siegfried ROUVRAIS, Miriam TARDELL 1435-1445 <u>Track 18: STEM Pedagogies and Curriculum</u> <i>Designing an Interdisciplinary Social-scientific STEM Curriculum on Students' Empathy, Efficacy, and Interest (Paper 44S)</i> Biyun HUANG, Morris Siu-Yung JONG, Ching Sing CHAI, Yun DAI, Darwin LAU
Parallel Sessions 1400 1500	Teachers Forum Session 3F Session Chair: Inggriani Liem Session Login: 1400-1405 1405-1415 <u>Track 2: Computational Thinking and Unplugged Activities in K-12</u> <i>SWOT Analysis and Strategy of Unplugged Activities to Localize STEM Courses in Rural</i> <i>Schools (Paper 69S)</i> Jiashuo CHANG, Shuo GUO 1415-1425 <u>Track 2: Computational Thinking and Unplugged Activities in K-12</u> <i>Computational Thinking Implementation in Schools – An Experience with Rural Welfare</i> <i>Schools in India (Paper 75S)</i> Pooja PALAPARTHI 1425-1435 <u>Track 2: Computational Thinking and Unplugged Activities in K-12</u> <i>Computational Thinking and Unplugged Activities</i> : <i>Localization Enabling Learning</i> <i>(Paper 76S)</i> Lakshmi Durga PETTA

Day 3: 4 June 2021 (Friday)		
Parallel Sessions 1400 1500	 1435-1445 <u>Track 4: Computational Thinking and Teacher Development</u> Bebras Challenge and PANDAI Movement Introducing Computational Thinking To K-12 Teachers in Indonesia (Paper 65S) Adi MULYANTO, Irya WISNUBHADRA, Inggriani LIEM 1445-1455 <u>Track 11: Computational Thinking and Evaluation</u> Upscaling Skills-Based Formative Assessment: The Journey Towards a Student-Run Web Application Pilot on Computational Thinking Skills (Paper 73S) Aaron HO, Yu Jie NG 	
Parallel Sessions 1400 1500	Teachers Forum Session 3G (English and Chinese) Session Chair: Wei Sin Ho and Enwei Xu Session Login: 1400-1405 1405-1415 <u>Track 12: Computational Thinking and Non-formal Learning</u> From Computational Thinking to Computational Action with Arduino Programming Projects through Non-formal Learning (Paper 16S) Poh-tin LEE, Chee-wah LOW 1415-1425 <u>Track 12: Computational Thinking and Non-formal Learning</u> Developing 21st Century Competencies and Computational Thinking through STEM- Based Co-Curricular Activities (Paper 53S) Wei Sin HO, Alex Han Rong YEO, Lay Teng NEO 1425-1435 <u>Track 1: Computational Thinking and Coding Education in K-12</u> <u>minifigurational Thinking and Coding Education in K-12</u> <u>minifiguration and Case Analysis (Paper 67S)</u> & k B.4 Enwei XU 1435-1445 <u>Track 1: Computational Thinking and Coding Education in K-12</u> <i>Jointifiguration and Case Analysis (Paper 67S)</i> & k B.4 Enwei XU 1435-1445 <u>Track 1: Computational Thinking and Coding Education in K-12</u> <i>Jointifigurational Thinking and Coding Education in K-12 Jointifigurational Thinking and Coding Education in K-12</i>	

Day 3: 4 June 2021 (Friday)	
Parallel Sessions 1400 1500	1445-1455 <u>Track 2: Computational Thinking and Unplugged Activities in K-12</u> <i>運算思維教育桌遊與圖形化程式設計對初學者學習運算思維之影響</i> <i>The Effects of Computational Thinking Educational Boardgame and Visual</i> <i>Programming on the Novices Learning Computational Thinking (Paper 78S)</i> 楊士弘, 許庭嘉, 陳沐生 Shih-Hung YANG, Ting-Chia HSU, Mu-Sheng CHEN
1500 1545	Invited Talk 3 Learning Redefined; Skills Reinvented; Developing a Learn-Ready Singapore Speaker: Mr Gary Lim (Head of Education, Google Cloud, Southeast Asia) Session Chair: A/P Bimlesh Wadhwa
1545 1615	Teachers Experience Sharing Session Session Chair: Dr Liew Beng Keat 1545-1600 Parsons Problem Implementation – Reducing Cognitive Load to Ease Beginners into Python Programming Speaker: Mr Calvin Heng (Singapore) 1600-1615 Computing Science Curriculum in Thai Primary Schools: An Integrated Story-based Approach Speaker: Mr Mock Panuakdet Suwannatat (Thailand)
1615 1630	Break
1630 1730	 Panel Discussion Finding the Key to Computational Thinking in Teacher Education Panelists: Professor Yasemin Gulbahar, Ankara University, Turkey Associate Professor Mikko-Jussi Laakso, Tuku University, Finland Professor Claudia Tenberge, Paderborn University, Germany Professor Valentina Dagiene, Vilnius University, Lithuania Assistant Professor Ibrahim H. Yeter, National Institute of Education, Nanyang Technological University, Singapore Professor Kong Siu Cheung, The Education University of Hong Kong, Hong Kong Moderator: Associate Professor Bimlesh Wadhwa, National University of Singapore, Singapore
1730 1750	Closing by Conference Chair Speaker: Professor Looi Chee Kit Announcement of CTE-STEM'2022