香港教育大學
The Education University of Hong Kong

Artificial Intelligence and Digital Competency Education Centre
人工智能及數碼能力教育中心

Co-organiser:

The 9th International Conference on Computational Thinking and STEM Education

In the Era of AI

18 - 20 June 2025

CTE-STEM 2025

Programme Booklet

Supporting Organisations:

Coo/Think @ JC 賽馬會運算思維教育

Education Bureau
The Government of the Hong Kong Special Administrative Region of the People's Republic of China

iTLE

香港電腦教育學會
The Hong Kong Association for Computer Education

Programme Booklet of the 9th International Conference on Computational Thinking and STEM Education

18-20 June 2025

Hong Kong

Organized by

The Education University of Hong Kong

Co-organized by

Southern University of Science and Technology

Publication of The Education University of Hong Kong

10 Lo Ping Road, Tai Po, New Territories, Hong Kong SAR

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i. Preface

International Conference on Computational Thinking and STEM Education in the Era of AI (CTE-STEM 2025) is the ninth international conference, continuing from the success of the previous eight international Computational Thinking conferences. CTE-STEM 2025 is organized by The Education University of Hong Kong (EdUHK) and co-organized by Southern University of Science and Technology (SUSTech).

CTE-STEM 2025 is held on 18-20 June 2025. Days 1 and 2 of the conference are held at EdUHK's Tai Po Campus, while Day 3 is held at SUSTech's Campus in Shenzhen. The conference is the most remarkable event of the Programme for worldwide sharing of ideas as well as dissemination of findings and outcomes on the implementation of computational thinking and STEM education development.

The conference this year includes keynote speeches, a teacher forum and paper presentations. The Teacher Forum is held on the first day of the conference. The purpose of the Forum is to set a stage for K-12 teachers worldwide to share best practices and key challenges of implementing Computational Thinking Education (CTE) in different countries/regions, and ultimately to facilitate CTE going global and increase involvement of K-12 teachers in the knowledge and experience exchange process.

Conference Theme

Computational Thinking and STEM Education in the Era of AI

Sub-themes:

- Computational Thinking and Unplugged Activities in K-12
- Computational Thinking and Coding Education in K-12
- Computational Thinking and Subject Learning and Teaching in K-12
- Computational Thinking and Teacher Development
- Computational Thinking and IoT
- Computational Thinking Development in Higher Education
- Computational Thinking and STEM/STEAM Education
- Computational Thinking and Non-formal Learning
- Computational Thinking and Psychological Studies
- Computational Thinking and Special Education Needs
- Computational Thinking in Educational Policy
- General Submission to Computational Thinking Education
- Computational Thinking and Evaluation
- Computational Thinking and Data Science
- Computational Thinking and Artificial Intelligence Education
- Computational Thinking and its Key Elements
- Computational Thinking as Method
- STEM and Interdisciplinary Integration
- Open-Source Software and Hardware for CT and STEM Education
- Teacher Forum

Paper Submission

The conference received a total of 47 submissions (13 full papers, 15 short papers and 19 poster papers) by 104 authors from 14 countries/regions (see Table 1).

Table 1: Distribution of Paper Submissions for CTE-STEM 2025

Country / Region	No. of Authors	Country / Region	No. of Authors
Hong Kong SAR	42	**Singapore**	3
Taiwan	23	**Spain**	3
China	8	**Israel**	2
United States	8	**Lithuania**	1
Japan	4	**Malaysia**	1
Peru	4	**Sweden**	1
India	3	**The Netherlands**	1
		Total	**104**

The International Programme Committee (IPC) is formed by 70 Members and 3 Co-chairs worldwide. Each paper with author identification anonymous was reviewed by at least three IPC Members. Related sub-theme Chairs then conducted meta-reviews and made recommendation on the acceptance of papers based on IPC Members' reviews. With the comprehensive review process, 41 accepted papers are presented (13 full papers, 14 short papers and 14 poster papers) (see Table 2) at the conference.

Table 2: Paper Presented at CTE-STEM 2025

Sub-themes	Full Paper	Short Paper	Poster Paper	Total
- Computational Thinking and Unplugged Activities in K-12	0	0	0	0
- Computational Thinking and Coding Education in K-12	0	1	0	1
- Computational Thinking and Subject Learning and Teaching in K-12	0	2	0	2
- Computational Thinking and Teacher Development	2	2	0	4
- Computational Thinking and IoT	0	0	0	0
- Computational Thinking Development in Higher Education	0	0	1	1
- Computational Thinking and STEM/STEAM Education	1	1	0	2
- Computational Thinking and Non-formal Learning	0	1	0	1
- Computational Thinking and Psychological Studies	0	1	0	1

- Computational Thinking and Special Education Needs	1	0	0	1
- Computational Thinking in Educational Policy	0	1	0	1
- General Submission to Computational Thinking Education	3	0	0	3
- Computational Thinking and Evaluation	0	1	0	1
- Computational Thinking and Data Science	0	1	0	1
- Computational Thinking and Artificial Intelligence Education	3	1	0	4
- Computational Thinking and its Key Elements	0	1	0	1
- Computational Thinking as Method	0	0	0	0
- STEM and Interdisciplinary Integration	1	1	3	5
- Open-Source Software and Hardware for CT and STEM Education	1	0	0	1
- Teacher Forum	1	0	10	11
Total	**13**	**14**	**14**	**41**

Conference Programme

The conference comprises keynote and invited speeches by internationally renowned scholars; a teacher forum, a workshop, as well as academic and poster paper presentations.

(i) Keynote and Invited Speeches

There are three Keynote Speeches and one Invited Speech at CTE-STEM 2025:

Keynote Speeches

1. "Transforming Learning and Education in the Era of AI"
   by Prof. Cynthia BREAZEA (Massachusetts Institute of Technology, United States)

2. "The Effectiveness of AI-based Support for Engagement During Video-based Learning"
   by Prof. Tanja MITROVIC (University of Canterbury, New Zealand)

3. "AI-Empowered Open-Ended Learning Environments in STEM Domains Application to SPICE: Science Projects Integrating Computing & Engineering"
   by Prof. Gautam BISWAS (Vanderbilt University, United States)

Invited Speech

1. "Transforming Education in Cambodia: Advancing STEM through Education Technology"
   by Mr. Tha SOK (Ministry of Education, Youth, and Sport, Cambodia)

(ii) Academic Paper and Poster Presentations

There are 10 sessions of academic and poster paper presentations with 30 papers (12 full papers, 14 short papers and 4 poster papers) in the conference. Worldwide scholars present and exchange the latest research ideas and findings, which highlight the importance and pathways of computational thinking education covering K-12 education, artificial intelligence education, teacher development and STEM/STEAM education, etc.

(iii) Teacher Forum

There are 2 sessions of teacher forum paper presentations with 11 papers (1 full paper, 10 poster papers) in the conference. K-12 teachers share best practices and key challenges of

implementing CTE in their countries/regions.

On behalf of the Conference Organizing Committee, we would like to express our gratitude towards all speakers as well as paper presenters for their contribution to the success of CTE-STEM 2025.

We sincerely hope everyone enjoys and gets inspired from CTE-STEM 2025.

With Best Wishes,

Prof. Siu Cheung KONG
The Education University of Hong Kong, Hong Kong SAR
Conference Chair of CTE-STEM 2025

Prof. Ting-Chia HSU
National Taiwan Normal University, Taiwan
Conference Program Chair of CTE-STEM 2025

Prof. Jianhua ZHAO
Southern University of Science and Technology, China
Conference Program Co-Chair of CTE-STEM 2025

ii. Conference Organization

Conference Chair

Siu Cheung KONG	The Education University of Hong Kong, Hong Kong SAR

Program Chair

Ting-Chia HSU	National Taiwan Normal University, Taiwan

Program Co-Chair

Jianhua ZHAO	Southern University of Science and Technology, China

International Program Committee Members *(Surnames in alphabetical order)*

Fahriye ALTINAY	Near East University, Northern part of Cyprus, Nicosia
Ankur BIST	Graphic Era Hill University, India
Ivica BOTICKI	University of Zagreb, Republic of Croatia
Chi-Cheng CHANG	National Taiwan Normal University, Taiwan
Ben CHANG	National Central University, Taiwan
Shao-Chen CHANG	National Taiwan Normal University, Taiwan
Yu-Shan CHANG	National Taiwan Normal University, Taiwan
Chih-Hung CHEN	National Taichung University of Education, Taiwan
Guang CHEN	Beijing Normal University, China
Jun-Ming CHEN	Soochow University, Taiwan
Ming-Puu CHEN	National Taiwan Normal University, Taiwan
Weidong CHEN	Suzhou University of Science and Technology, China
I-Chun CHEN	Chinese Culture University, Taiwan
Kwok Shing CHENG	The Education University of Hong Kong, Hong Kong SAR
Jongpil CHEON	Texas Tech University, USA
Feng-Kuang CHIANG	Shanghai Jiao Tong University, China
Yen-Lin CHIU	National Taiwan University of Science and Technology, Taiwan
Hyungshin CHOI	Chuncheon National University of Education, Korea

Chih-Ming CHU	National ILan University, Taiwan
Nardie Fanchamps FANCHAMPS	Open University of the Netherlands, Netherlands
Ana GIMENO-SANZ	Universidad Politécnica de Valenciaa, Spain
Christian GLAHN	Zurich University of Applied Sciences, Switzerland
Sungwan HAN	Gyeong-in National University of Education, Korea
Arnon HERSHKOVITZ	Tel Aviv University, Israel
Nicole IVARSSON-KENG	Aalto University, Finland
Marc JANSEN	University of Applied Sciences Ruhr West, Germany
Hi-Lian JENG	National Taiwan University of Science and Technology, Taiwan
Johan JEURING	Utrecht University, Netherlands
Chia-pin KAO	Southern Taiwan University of Science and Technology, Taiwan
Tai-Chien KAO	National Dong Hwa University, Taiwan
Charalampos KARAGIANNIDIS	University of Thessaly, Greece
Zuheir N. KHLAIF	An Najah National University, Palestine
Mi Song KIM	Western University, Canada
Irwin Kuo-Chin KING	The Chinese University of Hong Kong, Hong Kong SAR
Oka KURNIAWAN	Singapore University of Technology and Design, Singapore
Linda Wai-Ying KWOK	The Education University of Hong Kong, Hong Kong SAR
Daranee LEHTONEN	University of Turku, Finland
Daren LER	National University of Singapore, Singapore
Xu LI	University of Arizona South, America
Changyen LIAO	National Central University, Taiwan
Chang-Hsin LIN	National University of Tainan, Taiwan
Chiu Pin LIN	National Hsinchu University of Education, Taiwan
Hao-Chiang Koong LIN	National University of Tainan, Taiwan
Jia-Jiunn LO	Chung-Hwa University, Taiwan
Maria José MARCELINO	University of Coimbra, Portuguese Republic
Marcelo MILRAD	Linnaeus University, Sweden
Kuo-Liang OU	National Hsinchu University of Education, Taiwan

Hüseyin ÖZÇINAR	Pamukkale University, India
Vijay RAISINGHANI	Narsee Monjee Institute of Management Studies, India
Marcos ROMÁN-GONZÁLEZ	Universidad Nacional de Educación a Distancia, Spain
Emerita Sara BAÑADOS SANTANA	Universidad de Concepción, Chile
Peter SEOW	Nanyang Technological University, Singapore
Rustam SHADIEV	Zhejiang University, China
Junjie SHANG	Peking University, China
Kenneth Kuen-Fung SIN	The Education University of Hong Kong, Hong Kong SAR
Yanjie SONG	The Education University of Hong Kong, Hong Kong SAR
Niwat SRISAWASDI	Khon Kaen University, Thailand
Daner SUN	The Education University of Hong Kong, Hong Kong SAR
Meng-Jung TSAI	National Taiwan Normal University, Taiwan
Pei-Shan TSAI	National Taipei University of Technology, Taiwan
Meng-Ping TSUEI	National Taipei University of Education, Taiwan
Yasuhiko TSUJI	The Open University of Japan, Japan
Jan VAHRENHOLD	Westfälische Wilhelms-Universität Münster, Germany
Haipeng WAN	Capital Normal University, China
Sally WAN	The Chinese University of Hong Kong, Hong Kong SAR
Chun-wang WEI	Far East University, Taiwan
Gary Ka Wai WONG	The University of Hong Kong, Hong Kong SAR
Sheng-Yi WU	National Tsing-Hua University, Taiwan
Wan-Hsuan YEN	National Taiwan Normal University, Taiwan
Ibrahim H. YETER	Nanyang Technological University, Singapore

Local Organizing Committee Secretariat

Chair

Prof. Siu Cheung KONG	The Education University of Hong Kong, Hong Kong SAR

Member

Ho Fung Peter LAM	The Education University of Hong Kong, Hong Kong SAR

Mei Ki Vera CHAN	The Education University of Hong Kong, Hong Kong SAR
Yiling Elaine CHEN	The Education University of Hong Kong, Hong Kong SAR
Wan Yee TING	The Education University of Hong Kong, Hong Kong SAR
Luwei Vicky YE	The Education University of Hong Kong, Hong Kong SAR

iii. Programme Overview

Tentative Programme Rundown of CTE-STEM 2025 (as of 12 June 2025)

<table>
<tr><th>Time</th><th>Day 1: 18 June 2025 (Wed)
Location: EdUHK, Hong Kong SAR</th><th>Day 2: 19 June 2025 (Thu)
Location: EdUHK, Hong Kong SAR</th><th>Day 3: 20 June 2025 (Fri)
Location: SUSTech, Shenzhen</th></tr>
<tr><td>09:00 – 09:15</td><td colspan="2" rowspan="2">Registration</td><td>Opening Ceremony
09:00-09:20</td><td rowspan="25">Intelligent Technology Education Equipment Exhibition

09:00 - 1830</td></tr>
<tr><td>09:15 – 09:30</td><td rowspan="2">Keynote Speech 1
09:20-09:45</td></tr>
<tr><td>09:30 – 09:45</td><td rowspan="2">Opening Ceremony
09:30-10:00</td><td rowspan="3">Keynote Speech 2 of MetaACES 2025 (Dr. Yung-Hui Li)
09:30-10:15</td></tr>
<tr><td>09:45 – 10:00</td><td>Keynote Speech 2
09:45-10:10</td></tr>
<tr><td>10:00 – 10:15</td><td>Break 10:00-10:15</td><td rowspan="3">Keynote Speech 3
10:10-10:35</td></tr>
<tr><td>10:15 – 10:30</td><td rowspan="3">Keynote Speech 1 of CTE-STEM 2025 (Prof. Cynthia Breazeal)
10:15-11:00</td><td>Break 10:15-10:30</td></tr>
<tr><td>10:30 – 10:45</td><td rowspan="2">Invited Speech of CTE-STEM 2025 (Mr. Sok Tha)
10:30-11:15</td><td rowspan="2">Academic Paper Presentation of CTE-STEM 2025 Session 6 (English)
10:30-11:15</td><td rowspan="2">Academic Paper Presentation of CTE-STEM 2025 Session 7 (English)
10:30-11:15</td><td rowspan="2">Academic Paper Presentation of CTE-STEM 2025 Session 8 (English)
10:30-11:15</td></tr>
<tr><td>10:45 – 11:00</td><td>Break 10:35-10:50</td></tr>
<tr><td>11:00 – 11:15</td><td rowspan="3">Academic Paper Presentation of CTE-STEM 2025 Session 1 (English)
11:00-12:30</td><td rowspan="3">Academic Paper Presentation of CTE-STEM 2025 Session 2 (English)
11:00-12:30</td><td rowspan="3">Academic Paper Presentation of CTE-STEM 2025 Session 3 (Chinese)
11:00-12:30</td><td rowspan="2">Keynote Speech 4
10:50-11:15</td></tr>
<tr><td>11:15 – 11:30</td><td rowspan="3">Academic Paper Presentation of CTE-STEM 2025 Session 9 (English)
11:15-12:30</td><td rowspan="3">Academic Paper Presentation of CTE-STEM 2025 Session 10 (English)
11:15-12:30</td><td rowspan="3">Academic Paper Presentation of CTE-STEM 2025 Session 11 (English)
11:15-12:30</td></tr>
<tr><td>11:30 – 11:45</td><td>Keynote Speech 5
11:15-11:40</td></tr>
<tr><td>11:45 – 12:00</td><td rowspan="2">Keynote Speech 6
11:40-12:05</td></tr>
<tr><td>12:00 – 12:15</td><td rowspan="2">Lunch
12:30-13:30</td><td rowspan="2">Lunch
12:30-13:30</td></tr>
<tr><td>12:15 – 12:30</td><td>Keynote Speech 7
12:05-12:30</td></tr>
<tr><td>12:30 – 12:45</td><td rowspan="4">Lunch
12:30-14:00</td></tr>
<tr><td>12:45 – 13:00</td><td rowspan="3">Keynote Speech 1 of MetaACES 2025 (Prof. Zhiting Zhu)
13:30-14:15</td><td rowspan="3">Keynote Speech 3 of CTE-STEM 2025 (Prof. Tanja Mitrovic)
13:30-14:15</td></tr>
<tr><td>13:00 – 13:15</td></tr>
<tr><td>13:15 – 13:30</td></tr>
<tr><td>13:30 – 13:45</td><td rowspan="3">Teacher Forum Paper Presentation of CTE-STEM 2025 Session 4 (Chinese)
14:30-16:15</td><td rowspan="3">Teacher Forum Paper Presentation of CTE-STEM 2025 Session 5 (Chinese)
14:30-16:15</td><td rowspan="3">K12 Forum
14:00-15:40</td><td rowspan="3">Digital Intelligence Technology Frontier Forum
14:00-15:50</td></tr>
<tr><td>13:45 – 14:00</td></tr>
<tr><td>14:00 – 14:15</td></tr>
<tr><td>14:15 – 14:30</td><td>Break 14:15-14:30</td><td>Break 14:15-14:30</td></tr>
<tr><td>14:30 – 14:45</td><td rowspan="3">Workshop of CTE-STEM 2025 (Prof. Gautam Biswas)
14:30-16:00</td><td rowspan="3">Academic Paper Presentation of CTE-STEM 2025 Session 12 (Chinese)
14:30-16:00</td></tr>
<tr><td>14:45 – 15:00</td></tr>
<tr><td>15:00 – 15:15</td></tr>
<tr><td>15:15 – 15:30</td><td rowspan="2">Break
15:40-16:00</td><td rowspan="2">Break
15:50-16:10</td></tr>
<tr><td>15:30 – 15:45</td></tr>
<tr><td>15:45 – 16:00</td><td rowspan="3">Keynote Speech 3 of MetaACES 2025 (Dr. Linda Mannila)
16:00-16:45</td><td rowspan="4">K12 Forum
16:00-18:20</td><td rowspan="4">Digital Intelligence Technology Frontier Forum
16:10-17:55</td></tr>
<tr><td>16:00 – 16:15</td></tr>
<tr><td>16:15 –16:30</td><td rowspan="2">Keynote Speech 2 of CTE-STEM 2025 (Prof. Gautam Biswas)
16:15-17:00</td></tr>
<tr><td>16:30 –16:45</td></tr>
<tr><td>16:45 – 17:00</td><td colspan="2">Housekeeping Announcement 16:45-17:00</td></tr>
<tr><td>17:00 - 17:15</td><td colspan="2" rowspan="5"></td><td rowspan="4"></td></tr>
<tr><td>17:15 - 17:30</td></tr>
<tr><td>17:30 - 17:45</td></tr>
<tr><td>17:45 - 18:00</td></tr>
<tr><td>18:00 - 18:30</td><td colspan="2">Closing Ceremony
18:20-18:30</td></tr>
</table>

***Registered participants are responsible for any costs associated with attending Day 3 programmes at SUSTech, such as transportation, accommodation, visa, and other relevant expenses. The conference will arrange a shuttle service to transport participants from Luohu Port in Shenzhen to SUSTech, with a gathering time of 7:30 AM.**

iv. Programme Schedule

Tentative Programme Schedule of CTE-STEM 2025 (as of 11 June 2025)

Day 1: 18 June, 2025 (Wednesday), EdUHK, Hong Kong SAR		**Venue**
09:00 | 09:30	**Registration**	Reception
09:30 | 10:00	**Opening Ceremony**	Room 1
10:00 | 10:15	**Break**	Reception
10:15 | 11:00	**Keynote Speech 1 of CTE-STEM 2025** *Transforming Learning and Education in the Era of AI* Speaker: Prof. Cynthia BREAZEAL (Massachusetts Institute of Technology, United States) Moderator: Prof. Siu Cheung KONG (The Education University of Hong Kong, Hong Kong SAR)	Room 1
11:00 | 12:30	**Academic Paper Presentation of CTE-STEM 2025 Session 1 (English)** Session Chair: Dr. Yin Ling CHEUNG (Nanyang Technological University, Singapore) *Reducing Summer Learning Loss in Low-Achievement Elementary Students: The Role of Learning Frequency, Continuity, and Strategy (paper 2)* Yu-Jhong CHEN; Tzu-Chi YANG; Jiun-Yu WU; Shu-Chuan SHIH *Exploring Teacher Beliefs about Teaching AI Ethics under National Curriculum Reform: A Theory of Planned Behavior Perspective (paper 7)* Ming MA, Davy Tsz Kit NG, Gary K.W. WONG *Exploring Primary School Teachers' Perspectives in Integrating AI into STEM Education through Modular STEM Activities (paper 16)* Pui Yiu TAM, Muhammad ALI, Gary K.W. WONG *The Application of Computational Skills to Grant Proposal Writing (paper 33)* Yin Ling CHEUNG	Room 2
11:00 | 12:30	**Academic Paper Presentation of CTE-STEM 2025 Session 2 (English)**	Room 3

	Session Chair: Dr. Yin YANG (The Education University of Hong Kong, Hong Kong SAR) *Bridging the AI Literacy Gap: A Constructivist, No-Code AI Curriculum for Secondary Students (paper 18)* Phylliscia CHEW, Da LI *Developing Alice: A Scaffolding Agent for AI-Mediated Computational Thinking (paper 19)* Muhammad ALI, Bixia CHEN, Gary K.W. WONG *How Teachers Enhance Young Children's Collaboration in Situated Learning Environments through Computational Thinking Tasks (paper 20)* Xuechun SHI, Zhichun LIU, Kun WANG	
11:00 | 12:30	**Academic Paper Presentation of CTE-STEM 2025 Session 3 (Chinese)** Session Chair: Prof. Ming-Puu CHEN (National Taiwan Normal University, Taiwan) *Generative AI and Four-Learning Teaching Applications: Information Technology Tower of Hanoi Algorithm* *生成式 AI 與四學教學應用: 資訊科技河內塔演算法 (paper 14)* Tsun-Sheng FAN, Ting-Chia HSU, Yi-Wen LIAO *The Application and Effectiveness of Educational Robotics in Elementary Programming and Technological Humanistic Literacy Development* *機器人教育在小學程式設計與科技關懷素養的應用與成效探討 (paper 26)* Chia-Yen FENG, Ming-Puu CHEN, Li-Chun WANG *Interdisciplinary Project-Based Learning Curriculum Design in Information Technology——A Case Study of "Chasing Light, Youth"* *信息科技跨学科项目学程设计——以“追光吧，少年”为例 (paper 10)* Xi ZHANG, Yiying ZHANG *Turning Math Concepts Visible And Sound* *透過可見的音樂演繹抽象的數學世界 (paper 13)* Jessica Tsz Shan SO, Yee Nok CHOW *Interdisciplinary Integration of "Light Properties" and Programming Instruction: A Teaching Practice for Cultivating Computational Thinking with Scratch* *透過跨學科「光的特性」培養學生運算思維之教學實踐 (paper 49)*	Room 4

	Hon Wai MOK, Wing Ting YUEN	
12:30 | 13:30	**Lunch**	Reception
13:30 | 14:15	**Keynote Speech 1 of MetaACES 2025** *A New Framework for Human-Technology Collaborative Cognition and Creation in the GenAI Era* Speaker: Prof. Zhiting Zhu (East China Normal University, China) Moderator: Prof. Yu-Ju LAN (National Taiwan Normal University, Taiwan)	Room 1
14:15 | 14:30	**Break**	Reception
14:30 | 16:15	**Teacher Forum Paper Presentation of CTE-STEM 2025 Session 4 (Chinese)** Session Chair: Prof. Yi-Wen LIAO (National Kaohsiung University of Science and Technology, Taiwan) *The Cultivation of STEM Literacy for the Secondary Students with a Stent Bridge Model Project* *中學生的科技創新素養培養：以「支架橋」模型專題為例 (paper 1)* On-chi SIU *Pedagogical Reflections on Computational Thinking: Using Programming and Computational Thinking to Enhance Students' Cross-Border Learning Effectiveness* *運算思維教育的教學實踐反思：運用編程結合運算思維提升學生的跨境學習效能 (paper 4)* Man Sing HSU, Mau Fai WONG *Enhancing Travel Graph Concept Learning with Computational Thinking* *以運算思維概念支援行程圖概念學習 (paper 44)* Tsz-Wai YUEN *The Feasibility of Using Artificial Intelligence to Explore Ecological Balance in Primary Education* *在小學教育中運用人工智能探索生態平衡的可行性研究 (paper 45)* Wai Leung WONG *A Study on Using Scratch Games to Deepen Students' Understanding of Sustainable Development*	Room 2

	運用 Scratch 遊戲深化學生對可持續發展重要性的研究 (paper 46) Wai Leung WONG **Academic Paper Presentation of CTE-STEM 2025 Session 4 (Chinese)** Session Chair: Prof. Yi-Wen LIAO (National Kaohsiung University of Science and Technology, Taiwan) *A Study on the Application of Digital Learning Partners in the Digital Technology Course* *應用數位學習夥伴於數位科技概論課程之研究 (paper 11)* Siang-Chun HSIEH, Yi-Wen LIAO	
14:30 | 16:15	**Teacher Forum Paper Presentation of CTE-STEM 2025 Session 5 (Chinese)** Session Chair: Prof. Ting-Chia HSU (National Taiwan Normal University, Taiwan) *Enhancing Students' Computational Thinking and Creative Problem-Solving Skills through AI Technology and Environmental Concepts: A Case Study of "AI Recycling Bin" Project for Grade 6 Students* *結合 AI 技術與環保理念培養學生運算思維能力與創意解難能力：以六年級「人工智慧環保回收箱」課題為例 (paper 8)* Wai Lung MUNG, Chi Yan WONG, Wai Lam CHU *Exploring STEAM Education: A Curriculum on Clean Energy Powered Boats Integrating Scientific Experiments, Artificial Intelligence Teaching, and Computational Thinking Education* *探索 STEAM 教育：結合科學實驗、人工智能教學及運算思維教育的潔淨能源動力船研習課 (paper 24)* Wai Han CHEUK, Kam Yuen LAW, Lin Chun KWONG *Evaluation of Learning Effectiveness by Integrating Self-Directed Learning and Blended Learning: A Case Study on Bus Topology Curriculum Unit* *結合自主學習與混成式學習之學習成效分析：以匯流排拓樸課程單元為例 (paper 25)* Mei-Ling LIU, Shih-Hua HUANG, Ting-Chia HSU *Using Computational Thinking Education in Interdisciplinary Collaboration to Cultivate Lifelong Learning in Students to Meet Future Needs: A Case Study of the "Aqua Odyssey" Integrated Curriculum* *透過結合運算思維之跨學科學習培養學生終身學習以迎接未來需求——以『水漫旅程』為案例 (paper 43)* Fong CHU, Huihuan WU	Room 4

	Presenting Coding Through Problem Solving and Logical Thinking Model Implementing Coding Education in KS1 *將編程以解難及邏輯思維模式呈現於初小推行編程教育 (paper 47)* *Yan-Wai-Wind HO, Yuen-Ching YUNG* *The Fish Ball Game: Using Game-Based Constructivism to Address Lower Elementary Students' Confusion Between Multiplicand and Multiplier in Mathematics* *魚蛋遊戲：運用遊戲式建構主義釐清初小學生對乘數與被乘數的混淆 (paper 48)* Ting Hin CHAN, Ka Wai LIU	
16:15 | 17:00	**Keynote Speech 2 of CTE-STEM 2025** *AI-Empowered Open-Ended Learning Environments in STEM Domains Application to SPICE: Science Projects Integrating Computing & Engineering* Speaker: Prof. Gautam BISWAS (Vanderbilt University, United States) Moderator: Prof. Siu Cheung KONG (The Education University of Hong Kong, Hong Kong SAR)	Room 1

Day 2: 19 June, 2025 (Thursday), EdUHK, Hong Kong SAR		Venue
09:00 | 09:30	**Registration**	Reception
09:30 | 10:15	**Keynote Speech 2 of MetaACES 2025** *AI-Driven Immersive Learning: The Future of Metaverse & Education* Speaker: Dr. Yung-Hui LI (AI Research Center, Hon Hai Research Institute, Taiwan) Moderators: Prof. Yu-Ju LAN (National Taiwan Normal University, Taiwan)	Room 1
10:15 | 10:30	**Break**	Reception
10:30 | 11:15	**Invited Speech of CTE-STEM 2025** *Transforming Education in Cambodia: Advancing STEM Through Education Technology* Speaker: Mr. Tha SOK (Director of the Digital Transformation Department, MoEYS Cambodia) Moderator: Prof. Siu Cheung KONG (The Education University of Hong Kong, Hong Kong SAR)	Room 1
10:30 | 11:15	**Academic Paper Presentation of CTE-STEM 2025 Session 6 (English)** Session Chair: Dr. Ezra GOUVEA (Rethink Learning, Inc.; and University of Massachusetts Dartmouth, United States) *Working to Foreground Relationality in Computational Thinking (paper 42)* Ezra GOUVEA, Ali ASIF, Rohini THAPA, Kolawole KUSHIMO, Chandra ORRILL, Ramprasad BALASUBRAMANIAN, Shakhnoza KAYUMOVA *Design and Implementation of an Auto Marking System for MIT App Inventor Coding Education – An Alternative Approach (paper 34)* Jiangshan SUN, Shanshan CHEN	Room 2
10:30 | 11:15	**Academic Paper Presentation of CTE-STEM 2025 Session 7 (English)** Session Chair: Dr. Ka Yuk Cora SIU (The Education University of Hong Kong, Hong Kong SAR) *Computational Thinking and Artificial Intelligence Training Program for Students with Intellectual Disability: A Path to Inclusion (paper 30)*	Room 3

	Natalia GALBÁN-OJER, María ZAPATA-CÁCERES, Nardie FANCHAMPS, Estefanía MARTIN-BARROSO *Developing Computational Thinking through Interactive Storytelling in English Teacher Education (paper 36)* Hsin-I CHEN	
10:30 | 11:15	**Academic Paper Presentation of CTE-STEM 2025 Session 8 (English)** Session Chair: Prof. Masanori FUKUI (Iwate Prefectural University, Japan) *A Preliminary Approach to Quantitative Evaluation of Modified Problem-Posing for Problem Structure Understanding in Computational Thinking (paper 6)* Masanori FUKUI, Ryohei MIRADERA, Yuji SASAKI, Tsukasa HIRASHIMA *A Programming Learning Platform with Misconception Diagnosis (paper 41)* Si-ru CHEN, Yu-tzu LIN	Room 4
11:15 | 12:30	**Academic Paper Presentation of CTE-STEM 2025 Session 9 (English)** Session Chair: Ms. Ying ZHANG (The University of Hong Kong, Hong Kong SAR) *Young Children's Strategies for Developing Algorithmic Thinking in CT-based Mathematical Problem-Solving Activities with Floor Robot (paper 28)* Ying ZHANG, Gary WONG *Exploring How Programming Supports a Student's Spatial Reasoning and Understanding of Quadratic Growth (paper 38)* Xuan SU, Biyao LIANG *Envisioning Computational Thinking Education: An Idealized Design Approach from Teachers' Perspective (paper 22)* Ali HAMIDI	Room 1
11:15 | 12:30	**Academic Paper Presentation of CTE-STEM 2025 Session 10 (English)** Session Chair: Prof. Arnon HERSHKOVITZ (Tel Aviv University, Israel)	Room 2

	Self-Demand vs. Time Availability: A Sociological Analysis of STEM Project Performance Among School and University Students in the Arequipa Region of Peru (paper 9) Jair Jesús León LUCANO, Juan Diego Cerrón SALCEDO, Daniel Haro LAQUE, Alberto Torres HISNOSTROZA *The Computational Thinking Performance of Taiwanese Elementary School Students on Bebras Challenge Tasks on ViLLE (paper 12)* Tai-Ping HSU, Shih-Hua HUANG, Ting-Chia HSU, Valentina Dagienė *Use of Computational Thinking Skills in Second Language Acquisition Among Adult Immigrants (paper 17)* Cintia TETELBOM SCHUCHMANN, Arnon HERSHKOVITZ	
11:15 | 12:30	**Academic Paper Presentation of CTE-STEM 2025 Session 11 (English)** Session Chair: Prof. Jon-Chao HONG (National Taiwan Normal University, Taiwan) *Metacognitive Awareness, Self-Regulation Confirmation, Inventive Self-Efficacy and Continuous Self-Improvement: Differences in School Grade from an Invention Exhibition (paper 27)* Ngai Jia SHENG, Jon Chao HONG *Research on Design-Based-Augmented Reality Learning for Facilitating Students' Behaviors in Computational Thinking (paper 32)* Shucheng LUO, Xiao-Fan LIN *Integrating Computational Thinking in Indian K-12 Education under NEP 2020 (paper 37)* Sabitha VINOD	Room 4
12:30 | 13:30	**Lunch**	Reception
13:30 | 14:15	**Keynote Speech 3 of CTE-STEM 2025** *The Effectiveness of AI-Based Support for Engagement During Video-Based Learning* Speaker: Prof. Tanja MITROVIC (University of Canterbury, New Zealand) Moderator: Prof. Tak-Wai CHAN (National Central University, Taiwan)	Room 1
14:15 | 14:30	**Break**	Reception

14:30 | 16:00	**Workshop of CTE-STEM 2025** *AI and Data Modeling in Open-Ended STEM Learning Environments* Speaker: Prof. Gautam BISWAS (Vanderbilt University, United States) Moderator: Dr. Daner SUN (The Education University of Hong Kong, Hong Kong)	Room 3
14:30 | 16:00	**Academic Paper Presentation of CTE-STEM 2025 Session 12 (Chinese)** Session Chair: Ms. Yingqian ZHANG (Shanghai Jiao Tong University, China) *Research on Pre-Service Training Strategies for STEM Teachers' ICT Competency* *STEM 教师信息化教学能力的职前培养策略研究 (paper 29)* Yingqian ZHANG, Jiabin ZHU *An Engineering-Focused STEAM Education in Primary Schools: Universal Implementation Strategies* *以工程為軸心的小學普及創科（STEAM）教育 (paper 39)* Hau Kwan, CHAN, Ka Yuk Cora SIU	Room 4
16:00 | 16:45	**Keynote Speech 3 of MetaACES 2025** *Co-Creating AI Literacy to Empower Future Generations* Speaker: Dr. Linda MANNILA (University of Helsinki, Finland) Moderator: Prof. Ting-Chia HSU (National Taiwan Normal University, Taiwan)	Room 1
16:45 | 17:00	**Housekeeping Announcement**	Room 1

Day 3: 20 June, 2025 (Friday), SUSTech, Shenzhen		Venue
Intelligent Technology Education Equipment Exhibition (智慧科技教育装备展)		
09:00 | 18:30	**Exhibiting Unit (参展单位):** Yizhao Technology (Shenzhen) Co., Ltd. (奕兆科技（深圳）有限公司); MagicStar (Shenzhen) Education Technology Co., Ltd. (麻吉星（深圳）教育科技有限公司); Guangzhou AVA Electronic Technology Co., Ltd. (广州市奥威亚电子科技有限公司); Onion Academy (洋葱学园); Beijing Zhongqing Modern Technology Co., Ltd. (北京中庆现代技术股份有限公司); UBTECH Robotics Corp Ltd. (深圳市优必选科技股份有限公司); iFLYTEK Co., Ltd. (科大讯飞股份有限公司); Topsec Technologies Group, Inc. (天融信科技集团股份有限公司); Shenzhen Wansi Future Innovation Technology Co., Ltd. (深圳市万思未来教育科技有限公司); EEO Empower Education Online. (北京翼鸥教育科技有限公司); SUSTech School of Design (南科大创新创意设计学院); Shenzhen Future 3D Edu Tech Co., Ltd. (深圳未来立体教育科技有限公司) Guangzhou Shirui Electronics Co., Ltd. (广州视睿电子科技有限公司（希沃）); Beijing Volcano Engine Technology Co., Ltd. (北京火山引擎科技有限公司（字节跳动旗下）)	Second Floor of the Conference Center (南科大会议中心二楼)
Plenary (全体会议)		
09:00 | 09:20	**Opening Ceremony** Speaker: Dr. Ling ZHANG (张凌, 学校党委副书记) Prof. Yuehong CHEN (陈跃红, 人文社科学院院长, 讲席教授) Prof. Yurong GUO (郭雨蓉, 未来教育研究中心教授)	Conference Center Concert Hall (南科大会议中心音乐厅)
09:20 | 09:45	**Keynote Speech 1** *“通用智慧同伴假说”与“全球和幸”* Speaker: Prof. Tak-Wai CHAN (National Central University, Taiwan) Moderators: Prof. Jianhua ZHAO (Southern University of Science and Technology, China)	
09:45 | 10:10	**Keynote Speech 2** *AI 赋能智慧教育的创新框架*	

	Speaker: Prof. Zhiting ZHU (East China Normal University, China) Moderators: Prof. Jianhua ZHAO (Southern University of Science and Technology, China)	
10:10 **|** **10:35**	**Keynote Speech 3** *人工智能与规模化个性化学习：机遇与关切* Speaker: Prof. Ronghuai HUANG (Beijing Normal University, China) Moderators: Prof. Jianhua ZHAO (Southern University of Science and Technology, China)	
10:35 **|** **10:50**	**Break**	Reception
10:50 **|** **11:15**	**Keynote Speech 4** *AI 时代教育本质的思考* Speaker: Prof. Qintai HU (Guangdong University of Technology, China) Moderator: Prof. Shaoqing GUO (Northwest Normal University, China)	Conference Center Concert Hall (南科大会议中心音乐厅)
11:15 **|** **11:40**	**Keynote Speech 5** *教育数字化开辟（赋能）的教育新赛道* Speaker: Prof. Shaoqing GUO (Northwest Normal University, China) Moderator: Prof. Shaoqing GUO (Northwest Normal University, China)	
11:40 **|** **12:05**	**Keynote Speech 6** *The Challenges and Solutions of Using Generative Artificial Intelligence in School Education: A Three Dimension Framework of Understanding, Using and Unleashing* Speaker: Prof. Siu Cheung KONG (The Education University of Hong Kong, Hong Kong SAR) Moderator: Prof. Shaoqing GUO (Northwest Normal University, China)	
12:05 **|** **12:30**	**Keynote Speech 7** *Generative AI for Student Agency and Collaborative Knowledge Building* Speaker: Prof. Carol CHAN (The University of Hong Kong, Hong Kong SAR) Moderator: Prof. Shaoqing GUO (Northwest Normal University, China)	

12:30 | 14:00	**Lunch**	
Parallel Session 1: K12 Forum (平行会议一：K12 论坛)		
14:00 | 14:20	**Invited Speech 1** *科学精神与科学素养：《高科技十万个为什么》* Speaker: Prof. Qingsong LIU (Southern University of Science and Technology, China) Moderator: Prof. Pengze WU (South China Normal University, China)	Conference Center Concert Hall (南科大会议中心音乐厅)
14:20 | 14:40	**Invited Speech 2** *GenAI Competencies for University Teachers: Another Teacher Competency Framework?* Speaker: Prof. Cher Ping LIM (The Education University of Hong Kong, Hong Kong SAR) Moderator: Prof. Pengze WU (South China Normal University, China)	
14:40 | 15:00	**Invited Speech 3** *Harnessing AI Agents for Enhanced Research Productivity: From Ideas to Implementation* Speaker: Prof. Xiangen HU (The Hong Kong Polytechnic University, Hong Kong SAR) Moderator: Prof. Pengze WU (South China Normal University, China)	
15:00 | 15:20	**Invited Speech 4** *在线学习环境下学习倦怠规律分析及干预研究* Speaker: Prof. Changqin HUANG (Zhejiang University, China) Moderator: Prof. Pengze WU (South China Normal University, China)	
15:20 | 15:40	**Invited Speech 5** *Applying Generative AI in Teaching & Learning: Cases and Reflections* Speaker: Prof. Xiao HU (The University of Arizona, United States) Moderator: Prof. Pengze WU (South China Normal University, China)	
15:40 | 16:00	**Break**	
16:00		

| 16:20	**Invited Speech 6** *When AI Knows Everything: Educating for Epistemic Insights Beyond Content* Speaker: Dr. Yun DAI (The Chinese University of Hong Kong, Hong Kong SAR) Moderator: Prof. Pengze WU (South China Normal University, China)	
16:20 | 16:40	**Invited Speech 7** *Empowering Teacher Learning with Technology: A New Era for Teacher Education* Speaker: Dr. Qiaoping ZHANG (The Education University of Hong Kong, Hong Kong SAR) Moderator: Prof. Pengze WU (South China Normal University, China)	
16:40 | 17:00	**Invited Speech 8** *人机共育新生态的深圳实践* Speaker: Ms. Huimin ZHANG (Shenzhen Educational Information Technology Center) (深圳市教育信息技术中心) Moderator: Prof. Pengze WU (South China Normal University, China)	
17:00 | 17:20	**Invited Speech 9** *从破界融通到生态重建* Speaker: Mr. Jiang LU (Shenzhen Mingde Experimental School) (明德实验学校集团) Moderator: Prof. Pengze WU (South China Normal University, China)	
17:20 | 17:40	**Invited Speech 10** *回到基础：数智时代面向终身学习的育人模式创新实践* Speaker: Ms. Wen HUANG (Guangzhou Tianhe Huijing Experimental School) (广州市天河区汇景实验学校) Moderator: Prof. Pengze WU (South China Normal University, China)	
17:40 | 18:00	**Invited Speech 11** *计算思维视角下图形化编程教学模式的创新与探究* Speaker: Dr. Jun PENG (City University of Macau, Macau) Moderator: Prof. Pengze WU (South China Normal University, China)	

18:00 | **18:20**	**Invited Speech 12** *Interactive Synergy: AI in STEM Learning Environments* Speaker: Dr. Daner SUN (The Education University of Hong Kong, Hong Kong SAR) Moderator: Prof. Pengze WU (South China Normal University, China)	
Parallel Session 2: Digital Intelligence Technology Frontier Forum (平行会议二：数智科技前沿论坛)		
14:00 | **14:20**	**Invited Speech 1** *具身智慧支持的教育机器人探索：现状与趋势* Speaker: Prof. Jianhua ZHAO (Southern University of Science and Technology, China) Moderator: Dr. Xueqi FENG (Southern University of Science and Technology, China)	
14:20 | **14:35**	**Invited Speech 2** *如何通过游戏与人工智能让学习更有趣* Speaker: Mr. Xinhan LIN (Yizhao Technology (Shenzhen) Co., Ltd.) (奕兆科技(深圳)有限公司) Moderator: Dr. Xueqi FENG (Southern University of Science and Technology, China)	
14:35 | **14:50**	**Invited Speech 3** *破解课堂黑箱：教学大数据驱动的双 AI 教学范式转型实证* Speaker: Dr. Xuyi WANG (MagicStar (Shenzhen) Education Technology Co., Ltd.) (麻吉星(深圳)教育科技有限公司) Moderator: Dr. Xueqi FENG (Southern University of Science and Technology, China)	
14:50 | **15:05**	**Invited Speech 4** *AI 赋能“精学精研”的探索* Speaker: Mr. Xuanjie DU (Guangzhou AVA Electronic Technology Co., Ltd.) (广州市奥威亚电子科技有限公司) Moderator: Dr. Xueqi FENG (Southern University of Science and Technology, China)	
15:05 | **15:20**	**Invited Speech 5** *基于 AI 数据的教师数字素养提升：从精准诊断到专业成长的闭环路径* Speaker: Mr. Bo ZHANG (Beijing Zhongqing Modern Technology Co., Ltd.) (北京中庆现代技术股份有限公司)	

	Moderator: Dr. Xueqi FENG (Southern University of Science and Technology, China)	Conference Center Meeting Hall (南科大会议中心会议厅)
15:20 | 15:35	**Invited Speech 6** *数智化赋能高校高质量发展——希沃的探索与实践* Speaker: Mr. Hui SHEN (Guangzhou Shirui Electronics Co., Ltd.) (广州视睿电子科技有限公司(希沃)) Moderator: Dr. Xueqi FENG (Southern University of Science and Technology, China)	
15:35 | 15:50	**Invited Speech 7** *区域化跨学科学习研究* Speaker: Mr. Xiguang ZHANG (Shenzhen Wansi Future Innovation Technology Co., Ltd.) (深圳市万思未来教育科技有限公司) Moderator: Dr. Xueqi FENG (Southern University of Science and Technology, China)	
15:50 | 16:10	**Break**	
16:10 | 16:25	**Invited Speech 8** *洋葱学园 AI 课堂的实践与探索* Speaker: Mr. Haipeng LI (Onion Academy) (洋葱学园) Moderator: Mr. Qingtao CHEN (Southern University of Science and Technology, China)	
16:25 | 16:40	**Invited Speech 9** *AI 赋能教师教育变革的希沃实践* Speaker: Ms. Yali LU (Guangzhou Shirui Electronics Co., Ltd.) (广州视睿电子科技有限公司(希沃)) Moderator: Dr. Qingtao CHEN (Southern University of Science and Technology, China)	
16:40 | 16:55	**Invited Speech 10** *AI 时代下具身智能助力教学模式创新与实践探索* Speaker: Mr. Xiaoping WANG (EEO Empower Education Online.) (北京翼鸥教育科技有限公司) Moderator: Dr. Qingtao CHEN (Southern University of Science and Technology, China)	
16:55 | 17:10	**Invited Speech 11** *拥抱变化：从 STEAM 到 AI 教育*	

	Speaker: Mr. Wei XI (UBTECH Robotics Corp Ltd.) (深圳市优必选科技股份有限公司) Moderator: Dr. Qingtao CHEN (Southern University of Science and Technology, China)	
17:10 **|** **17:25**	**Invited Speech 12** *赋能与重塑——大模型驱动教育的变革与实践* Speaker: Mr. Tao ZHOU (iFLYTEK Co., Ltd.) (科大讯飞股份有限公司) Moderator: Dr. Qingtao CHEN (Southern University of Science and Technology, China)	
17:25 **|** **17:40**	**Invited Speech 13** *大模型应用安全防护* Speaker: Mr. Jingyu ZHANG (Topsec Technologies Group, Inc.) (天融信科技集团股份有限公司) Moderator: Dr. Qingtao CHEN (Southern University of Science and Technology, China)	
17:40 **|** **17:55**	**Invited Speech 14** *大模型在教育行业落地案例分享* Speaker: Mr. Yu LI (Beijing Volcano Engine Technology Co., Ltd.) (火山引擎教育行业解决方案(字节跳动)) Moderator: Dr. Qingtao CHEN (Southern University of Science and Technology, China)	
18:20 **|** **18:30**	**Closing Ceremony**	Conference Center Concert Hall (南科大会议中心音乐厅)

v. Keynote and Invited Speeches

Keynote Speech (1)

Transforming Learning and Education in the Era of AI

Date **18 June, 2025 (Wednesday)**

Time **10:15 – 11:00**

Venue **Conference Centre, Block E**

Speaker: Prof. Cynthia BREAZEAL

(Massachusetts Institute of Technology, United States)

Moderator: Prof. Siu Cheung KONG

(The Education University of Hong Kong, Hong Kong SAR)

Speech Abstract

Artificial intelligence is rapidly transforming the world, and it is essential for educators, researchers, and innovators to prepare students to thrive in an increasingly AI-powered workforce. The MIT RAISE Initiative is at the forefront of the growing K12 AI Literacy/Fluency movement. Our efforts advance research, innovation, and impact goals at the intersection of AI and learning for K12 students on a global scale. Building on MIT's tradition of constructionist pedagogy and groundbreaking science and innovation, MIT RAISE develops transformative educational technologies, innovative curriculum, teacher development materials, and innovative K12 outreach programs such as the Day of AI and MIT Future Makers. This includes exploring how AI-powered educational interventions can support student learning outcomes and prepare them to work creatively and responsibly with increasingly intelligent tools and technologies. Today, even young learners can now use these powerful AI and computing tools to become positive change makers at the personal, community, and national levels. Much of what we develop and share with the educational community is free and open source. This talk will introduce these resources, their impact, and how to access them. Our hope is K12 teachers can use these resources to build their own AI literacy skills, learn how to responsibly and effectively use AI in teaching practice, and bring AI literacy and AI fluency to their classroom. By doing so, we hope to contribute to a future where everyone can participate in, benefit from, and responsibly shape our future with artificial intelligence.

Speaker Bio

Cynthia Breazeal is a professor of media arts and sciences at MIT, where she founded and directs the Personal Robots group at the Media Lab. She is the MIT dean for digital learning, and in this role, she leverages her experience in emerging digital technologies and business, research, and strategic initiatives to lead Open Learning's business and research & engagement units. She is also the Director of the MIT-wide Initiative on Responsible AI for Social Empowerment and Education (raise.mit.edu). MIT RAISE is a research and outreach effort that advances access and inclusivity in AI education to people of all ages and backgrounds with a focus on K12 and the workforce. She co-founded the consumer social robotics company, Jibo, Inc., where she served as Chief Scientist and Chief Experience Officer.

Breazeal is a pioneer of social robotics and human-robot interaction. Her work balances technical innovation in AI, UX design, and understanding the psychology of engagement to design personified AI technologies that promote human flourishing and personal growth. Her recent work focuses on the theme of "living with AI" and understanding the long-term impact of social robots that can build relationships and provide personalized support as helpful companions in daily life. Her research group actively investigates social robots applied to education, pediatrics, health and wellness, and aging. As part of this mission, her group also develops design justice frameworks for human-robot interaction and inclusive AI literacy education for under-served K12 students.

Keynote Speech (2)

AI-Empowered Open-Ended Learning Environments in STEM Domains Application to SPICE: Science Projects Integrating Computing & Engineering

Date **18 June, 2025 (Wednesday)**

Time **16:15 – 17:00**

Venue **Conference Centre, Block E**

Speaker: Prof. Gautam BISWAS

(Vanderbilt University, United States)

Moderator: Prof. Siu Cheung KONG

(The Education University of Hong Kong, Hong Kong SAR)

Speech Abstract

Over the last twenty years, significant developments in AI, Machine Learning, and data collection technologies have emerged in computer-based learning environments. A new focus in AI in Education includes Open-Ended Learning Environments (OELEs) that allow learners to practice problem-solving in real-world contexts with tools that support engaged learning.

In this talk, I will present examples of OELEs that we have developed for STEM education. I will specifically discuss SPICE (Science Projects Integrating Computation and Engineering). Utilizing computational thinking (CT), this environment integrates science and engineering learning for middle school students. SPICE features a water runoff curriculum, in which students create models for various ground surfaces after rainfall. They then tackle an engineering design challenge by analyzing trade-offs between cost, absorption, and accessibility to find their "optimal" solutions.

I will address a key research question using data from classroom studies: How does a learning sequence that adopts multiple linked representations, combining conceptual and computational modeling with engineering design, enhance students' critical thinking in STEM and CT? Additionally, I will discuss the design and deployment of conversational agents for automated grading and feedback on formative assessments, as well as other AI tools designed to help teachers gain deeper insight into student classroom activities for tailored instruction.

Speaker Bio

Gautam Biswas is a Cornelius Vanderbilt Professor of Engineering and Professor of Computer Science and Engineering in the CS Department, as well as a Senior Research Scientist at the Institute for Software Integrated Systems at Vanderbilt University. He conducts research in intelligent systems with primary interests in modeling and simulation, analysis of complex embedded systems, data mining, and Open-Ended Learning Environments (OELEs) for STEM disciplines. His notable projects include Teachable Agents and learning environments that promote synergistic learning of Computational Thinking and STEM concepts and practices. He has also developed innovative data mining techniques for studying students' learning behaviors and linking them to metacognitive strategies. More recently, as part of an NSF AI Institute, ENGAGE AI, and an IES STEM Education Center, GENIUS, he has developed tools for multimodal data collection and analyses in classroom environments. He is now developing conversational chatbots to support student learning. Prof. Biswas is a Life Fellow of the IEEE, Asia Pacific Society for Computers in Education (APSCE), and the Prognostics and Health Management Society.

Keynote Speech (3)

The Effectiveness of AI-Based Support for Engagement During Video-Based Learning

Date **19 June, 2025 (Thursday)**

Time **13:30 – 14:15**

Venue **Conference Centre, Block E**

Speaker: Prof. Tanja MITROVIC

(University of Canterbury, New Zealand)

Moderator: Prof. Tak Wai CHAN

(National Central University, Taiwan)

Speech Abstract

Video-based learning is very popular both in formal and informal educational settings. Videos do not only allow information transfer, but also offer opportunities to show how to perform tasks so that the learner can grasp them better. However, watching videos can be a passive activity and result in shallow learning. We have developed AVW-Space, a video watching platform, which allows the teacher to select publicly available videos from YouTube and define a space for their students. Learning happens in two phases in the platform. In the first phase, students watch videos and write comments on them. The teacher can specify aspects for students to use when writing comments, which focus students' attention to important concepts in videos or to encourage students to self-reflect. In the second phase, the teacher can select some comments to open anonymously to the whole class, to review and rate. The teacher can specify rating categories to reinforce important activities, such as self-reflection. AVW-Space is a general-purpose and can be used to provide instruction in any domain. In our research, we focus on teaching soft skills, e.g. giving presentations or communications in software-development teams, as such skills are difficult to teach in the classroom and require the learner to reflect on their experience and observe the skills performed in various situations. In addition to writing/rating comments, AVW-Space uses AI-based support in order to track the learner's behaviour and provide personalized nudges in order to improve engagement. In this talk, I will present the evolution of AVW-Space and various types of AI-based support we have added to it over the years. In early studies, when there was no support, half of the participants watched videos passively. To improve engagement via comment writing, extended the platform by adding a set of reminder nudges, which are given to students who are passively watching videos or not commenting on a variety of topics. Those nudges resulted in a significantly higher percentage of students writing comments. We then developed machine learning models which classify students' comments immediately after they

are written into low, medium or high-quality comments. Based on these classification, AVW-Space provides additional nudges to students based on the quality of comments they write. We also added visualizations of students' activities, the comment quality and nudges, so that students can easily review their progress. The most recent studies show the effectiveness of the AI-based support: the vast majority of students are now active and writing high-quality comments, which also results in higher learning outcomes.

Speaker Bio

Dr Antonija (Tanja) Mitrovic is a full professor at the Department of Computer Science and Software Engineering, the University of Canterbury, Christchurch, New Zealand. She is the leader of ICTG (Intelligent Computer Tutoring Group). Dr Mitrovic received her PhD in Computer Science from the University of Nis, Yugoslavia, in 1994. She is an associate editor of the following journals: Practice in Technology Enhanced Learning (RPTEL), International Journal on Artificial Intelligence in Education (IJAIED) and Journal of Universal Computer Science (JUCS). She is a Fellow of the Asia-Pacific Society for Computers in Education (APSCE), Distinguished member of ACM, and senior member of AAAI and IEEE. She was awarded the Distinguished Researcher Award in 2011 by APSCE.

Dr Mitrovic's primary research interests are in AI in education and student modeling. ICTG has developed a number of constraint-based intelligent tutoring systems in a variety of domains, which have been thoroughly evaluated in real classrooms, and proven to be highly effective. These systems provide adaptive support for acquiring both problem-solving skills and meta-cognitive skills. ICTG has also developed ASPIRE, a full authoring and deployment environment for constraint-based tutors. Her recent research focuses on AI-based support for active learning from videos.

Invited Speech

Transforming Education in Cambodia: Advancing STEM through Education Technology

Date **19 June, 2025 (Thursday)**

Time **10:30 – 11:15**

Venue **Conference Centre, Block E**

Speaker: Mr. Tha SOK
(Ministry of Education, Youth and Sport, Cambodia)

Moderator: Prof. Siu Cheung KONG

(The Education University of Hong Kong, Hong Kong SAR)

Speech Abstract

Cambodia is navigating a transformative journey towards becoming a resilient and knowledge-based society, guided by the Pentagonal Strategy Phase I. Central to this evolution is the overhaul of the education system to embrace digital tools and STEM disciplines, preparing students with essential 21st-century skills. The Ministry of Education, Youth, and Sport's comprehensive reforms prioritize elevating education quality, science, and technology for a robust educational landscape. Strategic initiatives encompass digital education advancements, curriculum enhancements, teacher empowerment, and infrastructural support to drive equity, quality, and relevance in education. The impetus for Cambodia's digital education surge was heightened by the challenges of the COVID-19 pandemic, underscoring the necessity of technology-enabled learning for all. The ministry's proactive response includes the development of digital platforms, the incorporation of digital literacy in curricula, teacher capacity building, and the establishment of community technology centers to facilitate blended learning, particularly in underserved areas. More importantly, National policies such as the STEM Education Policy (2016) and Policy and Strategy on ICT Education (2018) provide strategic direction, complemented by recent frameworks like Digital Education Strategies for Schools (2023) and School-Based STEM Framework (2024), driving the integration of digital and STEM competencies across education levels. In addition to academic focus, Cambodia is nurturing holistic learner development through extracurricular activities in digital skills, STEM career guidance, and creative expression to cultivate well-rounded individuals. In a nutshell, through these concerted efforts, Cambodia's education transformation transcends aspiration, emerging as a strategic imperative for fostering innovative, disciplined, and globally aware individuals..

Speaker Bio

Mr. Sok Tha is the Director of the Department of Digital Transformation at the Ministry of Education, Youth, and Sport, Cambodia. He has been at the forefront of the digital revolution in the education sector of Cambodia. Under his leadership, significant milestones have been achieved, including the successful deployment of ICT infrastructure in educational institutions, the implementation of information systems in the education sector, the development of ICT-based curricula and textbooks for general education, and the creation of digital educational content to enhance teaching and learning experiences. Moreover, efforts have been made to support schools in obtaining necessary ICT facilities and infrastructure, empower educators with digital competencies, and introduce innovative technological tools like e-learning and distance education, all of which have been crucial in driving pedagogical improvement and enhancing administrative efficiency. His collaborative strategy underscores the significance of engaging with government entities, development partners, the private sector, international and local organizations, and other stakeholders, highlighting the critical need to integrate technology seamlessly throughout all educational tiers and to effectively navigate the dynamic landscape of digital education within the sector. His commitment to empowering youth through technology-driven education shows his visionary leadership in driving the digital transformation sector, making him a key figure in advancing education in the country.

vi. Workshop on AI and Data Modeling

AI and Data Modeling in Open-Ended STEM Learning Environments

Date **19 June, 2025 (Thursday)**

Time **14:30 – 16:00**

Venue **Conference Centre, Block E**

Speaker: Prof. Gautam BISWAS

(Vanderbilt University, United States)

Moderator: Dr. Daner SUN

(The Education University of Hong Kong, Hong Kong SAR)

Workshop Summary

A new focus in AI education is on Open-Ended Learning Environments (OELEs), which allow learners to practice problem-solving in real-world contexts using tools that foster engaged, exploratory learning. In this workshop, we will present examples of OELEs developed for STEM education, specifically discussing SPICE (Science Projects Integrating Computation and Engineering), a middle school STEM curriculum integrating science, engineering, and computational thinking. SPICE presents a water runoff curriculum, where students create models of various ground surfaces to simulate runoff or flooding after heavy rainfall. Understanding that runoff varies by surface materials, students tackle an engineering design challenge: redesigning their school playground to meet cost, functionality, and accessibility constraints. Generating an "optimal design" requires analyzing trade-offs between cost, absorption, and accessibility.

The workshop will explore how AI and data modeling techniques can support open-ended STEM learning by providing real-time, personalized feedback and uncovering patterns in student thinking. I will demonstrate how Large Language Models (LLMs) can grade and provide personalized feedback on students' open-ended formative assessment tasks. Additionally, I will share examples of how data modeling techniques can analyze students' computational model-building strategies, engineering design behaviors, and learning progression over time.

Participants will engage in the following hands-on activities during the session:

- **Explore the SPICE environment:** Experience the block-based computational modeling and engineering design interface utilized by middle school students to address real-world problems.

- **Demo of AI-powered teacher tools:** Discover how AI-driven analytics offer teachers actionable insights into students' responses and learning progress.
- **Real-time LLM-based grading:** Submit formative assessment responses and observe instant grading along with personalized feedback generated by LLM.
- **Interact with an AI feedback agent:** Engage directly with an AI conversational agent to comprehend the provided feedback and bridge knowledge gaps.

By the end of the session, participants will gain concrete ideas for integrating AI tools and data analysis techniques into their STEM classrooms to enhance computational thinking and learning instruction.

Speaker Bio

Gautam Biswas is a Cornelius Vanderbilt Professor of Engineering and Professor of Computer Science and Engineering in the CS Department, as well as a Senior Research Scientist at the Institute for Software Integrated Systems at Vanderbilt University. He conducts research in intelligent systems with primary interests in modeling and simulation, analysis of complex embedded systems, data mining, and Open-Ended Learning Environments (OELEs) for STEM disciplines. His notable projects include Teachable Agents and learning environments that promote synergistic learning of Computational Thinking and STEM concepts and practices. He has also developed innovative data mining techniques for studying students' learning behaviors and linking them to metacognitive strategies. More recently, as part of an NSF AI Institute, ENGAGE AI, and an IES STEM Education Center, GENIUS, he has developed tools for multimodal data collection and analyses in classroom environments. He is now developing conversational chatbots to support student learning. Prof. Biswas is a Life Fellow of the IEEE, Asia Pacific Society for Computers in Education (APSCE), and the Prognostics and Health Management Society.

vii. Campus Map

Conference Centre

Southern University of Science and Technology Campus
南方科技大學校園

viii. Transportation

How to get to EdUHK (Hong Kong) for international visitors?

a. From HK International Airport to EdUHK

Take a taxi to EdUHK direct (pay by cash; about HK$350-HK$400), or

Take Airbus E41 to Tai Po Centre then change to bus 74K or taxi (about HK$60)

b. From Shenzhen to EdUHK

Take MTR train from Lo Wu to Tai Po Market Station (details)

then change to bus 74K or taxi (pay by cash; about HK$60)

c. From Hung Hom MTR Station to EdUHK

Take MTR train to Tai Po Market Station (details)

then change to bus 74K or taxi (pay by cash; about HK$60)

Public Transportation Information

KMB		
	**No. 74K** Bus – Circular (between MTR Tai Po Market Station and Sam Mun Tsai visiting The Education University of Hong Kong)	KMB No. 74K Bus Schedule
	No. 74F Bus - Express Route (between Kwun Tong Ferry and The Education University of Hong Kong)	KMB No. 74F Bus Schedule
	**No. 73F** Bus - Express Route (between Tsuen Wan Nina Tower and The Education University of Hong Kong)	KMB No. 73F Bus Schedule
	No. 263C Bus ~ NEW (between Tuen Mun Station and The Education University of Hong Kong)	KMB No. 263C Bus Schedule
	No. 265S Bus ~ NEW (from Tin Shui Wai Town Centre to The Education University of Hong Kong)	KMB No. 265S Bus Schedule
Green Minibus		
	**No. 26** Service (between Tai Po Campus and Bayshore Towers, Ma On Shan)	Green Minibus No. 26 Service Schedule

How to get to SUSTech (Shenzhen) for international visitors?

a. From Luohu Port (Conference Shuttle Bus is provided)

Take the Conference Shuttle Bus from Luohu Port (羅湖口岸). The meeting time is at 7:30 a.m..

b. From Shenzhen Bao'an International Ariport

Take Metro Line 11 to Qianhaiwan, transfer to Metro Line 5 to Tanglang. (1hour)

c. From Shenzhen North Railway Station

Take Metro Line 5 to Tanglang. (20 minutes)

d. From Futian Railway Station

Take Metro Line 4 to Shenzhen North Railway Station, transfer to Metro Line 5 to Tanglang. (1 hour) (b) Take bus M459 from Gouwu Gongyuan Metro Station to Tanglang Primary School. (1.5 hours)

ix. Enquiry

2025
CTE-STEM

18 – 20 June, 2025 (Wednesday – Friday)

The Education University of Hong Kong, Hong Kong SAR
Southern University of Science and Technology, Shenzhen

https://www.eduhk.hk/ctestem2025/

Enquiry:

ctestem2025@eduhk.hk (CTE-STEM 2025 Secretariat)

(+86) 15013731050 (陈老师, SUSTech, Shenzhen)

(+86) 13776657705 (冯老师, SUSTech, Shenzhen)

(+86) 18393418337 (康老师, SUSTech, Shenzhen)

See you at CTE-STEM 2025!

香港教育大學
The Education University of Hong Kong

Artificial Intelligence and Digital Competency Education Centre
人工智能及數碼能力教育中心

Co-organiser:

2025 CTE-STEM

Website URL:

https://www.eduhk.hk/ctestem2025/

Email:

ctestem2025@eduhk.hk

Supporting Organisations:

Coo/Think @ JC 賽馬會運算思維教育

Education Bureau
The Government of the Hong Kong Special Administrative Region of the People's Republic of China

iTLE

香港電腦教育學會
The Hong Kong Association for Computer Education