

The 6th International Conference on Civil and Building Engineering Informatics (ICCBEI 2025)

Constructing the Future: Digital Transformation
in Smart and Sustainable Built Environment

Dates: 8 - 11 Jan 2025 (Wed - Sat)

Location: Crowne Plaza Hong Kong Kowloon East Hotel
(Tower 5, No. 3 Tong Tak Street, Tseung Kwan O, Hong Kong, China)



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透過 **網上平台**與其他i-Club會員交流

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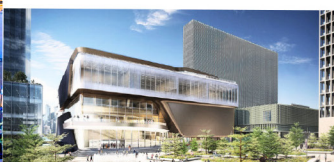
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Program Rundown

Day 1 – 8 January 2025 (Wednesday)

Time (HKT)	Venue: 47/F, Cielo Restaurant and Bar, Crowne Plaza Kowloon East Hotel
18:00 – 19:00	Registration (1/F, Crowne Plaza Kowloon East Hotel)
18:00 – 20:00	Pre-Conference Welcome Reception

Day 2 – 9 January 2025 (Thursday)

Time (HKT)	Venue: Grand Ballroom II-III (1/F)
08:30 – 09:00	Registration
09:00 – 09:30	Welcome Speeches <ul style="list-style-type: none"> - <i>Ir John KWONG Ka-Sing, BBS, JP</i> (Vice-President for Development, HKUST) - <i>Prof. Hong Kam LO, JP</i> (Dean of Engineering, HKUST) - <i>Prof. Jack CHENG</i> (Conference Chair; Professor and Associate Head, HKUST) - <i>Prof. Nobuyoshi YABUKI</i> (Conference Chair; President of AGCEI, Professor, Osaka University)
09:30 – 09:45	Opening Speech by Guest of Honor <ul style="list-style-type: none"> - <i>Ir Ricky LAU Chun-kit, JP</i> (Permanent Secretary for Development (Works), HKSAR)
09:45 – 10:00	Group Photos
10:00 – 10:15	Opening Keynote Presentation <p>"Future of Construction"</p> <ul style="list-style-type: none"> - <i>Ir Prof Thomas HO, JP</i> (Chairman, Construction Industry Council, Hong Kong)
10:15 – 10:25	Networking Break with Coffee
10:25 – 12:15	Keynote Presentations (Chairs: Prof. Nashwan DAWOOD, Prof. Markus KONIG) <p>"Opportunities and Trends of Computing in Civil and Building Engineering"</p> <ul style="list-style-type: none"> - <i>Prof. Kincho H. LAW</i> (Stanford University, USA) <p>"Enhancing Construction Safety with CBS and AI"</p> <ul style="list-style-type: none"> - <i>Prof. Dongping FANG</i> (Tsinghua University, China) <p>"Let's Build a Better World, and Future-proof Our Smart Cities Through Digital Transformation!"</p> <ul style="list-style-type: none"> - <i>Ar Prof. Ada FUNG</i> (Hong Kong, China Chapter of buildingSMART International) <p>"Transforming Construction: The Shift from Traditional Practices to Intelligent Systems"</p> <ul style="list-style-type: none"> - <i>Prof. Xiangyu WANG</i> (Curtin University, Australia) <p>Q&A Session for Keynote Speakers</p>
12:15 – 13:30	Luncheon (The Chef's Table, 1/F)

Day 2 – 9 January 2025 (Thursday)

Time (HKT)	Grand Ballroom I (1/F)	Grand Ballroom II (1/F)	Grand Ballroom III (1/F)
13:30 – 15:10	Technical Paper Presentation Session 1 Digital Twins and BIM Technologies (<i>Prof. Jun Wang,</i> <i>Prof. Ahn Changbum</i>)	Technical Paper Presentation Session 2 Construction Safety and Worker Well-being (<i>Prof. Hung Lin Chi,</i> <i>Prof. Jun Ma</i>)	Technical Paper Presentation Session 3 Innovations for Operation and Maintenance (<i>Prof. Yang Zou,</i> <i>Prof. Xinming Li</i>)
15:10 – 15:20	Networking Break with Coffee		
15:20 – 17:00	Technical Paper Presentation Session 4 XR (VR/AR/MR), Visualization, and Simulation (<i>Prof. Mingzhu Wang,</i> <i>Prof. Sang-Ho Lee</i>)	Technical Paper Presentation Session 5 Advancing Construction through Robotics and Human-Machine Collaboration (<i>Prof. Long Chen,</i> <i>Prof. Charinee Limsawasd</i>)	Technical Paper Presentation Session 6 Large Model and Intelligent Building Operation and Maintenance (<i>Prof. Jiarui LIN,</i> <i>Prof. Yujie Lu</i>)
17:00 – 18:30	Bus Tour to Conference Banquet Dinner		
18:30 – 21:00	Conference Banquet Dinner		

Day 3 – 10 January 2025 (Friday)

Time (HKT)	Venue: Grand Ballroom II-III (1/F)
08:30 – 09:00	Registration
09:00 – 09:05	Opening by - <i>Prof. Nobuyoshi YABUKI</i> (Conference Co-Chair) and <i>Prof. Yantao YU</i> (Conference Co-Chair)
09:05 – 10:55	Keynote Presentations (Chairs: Prof. Koji MAKANAE, Prof. Veerasak LIKHITRUANGSILP) "Construction 5.0 in the Age of Digital Transformation: Current Trends and Future Research" - <i>Prof. Mirosław SKIBNIEWSKI</i> (University of Maryland, USA) "AI-based Digital Twinning the Built Environment" - <i>Prof. Ioannis BRILAKIS</i> (Cambridge University, UK) "From Blueprint to Greenprint: Challenges and Opportunities in the Digital Transformation of Construction Industry for Sustainability" - <i>Prof. Shang-Hsien HSIEH</i> (National Taiwan University, Taiwan) "Integrated BIM, Blockchain, and Multimodal Data-Driven Digital Twins for AEC Industry Digitalization" - <i>Prof. Farzad RAHIMIAN</i> (Teesside University, UK) Q&A Session for Keynote Speakers
10:55 – 11:05	Networking Break with Coffee

Day 3 – 10 January 2025 (Friday)

11:05 – 12:55	Keynote Presentations (Chairs: Prof. Guangbin WANG, Prof. Calvin KAM) “Intelligent Safety Assurance for Scaffold Systems” - <i>Prof. Hyoungkwan KIM</i> (Yonsei University, Korea) “Navigating Complexity: Advanced Robotics for Dynamic Construction Environments” - <i>Prof. Yong-Kwon CHO</i> (Georgia Institute of Technology, USA) “Formalizing Complex Engineering Knowledge with Computational Methods - Art or Science” - <i>Prof. Timo HARTMANN</i> (Technische Universität Berlin, Germany) “AI Meets Geospatial: Transforming Building Operations and Management” - <i>Prof. Yelda TURKAN</i> (Oregon State University, USA) Q&A Session for Keynote Speakers		
12:55 – 14:00	Luncheon (Grand Ballroom I, 2/F)		
Time (HKT)	Grand Ballroom II (1/F)	Grand Ballroom III (1/F)	Diamond Room 3 (2/F)
14:00 – 15:40	Technical Paper Presentation Session 7 Sustainable Construction and Development <i>(Prof. Jingyuan TANG, Prof. Wen Yi)</i>	Technical Paper Presentation Session 8 OpenBIM and Generative Design <i>(Prof. Brian Guo, Prof. Chao Mao)</i>	AGCEI Board Meeting [14:10-15:50]
Time (HKT)	Diamond Room 1-2 (2/F)		Diamond Room 5-6 (2/F)
14:00 – 15:40	Technical Paper Presentation Session 9 AI for Safety and Health in Building Environment <i>(Prof. Vincent Gan, Prof. Albert Y. Chen)</i>		Technical Paper Presentation Session 10 Information Management in Design and Maintenance <i>(Prof. Yi Tan, Prof. Yiwei WENG)</i>
15:40 – 15:50	Networking Break with Coffee		
Time (HKT)	Grand Ballroom II (1/F)		Grand Ballroom III (1/F)
15:50 – 16:55	Technical Paper Presentation Session 11 AI in Construction: Innovations, Risks, and Best Practices <i>(Prof. Bo Xiao, Prof. Jiayu Chen)</i>		Technical Paper Presentation Session 12 Digital Twins for Building and Infrastructure Maintenance <i>(Prof. Weiwei Chen, Prof. Botao Zhong)</i>
Time (HKT)	Diamond Room 1-2 (2/F)		Diamond Room 5-6 (2/F)
15:50 – 16:55	Technical Paper Presentation Session 13 Education and Training in Construction <i>(Prof. Jingfeng Yuan, Prof. JoonOh SEO)</i>		Technical Paper Presentation Session 14 Digital Campus <i>(Prof. Jack C.P. Cheng, Prof. Lavinia Chiara Tagliabue)</i>
16:55 – 17:15	Networking Break with Coffee		
17:15 – 17:30	Closing Ceremony and Presentation of Best Student Paper Awards		

Day 4 – 11 January 2025 (Saturday)

Time (HKT)	Technical Visit / Excursion in Macau (Optional)
09:00 – 18:00	(Optional) Excursion – Hong-Kong-Zhuhai-Macau Bridge, Macau University of Science and Technology, etc.

About ICCBEI 2025

The 6th International Conference on Civil and Building Engineering Informatics (ICCBEI 2025) will be held on 8th-11th January 2025 in Hong Kong. The conference will cover a wide range of research fields in the application of Information and Communication Technology (ICT) to Civil, Building, and Environmental Engineering. The topics include but not limited to Building and Construction Information Modeling (BIM/CIM); Artificial Intelligence (AI), Blockchain, Digital Twin; Information and Process Management; Laser and Image Scanning; IoT Sensors and Monitoring; Visualization and XR (VR/AR/MR); Smart Cities; Facility, Infrastructure, and Asset Management; Computational Mechanics and Engineering; Construction Management; Disaster Management; Green Construction and Sustainability; Architecture, Engineering, Construction and Operation (AECO) Industrial Issues.

About The Hong Kong University of Science and Technology (HKUST)

The Hong Kong University of Science and Technology (HKUST) is a dynamic, international research university, in relentless pursuit of excellence, leading the advance of science, technology, business and humanities, and educating the new generation of front-runners for the world. To facilitate digital construction, research programs at HKUST have focused on the application of information and communication technologies such as building information modeling (BIM), Internet of Things (IoT), artificial intelligence (AI) and drones on the building and construction sectors. By integrating expertise and intelligence from multiple fields, HKUST has also established the GREAT Smart Cities Center (GSCC) to advance the underpinning science and technology for smart city development. Academic and industry research collaborations have been established locally and internationally.

About Asian Group for Civil Engineering Informatics (AGCEI)

About Asian Group for Civil Engineering Informatics (AGCEI) was developmentally organized from the previous series of Asian Construction Information Technology Roundtable Meeting sponsored by the Japan Society of Civil Engineers (JSCE) and Japan Construction Information Center (JACIC). AGCEI is a sister organization of International Society for Computing in Civil and Building Engineering (ISCCBE), and ICCBEI, which is organized by AGCEI, is a sister international conference of International Conference on Computing in Civil and Building Engineering (ICCCBE) officially. ICCBEI is to be held in the odd number years in Asia, while International Conference on Computing in Civil and Building Engineering (ICCCBE), which is organized by ISCCBE, is to be held in the even number years. Although ICCBEI is held in Asia, it is a truly international conference, and we welcome participants from all over the world.

International Scientific Committee

- Robert Amor (University of Auckland, New Zealand)
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- Farrukh Arif (NED University of Engineering and Technology Karachi, Pakistan)
- Habeb Astour (Erfurt University of applied sciences, Germany)
- Niels Bartels (TH Köln Technische Universität, Germany)
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- Hiroaki Date (Hokkaido University, Japan)
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- Zhenhua Zhu (Wisconsin University, USA)
- Yang Zou (University of Auckland, New Zealand)



Message From Conference Chair

Prof. Jack CHENG

The Hong Kong University of Science and Technology

On behalf of the Hong Kong University of Science and Technology (HKUST), I am delighted to welcome you to Hong Kong and the 6th International Conference on Civil and Building Engineering Informatics (ICCBEI 2025). This conference is a vital platform for researchers, practitioners, and industry leaders to explore the intersection of built environments and informatics.

At HKUST, we are dedicated to advancing science, business, and technology. Our initiatives include the HKUST BIM Lab, where we focus on BIM-related digital innovations and applications of smart technologies. In addition, we have established the GREAT Smart Cities Institute to foster a sustainable smart campus, serving as a Living Lab for future developments. With Hong Kong's rapid urbanization and innovative construction practices, we aim to create sustainable solutions for a smart built environment.

We are excited to host ICCBEI this year, one of the premier conferences in the construction field. This year, ICCBEI 2025 focuses on innovative technologies that enhance civil infrastructure design, construction, and maintenance. As urbanization and climate change present new challenges, integrating informatics into civil engineering is more crucial than ever. ICCBEI 2025 includes technical visits in Hong Kong and Macau, networking sessions, and presentations from keynote speakers and authors worldwide. This conference encourages participants to discuss challenges and solutions in smart and sustainable built environments. I believe the insights gained will inspire growth and transformation within our AECO industry.

This is the first time that ICCBEI is organized in the Greater China. Hong Kong serves as a vital link between East and West, bringing together global leaders, stakeholders, and scholars from the construction and IT industries for networking and knowledge sharing. Renowned for its culinary scene and vibrant shopping, Hong Kong also features a dynamic construction industry, known for its innovative skyscrapers and sustainable urban development. With excellent public transportation and world-class infrastructure, Hong Kong is an ideal venue for international gatherings, providing a rich backdrop for intellectual exchange and cultural experiences.

Finally, I extend my heartfelt gratitude to our sponsors, supporting organizations, keynote speakers, paper authors, conference participants, and the organizing committee for their invaluable contributions to this conference's success.

Thank you for your participation! I wish you an enjoyable experience throughout the conference and during your stay in Hong Kong.

Jack CHENG



Message From Conference Co-Chair

Prof. Nobuyoshi YABUKI

Osaka University

On behalf of the Board of Directors (BoD) of the Asian Group for Civil Engineering Informatics (AGCEI), I would like to warmly welcome you to the 6th International Conference on Civil and Building Engineering Informatics (ICCBEI 2025) held on January 8 – 11, 2025, in Hong Kong. Your presence here is highly appreciated, and we are excited to have you join us for what promises to be an inspiring and informative event. Our goal is to ensure that you feel comfortable and inspired throughout the conference. We have a fantastic lineup of keynote speakers, technical paper sessions, and networking opportunities, as well as technical visits and Macau excursions, lined up for you. Thank you for joining this exciting event. We will make this conference a memorable and rewarding experience together.

Nobuyoshi Yabuki



Message From Conference Co-Chair

Prof. Yantao YU

The Hong Kong University of Science and Technology

Dear Participants,

As a Co-Chair of the Sixth International Conference on Civil and Building Engineering Informatics (ICCBEI 2025), I am delighted to welcome you all. I wish you a successful and enjoyable experience here in the beautiful city of Hong Kong.

The construction and built environment face many challenges that require innovative solutions and collaboration. ICCBEI 2025 is a key platform for sharing knowledge, sparking discussions, and building partnerships that will shape our industry's future. This conference will be an excellent opportunity for researchers and practitioners to present their work, exchange ideas, and explore new directions. I encourage you to actively participate in the sessions, share your insights, and connect with fellow attendees.

I would like to express my heartfelt thanks to the international team of reviewers for their exceptional work in selecting high-quality papers for presentation. I also extend my sincere gratitude to the organizing committee members and volunteers for their invaluable contributions. Your support has been crucial in bringing this conference to life.

We hope you find this event enlightening and enjoyable, and we look forward to the stimulating discussions and ideas that will emerge in the coming days.

Welcome to ICCBEI 2025!

Warm regards,

Yantao YU

Co-Chair, ICCBEI 2025

Keynote Speakers, Biography & Presentation Abstracts



Ir Prof. Thomas On-sing HO, JP

Construction Industry Council
Chairman

About the Speaker

Ir Prof. Thomas HO is the Chairman of the Construction Industry Council (CIC). The mission of CIC is to CONNECT, LEAD and EXCEL. He possesses over 40 years of experience in construction industry. He has been dedicated to spearheading project management and general management, safety initiatives, sustainable development and innovation excellence in the construction industry. He is recognised by the industry as the figurehead in promoting excellence in construction management, safety leadership, as well as sustainable and quality construction. After joining CIC, he promoted Mi-Infinity, Integrated Common Data Environments and holistic Robotic Construction, he also insisted Design for Safety, High Productivity and Sustainability in the future of Construction. Livability and Well-being will be the ultimate game. In recognition of his advanced mindset in advocating innovative and green construction initiatives, Ir Prof. HO received the Outstanding Achievement Award from Hong Kong Institute of Construction Managers in 2018. He was appointed as a Fellow Member of the Hong Kong Academy of Engineering Sciences.

Opening Keynote Speakers : "Future of Construction"

Abstract

The construction industry is currently facing challenges. To navigate these obstacles, the sector must evolve to implement high-productivity construction methods, sustainable design practices, and advanced technologies such as robotics and AI. In addition to these adaptations, nurturing industry talent is essential. By learning from global best practices and leveraging opportunities in the Greater Bay Area, the industry can cultivate a skilled workforce capable of driving innovation and excellence. This comprehensive approach not only addresses the current challenges but also paves the way for a more resilient, innovative, and globally competitive construction industry.

Keynote Speakers, Biography & Presentation Abstracts



Prof. Kincho LAW

Stanford University, USA

Professor

About the Speaker

Prof. Kincho H. Law is Professor of Civil and Environmental Engineering at Stanford University. He received his B.Sc. in Civil Engineering and B.A. in Mathematics from the University of Hawaii in 1976, and M.S. and Ph.D. in Civil Engineering from Carnegie Mellon University in 1979 and 1981, respectively. After serving as Assistant Professor at Rensselaer Polytechnic Institute from 1982 to 1988, he joined Stanford University in 1988. Prof. Law's research interests focus on information science and computing technologies in civil and mechanical engineering.

Prof. Law was the recipient of ASCE Computing in Civil Engineering Award in 2011 and the Excellence in Research Award by ASME's Division of Computers and Information in Engineering in 2023. He has received a number of best paper awards from the American Society of Civil Engineers (ASCE), American Society of Mechanical Engineers (ASME), the Institute of Electrical and Electronics Engineers (IEEE) and Digital Government Society. He has been on the advisory boards for a number of start-up companies on Data Analytics, IoT Platform for Manufacturing, Autonomous Vehicles, and others. Prof. Law was elected Distinguished Member of ASCE in 2017, Fellow of ASME in 2017, Life Member of ASCE in 2018, and Senior Member of IEEE in 2019.

Keynote Speakers : “Opportunities and Trends of Computing in Civil and Building Engineering”

Abstract

Civil and building Engineering has had a long and successful history in adopting computing technologies, from computer graphics, CAD, engineering analyses, virtual simulations, to project management. As technologies continue to advance, there are many new opportunities that can take advantage of information science and computing technologies in engineering. Technologies such as information modeling, enterprise integration, digital twins, computer vision, sensors, Internet and cloud computing, IoT and cyber-physical systems, AI and machine learning, are now being deployed in engineering. This keynote will provide an overview of current trends of computing technologies and opportunities in civil and building engineering.

Keynote Speakers, Biography & Presentation Abstracts



Prof. Dongping FANG

Tsinghua University, China
Professor and Dean

About the Speaker

Prof. Dongping Fang is a Professor and the Dean of School of Civil Engineering at Tsinghua University. He also serves as the Deputy Director of the Tsinghua Institute for Future Cities and Infrastructures. Prof. Fang specializes in construction safety and urban resilience. He has authored over 270 papers and has been recognized as a Highly Cited Chinese Researcher by Elsevier for ten consecutive years and a World's Top 2% Scientist by Stanford University for five consecutive years. His contributions have earned him the CAE Guanghua Engineering Science and Technology Award, and the awards from the Governments of Beijing and Guangdong Province, the Construction Industry Council of Hong Kong, and the Chartered Institute of Building (CIOB).

Keynote Speakers : “Enhancing Construction Safety with CBS and AI”

Abstract

Unsafe behaviors are related to over 80% of accidents on construction sites. This keynote begins by exploring the root causes of unsafe behaviors in the construction industry and introduces the cognition-based safety CBS, along with LCB approaches for assessing and enhancing safety leadership (L), safety culture (C), and safety behavior (B). It also presents how intelligent technologies such as generative AI and IoT were developed based on CBS, and introduces the developed intelligent safety management system BESAFE, illustrating its application value to site safety management through case studies.

Keynote Speakers, Biography & Presentation Abstracts



Ar Prof. Ada YS FUNG

Hong Kong, China Chapter of buildingSMART International
Founding Chairperson

About the Speaker

Ar Prof. Ada Fung is the former Director of Housing (Development & Construction) of the Hong Kong Housing Authority. Her role was to oversee all facets of public housing development representing homes for almost half of the Hong Kong population. Retired from the Housing Authority in end 2017, Ada continues with her relentless efforts towards driving improvement in the built asset industry, sustainable development and ESG. With more than 40 years of solid experience in the construction industry, she has been serving as president and honorary advisor to a variety of professional bodies in different domains.

Ar Prof. Fung has been appointed to serve as Member on various Government Boards, including the Advisory Council on the Environment, Occupational Safety and Health Council, Green Tech Fund Assessment Committee, Panel of Advisors for Land Sharing Pilot Scheme, and Board of Directors for Logistics and Supply Chain MultiTech R&D Centre etc. amongst other appointments.

She is Past President of the Hong Kong Institute of Architects (2013 - 2014), Past Director and Board Secretary of the World Green Building Council (2018-2020), and Past Chair of Committee on BIM of the Construction Industry Council (2017-2023).

Keynote Speakers : “Let’s Build a Better World, and Future-proof Our Smart Cities Through Digital Transformation!”

Abstract

We are facing climate risks, and we can feel the urgency of the emergency. We need to act wisely and design for resilience to combat climate risk. We have only ONE planet, and Construction industry is a big spender of the Earth’s natural resources. We need to act wisely throughout all stages of the life cycle of built assets to reduce our carbon footprint and achieve Net Zero emissions. Some of these actions include the World’s Green Building Movement, government’s target for decarbonisation, mandatory disclosure of Environment, Social and Governance (ESG) for listed companies, Smart City initiatives etc.

Sustainable development, ESG, green finance, etc. become important issues in the built asset industry. Wider adoption of passive design, prolonging the useful life of existing buildings, construction new buildings with longer life expectancy are some practical strategies to be promoted, based on some exemplary demonstration projects in public housing. Industrial infrastructures for waste management emerge as a building typology for advancing net zero carbon emission.

“What gets measured gets done.” We need trusted data and information in order to develop ESG Strategies and set realistic goals, develop initiatives that are measurable, quantifiable, scalable and achievable, and then tracking performance. Digital transformation with the use of BIM, GIS, IoT, AI etc are indispensable. We need strategies to work smart towards digitalisation for our smart cities, and avoid digital silos. We need to ensure data sustainability and interoperability, with the use of openBIM etc.

Government as developer / procuring entity, and Government as regulator would be in the best position to drive digitalisation by mandating BIM adoption, whilst the industry should move in tandem towards R&D, training, developing standard, and promoting openBIM adoption, and future-proof our smart cities through digitalisation.

Keynote Speakers, Biography & Presentation Abstracts



Prof. Xiangyu WANG

Curtin University, Australia and East China Jiaotong University
Professor

About the Speaker

Prof. Xiangyu Wang is a globally renowned scholar and thought leader in civil engineering, construction, and transportation, with a strong focus on pioneering digital technologies. He is a Fellow of the EU Academy of Sciences (EUAS) and was named a Highly Cited Researcher by Clarivate in 2022. Prof. Wang is a prominent figure in the New Infrastructure movement and a key driver of digital transformation across Australia, China, and beyond. He is currently the Executive Director of the Civil Infrastructure Smart Construction Research Institute at East China Jiaotong University and also affiliated with Curtin University. Additionally, he is the Founding President of the International Society for Smart Construction and Production (SCP) and director of both the Curtin Advanced Technologies Research and Innovation Alliance (CATRINA) and the Australasian Joint Research Centre for Building Information Modelling. He has previously served as the Australian Research Council (ARC) College of Experts (2016-2018) and as the Curtin-Woodside Chair Professor for Oil, Gas & LNG Construction and Project Management (2013-2018). Over his distinguished career, he has led more than 60 major research projects globally, securing over AUD 20 million in research funding. His collaborations with industry leaders such as Shell, Woodside, and BHP have resulted in impactful solutions in construction and project management, with a particular emphasis on the practical integration of digital technologies. With over 500 scientific papers published, Prof. Wang's work has garnered more than 36,000 citations, and he holds an H-index exceeding 100. His research includes 30 highly cited papers and 9 hot papers, as listed by the Web of Science, further highlighting his substantial contributions to his fields of expertise. He has been recognized with numerous prestigious awards, including the Marquis Lifetime Achievement Award, and has been consistently ranked among the World's Top 2% Scientists by Stanford University.

Keynote Speakers : “Transforming Construction: The Shift from Traditional Practices to Intelligent Systems”

Abstract

This keynote offers an in-depth exploration of the transformation of the construction industry from traditional practices to the integration of advanced intelligent technologies, centring on the innovative concept of the "Engineering Brain" and its implications for future development. It begins by examining the evolution of intelligent construction through four distinct stages, highlighting the technological breakthroughs and representative innovations that define each phase. The theoretical framework of the "Engineering Brain" is then introduced, providing a comprehensive overview of its underlying principles and a detailed explanation of the five critical components that form the foundation of intelligent construction systems based on this concept. The discussion further delves into the practical implementation of intelligent construction systems, structured into three progressive phases. The first phase is explored in detail, supported by an analysis of three engineering case studies that demonstrate the application and effectiveness of this approach in real-world scenarios. These examples illustrate how the Engineering Brain framework is transforming construction processes, enabling smarter decision-making and enhanced operational efficiency. The keynote concludes with a forward-looking perspective, addressing the potential of Engineering Brain-driven intelligent construction systems to reshape the industry. It identifies emerging trends, future research directions, and the anticipated challenges and opportunities as the construction sector continues to embrace digitalisation and intelligent solutions. This comprehensive overview provides valuable insights into the transformative impact of the Engineering Brain on the future of construction.

Keynote Speakers, Biography & Presentation Abstracts



Prof. Mirosław SKIBNIEWSKI

University of Maryland, USA

Professor

About the Speaker

Prof. Mirosław Skibniewski from the University of Maryland holds M.S. and Ph.D. degrees in Civil Engineering from Carnegie-Mellon University. His research and teaching activities include construction automation and robotics, systems engineering and management for resilient and sustainable construction, effective strategies for technology transfer, and legal aspects of architecture, engineering and construction. He is the Honorary Editor of Automation in Construction published by Elsevier, the top-ranked Civil Engineering scholarly journal listed in the Web of Science Journal Citation Reports, and served for three decades as the editor-in-chief of that journal. An author/co-author of over 400 technical publications, Skibniewski currently also serves as Co-Editor-in-Chief of Frontiers of Engineering Management published by Springer and Higher Education Press.

Keynote Speakers : “Construction 5.0 in the Age of Digital Transformation: Current Trends and Future Research”

Abstract

A new industry paradigm referred to as “Construction 5.0” has emerged in recent years that aims at capitalizing on the achievements of Construction 4.0 in the pursuit of additional objectives, including environmental sustainability, human/societal welfare, and infrastructure resilience in the face of climate change and increasingly common natural disasters. Researchers and practitioners alike devote increasing attention to the innovative software-based tools, sensor systems solutions, automated controls, generative AI models, and other technological features aimed at transforming construction and related business activity in pursuit of improved sustainability, resilience, and human well-being. New research directions are being defined to optimize these efforts with respect to different criteria of interest.

Keynote Speakers, Biography & Presentation Abstracts



Ioannis BRILAKIS

University of Cambridge, UK

Laing O'Rourke Professor of Civil and Information Engineering

About the Speaker

Prof. Ioannis Brilakis is the Laing O'Rourke Professor of Civil & Information Engineering and the Director of the Construction Information Technology Laboratory at the Division of Civil Engineering of the Department of Engineering at the University of Cambridge. He completed his PhD in Civil Engineering at the University of Illinois, Urbana Champaign in 2005. He then worked as an Assistant Professor at the Departments of Civil and Environmental Engineering, University of Michigan, Ann Arbor (2005-2008) and Georgia Institute of Technology, Atlanta (2008-2012) before moving to Cambridge in 2012 as a Laing O'Rourke Lecturer. He was promoted to Reader in October 2017 and to Professor in 2021. He has also held visiting posts at the Department of Computer Science, Stanford University as a Visiting Associate Professor of Computer Vision (2014) and at the Technical University of Munich as a Visiting Professor, Leverhulme International Fellow (2018-2019), and Hans Fischer Senior Fellow (2019-2023). He is a recipient of the 2022 EC3 Scherer Award, 2022 EC3 Thorpe Medal, 2019 ASCE J. James R. Croes Medal, the 2018 ASCE John O. Bickel Award, the 2013 ASCE Collingwood Prize, the 2012 Georgia Tech Outreach Award, a 2010 NSF CAREER award, and a 2009 ASCE Associate Editor Award. Dr Brilakis is an author of over 200 papers in peer-reviewed journals and conference proceedings, an Associate Editor of the ASCE Computing in Civil Engineering, ASCE Construction Engineering and Management, Elsevier Automation in Construction, and Elsevier Advanced Engineering Informatics Journals, and the lead founder of the European Council on Computing in Construction.

Keynote Speakers : “AI-based Digital Twinning the Built Environment”

Abstract

Digital Twinning methods can produce a reliable digital record of the built environment and enable owners to reliably protect, monitor and maintain the condition of their asset. The built environment is comprised of large assets that need significant resource investments to design, construct, maintain and operate them. Improving productivity, i.e., efficiency and effectiveness, and creating new, disruptive ways to address existing problems throughout their lifecycle can generate significant performance improvements in cost, time, quality, safety, sustainability, and resilience metrics for all involved parties. Creating and maintaining an up-to-date electronic record of built environment assets in the form of rich Digital Twins can help generate such improvements. This keynote introduces research conducted at the University of Cambridge on inexpensive AI methods for generating object-oriented infrastructure geometry, detecting, and mapping visible defects on the resulting Digital Twin, automatically extracting defect spatial measurements, and sensor and sensor data modelling. The results of these methods are further exploited through their application in design for manufacturing and assembly (DfMA), mixed-reality-enabled mobile inspection, and proactive asset protection from accidental damage.

Keynote Speakers, Biography & Presentation Abstracts



Prof. Shang-Hsien HSIEH

National Taiwan University, Taiwan

Professor and Director of BIM Research Center

About the Speaker

Prof. Hsieh, a Professor in Civil Engineering at National Taiwan University, specializes in Computer-Aided Engineering and directs the Research Center for Building & Infrastructure Information Modeling and Management. He served on the Board of Directors of the International Society for Computing in Civil and Building Engineering (1999–2022) and was its President (2006–2008). Currently, he is a Board Member of the Asian Group for Civil Engineering Informatics (since 2013) and the International Consortium of Construction Engineering and Project Management (since 2021). Elected as a Corresponding Member of the International Academy of Engineering in 2021, Prof. Hsieh is recognized for his contributions to academic research, international collaboration, and digital transformation in construction. His research interests span intelligent engineering modeling, knowledge management systems, and innovative education. Recently, he focuses on digital transformation for sustainable development in the built environment.

Keynote Speakers : “From Blueprint to Greenprint: Challenges and Opportunities in the Digital Transformation of Construction Industry for Sustainability”

Abstract

The construction industry is undergoing a paradigm shift as it strives to meet the dual imperatives of digital transformation and sustainability. Moving from traditional blueprints to "greenprints," this transformation integrates advanced digital technologies with eco-conscious practices to create a resilient and sustainable built environment. This keynote explores the challenges and opportunities in this evolving landscape, emphasizing the role of Building Information Modeling (BIM), digital twins, and IoT-enabled systems in reducing environmental impact and improving resource efficiency.

The keynote will address key challenges, such as technological adoption barriers, data interoperability and standardization, and skill gaps, while showcasing innovative solutions that bridge these divides. Real-world examples will be discussed to highlight the successful integration of digital tools to enhance energy performance, streamline material use, and enable circular construction practices. Furthermore, the keynote will discuss the critical need for collaboration among stakeholders—government, academia, and industry—and the importance of fostering a culture of innovation and sustainability within organizations. It is hoped that attendees will gain a deeper understanding of how to navigate this transformative journey and align their strategies with the dual goals of digital and green innovation, paving the way for a resilient and eco-conscious future in construction.

Keynote Speakers, Biography & Presentation Abstracts



Prof. Farzad RAHIMIAN

Teesside University, UK

Professor

About the Speaker

Prof. Rahimian is a Professor of Digital Engineering at the School of Computing, Engineering and Digital Technologies at Teesside University. He leads the Centre for Sustainable Engineering, the Open Research and Output Quality group, and the Cluster for Construction Innovation & Research (CCIR). He is Editor in Chief of Smart and Sustainable Built Environment and Associate Editor of Automation in Construction. He has 4500 citations for over 200 publications with a strong emphasis on adopting cutting-edge technologies to serve the net zero and sustainability agenda, including energy policies, data-driven digital twins, demand response optimisation, smart energies, circular construction and social innovation. Farzad supervised 13 successful academics during their PhD study as their director of studies and is the mentor of 12 academics at CSE. This is demonstrated through a sustained strong research record that includes 19 funded industry-led research projects and four consultancies (principal investigator in 14 projects and four consultancies with an overall value of £2.4m) from the H2021, Innovate UK, AHRC, ERDF, CSIC, SFC, and Data Lab. He is a member of the International Council for Building (CIB) and buildingSMART International.

Keynote Speakers : “Integrated BIM, Blockchain, and Multimodal Data-Driven Digital Twins for AEC Industry Digitalization”

Abstract

This keynote will focus on recent developments in utilising blockchain and multimodal AI tools for data analytics to digitise the AEC (Architecture, Engineering, and Construction) industry. Evidence underscores that the construction industry's transformation toward Industry 5.0 relies on integrating advanced technologies like Blockchain and the Internet of Things (IoT) as crucial prerequisites for automating value-added tasks and data acquisition systems. My team developed multimodal data-driven digital twins for the management and predictive maintenance of large infrastructure. We also developed blockchain-based solutions to digitise the financial management processes of construction projects.

This keynote will provide insights into combining IoT, blockchain, and BIM for circular supply chains in existing building stocks. Furthermore, I will utilise this opportunity to showcase our efforts in adopting a software development process to create an open web-based prototype, addressing existing gaps in semi-automated tools such as COBie. The prototype underwent testing using three case studies, revealing challenges in its application and emphasising the necessity of replicating IFC-extracted data to the cloud server via linked servers in SQL.

With the rapid advancements in artificial intelligence (AI), advanced learning, transfer learning and deep learning (DL)-based crack detection techniques have garnered increased attention as a solution to issues faced during manual inspection. A prevalent deep learning technique for computer vision applications is the CNN. Finally, I will delve into our research on using deep learning to detect distress in highway pavements. For instance, our paper compares eight CNN models for crack detection, optimising the detection process.

Keynote Speakers, Biography & Presentation Abstracts



Prof. Hyoungkwan KIM

Yonsei University, Korea

Professor and Vice President of IAARC

About the Speaker

Prof. Hyoungkwan Kim is a professor in the School of Civil and Environmental Engineering at Yonsei University, South Korea, where he specializes in construction automation and climate change adaptation in infrastructure. He currently leads a \$10 million research project, Smart Safety Assurance for Temporary Structures, part of a smart construction initiative funded by the Korean Ministry of Land, Infrastructure, and Transport and the Korea Agency for Infrastructure Technology and Advancement. Professor Kim serves as the president of the International Association for Automation and Robotics in Construction (IAARC) and is an associate editor for the Journal of Computing in Civil Engineering, a publication of the American Society of Civil Engineers (ASCE). Previously, he held the role of secretary-general for the Association for Engineering Education in Southeast Asia and the Pacific (AESEAP). His career in teaching and research has earned him numerous accolades, including multiple teaching excellence awards, Yonsei University's Best Engineering Professor award, and IAARC's prestigious Tucker-Hasegawa Award.

Keynote Speakers : “Intelligent Safety Assurance for Scaffold Systems”

Abstract

This keynote will present the progress of a research project titled “Smart Safety Assurance System”, developed as part of the Smart Construction Initiative sponsored by the Korean Ministry of Land, Infrastructure, and Transport and the Korea Agency for Infrastructure Technology Advancement. The project focuses on ensuring the safety of scaffolding structures through a system that integrates a four-legged robot, LiDAR technology, and AI-powered algorithms. The autonomous robot navigates construction sites to scan scaffolding structures, while data-driven algorithms process the collected data to generate an accurate 3D digital twin. This digital twin is then utilized to verify compliance with safety regulations set by the Korean Occupational Safety and Health Agency (KOSHA). The proposed system, when deployed on construction sites, is expected to significantly enhance the safety and reliability of temporary structures.

Keynote Speakers, Biography & Presentation Abstracts



Prof. Yong-Kwon CHO

Georgia Institute of Technology, USA

Professor

About the Speaker

Prof. Yong-Kwon CHO is a Professor in the School of Civil and Environmental Engineering and an affiliated core faculty member of the Institute for Robotics and Intelligent Machines (IRIM) at the Georgia Institute of Technology. He is the Director of the Robotics and Intelligent Construction Automation Lab (RICAL), where his primary research and teaching interests focus on construction robotics and field automation. His research aims to automate and roboticize critical field tasks related to disaster relief, construction management, infrastructure maintenance, and the improvement of worker safety and productivity. In recognition of his contributions, Prof. Cho received the prestigious Tucker-Hasegawa Award from the International Association for Automation and Robotics in Construction (IAARC) in 2022 and ASCE's Computing in Civil Engineering Award in 2024. He also serves as one of the Vice Presidents of IAARC and is a Co-Editor-in-Chief for the ASCE Journal of Computing in Civil Engineering.

Keynote Speakers : “Navigating Complexity: Advanced Robotics for Dynamic Construction Environments”

Abstract

Construction sites are inherently dynamic, with constantly changing environments, scattered objects, and mobile entities such as workers and equipment. As the industry progresses towards future construction sites, the integration of multiple types of mobile robots—ranging from humanoid co-workers and material delivery robots to mobile industrial manipulator robots—will become increasingly common. This evolution brings unique challenges for ensuring that robots can effectively navigate and operate alongside human workers in these complex, ever-changing conditions. This keynote examines advancements in simultaneous localization and mapping (SLAM), optimized robotic scanning, and navigation technologies that enable robots to adapt to daily site changes. It discusses methods for efficient mapping of cluttered environments and responsiveness to dynamic elements like workers and machinery. The role of real-time 3D visualization in enhancing spatial awareness and human-robot collaboration will also be covered. By addressing the challenges of robotic perception and navigation in dynamic construction settings, this keynote outlines strategies for integrating robotics technologies to improve safety, efficiency, and human-robot co-existence on future construction sites.

Keynote Speakers, Biography & Presentation Abstracts



Prof. Timo HARTMANN

Technische Universität Berlin, Germany

Professor

About the Speaker

Prof. Timo Hartmann is intrigued by the working processes of construction, engineering, and architectural professionals and how they design the complex engineering systems that keep our societies ticking, moving, and thriving. While he is in awe of how engineers are able to deal with the complexity of their designs, he tries to provide managerial and technical solutions that improve how they work. He believes in the digitalization of the industry in the sense that computational tools have the potential to allow engineers to design significantly different than they were able before – individually, but more importantly together in integrated engineering efforts. To develop such tools, it is important to consider both technical and social factors working in close collaboration with practitioners.

Prof. Hartmann received a Ph.D. from Stanford University where he was a student at the Center for Integrated Facility Management. His work has been published in Advanced Engineering Informatics, the Journal of Construction Engineering and Management, Building Research and Information, Journal of Computing in Civil Engineering, Design Studies, or ITCON. He is the handling editor of Advanced Engineering Informatics where we explore the science of engineering knowledge formulation with computational methods and Engineering, Construction, and Architectural Management where we would like to explore how to best manage collaborative and integrated engineering projects.

Keynote Speakers : “Formalizing Complex Engineering Knowledge with Computational Methods - Art or Science”

Abstract

The representation and formalization of complex engineering knowledge is the main aim of inquiries in the scientific field of Advanced Engineering Informatics. This keynote will introduce ontology and logic as underlying methods to formalize knowledge. It is also suggested that it is important to account for the purpose of engineers and the context they work in while representing and formalizing knowledge. Based on the concepts of ontology, logic, purpose, and context, this keynote will discuss different possible research methods and provide a critical review of the field and its impact in recent years.

Keynote Speakers, Biography & Presentation Abstracts



Prof. Yelda TURKAN

Oregon State University, USA
Associate Professor

About the Speaker

Prof. Yelda Turkan is an Associate Professor in the School of Civil and Construction Engineering at Oregon State University. She earned her Ph.D. in Civil Engineering from the University of Waterloo, Canada. Prof. Turkan's research focuses on the application of computer vision and machine learning technologies to foster a sustainable and resilient built environment. With over 80 peer-reviewed publications, Prof. Turkan has made significant contributions to the field. She has served as Associate Editor for the ASCE OPEN Journal since 2023 and has been a member of the editorial board for the Advanced Engineering Informatics Journal since 2020. Her research program has created over \$4.5 million in grant funding, supported by agencies such as the National Science Foundation and the National Cooperative Highway Research Program, among others. In addition to her academic achievements, Prof. Turkan holds leadership roles in key professional organizations. She is the Vice President of the International Association for Automation and Robotics in Construction and serves as the Chair of the ASCE Computing Division Executive Committee.

Keynote Speakers : “AI Meets Geospatial: Transforming Building Operations and Management”

Abstract

A digital twin (DT) is a multiphysics, multiscale model that updates a digital representation, such as a building information model (BIM), using data from physical systems like sensors, probabilistic simulations, and material/structural models. This keynote highlights the integration of sensor data into BIM as a foundational step toward implementing DTs for structural health monitoring (SHM). Specifically, it outlines a methodology for combining the as-built geometry, material properties, and sensor data of existing buildings into a digital model. This approach was tested on a mass-timber structural system at the George W. Peavy Forest Science Center (“Peavy Hall”) at Oregon State University, featuring post-tensioned cross-laminated timber (CLT) self-centering shear walls. A Scan-to-BIM process was used to convert laser-scanned point clouds into a BIM of the shear walls. Sensors installed in the building monitored parameters such as relative humidity, air and wood temperature, wood moisture content, displacements, and deformations. Associating these measurements with the BIM adds a spatial dimension to the data, aiding in analysis and management. Additionally, integrating a material- and phenomena-specific warning tool into the IFC-BIM platform helps quickly identify potential issues, supporting inspection and maintenance planning. This approach could extend the building's service life by optimizing performance monitoring.

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