

The Association of Consulting Engineers of Hong Kong  
香港顧問工程師協會

# ACEHK ANNUAL SEMINAR 2024

## AI APPLICATION IN ENGINEERING

### PLATINUM SPONSORS

**AECOM**

**aurecon**

**binnies**

**VIBRO 惠保**  
新創建築集團成員  
Member of NWS Holdings

### SUPPORTING ORGANISATIONS

**AAP** 建築師事務所協會  
THE ASSOCIATION OF  
ARCHITECTURAL PRACTICES

**ACQS**  
Association of  
Consultant  
Quantity  
Surveyors

**CIHT**  
Hong Kong

**CONSTRUCTION  
INDUSTRY COUNCIL**  
建造業議會

**香港  
建造  
業議會**  
Construction  
Industry Council  
Hong Kong

**發展局**  
Development Bureau  
The Government of the Hong Kong Special Administrative Region  
of the People's Republic of China

**香港建造商會**  
HKCA

**香港建築師學會**  
The Hong Kong Institute of Architects

**HKIE** THE HONG KONG  
INSTITUTE OF ENGINEERS  
香港工程師學會

**SURVEYORS**  
香港測量師學會  
Inheriting HKIS Values 傳承·專業·交流  
40th ANNIVERSARY

**ice**  
Hong Kong

**香港大學**  
THE UNIVERSITY OF HONG KONG

## Event Details

Date: 20 September 2024

Time: 9:00am - 5:00pm

Venue: Multi-Purpose Hall,  
CIC-Zero Carbon Park, Kowloon Bay

Format: Hybrid Event (Physical & Zoom)



# TABLE OF CONTENTS



## ACEHK ANNUAL SEMINAR 2024

4

INTRODUCTION  
ACEHK

6

MESSAGE FROM  
CHAIRMAN, ACEHK  
Ir Stephen Lai

7

MESSAGE FROM  
CHAIRMAN OF THE  
ORGANISING COMMITTEE  
Ir Francis Yau

8

ABOUT THE  
ANNUAL SEMINAR 2024  
AI Application In Engineering

9

ACKNOWLEDGEMENT  
Sponsors and  
Supporting Organisations

10

PROGRAMME  
Morning and  
Afternoon Sessions

13

OPENING ADDRESS  
Ir Ricky LAU Chun-kit, JP,  
Permanent Secretary for  
Development (Works),  
Development BureauU

14

BIOGRAPHY AND ABSTRACT  
Ir H.W. Chan  
Mr Andy PANG  
Topics:  
AI and Data Intelligence in  
Smart Railway

16

BIOGRAPHY AND ABSTRACT  
Prof Jack CHENG Chin-pang  
Topics:  
AI with BIM / Digital Twin  
for a Greener and Safer  
Built Environment

# TABLE OF CONTENTS



## ACEHK ANNUAL SEMINAR 2024

18

BIOGRAPHY AND ABSTRACT

**Mr Wisdom CHAN**

Topics:  
Generative AI for a New  
Chapter in Engineering

19

BIOGRAPHY AND ABSTRACT

**Ir Dr Julian KWAN Shun-hang**

Topics:  
Engineering Powered by AI

20

BIOGRAPHY AND ABSTRACT

**Prof DUAN Yuan-feng**

Topics:  
AI Aided Structure Health  
Monitoring of Bridges and  
Structures

22

BIOGRAPHY AND ABSTRACT

**Ms Christina POON**  
**Mr Tony SIU Sai-kwan**

Topics:  
Weaving Love: Pioneering 3D  
Metal Printing for Large-Scale  
Pavilions in Hong Kong

24

BIOGRAPHY AND ABSTRACT

**Dr WANG Xu-guang**

Topics:  
Machine Learning-Based  
Photogrammetry Applications  
for Civil Structures

25

BIOGRAPHY AND ABSTRACT

**Ir Dr George WONG**

Topics:  
AI – a Perspective from the  
Construction Industry

26

LIST OF ORGANISING  
COMMITTEE

27

ADVERTISEMENTS



# INTRODUCTION ABOUT ACEHK



The Association of Consulting Engineers of Hong Kong  
香港顧問工程師協會

The Association of Consulting Engineers of Hong Kong (ACEHK) is a non-profit making association representing the consulting engineering profession in Hong Kong. As an industry group, the Association seeks to set and maintain standards of professional conduct and ethics of consulting engineers, promote the advancement of the profession of consulting engineering and uphold the professional interests, rights, powers and privileges of consulting engineers.

ACEHK places high importance on the business interests of its members and assist authorities, developers, bankers, funding agencies and others requiring engineering services to select consulting engineers. The Association is a member association of the International Federation of Consulting Engineers (FIDIC).

ACEHK represents the industry on various external committees, principally the Government Works Bureaux and Works Departments, such as, Development Bureau, Housing Authority, Architectural Services Department, Buildings Department, Civil Engineering and Development Department, Electrical and Mechanical Services Department and Highways Department.



# INTRODUCTION

## LIST OF COUNCIL MEMBERS



Ir Stephen LAI  
Chairman  
AECOM



Ir Francis YAU  
Vice Chairman  
Aurecon Hong Kong Limited



Ir Ole WONG  
Honorary Secretary  
Mott MacDonald HK Ltd



Ir Chris LEE  
Honorary Treasurer  
CM Wong & Associates Ltd.



Ir Andy KWOK  
Immediate Past Chairman  
Binnies Hong Kong Limited



Ir Ivy KONG  
Council Member  
WSP (Asia) Limited



Ir Simon LAU  
Council Member  
Au Posford Consultants Ltd



Ir Simon NG  
Council Member  
Mannings (Asia)  
Consultants Limited



Ir Eric LAU  
Council Member  
Buro Happold



Ir Jason WONG  
Council Member  
Arup



Ir David C H CHANG  
Council Member  
SMEC Asia Limited



Ir Dickson LAW  
Council Member  
Asia Infrastructure  
Solutions Limited



Ms Claudine LEE  
Council Member  
Meinhardt Infrastructure &  
Environment Ltd.



Ir Francis SOOTO  
Co-opted Council Member  
MVA Hong Kong Limited



Ir Victor CHEUNG  
Co-opted Council Member  
J.Roger Preston Limited

# MESSAGE FROM CHAIRMAN, ACEHK



**Ir Stephen LAI**  
Chairman  
ACEHK

Welcome to the Annual Seminar on AI Applications in Engineering. Today, we gather to explore how artificial intelligence is revolutionizing our field, fostering innovation, enhancing efficiency, safety, and sustainability in engineering practices.

This seminar features an impressive roster of experts who will share their pioneering insights on various AI applications. Your participation, whether in person or online, underscores our shared commitment to advancing our profession.

I would like to extend my sincere appreciation to our Guest of Honour and Keynote Speaker - Ir Ricky Lau Chun Kit, JP, our distinguished speakers, distinguished guests, members, sponsors, supporting organizations, and the organizing committee. Your contributions make this event possible and meaningful.

I encourage you to engage in the discussions, share your insights, and connect with fellow professionals. Together, let's envision a future where AI empowers us to achieve greater heights in engineering.

# MESSAGE FROM CHAIRMAN OF THE ORGANISING COMMITTEE



**Ir Francis YAU**

Vice Chairman

Chairman of The Organising Committee  
ACEHK

It is my pleasure to welcome you to the Annual Seminar on AI Application in Engineering. This year, we focus on the profound influence of artificial intelligence across various engineering disciplines. With over 1000 participants joining us virtually and 140 in person, this seminar demonstrates our collective interest in innovative solutions that AI offers.

The lineup of speakers is outstanding, their insights will inspire us to think critically about how we can leverage AI to enhance efficiency, safety, and sustainability in our projects.

I would like to express my gratitude to everyone involved in organizing this event, your engagement today will contribute to a richer understanding of AI's role in our industry. Let us pave the way for a smarter future in engineering!



# ABOUT THE SEMINAR



This seminar is focused on exploring and showcasing the latest advancements in the integration of artificial intelligence (AI) technologies within various engineering disciplines. The seminar brings together government officials, industry professionals, and scholars to discuss how AI is transforming and enhancing engineering practices and capabilities.

Key themes will include AI and data intelligence in smart railway systems, generative AI for innovative design, and the use of AI with Building Information Modeling (BIM) and digital twin technologies to create greener and safer built environments. Additionally, the seminar will cover AI-aided structural health monitoring for bridges, the broad applications of AI in engineering workflows, pioneering 3D metal printing techniques, machine learning in photogrammetry for civil structures, and perspectives on AI's role in the construction industry.

Through a mix of keynote presentations, speakers' presentations & discussions, and networking opportunities, the "AI Application in Engineering" seminar provides a platform for the exchange of ideas, case studies, and best practices to further the integration of AI in the engineering domain.

## KEYNOTE SPEAKER

**Ir Ricky LAU Chun-kit, JP**

Permanent Secretary for Development (Works)

Development Bureau

The Government of the HKSAR



# ACKNOWLEDGEMENT SPONSORS & SUPPORTING ORGANISATIONS



## PLATINUM SPONSORS



## GOLD SPONSORS



## SILVER SPONSORS



## TABLE TOP DISPLAYS



## SUPPORTING ORGANISATIONS



# PROGRAMME



## OPENING

**08:30** Registration

**09:05** Welcome Speech **Ir Stephen LAI**, Chairman, ACEHK

**09:10** Opening Address **Ir Ricky LAU Chun-kit, JP**,  
Permanent Secretary for Development (Works), Development Bureau

**09:20** Certificates Presentation & Group Photo

## AM SESSION

**09:30** Session 1

### **AI and Data Intelligence in Smart Railway**

**Ir H.W. CHAN**, Deputy General Manager - Operations Innovation Hub,  
MTR Corporation Limited

**Mr Andy PANG**, Chief Operations Data Studio Manager,  
MTR Corporation Limited

**09:55** Session 2

### **AI with BIM / Digital Twin for a Greener and Safer Built Environment**

**Prof Jack CHENG Chin-pang**, Professor and Associate Head,  
Department of Civil and Environmental Engineering,  
The Hong Kong University of Science and Technology

**10:20** Networking Break

**10:50** Session 3

### **Generative AI for a New Chapter in Engineering**

**Mr Wisdom CHAN**, Founder, O1River Ltd

**11:15** Session 4

### **Engineering Powered by AI**

**Ir Dr Julian KWAN Shun-hang**, Assistant Director (Technical),  
Civil Engineering and Development Department



# PROGRAMME



**11:40** Panel Discussion (1) **Moderator:**

**Ir Dickson LAW**, Council Member, ACEHK

**Panelists:**

**Ir H.W. CHAN**, Deputy General Manager - Operations Innovation Hub,  
MTR Corporation Limited

**Mr Andy PANG**, Chief Operations Data Studio Manager,  
MTR Corporation Limited

**Prof Jack CHENG Chin-pang**, Professor and Associate Head,  
Department of Civil and Environmental Engineering,  
The Hong Kong University of Science and Technology

**Mr Wisdom CHAN**, Founder, 01River Ltd

**Ir Dr Julian KWAN Shun-hang**, Assistant Director (Technical),  
Civil Engineering and Development Department

**12:00** Certificates Presentation & Group Photo

**12:15** Networking Lunch

## PM SESSION

**14:05** Session 5

**AI Aided Structure Health Monitoring of Bridges and Structures**

**Prof DUAN Yuan-feng**, Head of Civil Engineering Department,  
Zhejiang University

# PROGRAMME



**14:30** Session 6

## **Weaving Love: Pioneering 3D Metal Printing for Large-Scale Pavilions in Hong Kong**

**Ms Christina POON**, Senior Architect/Building Information Modelling, Architectural Services Department

**Mr Tony SIU Sai-kwan**, Assistant Manager (R&D), Vibro (H.K.) Limited

**14:55** Networking Break

**15:25** Session 7

## **Machine Learning-Based Photogrammetry Applications for Civil Structures**

**Dr WANG Xu-guang**, Assistant Professor (Infrastructure Project Management), The University of Hong Kong

**15:50** Session 8

## **AI – a Perspective from the Construction Industry**

**Ir Dr George WONG**, Senior Manager – Industry Development, Construction Industry Council

**16:15** Panel Discussion (2)

### **Moderator:**

**Ir Chris LEE**, Honorary Treasurer, ACEHK

### **Panelists:**

**Prof DUAN Yuan-feng**, Head of Civil Engineering Department, Zhejiang University

**Mr Derek SO Kwok-leung**, Managing Director, Vibro (H.K.) Limited

**Dr WANG Xu-guang**, Assistant Professor (Infrastructure Project Management), The University of Hong Kong

**Ir Dr George WONG**, Senior Manager – Industry Development, Construction Industry Council

**16:35** Certificates Presentation & Group Photo

**16:50** Closing Remarks

**Ir Francis YAU**, Vice Chairman, ACEHK

# OPENING ADDRESS



**Ir Ricky LAU Chun-kit, JP**  
Permanent Secretary for  
Development (Works)  
Development Bureau  
The Government of the HKSAR

In October 2021, Ir Ricky LAU was appointed as the Permanent Secretary for Development (Works) to oversee public works policy and infrastructure development.

Ir LAU was the Director of Civil Engineering and Development from October 2018 to October 2021, and was responsible for overseeing the strategic planning and the implementation of various reclamation, new development area and major infrastructure projects. He joined the Hong Kong Government in 1992 as an Assistant Engineer. Before joining the Civil Engineering and Development Department in 2015, he worked in the Highways Department and the Development Bureau.



# SPEAKERS BIOGRAPHY AND PRESENTATION ABSTRACT



## AI and Data Intelligence in Smart Railway

## Speakers Bio

### Ir H.W. CHAN

Deputy General Manager - Operations  
Innovation Hub  
MTR Corporation Limited



Ir H.W. Chan is Deputy General Manager - Operations Innovation Hub in MTR Corporation. He is widely experienced in communications, control and network systems and has over 20 years of related exposures, most of which have been associated with the MTR Corporation in Hong Kong.

Mr Chan has broad experience in a number of railways around the region with in-depth knowledge in many telecom, control facilities and network in use by railways. He heads up a team of young engineers to drive innovation by introducing smart technology for enhancement of railway operations and maintenance. The introduction of the smart systems contributes to the Corporate growth and support the improvement of staff and passengers' safety, railway operation and maintenance efficiency and customer experience. He has also shared expert opinions for the adoption of smart transport and digitalization to MTR subsidiary railways in China and overseas.



### Mr Andy PANG

Chief Operations Data Studio Manager  
MTR Corporation Limited

Mr Andy Pang is an experienced engineer in rolling stock and railway data analytics. He has established a Data Studio office and team at MTR to manage data as an asset, enabling Railway Smart Maintenance.

Through the collection and integration of data from various sources, Mr Pang provides insightful analytics to the maintenance and operations teams. By performing cross-system analytics using advance predictive models, he helps unlock actionable insights to optimize asset maintenance and railway operations. In addition to his expertise in data analytics, Mr. Pang is experienced in condition-based monitoring of railway systems. He has designed and implemented sensor and IoT systems on trains and railway infrastructure for proactive asset condition monitoring. This data-driven approach is critical to improving the performance and reliability of MTR's railway system

# SPEAKERS BIOGRAPHY AND PRESENTATION ABSTRACT



## AI and Data Intelligence in Smart Railway

## Abstract

As railway systems become increasingly complex and interconnected, the need for advanced data intelligence and AI-powered decision-making has become paramount. The modern railway network generates massive amounts of data from a multitude of sources, including rolling stock, passenger information, and environmental sensors. Harnessing this data and extracting meaningful insights is crucial for enhancing the efficiency, resilience, and safety of railway operations.

This presentation will explore the transformative role of AI and data intelligence in shaping the future of smart railway systems. It will demonstrate the key components of a smart railway ecosystem, including the seamless integration of Internet of Things (IoT) devices, cloud-based data platforms, and advanced analytics. The presentation will examine how AI techniques, such as machine learning, natural language processing, and computer vision, can be leveraged to automate decision-making, predict system failures, and enhance the passenger experience.

Furthermore, this presentation will explore the challenges and considerations associated with the implementation of AI and data intelligence in railway systems. These include data quality and governance, and the alignment of technology. By addressing these critical aspects, the presentation aims to provide a comprehensive understanding of the transformative potential of AI and data intelligence in railway.

# SPEAKERS BIOGRAPHY AND PRESENTATION ABSTRACT



## AI with BIM / Digital Twin for a Greener and Safer Built Environment

### Speakers Bio



**Prof Jack CHENG Chin-pang**  
Professor and Associate Head  
Department of Civil and Environmental Engineering,  
The Hong Kong University of Science and Technology

Prof Jack CHENG is a Professor and Associate Head in the Department of Civil and Environmental Engineering, Associate Director of GREAT Smart Cities Institute, and Director of Building Information Modelling (BIM) Lab at the Hong Kong University of Science and Technology (HKUST). Prof CHENG obtained his PhD degree from Stanford University. His research interests include BIM, Digital Twin, Internet of Things, artificial intelligence, construction robotics, blockchain, smart construction and facility management, smart and low carbon buildings, and construction digitalisation. Prof CHENG has led a number of Research and Development projects in smart buildings and construction. He is an author of over 300 international journal and conference publications.

Prof CHENG is currently also the Chairperson of the Committee on Building Information Modelling and Construction Digitalisation and a Council Member of the Construction Industry Council (CIC), a Director of the BEAM Society, and Editorial Board Member of several international journals. He is a Past Chairperson of the CIC Task Force on BIM Standards, Past President of the American Society of Civil Engineers (ASCE) Greater China Section, Past Honorary Treasurer of the Hong Kong Institute of Building Information Modeling (HKIBIM), and Past Director of the Hong Kong Green Building Council. Prof CHENG is a Fellow Member of the Hong Kong Institute of Civil and Building Information Management, Professional Member of the HKIBIM, CIC Certified BIM Manager (CCBM), CIC Certified BIM Coordinator (CCBC), and Certified Carbon Auditor Professional. He has received the Construction Industry Outstanding Person Award in 2019 from CIC, and a few research and paper awards in international conferences.



# SPEAKERS BIOGRAPHY AND PRESENTATION ABSTRACT



## AI with BIM / Digital Twin for a Greener and Safer Built Environment

### Abstract

The integration of digital technologies has significantly enhanced the efficiency, sustainability, and safety of engineering practices. In particular, Artificial Intelligence (AI) integrated with 3D digital building models or BIM can provide a lot of possibilities. AI can not only more intelligently generate better building design, but also help analyze large amounts of data in a smarter contextual way.

This talk will present the capability of generative AI with BIM for building design optimization, such as layout planning of building blocks and components, low-carbon design of building structures, and steel reinforcement design. The adoption of AI together with digital twin for smart site monitoring and urban resilience monitoring will then be discussed. The leverage of AI with robotics for reality capture such as point cloud processing and low-cost high resolution 3D reconstruction will be presented and illustrated as well. Examples and potential challenges in these applications will be discussed in this talk.

# SPEAKERS BIOGRAPHY AND PRESENTATION ABSTRACT



## Generative AI for a New Chapter in Engineering

## Speakers Bio



**Mr Wisdom CHAN**  
Founder  
01River Ltd

Mr Wisdom CHAN is a dynamic serial entrepreneur and co-founder of 01River Limited specializing on AI technologies. He has been at the forefront of steering the company through the evolving landscape of technology. His tenure in the industry is marked by a steadfast commitment to innovation and the strategic application of emerging technologies. Prior to his current role, Wisdom demonstrated his technological acumen as a Chief Technology Officer (CTO) and IT Director for various tech-centric startups. He spearheaded the development of pioneering technologies, laying down the groundwork for several smart city initiatives that have since garnered both industry respect and widespread recognition. Wisdom is also the Executive Director of Asia Infrastructure Solutions, leveraging his expertise in Digital Twins, Artificial Intelligence, Robotics, IoT, and Augmented/Virtual Reality propelling Asia Infrastructure Solutions to the vanguard of AI technology implementation.

## Abstract

Discover the transformative impact of generative AI in the construction industry. This presentation introduces the fundamentals of generative AI and its role in the future of engineering. We will explore real-world applications, demonstrating how AI can revolutionize traditional engineering by enhancing design processes, increasing operational efficiency, and improving risk management.

Attendees will gain valuable insights into the challenges of integrating AI and the synergy between AI and other technological advancements. This session provides a forward-thinking perspective on strategically adopting AI, setting the stage for groundbreaking advancements in construction.

Join us to understand how embracing AI technologies can lead to innovative solutions and a competitive edge in the rapidly evolving construction landscape.

# SPEAKERS BIOGRAPHY AND PRESENTATION ABSTRACT



## Engineering Powered by AI

## Speakers Bio



**Ir Dr Julian KWAN Shun-hang**  
Assistant Director (Technical)  
Civil Engineering and  
Development Department

Ir Dr Julian Kwan is the Assistant Director (Technical) of the Civil Engineering and Development Department. He is leading the Technical Branch of the department to provide contractual advice, site safety control and information technology support. As part of his duties, he is in charge of promoting the adoption of innovation and technology in delivering CEDD's services.

## Abstract

CEDD has been spearheading infrastructure construction and land supply projects to support the housing, social and economic development of Hong Kong. Besides, CEDD is the technical arm of the HKSAR Government in managing landslide risk and coastal hazards. In delivering the services, CEDD has been pursuing collaboration and partnership with academics and industrial practitioners on taking forward numerous smart initiatives to drive advancements in land development and sustainable infrastructure construction.

With the concerted efforts of CEDD and their strategic partners, the cross-organizational collaborations have successfully harnessed emerging AI technologies to produce novel engineering solutions for bringing about enhancements of productivity, speed, efficiency, quality and safety. The AI technologies offer ample opportunities to transform the delivery of engineering services. The trend of the AI-informed problem solving process in engineering sector has just commenced. The construction industry should join hand together to explore more AI applications for advancing our services. While AI is to be providing more and more supports to the engineers, the mastermind behind in producing engineering solutions is always the engineers because the creativity and judgement of engineers are irreplaceable.



# SPEAKERS BIOGRAPHY AND PRESENTATION ABSTRACT



## AI Aided Structure Health Monitoring of Bridges and Structures

## Speakers Bio



**Prof DUAN Yuan-feng**  
Head of Civil Engineering Department  
Zhejiang University

Prof Yuanfeng DUAN is a professor of Structural and Bridge Engineering, and Associate Dean (International Affairs), at College of Civil Engineering and Architecture, Zhejiang University, China. He obtained his Ph.D. degree from The Hong Kong Polytechnic University in 2004, and joined Zhejiang University in 2008 as an associate professor. He was promoted to a full professor in 2015. He visited University of Illinois at Urbana-Champaign from Dec. 2014 to Dec. 2015. His research interests include Structural Health Monitoring and Vibration Control, Vector Mechanics and Structural Dynamics.

He is a member of Specialty Committee of Structural Vibration Control and Health Monitoring, Chinese Society of Vibration Engineering. He is also a Council Member of Bridge and Structural Engineering Branch of China Highway and Transportation Society. He is the obtainers of National Natural Science Grant for Excellent Young Scholar, Zhejiang Provincial Grant for Distinguished Young Scholar, and Fok Ying Tung Grant. He has been the principal investigators of 8 China National Natural Science Foundation Grants, and 1 National Key R&D Program of China. He has published over 120 papers, including over 60 SCI indexed paper, over 30 EI indexed papers, and over 20 keynote speeches or invited talks. He has been awarded 17 international invention patents (China, US, Korea, Japan). His research outputs have been applied to health monitoring or vibration control of more than 60 large-scale structures, such as Main Stadium of FIFA World Cup Qatar 2022, Hong Kong's Tseung Kwan O Cross Bay Bridge, China Quanzhou Bay Bridge, and so on.



# SPEAKERS BIOGRAPHY AND PRESENTATION ABSTRACT



## AI Aided Structure Health Monitoring of Bridges and Structures

## Abstract

Utilizing artificial intelligence technology to enhance the Structure Health Monitoring of technologies is a highly promising research direction. This presentation includes the Generative Adversarial Network (GAN) aided compressing sensing and data reconstruction to meet the data volume requirements for structural damage identification, the Spatial and Frequency Spectrum integrated CNN method for damage detection of a tied-arch bridge, the Recurrent Plot integrated with CNN method for damage detection of buildings and bridges, Convolutional Autoencoder integrated with eXtreme Gradient Boosting Tree (XGBT) method for damage detection of bridges, as well as the Neural Network aided Elasto-magneto-Electrical sensors for sensing bridge cable forces. Part of these methods have yielded favorable results in real-world bridges and structures, such as the Xiushan Bridge (suspension bridge) and the Daxie Second Bridge (cable-stayed bridge), and Main Stadium of FIFA World Cup Qatar 2022, Hong Kong's Tseung Kwan O Cross Bay Bridge.

# SPEAKERS BIOGRAPHY AND PRESENTATION ABSTRACT



## Weaving Love: Pioneering 3D Metal Printing for Large-Scale Pavilions in Hong Kong

### Speakers Bio

#### Ms Christina POON

Senior Architect/Building Information Modelling  
Architectural Services Department



Ms Christina POON joined the Architectural Services Department as a registered architect and currently serves as a Senior Architect specializing in BIM. In her role, she leads the Departmental BIM support team, focusing on the department's initiatives in BIM development.

Christina has conducted extensive research and development on BIM-related studies, receiving recognition for her award-winning work on smart checking tools for General Building Plans submissions. She is also the design team leader for a pilot 3D metal printing project at the Immigration Headquarters in Tseung Kwan O. Previously, Christina worked as a project manager for the development of quarantine facilities and government quarters, among other projects. She is committed to advancing innovative building solutions and enhancing the quality of the built environment in Hong Kong.



**Mr Tony SIU Sai-kwan**  
Assistant Manager (R&D)  
Vibro (H.K.) Limited

Tony SIU Sai-kwan is an Assistant Manager (R&D) at Vibro (H.K.) Ltd, with over 12 years of experience in the construction industry, focusing on R&D since 2017. A Chartered Engineer, a Member of IMechE and a CSWIP 3.1 Welding Inspector, Tony holds a master's in Engineering Enterprise Management from HKUST and a bachelor's in Mechanical Engineering from UBC. He has led pioneering initiatives, including Hong Kong's first 3D metal printing project using WAAM. Tony manages R&D teams on projects ranging from robotic welding, computer vision, IoT and to large-scale construction robots, consistently delivering practical, user-centric solutions. He is committed to advancing construction technologies and redefining industry standards through innovative approaches.

# SPEAKERS BIOGRAPHY AND PRESENTATION ABSTRACT



## **Weaving Love: Pioneering 3D Metal Printing for Large-Scale Pavilions in Hong Kong**

### **Abstract**

"Weaving Love" located in the wedding garden of the Tseung Kwan O Immigration Headquarters, is the first large-scale 3D metal-printed pavilion constructed in Hong Kong. Utilizing advanced Wire Arc Additive Manufacturing (WAAM) technology, this initiative merges art and technology to create an intimate, cozy, and romantic environment for newlyweds and their guests.

The design and fabrication of its complex geometries are driven by parametric computation and digitalized manufacturing. These innovative technologies enable the realization of a fluid design, transforming traditionally cold, rigid materials into an artistic and organic architectural piece.

In addition to offering a unique spatial experience, the project successfully reduced material waste by over 80%, construction time by 70%, and costs by 50% compared to conventional construction methods.

In this presentation, we will detail the entire process—from design and technical analysis to manufacturing, installation, and on-site verification. We will share the difficulties and challenges encountered, the project's merits, and the insights gained throughout this journey.



# SPEAKERS BIOGRAPHY AND PRESENTATION ABSTRACT



## Machine Learning-Based Photogrammetry Applications for Civil Structures

### Speakers Bio



**Dr WANG Xu-guang**  
Assistant Professor  
(Infrastructure Project Management)  
The University of Hong Kong

Dr Xuguang Wang is an Assistant Professor in the Department of Civil Engineering at the University of Hong Kong. He earned his Ph.D. in Civil and Mineral Engineering from the University of Toronto, Canada, where he later served as a Lecturer. Following his time at the University of Toronto, Dr Wang joined the research team at the University of Illinois at Urbana-Champaign, working on postdoctoral studies within the Center for Infrastructure Resilience in Cities as Livable Environments (CIRCLE). His research is concentrated on the forefront of digital twin technology, fire engineering, and computational fluid dynamics. Dr Wang's work is dedicated to advancing the understanding and development of resilient infrastructure systems, with a particular emphasis on integrating computer vision and AI technologies to enhance system performance and reliability.

### Abstract

The frontier of civil engineering is being reshaped by the integration of machine learning techniques. These advancements have elevated the processes of structural design, infrastructure maintenance, and numerical analysis to unprecedented levels of efficiency. This presentation will explore three practical applications of machine learning-based methods in addressing real-world civil engineering challenges. The first project utilizes Unmanned Aerial Vehicles (UAVs) to collect image data. Machine learning-based photogrammetry algorithms then perform 3D reconstructions and extract critical geometric data, streamlining the risk assessment process. The second project innovatively applies a genetic algorithm to develop bridge fragility curves. This approach provides an understanding of how bridges respond to seismic loads and enhances decision-making in maintenance, repair, and resilience planning. The third project presents a novel application of a deep learning-based computer vision algorithm for photogrammetry-based computational fluid dynamics (CFD) analysis. This integration particularly reduces the time and manpower required to construct a computable CFD model from scratch. In each of these projects, machine learning algorithms demonstrate their strength in rapid model construction and data-driven analysis. These examples illustrate the potential of machine learning in supporting engineering designs and decision-making processes.

# SPEAKERS BIOGRAPHY AND PRESENTATION ABSTRACT



## AI – a Perspective from the Construction Industry

## Speakers Bio



**Ir Dr George WONG**  
Senior Manager –  
Industry Development  
Construction Industry Council

Ir Dr George WONG is a chartered Structural Engineer and a CIC-Certified BIM Manager with over 25 years of experience in construction industry. Ir Dr. Wong has been promoting and supporting the adoption of BIM and construction digitalisation for the industry since 2017. In 2021, he led a team to develop and publish a Construction Digitalisation Roadmap for the industry where the vision is “Smart Construction empowered by Digitalisation”. As AI has received increasing interest by the industry in recent years, Ir Dr. Wong has been focusing in promoting the application of AI that benefit the industry as well as developing Master Class on AI for Construction with LLM to enhance practitioners’ knowledge in AI.

## Abstract

The integration of Artificial Intelligence (AI) within the construction industry signifies a transformative shift, particularly in enhancing safety, productivity, and quality. This presentation explores the multifaceted roles of AI technologies in construction processes including operation and maintenance, from initial planning stages to the final execution phases. AI-driven systems, such as machine learning algorithms and AI-based analytics, have been instrumental in predicting potential safety hazards, thereby mitigating risks and reducing onsite accidents. Furthermore, AI applications in task automation not only expedite construction activities but also alleviate human error, leading to substantial improvements in productivity and quality. Quality assurance is another critical area where AI contributes significantly. Through advanced data analysis and real-time monitoring, AI ensures adherence to standards and specifications, enhancing the overall quality of construction projects. This presentation provides a comprehensive review of current AI applications in the construction industry and discusses potential future developments. The insights presented underscore the profound impact of AI on reshaping construction practices, making them safer, more efficient with better quality.

# LIST OF ORGANISING COMMITTEE



Ir Francis YAU  
Organising Committee Chairman  
Aurecon Hong Kong Limited



Ir Dickson LAW  
Organising Committee  
Asia Infrastructure Solutions Limited



Ir Chris LEE  
Organising Committee  
CM Wong & Associates Ltd.



Ir Jason WONG  
Organising Committee  
Arup



Ir Derek YU  
Organising Committee  
AECOM



Mr Louis AU  
Organising Committee  
AECOM



# Delivering integrated infrastructure through AI

Decisions driven by data produce outcomes that deliver success in every industry across the world – and one of the key motivating forces behind this digital transformation model is artificial intelligence (AI). At AECOM, we take your organization through every step of its AI journey – from developing strategy, to optimizing data, to designing and deploying tailor-made solutions for your needs.

**Our work covers all types of infrastructure – above and below ground – all connected within an urban ecosystem**



**Governance and data**

We use AI for data privacy and security

**Above ground infrastructure**

We adopt AI for resilient flood forecasting

**Mobility networks**

We engage AI for traffic analytics

**Below ground infrastructure**

We deploy AI for predictive maintenance





# WHAT DOES IT TAKE?

...to construct Hong Kong's most curved viaduct over the sea?

It requires unconventional thinking—engineering a structure with exceptionally tight curves as narrow as 44-meter radii. It demands cost-effective strategies that trim six months off the construction schedule. It benefits from streamlined integration, enhancing the interchange connection for improved traffic flow and safety. This strategic enhancement facilitates smoother transitions between routes, significantly reducing congestion and boosting overall travel efficiency.

At Aurecon, every client's journey matters.



*Scan to see  
why we do  
what we do.*

[aurecongroup.com](https://aurecongroup.com)

*Project in image: Tseung Kwan O - Lam Tin Tunnel*

**aurecon**  
*Bringing ideas to life*





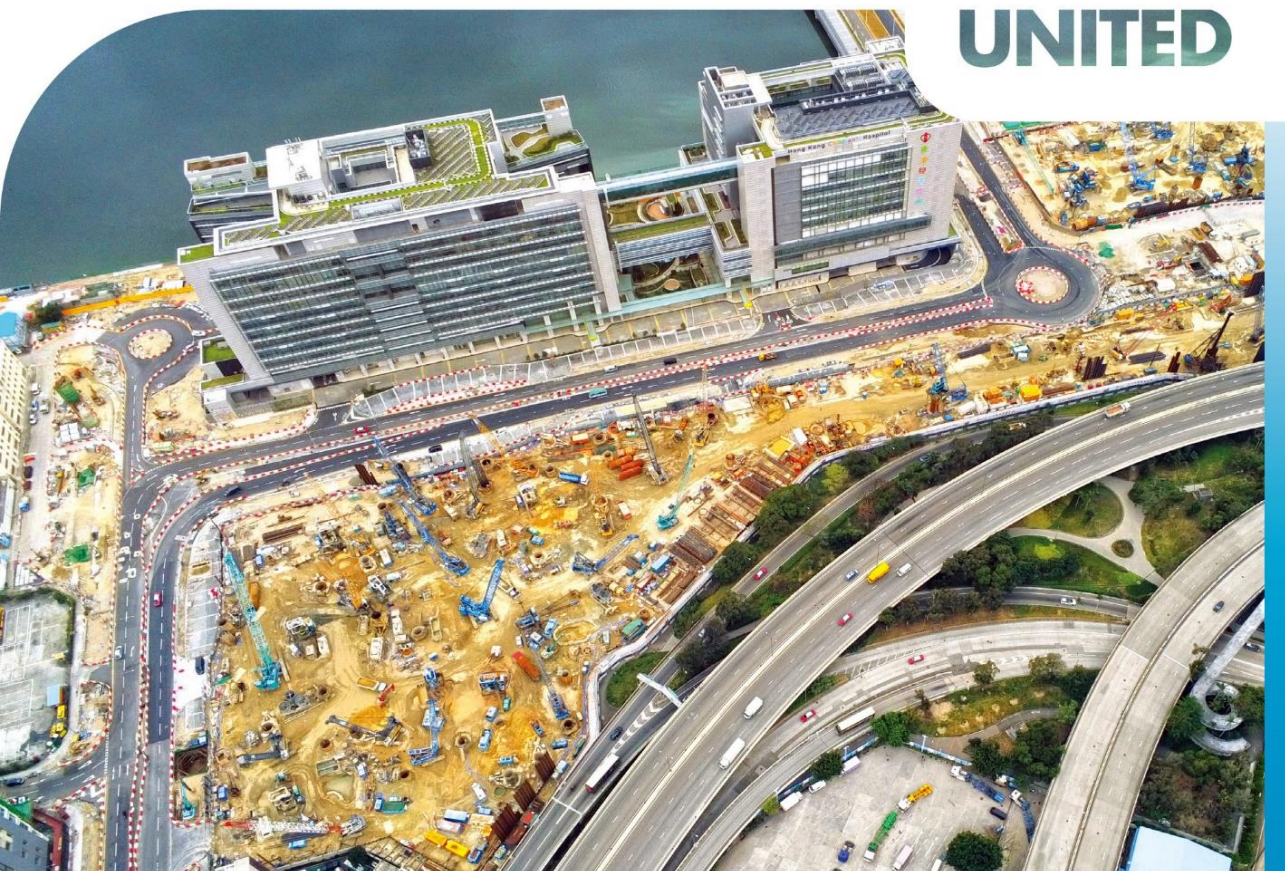
## Unlocking Digital Innovation for a Sustainable Tomorrow

Since 1930, Binnies has played a key role in developing Hong Kong's infrastructure. Today, in an increasingly complex digital world, we combine our infrastructure knowledge and digital engineering and environmental expertise with leading-edge digital capabilities to create innovative and intelligent solutions to help our clients manage today's diverse integrated infrastructure.

Find out more at [binnies.com](https://www.binnies.com)



# COMMITTED PROFESSIONAL UNITED



New Acute  
Hospital  
at Kai Tak  
Development  
Area

Road  
Improvement  
Works in  
West Kowloon  
Reclamation  
Development





# Engineering Excellence Harnessing AI for a Smarter Future

Modular-Integrated Construction | Digital Twins | Robotic Process Automation | Generative AI

Follow Us:



@asiainfrastructuresolutions



asiainfrasolutions.com






# Elevating the built environment with digital creativity

At Arup, we combine data and digital technology with our multidisciplinary breadth to redefine the built environment. From creating tools that drive more efficient ways of working to using AI to better understand asset performance, we are setting new standards of excellence.



AI-generated image created with Adobe Firefly





# Engineering a better future for our planet and its people

We're committed to lead our clients, and partners across the infrastructure ecosystem, to engineer a better future for our planet and its people.

[atkinsrealis.com](https://atkinsrealis.com)

Find out more







# Build with Professionalism Innovation Integrity

**Build King Holdings Limited**

利基控股有限公司

6/F., Tower B, Manulife Financial Centre, 223 Wai Yip Street, Kwun Tong, Kowloon, Hong Kong  
香港九龍觀塘偉業街223號宏利金融中心B座六樓

T +852 2272 3680 F +852 2375 3655 E [info@buildking.hk](mailto:info@buildking.hk)

  
[www.buildking.hk](http://www.buildking.hk)





中國建築工程(香港)有限公司  
CHINA STATE CONSTRUCTION ENGINEERING (HONG KONG) LIMITED

# 慎微篤行 精築致遠

Exercise caution in  
**details** and **implementation**  
Build a strong foundation  
to seek **greater success**



[www.cscechk.com](http://www.cscechk.com)





Noise Barriers along Tuen Mun Road



Kai Tak development - stage 4 infrastructure



Temporary Quarantine Camp at Penny's Bay (Phase IV)

# Inspiration with Excellence



**MANNINGS**  
Consultants

Mannings (Asia) Consultants Limited  
Wholly owned subsidiary of **Boltek Holdings Limited** (HKEX Stock Code 8601)  
5/F, Winning Commercial Bldg., 46-48 Hillwood Rd., Tsim Sha Tsui, Kin., Hong Kong  
Tel : (+852) 3168 2028 Fax: (+852) 3168 2022





## Meinhardt China

With 1,200 staff in Hong Kong and China, our services cover all aspects of mechanical, electrical, civil and structural design for all types of construction projects, as well as project management and infrastructure such as bridges, tunnels, highways, ports, transportation, water services and waste management. We provide environmental consultancy across our projects and as standalone services. We also have a team of specialists providing services in all aspects of the façade of buildings and structures including curtain wall design, concrete repair and refurbishment.

Our clients include government bodies, agencies, private developers and end-users both in industrial and commercial enterprises.

Our award-winning projects have garnered recognition internationally and these awards serve to affirm our unrivalled reputation for innovative and inspiring engineering solutions.



## Our Projects



**Hong Kong Children's Hospital**  
(Civil & Structural)



**Cross Bay Link, TKO**  
(Infrastructure & Environment)



**Northwest Kowloon Long Span Footbridge**  
(Infrastructure & Environment)



**Grand Central & Yue Man Square**  
(Mechanical & Electrical)



**Hong Kong West Kowloon Station High Speed Rail**  
(Mechanical & Electrical)



**HKSTP Advanced Manufacturing Centre**  
(Civil & Structural)



The background of the slide is a collage of cityscapes, primarily Hong Kong, framed by a purple hexagonal pattern. The top section shows a wide view of the city with mountains in the background. The middle section features a large, modern building with a curved roof, likely the Hong Kong Convention and Exhibition Centre, situated near the water. The bottom section shows a dense urban area with many skyscrapers, some of which are illuminated at night.

M

M  
MOTT  
MACDONALD

# Connecting innovation to outcomes

At Mott MacDonald we drive digital transformation by combining engineering experience with digital expertise. Delivering social, economic and environmental value by connecting innovation to outcomes. All powered by our digital solutions platform Moata.

[mottmac.com](https://mottmac.com)



## **Crafting a Sustainable Tomorrow**

---

Committed to fostering a decarbonised environment, our team of experts harness the power of technological advancements and innovative approaches to design and implement energy-efficient equipment and low-carbon systems, contributing to reduced carbon emissions as well as the enhanced health and well-being of individuals and communities, helping to shape a greener, smarter and more resilient city.





**C M WONG & ASSOCIATES LTD**

**黃志明建築工程師有限公司**

11/F Universal Trade Centre  
3-5A Arbuthnot Road, Hong Kong  
Tel: (852)2522-1068  
Fax: (852)2526-3111  
www.cmwal.com  
cmwal@cmwal.com



**C M Wong & Associates Ltd** is a Hong Kong based consulting engineer in providing a full range of professional services including feasibility studies, planning, design and supervision in relation to building and infrastructure projects. Our clients include various Hong Kong Government departments, institutions and major developers.

We adopt a flexible approach to suit clients' needs. We are also renowned for providing innovative engineering solutions for challenging projects especially for those with difficult ground conditions.



# DAVID AU

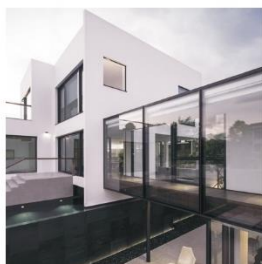
DAVID S.K. AU & ASSOCIATES LTD.

15th Floor, 633 King's Road  
North Point, Hong Kong

T +852 2560 8811  
F +852 2513 1828  
W [www.daa1.com.hk](http://www.daa1.com.hk)  
E [daa1@daa1.com.hk](mailto:daa1@daa1.com.hk)

## David S.K. Au & Associates Ltd. (DAAL)

has been practicing in Hong Kong since 1980. DAAL is a total solution development consultant providing architectural, civil, building structural, geotechnical, electrical & mechanical, building survey and quantity survey services to both private and government sectors in residential, commercial, industrial and civil engineering projects.







# Transforming Infrastructure Engineering

Where AI meets Human Creativity

At Egis, we are redefining infrastructure engineering through the integration of Artificial Intelligence (AI). Our commitment to innovation ensures that we not only embrace technological advancements but also prioritize the essential role of human creativity and engineering expertise.



[EGIS-GROUP.COM](https://www.egis-group.com)



[EGIS-IN-APAC](https://www.egis-in-apac.com)




[COMMERCIAL.ASIA@EGIS-GROUP.COM](mailto:COMMERCIAL.ASIA@EGIS-GROUP.COM)



Gammon





The Association of Consulting Engineers of Hong Kong  
香港顧問工程師協會

## ACEHK ANNUAL SEMINAR 2024

# AI APPLICATION IN ENGINEERING

Thank you for joining us today.

We hope you enjoyed the Annual Seminar.

See you next year!

