CONSTRUCTION R&D FORUM

BRINGING APPLIED R&D TO NEW HEIGHTS

中華人民共和國香港特別行政區
Hong Kong Special Administrative Region of the People's Republic of China
25th 周年紀念 ANNIVERSARY

發展局
Development Bureau

CEMP
CENTRE OF EXCELLENCE FOR MAJOR PROJECT LEADERS

CONGRATULATORY MESSAGE FROM THE FINANCIAL SECRETARY

Mr Paul CHAN Mo-po, GBM, GBS, MH, JP

Financial Secretary
The Hong Kong Special Administrative Region

I'm pleased to congratulate the Development Bureau and the University-Government-Industry Consortium for Sustainable Urban Development on their joint organisation of the Construction R&D Forum.

The day-long forum brings together construction consultants, contractors and related industry professionals, together with academics, researchers and government officials working to ensure the sustainable development of Hong Kong and its construction industry.

Innovation and R&D are Government priorities. That very much includes the construction industry, given its longstanding importance to Hong Kong's economy and community and the massive construction developments, and plans, in Hong Kong's future.

Innovation is critical to the continuing success of the construction industry. Applied R&D is particularly important in supporting construction industry innovation. The Forum's theme, "Bringing Applied R&D to New Heights", underlines this reality. In the current Budget, I provided funding to promote applied R&D in the construction industry and public works projects. Rest assured, the Government will continue work with industry and academia in support of R&D and innovation.

I wish you all a rewarding forum, and the best of health and business in the coming year.

CONGRATULATORY MESSAGE FROM THE PRESIDENT OF THE HONG KONG POLYTECHNIC UNIVERSITY

Prof Jin-Guang TENG, JP
President
The Hong Kong Polytechnic University

It is my great pleasure to participate in the Construction R&D Forum – Bringing Applied R&D to New Heights.

Close collaboration among the government, universities and industries is essential to foster a robust ecosystem for the development and implementation of technologies for sustainable cities. With the government's strong leadership and support for sustainable development, universities can create new breakthroughs and technologies to tackle major challenges in construction, and industries can translate technological innovations into impactful applications.

This Forum will provide an excellent opportunity to identify the societal needs for infrastructure development, demonstrate new research outcomes, and facilitate further collaboration among the sectors of government, academia and industry.

I look forward to seeing more fruitful and productive partnerships among the three sectors and wish great success for the Construction R&D Forum.

CONGRATULATORY MESSAGE FROM THE SECRETARY FOR DEVELOPMENT

Ms Bernadette LINN, JP

Secretary for Development
Development Bureau

I am delighted to welcome you to the Construction R&D Forum. I would also like to express my gratitude to the University-Government-Industry (UGI) Consortium for Sustainable Urban Development for being a great partner in jointly organising the forum with us.

The construction industry is in a golden age, with major infrastructural projects and development plans in the pipeline.. Facing the challenges of completing the many construction projects in good time, we have to embrace innovation to achieve our target of enhancing quantity, speed, efficiency and quality.

Development Bureau has been taking forward Construction 2.0 and supporting construction innovation through various means, including the $2.2 billion Construction Innovation and Technology Fund (CITF) for boosting the capacity of the construction industry to adopt new technology. This year, the Budget earmarked $30 million for us to further promote applied R&D in public works and the industry. Riding on innovation and technology revolution through piloting new construction materials, methods and other advanced technologies in public works projects, we endeavour to provide stronger support for construction innovation.

Today's forum is an excellent demonstration of cross-disciplinary synergy in bringing applied R&D to new heights. I wish the forum an enormous success.

CONGRATULATORY MESSAGE FROM UGIC CHAIRMAN

Ir Dr Andrew KC CHAN, BBS, JP
Chairman of Steering Committee
UGI Consortium for Sustainable Urban Development

On behalf of the University-Government-Industry Consortium (UGIC) for Sustainable Urban Development, I offer my warm congratulations to the Construction R&D Forum – Bringing Applied R&D to New Heights. It is our honour to co-organise this forum with the Development Bureau of the Hong Kong SAR Government.

Hong Kong is a world city of high population density and great efficiency for urban activities. UGIC annual forum offered an important platform to exchange ideas on future city development. This year's R&D Forum provides a great opportunity to facilitate concrete collaborations among the government, universities and industry to advance sustainable urban development.

MESSAGE FROM THE PERMANENT SECRETARY FOR DEVELOPMENT (WORKS)

Ir LAU Chun-kit, Ricky, JP
Permanent Secretary for Development (Works)
Development Bureau

I express my gratitude to the University-Government-Industry (UGI) Consortium for Sustainable Urban Development to jointly organise the Construction R&D Forum with us.

There are both opportunities and gaps for our construction innovation. On one hand, we have gaps in applied R&D, which turns the fundamental R&D from the universities into real application in the industry. It requires pilots, however, being pilots is never easy. We established the Task Force on Applied R&D in Public Works last year to fill the gaps. We will take a leading role and enhance the UGI collaboration in piloting applied R&D in public works projects.

On other hand, the mega portfolio of public works projects provides substantial opportunities for applied R&D. Instead of only completing these projects, we should also share a vision to capitalise on utilising the opportunities to pilot new innovations, to continually enhance our project performance, as well as to advance our construction industry.

Today's forum is just a beginning. Our friends in universities, government and industry, let's join hands to start the long journey of promoting applied R&D, bringing it to new heights, and drive for a better construction industry. I wish the forum a great success.

PROGRAMME RUNDOWN

Time	Event
9:00	**Reception**
9:30	**Opening Remarks** **Mr Paul CHAN Mo-po, GBM, GBS, MH, JP** Financial Secretary, The Hong Kong Special Administrative Region
	Photo Session
9:50	**Keynote Presentation 1 – How can University Research Support Construction Industry Innovations** **Prof Jin-Guang TENG, JP** President, The Hong Kong Polytechnic University
	Keynote Presentation 2 – Applied R&D in Public Works **Ms Bernadette LINN, JP** Secretary for Development, Development Bureau
	Keynote Presentation 3 – UGI Collaboration in Applied R&D **Ir Dr Andrew KC CHAN, BBS, JP** Chairman of Steering Committee, UGI Consortium for Sustainable Urban Development
SESSION I – OPPORTUNITIES AND CHALLENGES FOR APPLIED R&D	
10:20	**Advancing Infrastructure Construction through Applied R&D for Northern Metropolis and Lantau Tomorrow Vision** **Ir Michael FONG, JP** Director of Civil Engineering and Development, Civil Engineering and Development Department
	CLP Electricity Infrastructure Development – Challenges and Opportunities **Mr CHIANG Tung Keung** Managing Director, CLP Power Hong Kong Ltd.
	Break
	Smart Developments in Public Housing **Mr Stephen KM LEUNG, JP** Deputy Director (Development & Construction), Housing Department
	Hospital Development Plans **Mr Andrew WONG** Chief Manager (Capital Planning), Hospital Authority
	Applied R&D, Testing & Certification and New Opportunities in Hong Kong **Mr Andrew WEIR, MA, FCA, FHKSA, FIOD** Regional Senior Partner, Hong Kong, Vice Chairman, China, Global Chair, Asset Management and Real Estate, KPMG International
	Panel Discussion Panel Chair: **Ir WAI Chi Sing, GBS, JP, FHKEng** Managing Director, Urban Renewal Authority
12:15	**Closing Remarks** **Ir Ricky LAU Chun-kit, JP** Permanent Secretary for Development (Works), Development Bureau
12:30	**Lunch** Luncheon Session 推動深港「四鏈」協同，共建粵港澳大灣區國際科技創新中心 深圳市科技創新委員會主任 王有明先生

PROGRAMME RUNDOWN

Time	Event	
SESSION II – APPLIED R&D FOR INNOVATION		
14:00	**Reception**	
	Breakout Session I **New Construction Materials and Methods** Session Co-chairs: **Ir Prof Albert CHAN** & **Mr James LEE**	**Breakout Session II** **Smart Construction and Operation** Session Co-chairs: **Prof Anthony GO YEH** & **Ir Paul EVANS**
14:20	**Opening Remarks** **Mr James LEE** Chief Executive Officer & Executive Director, Paul Y. Engineering Group Limited	**Opening Remarks** **Ir Paul EVANS** Executive Director & Chief Technology Officer, Gammon Construction Limited
	High Productivity Construction – Modular Integrated Construction **Prof Wei PAN** Associate Vice-President (Research & GBA), Executive Director, Centre for Innovation in Construction and Infrastructure Development, The University of Hong Kong	**The Smart Construction ERA: Education, Research and Application** **Prof Michael YAM** Professor and Head of Department of Building and Real Estate, Deputy Director and Executive Secretary, Chinese National Engineering Research Centre for Steel Construction (Hong Kong Branch), The Hong Kong Polytechnic University
	Effective Use of High Strength S690 Steel in Construction – A Journey from Research and Development to Engineering Application **Ir Prof KF CHUNG** Director, Chinese National Engineering Research Centre for Steel Construction (Hong Kong Branch), The Hong Kong Polytechnic University	**Building a Sustainable Future through Smart Technologies** **Dr Winnie TANG, MH, JP** Founder and Chairman, Esri China (Hong Kong) Limited
	Innovative Application of Fiber Reinforced Cementitious Materials to Enhance Productivity **Prof Christopher KY LEUNG** Professor, Department of Civil and Environmental Engineering, The Hong Kong University of Science and Technology	**Smart Campus Development in CityU** **Ir CHAN Tsz Kin** Director of Campus Development, City University of Hong Kong
	Break	**Break**
	The Journey of Technology-in-Action: Self-compacting Backfill Material & Vibration-resistant Sprayable Concrete **Dr Ivan ML SHAM** Chief Commercial Officer cum R&D Director (Construction), Nano & Advanced Materials Institute	**Digitalisation in Smart Construction** **Ms Rosana WONG** Executive Director, Yau Lee Holdings Ltd. Founder and President, Ophylla Ventures Company
	Innovating for a Smarter Geotechnical Practice **Ir Dr Raymond WM CHEUNG, JP** Head of Geotechnical Engineering Office, Civil Engineering and Development Department	**Smart Construction and Management** **Ir Danny CS HUNG** Executive Director, Chairman and President, China State Construction Engineering (Hong Kong) Limited
	Panel Discussion	**Panel Discussion**
16:30	**Closing Remarks** **Ir Prof Albert CHAN** Dean of Students, Associate Director of RISUD, Able Professor in Construction Health and Safety, Chair Professor of Construction Engineering and Management, The Hong Kong Polytechnic University	**Closing Remarks** **Prof Anthony GO YEH** Chair Professor, Department of Urban Planning and Design, The University of Hong Kong


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Session I – Opportunities and Challenges for Applied R&D

PANEL CHAIR

市區重建局
URBAN RENEWAL AUTHORITY

Ir WAI Chi Sing, GBS, JP, FHKEng

Managing Director
Urban Renewal Authority

Ir **Wai Chi Sing** has been appointed the Managing Director of the Urban Renewal Authority since 15 June 2016. By virtue of holding that office, he is also the Deputy Chairman of the Board. He has also been appointed a Director of the Board of Urban Renewal Fund since 13 July 2016.

Ir Wai is an engineer by profession. He joined the Hong Kong Government in August 1980, and has since served in the Transport Department, the Highways Department, and the former Environment, Transport and Works Bureau. He was the Director of Highways from November 2006 to June 2010 and was Permanent Secretary for Development (Works) from June 2010 to April 2015 before retirement.

Ir Wai holds a master's degree in transportation engineering from Purdue University in the United States. He has professional experience in civil, structural and geotechnical engineering and is a fellow of the Hong Kong Academy of Engineering Sciences.

GUEST SPEAKER

Ir Michael FONG, JP

Director for Civil Engineering and Development
Civil Engineering and Development Department

Ir **Michael Fong** is currently the Director of Civil Engineering and Development, leading the Department in taking forward Hong Kong's new town development and land supply projects, among which are the Northern Metropolis and the Lantau Tomorrow Vision that serve as the two key drivers for the social and economic growth of Hong Kong.

Over the past 30 years, Ir Fong held numerous positions in various works departments and the Development Bureau (DEVB), including Chief Assistant Secretary of DEVB, Assistant Director/Projects and Development of Drainage Services Department, Deputy Project Manager of the West Development Office of Civil Engineering and Development Department (CEDD), and Head of Sustainable Lantau Office of CEDD. Ir Fong is widely known in the construction industry as a determined champion of construction safety and innovation technologies.

Advancing Infrastructure Construction through Applied R&D for Northern Metropolis and Lantau Tomorrow Vision

The Civil Engineering and Development Department (CEDD) has been pursuing collaboration and partnership with academics and industrial practitioners on taking forward various applied R&D initiatives that aim at enhancing construction productivity, works quality, site safety and sustainability. With the concerted efforts of all, such University-Government-Industry (UGI) collaborations have successfully harnessed some emerging technologies to produce new engineering solutions for application in infrastructure construction in Hong Kong.

CEDD has been taking forward a number of mega projects including the Northern Metropolis, and the Kau Yi Chau Artificial Islands in the Central Waters under the Lantau Tomorrow Vision, which would be the major sources of land supply in the next 20 to 30 years, for supporting Hong Kong's long term development need. The delivery of these mega projects is fraught with huge challenges in terms of productivity, resources, construction safety, etc. In the Forum, the Director of Civil Engineering and Development will share CEDD's successful experiences in steering and adopting applied R&D, and its newest efforts and way forward in the pursuit of applied R&D for further driving technological developments, in order to rise up to these upcoming challenges.

GUEST SPEAKER

Mr CHIANG Tung Keung

Managing Director
CLP Power Hong Kong Ltd.

Mr **Chiang Tung Keung** is the Managing Director of CLP Power Hong Kong and holds overall responsibility for the operations of CLP's Hong Kong regulated business, which includes a vertically integrated electricity utility serving customers in Kowloon, the New Territories and most of the outlying islands. Mr Chiang is also a Director of various subsidiary companies and affiliated companies of the CLP Group.

Mr Chiang joined CLP Power Hong Kong as a Graduate Trainee in 1988. He has extensive experience in generation, transmission, and distribution systems as well as regulatory strategy. He has held various posts in different areas including power system asset management, planning, design, operation and maintenance, power quality, and corporate and regulatory strategy. Mr Chiang was the Chief Operating Officer – CLP Power Hong Kong before taking up his current position in June 2017.

CLP Electricity Infrastructure Development – Challenges and Opportunities

Lantau Tomorrow and Northern Metropolis are now under development by government to cater for the growth of local population and meet the need of economic development. Coupled with the urban renewal programme and the emerging new business sectors such as Data Centre Hub, huge power demand will be imminently required. CLP will embrace the challenges to accelerate our electricity infrastructure projects in close collaboration with stakeholders and pursue further opportunities in construction of transmission and distribution projects to timely provide clean and reliable electricity supply for a better future of Hong Kong.

GUEST SPEAKER

香港房屋委員會
Hong Kong Housing Authority

Mr Stephen KM LEUNG, JP

Deputy Director (Development and Construction)
Housing Department

Mr **Stephen Leung** is an architect by profession. He has over 30 years of experience in the construction industry in both the private and public sectors.

In his position as Deputy Director of Housing, he leads a multi-disciplinary team for the implementation of public housing developments in Hong Kong, covering a wide spectrum of tasks on projects from feasibility, planning, design to construction stages as well as on development and procurement central functions and establishing operational policies and strategies for sustainable development, embracing HKHA's core values being Caring, Customer-focused, Committed and Creative. He has been steering and overseeing the development and application of information technology including but not limited to Building Information Modeling (BIM), Geographic Information System (GIS), as well as construction technology to enhance the business practices of the Development and Construction Division of the Housing Department.

Smart Developments in Public Housing

The Hong Kong Housing Authority (HA) is a strong advocate of using smart technologies to meet uprising challenges in the delivery of public housing, and strives on all fronts to take forward smart technologies for improving efficiency, expediting speed of construction, enhancing quality and safety performance of public housing developments.

This presentation will introduce the innovation and construction technologies currently employed or explored by HA, including the wider use of Building Information Modelling (BIM) in planning, design and construction stages, implementation of Innovation and Technology (I&T) for site safety, progress monitoring and site hand-over, etc. for application at various stages of public housing developments.

GUEST SPEAKER

醫院管理局
HOSPITAL AUTHORITY

Mr Andrew WONG

Chief Manager (Capital Planning)
Hospital Authority

Mr **Andrew Wong** leads the Capital Planning Department of the Hospital Authority. Andrew has over 30 years of experience in the construction industry representing clients, consultants and contractors locally and internationally. He currently oversees the planning, development and maintenance of quality healthcare facilities, including the delivery of the major capital projects committed under the two 10-year Hospital Development Plans with a total budget of $470B.

Hospital Development Plans

The Hospital Authority is delivering $200B worth of major public hospital development projects as part of the first 10-year Hospital Development Plan (HDP); and is planning a larger second 10-year HDP in order to meet future healthcare service needs.

The talk discusses some of the current challenges of hospital project delivery and operations across a significant and growing healthcare asset portfolio. Leveraging on Government leadership, improving industrial best practices and underpinned by academia, areas of Research & Development are suggested in augmenting delivery of HDP and the operation and maintenance of future healthcare facilities.

GUEST SPEAKER

Mr Andrew WEIR, MA, FCA, FHKSA, FIOD

Regional Senior Partner, Hong Kong
Vice Chairman, China
Global Chair, Asset Management and Real Estate
KPMG International

Mr **Andrew Weir** is Regional Senior Partner of KPMG in Hong Kong and Vice Chairman of KPMG China. He has over 30 years' experience servicing listed companies, public bodies, investment funds and MNCs. Andrew was made an MBE in 2017 was awarded Director of the Year by the Institute of Directors. He is a Justice of the Peace.

Andrew is also:

- Council Member of HKTDC, to sit on the Belt and Road Committee and chair the Global Belt and Road Forum
- Director of FSDC, chairs the Governance Committee and sits on the Policy Research Committee
- Ex-chair of the Listing Committee of HKSE
- Chairman of PBEC and Plan International
- Deputy Chairman of UNESCAP on Financial Services
- Director of APREA, ANREV and Community Business
- Ex-chairman of British Chamber of Commerce in Hong Kong and Community Business Leadership Council
- Member of the International Business Council

Applied R&D, Testing & Certification and New Opportunities in Hong Kong

Positioning Hong Kong as an "International innovation and technology hub" requires all sectors of the community to put forward and materialise innovation ideas in addressing the city's needs. For the construction industry which underpins our world-class infrastructure, there is an imminent need to tackle challenges such as declining productivity and ageing workforce through innovation. As such, an ecosystem that enables the effective translation of fundamental research successes into industry application through applied R&D and testing & certification would be needed. With the massive pipeline of development projects in the upcoming years, there are plenty of new opportunities for Hong Kong to capture and to become a connector between the GBA and the international markets.

LUNCHEON GUEST SPEAKER

王有明先生

深圳市科技創新委員會主任

王有明，中共黨員，博士研究生學歷，東南大學機械工程系畢業。現任深圳市科技創新委員會黨組書記、主任、一級巡視員，深圳市七屆市委委員。

王有明同志具有豐富的政府工作經驗，長期在科技、知識產權、市場監管、投資推廣、商務等多個政府部門工作。先後擔任投資推廣、商務、科技等部門主要負責人，熟悉招商引資、科技創新、產業發展政策，對科技創新和高新技術產業發展有比較深入的思考和研究。

Session II – Applied R&D for Innovation
Breakout Session I - New Construction Materials and Methods

SESSION CO-CHAIRS

THE HONG KONG POLYTECHNIC UNIVERSITY 香港理工大學

Ir Prof Albert CHAN

Dean of Students, Associate Director of RISUD, Able Professor in Construction Health and Safety, Chair Professor of Construction Engineering and Management
The Hong Kong Polytechnic University

Ir Prof **Albert Chan** is currently PolyU's Dean of Students, Associate Director of Research Institute for Sustainable Urban Development, Able Professor in Construction Health and Safety, and Chair Professor of Construction Engineering and Management. He earned his MSc degree in Construction Management and Economics from the University of Aston in Birmingham, and PhD degree in Project Management from the University of South Australia. Ir Professor Chan was ranked among the Top 2% of Scientists in the World for three years in a row since 2020, according to a study by a group of scholars in Stanford University.

Paul Y 保華建業 Paul Y. Engineering

Mr James LEE

Chief Executive Officer & Executive Director
Paul Y. Engineering Group Limited

Mr **James Lee** has over 30 years of experience in project construction and management, property development and architectural practice. He is a A.P.(Architects), R.A.(H.K., Macau), FHKICM, MCABE Chartered Bldg. Eng., ACBI, AHKMC, HKID, MHIREA, and MCIArb.

Paul Y. – with 76 years of construction history, is transforming to be an innovative and smart construction company with active integration of BIM, MiC, and DfMA within AEC to create value to the Construction Industry.

Mr Lee supports the adoption of new construction materials, methods, and technology in the Construction industry through working with XenseTech and will be sharing from the perspective as a leader steering this change in the era of new norm.

GUEST SPEAKER

香 港 大 學
THE UNIVERSITY OF HONG KONG

Centre for Innovation in Construction & Infrastructure Development

Prof Wei PAN

Associate Vice-President (Research and GBA)
Executive Director, Centre for Innovation in Construction and Infrastructure Development
The University of Hong Kong

Prof **Wei Pan** is Associate Vice-President (Research and GBA) of The University of Hong Kong (HKU) where he is also Executive Director of Centre for Innovation in Construction and Infrastructure Development (CICID) and Professor at Department of Civil Engineering. Prof Pan's research covers modular integrated construction, productivity, smart construction, net zero carbon and sustainable infrastructure, and has practiced in China, Singapore, UK and Hong Kong. He has authored over 300 publications and is a top 1% scholar worldwide by citations. He was named Distinguished Young Investigator of China Frontiers of Engineering by Chinese Academy of Engineering in 2019, and achieved CE's Commendation Award in 2020.

High Productivity Construction – Modular Integrated Construction

Construction and infrastructure development set the cornerstone of economic growth and social welfare. The sustainable development of infrastructures in Hong Kong is challenged by factors including ageing workforce, cost escalation and limited resources. R&D has become even more strategically important to drive cities like Hong Kong staying forefront of the world stage. This talk focuses on modular integrated construction (MiC) as an innovative example of R&D and elaborates how MiC rewrites productivity. Drawing on the R&D led by HKU, the talk demonstrates the comprehensive benefits from MiC, not only enhancing productivity but enabling smart and sustainable construction.

GUEST SPEAKER

THE HONG KONG POLYTECHNIC UNIVERSITY 香港理工大學

國家鋼結構工程技術研究中心香港分中心
Chinese National Engineering Research Centre For Steel Construction (Hong Kong Branch)

Ir Prof KF CHUNG

Director
Chinese National Engineering Research Centre for Steel Construction (Hong Kong Branch),
The Hong Kong Polytechnic University

Prof **KF Chung** is an internationally renowned academic, researcher and structural engineer with an established expertise in steel construction. Currently, Prof Chung is a Professor at the Department of Civil and Environmental Engineering, and Founding Director of Chinese National Engineering Research Centre for Steel Construction (Hong Kong Branch) at The Hong Kong Polytechnic University.

Prof Chung works on a wide range of inter-disciplinary engineering investigations, analyses and simulations, especially on modern steel and steel-concrete composite structures. His research interests include materials and behaviour of high strength steels, structural behaviour, limit state analyses and performance-based design of structural systems, structural fire engineering and fire protection in buildings and tunnels, and design codification.

Prof Chung serves as a Member of the Construction Industry Council in Hong Kong since 2018, and he was Vice President of the Institution of Structural Engineers at the U.K. from 2017 to 2020. Prof Chung is currently also a Member of the Election Committee 2021 of the Government of Hong Kong SAR under Sub-Sector “Technology and Innovation”.

Effective Use of High Strength S690 Steel in Construction – A Journey from Research and Development to Engineering Application

High strength S690 steel are highly effective constructional materials, and their wide adoption in construction are expected to provide significant savings in costs and time. However, there are concerns on deterioration in mechanical properties of the S690 steel after welding as a result of material (microstructural) changes.

This presentation reports the latest research and development work on effective use of high strength S690 steel in construction. Essential development in various sectors and trades of the construction industry enabling their wide engineering applications are also presented.

This journey began in 2010 here in Hong Kong. How far are we prepared to go?

GUEST SPEAKER

Prof Christopher KY LEUNG

Professor, Department of Civil and Environmental Engineering
Hong Kong University of Science and Technology

Prof **Christopher Leung** is Professor at the Department of Civil and Environmental Engineering of HKUST, and he served as the Head of Department from July 2009 to June 2015. His research interests include mechanics of composite materials, application of composites in civil engineering, fracture mechanics and mechanical aspects of fiber-optic sensing. He has published over 300 journal and conference papers, and delivered plenary/keynote talks at international conferences in North America, Europe, UK, China and other countries. He has also served as the Associate Editor/Editorial Board Member of journals including Cement and Concrete Composites, Construction and Building Materials and Materials and Structures.

Prof Leung has received a number of research-related awards and his work has also been recognized by different professional communities. He served as the Honorary President of RILEM in 2011 and is elected Fellow of HKIE, ICE (UK), IStructE (UK), ASCE, RILEM and IA-FraMCoS.

Innovative Application of Fiber Reinforced Cementitious Materials to Enhance Productivity

In this talk, three examples on the innovative use of fiber reinforced cementitious materials in construction will be discussed. These include (i) a fiber reinforced mortar for repairing concrete slabs with severely corroded reinforcements that can eliminate the need for adding new rebars, (ii) engineered cementitious composites (ECC) for crack control in basement walls that enable the saving in steel reinforcements or reduction in wall thickness, and (iii) ECC for enhancing the blast resistance of tunnel linings so it is possible to use the temporary lining (which is subject to blasting) as the permanent lining. By properly exploiting the high performance of advanced materials, both construction productivity and cost-effectiveness can be enhanced.

GUEST SPEAKER

Dr Ivan ML SHAM

Chief Commercial Officer cum R&D Director (Construction)
Nano & Advanced Materials Institute

Dr **Ivan Sham** oversees the applications and impact of NAMI technologies, cum the research and development projects in the Construction Sector. He received his Ph.D. in Mechanical Engineering from the Hong Kong University of Science & Technology (HKUST) and MBA from the University of Strathclyde (UK). His research interests include advanced cementitious composites, fiber surface treatment, nanostructured composites materials, finite element analysis, innovation management, etc. He is now a Fellow of IOM3 (FIMMM-IOM3) and Council Member of the Institute of Materials, Minerals, and Mining (IOM3, HK Chapter). He has over 50 publications in international peer-reviewed journals/conferences, and 15 granted patents in the US and China.

The Journey of Technology-In-Action: Self-Compacting Backfill Material & Vibration-resistant Sprayable Concrete

The key to innovation is to turn technologies into products which can meet the necessity of our living timely and make an impact. In the construction industry, better ways to improve productivity, sustainability and safety are always desired. Through the collective efforts among structural engineers, materials scientists and materials producers, more efficient, cost-effective and safer construction can be actualized with new materials and new design approaches. In this presentation, we will share how the two novel construction materials, namely, self-compacting backfill material and vibration-resistant sprayed concrete, are developed, produced and applied in Hong Kong.

GUEST SPEAKER

Ir Dr Raymond WM CHEUNG, JP

Head of Geotechnical Engineering Office
Civil Engineering and Development Department

Ir Dr **Raymond Cheung** has more than thirty years' experience in civil and geotechnical engineering. He has been involved in a number of mega civil engineering projects in Hong Kong under the Airport Core Programme, including the Airport Railway, Chek Lap Kok International Airport reclamation and Western Harbour Crossing, before joining the Hong Kong SAR Government in the late 1990s. He is a member of the School Scientific Committee of Landslide Risk Assessment and Mitigation (LARAM), International Network on Landslide Early Warning Systems (LandAware) and the Editorial Board of the Chinese Journal of Geotechnical Engineering. He is currently Head of the Geotechnical Engineering Office (GEO) of the Civil Engineering and Development Department overseeing control of geotechnical works, setting geotechnical standards, mining operation and quarrying, tunneling and underground space development, the Landslip Prevention and Mitigation Programme, and the landslide emergency services.

Innovating for a Smarter Geotechnical Practice

In collaboration with academia, research institutes and industrial practitioners, Geotechnical Engineering Office (GEO) of the Civil Engineering and Development Department has been leading the development and application of innovative solutions to achieve a smarter and safer geotechnical practice in Hong Kong. Notable examples of the research and development work recently undertaken by GEO include:

- Application of novel remote sensing and 3D geological modelling techniques to better characterise the above-ground and under-ground conditions to enhance the effectiveness of planning, investigation and engineering design of infrastructure projects.
- Development of robotic solutions and automated construction material testing systems to bring upon new benefits to daily engineering applications.
- Continual advancements in design and construction practice of various geotechnical works including reclamation, tunnel/cavern and foundation to further enhance safety, cost effectiveness and sustainability of project implementation.

The presentation will share research and development of these innovative technologies and their applications in geotechnical practice.

Session II – Applied R&D for Innovation
Breakout Session II - Smart Construction and Operation

SESSION CO-CHAIRS

Prof Anthony GO YEH

Chair Professor, Department of Urban Planning and Design
The University of Hong Kong

Prof **Anthony GO Yeh**, FHKIP, FRTPI, FPIA, FCILT, FRICS, FAcSS is a Member of the Chinese Academy of Sciences and Hong Kong Academy of Sciences and Fellow of TWAS (The World Academy of Sciences), Chan To-Hann Professor in Urban Planning and Design and Chair Professor of Department of Urban Planning and Design and Director of GIS Research Centre at the University of Hong Kong. His main areas of specialisation are in urban development and planning in Hong Kong, China, and South East Asia and the applications of geographic information systems (GIS) in planning support system and smart cities. He received the UN-HABITAT Lecture Award in 2008. His "Angle Difference Method for Vehicle Navigation in Multilevel Road Networks" won a gold medal in the 2018 Geneva International Exhibition of Inventions.

Ir Paul EVANS

Executive Director & Chief Technology Officer
Gammon Construction Limited

Ir **Paul Evans** has over 40 years' multi-disciplinary design and construction project management experience in Hong Kong, Macau, and the United Kingdom, with the past 26+ years spent working in Hong Kong and Macau. He joined Gammon in 2019 and was appointed Executive Director in 2020 responsible for overseeing the E&M division. In late 2020, Paul was given an expanded role as Chief Technology Officer responsible for Integrated Data Technologies, Digital and BIM business functions and for the Gammon in-house Innovation Incubator, Digital G Limited.

GUEST SPEAKER

THE HONG KONG POLYTECHNIC UNIVERSITY 香港理工大學

DEPARTMENT OF BUILDING & REAL ESTATE 建築及房地產學系
INTERNATIONAL • COLLABORATIVE • CONSTRUCTION

Prof Michael YAM

Professor and Head of Department of Building and Real Estate
Deputy Director and Executive Secretary
Chinese National Engineering Research Centre for Steel Construction (Hong Kong Branch)
The Hong Kong Polytechnic University

Prof **Michael Yam** is Head of the Department of Building and Real Estate at the Hong Kong Polytechnic University. He was appointed Deputy Director and Executive Secretary of the Chinese National Engineering Research Centre for Steel Construction (Hong Kong Branch) which was established in October 2015 with the approval of the Ministry of Science and Technology, PRC, and support from ITC of the Hong Kong SAR Government. He has involved in various accreditation exercises of engineering degrees in Hong Kong representing the HKIE. Prof Yam was the auditor for the quality audits of sub-degree operations of the UGC-funded universities. In the capacity of a local auditor, he is tasked with the quality audits of the third audit cycle (2022-2024). Prof Yam is a Fellow of the American Society of Civil Engineers, The Hong Kong Institution of Engineers and The Hong Kong Institute of Construction Managers.

The Smart Construction ERA: Education, Research and Application

In the era of smart construction, it is of paramount importance to enhance our construction education curriculum and to align our research focus and direction towards innovative and advanced technologies for construction. This presentation will briefly introduce the measures that have been taken by the Department of Building and Real Estate, The Hong Kong Polytechnic University in education and research in smart construction. A total of four research projects will be briefly presented and the application of the research findings will also be discussed.

GUEST SPEAKER

Dr Winnie TANG, MH, JP

Founder and Chairman
Esri China (Hong Kong) Limited

Dr **Winnie Tang**, MH, JP, is an Adjunct Professor in the Department of Computer Science, Faculty of Engineering, Department of Geography, Faculty of Social Sciences and Faculty of Architecture at the University of Hong Kong (HKU). She is one of the local born IT entrepreneurs from Hong Kong. In the 1990s, Dr Tang founded Esri China (Hong Kong) Limited to develop and promote Geographic Information System (GIS) software and solutions. She is also the Founder and Honorary President of Smart City Consortium. Over the years, she has been actively advocating the use of technology and sharing her views regarding the ICT industry, eHealth, environmental conservation, entrepreneurship and smart city through her services in government and non-government organizations in Hong Kong.

Building a Sustainable Future through Smart Technologies

Pandemic provides impetus to change the world that we live in. The architecture, engineering and construction (AEC) industry must be smarter than ever in order to overcome unprecedented challenges. The idea behind smart construction is to use technology and data to make better decisions, deliver a better quality of life and create a sustainable future.

This presentation will share about:

- global trends of smart cities and AEC industry
- the journey of Hong Kong towards a smart city
- how emerging technologies empower smart construction/operation
- what's next for achieving a sustainable future

GUEST SPEAKER

CityU
香港城市大學
City University of Hong Kong

Ir CHAN Tsz Kin

Director of Campus Development
City University of Hong Kong

Ir **Chan Tsz Kin** has more than 30 years of experience in project management, master planning, design and construction of large scale property development and infrastructure projects in Hong Kong, China and overseas.

As the Director of Campus Development Office of City University of Hong Kong, he is responsible for long-term master planning and space allocation, construction, operation and repair and maintenance of the university campus. He has been promoting the use of Modular Integrated Construction (MiC) in new building projects, and the application of Building Information Modelling (BIM) and Internet-of-Thing (IoT) in achieving AI-driven campus maintenance and operation for reliability and energy efficiency.

As a registered professional building services engineer, he is specialised in large-scale building services installation, smart campus, risk assessment and performance-based fire engineering approach design. Also, he served as the President of Hong Kong Chapter of American Society of Heating, Refrigerating and Air-Conditioning Engineers in 2004-2005.

Smart Campus Development in CityU

Extensive applications of digital technologies and ITC (Information and Communication Technology) initiatives has driven profound changes in construction industry in Hong Kong. This presentation shares how City University of Hong Kong transforms a 40-year old campus from a cluster of standalone buildings to an integrated smart campus.

BIM model covering the entire university campus of about 240,000 sq.m in net area was built in 2 years. More than 600 IoT (Internet-of-Things) devices providing real time data and key as-built records would be integrated with the BIM model accessible via CityU's cloud platform to achieve a predictive and AI-driven operation.

GUEST SPEAKER

有利集團有限公司
Yau Lee Holdings Limited

Ophylla Ventures

Ms Rosana WONG

Executive Director
Yau Lee Holdings Limited
Founder and President
Ophylla Ventures Company

Ms **Rosana Wong** is an Executive Director of Yau Lee Holdings Limited and leads the Group to be an integrated green corporation by focusing technology, innovation, science and dynamic spatial data. She has further founded Ophylla Ventures to seed a group of startups to research, develop and commercialise sustainable smart city solutions in terms of environment, infrastructure, care and transformation. Rosana is also the Director of Cyberport and the Chair of Construction and Facilities Committee as well as the Vice President of Smart City Consortium and the Chair of Smart Living Committee.

Digitalisation in Smart Construction

Integrating R&D at the heart of business strategy is vital in particular shifting traditional construction from the least digitally advanced to one of the most innovative industries. Rosana will share how digitalization leads the way into lean lifecycle by illustrating actual MiC projects and Hong Kong's first blockchain-enabled multifunctional platform for QA/QC, JIT delivery, traceability and reliability. Together with a wide range of key emerging tech in automation and AI robotics, productivity and buildability could be enhanced while the manpower be greatly reduced. Rosana will also share her experiences in collaborating with local and overseas universities on R&D and innovation activities to benefit the AECO industry in Hong Kong and the Greater Bay Area.

GUEST SPEAKER

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

Ir Danny CS HUNG

Executive Director, Chairman and President
China State Construction Engineering (Hong Kong) Limited

Ir **Danny CS Hung** is a Chartered Engineer in structural engineering by profession, a member of HKIE and IStructE (UK), and possesses over 40 year's bountiful experiences in local and overseas. He is an active member of CIC in application of innovation and smart construction.

Danny joined China State (HK) in 1996, he is an Executive Director, Chairman and President of China State Construction Engineering (Hong Kong) Limited. He is also an Executive Director and a Vice President of the Holdings. Danny overall manages all construction business in Hong Kong, joint venture operation in Macau as well as construction related investment in overseas. Danny is also a Vice President of the HKCA and a member of the Registered Contractors' Disciplinary Board Panel.

Smart Construction and Management

Research and Development (R&D) with practical thinking in construction has been aggressively emphasized in recent years, for labor shortage, production inefficiencies and issues relating to construction safety, the environment and zero carbon emission in the industry. The authorities decided to collaborate and initiate policies with leading contractors to speed up engineering innovation, applied R&D and technology adoption, and to encourage the industry players to meet the new challenges of the constantly changing and evolving modern world. We should regard and treat this development as a revolution and ensure we use our intelligence and experience to expand the frontiers of our knowledge.

NOTES

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Development Bureau