



土木工程系

Department of Civil Engineering
The University of Hong Kong



Department of Civil Engineering eNews (November and December 2024)

Department News

William Mong Distinguished Lecture

Professor Michael Wagner from University of Vienna has delivered the William Mong Distinguished Lecture titled "Seeing is Understanding: Next Generation Chemical Imaging for Super-Fast Functional Analyses of Microbiomes" on November 13, 2024. The lecture was hosted by Professor Tong Zhang.



For full details, please access the webpage via this link: [Faculty eNews - Issue 12, 2024](#)

Departmental Distinguished Lecture

A Departmental Distinguished Lecture was held successfully on December 12, 2024. The Department is honoured to have Professor Nikolaos Geroliminis, one of the world's leading experts in urban transportation, to give a keynote speech for the lecture. Professor Nikolaos Geroliminis is a Full Professor at EPFL and the Head of the Urban Transport Systems Laboratory (LUTS). His research interests focus on urban transportation systems, traffic flow theory and control, public transportation and on-demand transport, car sharing, optimization and large-scale networks. He is currently the Editor-In-Chief of Transportation Research Part C: Emerging Technologies.

The title of the lecture is "Large-scale Modelling and Perimeter Control for Congested Transport Networks." The lecture was hosted by Dr. Jintao Ke and the Department souvenir was presented to Professor Geroliminis by Professor S.C. Wong. This lecture was held in KKL109 on LG1/F of K.K. Leung Building in HKU, with around 100 participants. Professor Geroliminis shared insights on how to trace where congestion originates and how traffic management systems affect its



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formation and the time it finishes. A black-tie dinner was hosted following the lecture.



Staff Award

Leung Cheuk Tong Outstanding Young Professorship

Dr. Hailong Ye has been honoured with the Leung Cheuk Tong Outstanding Young Professorship and has received the award at The Thirteenth Inauguration of Endowed Professorships on November 25, 2024.



For full details, please access the webpage via this link: [HKU Media](#) and [Faculty eNews - Issue 12, 2024](#)



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Staff News

Dr. Mingfu Guan has been promoted to Associate Professor, effective from November 1, 2024.

Dr. Mingfu Guan has been awarded with 2024/2025 NSFC-RGC Joint Research Scheme grant (HK\$ 992,300) by Research Grant Council, with a project titled “Developing strategies to boost resilience of metro systems to extreme flooding in a changing climate”.

Professor A.W. Jayawardena has been invited to a Keynote Lecture on the “Role of artificial intelligence in hydrological modelling” given at the International Conference on Hydrology and Water Management (CHWM2024) held during April 19-21, 2024 in Xiamen, China (via Zoom).

He has also been invited to a Keynote presentation on the “Role of water for a sustainable future” at the International Conference on Environmental Science and Sustainable Earth 2024 held during November 11 – 12, 2024 in Paris, France (in person).

Dr. Xiao Li has been awarded with Innovation and Technology Fund with the project titled “Hybrid Pose Adjustment (HyPA) robot for assembly process in modular integrated construction (MiC)”.

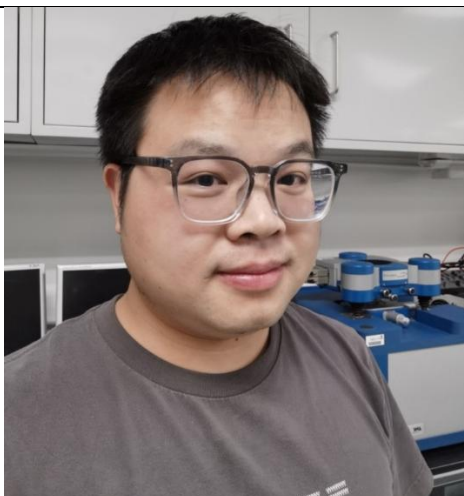
The MEMBest research team led by Professor Chuyang Tang, Chair Professor of Environmental Engineering, has developed a novel nanofiltration membrane using natural silk. This membrane is ten times more permeable than commercially available products, allowing a water flux of as high as 56.8 liters per square meter per hour under a partial vacuum suction. The patented technology can offer approximately 80% reduction in energy consumption for water purification.

“Silk is an amazing material—strong, flexible, and eco-friendly. We've harnessed its unique properties to push the boundaries of water purification,” explained Mr. Bowen GAN, Professor Tang’s PhD student who spearheaded the invention.



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The team has published the work in *Nature Communications*, in an article entitled “Ultra-permeable Silk-based Polymeric Membranes for Vacuum-driven Nanofiltration”.

For full details, please access the webpages via these links: [Nature Communications](#), [HKU Media](#), [Ming Pao](#), [Hong Kong Economic Times](#), [Hong Kong Economic Journal](#), [Oriental Daily News](#) and [Ta Kung Pao](#).

Professor Sze Chun Wong has been appointed as a Member of the Environment Committee for San Tin Technopole, effective from September 27, 2024, to September 26, 2026.

Alumni News

Fellow of Australian Academy of Technological Science and Engineering

Professor Yixia Zhang has been elected as the Fellow of Australian Academy of Technological Science and Engineering in October 2024. Professor Zhang was awarded PhD in Structural Engineering from Department of Civil Engineering at the University of Hong Kong in 2001, under the supervision of Professor Y.K. Cheung.

Professor Zhang is currently Deputy Chair of Academic Senate (was Acting Chair and member of Board of Trustee) of Western Sydney University, Discipline Lead of Civil and Environmental Engineering and Co-Director of Advanced Manufacturing Technology. Before joining Western Sydney University in 2019, she worked in University of New South Wales for 15 years. She was elected as the member of the College of Expert of Australian Research Council since 2021. Professor Zhang has made tremendous contribution in the area of advanced engineering materials, construction and building materials, composite materials and structures, and structural engineering and computational mechanics. Her interest focuses on the construction sustainability and infrastructure resilience and structural safety. Working closely with her industry partners and government, her research over 50 projects made significant impact to the society. Up until October 2024, she published



over 400 peer reviewed papers with 210 papers published in the top international journals in the relevant areas. She supervised and mentored over 100 researchers from the globe with many from China.



For full details, please access the webpage via this link: [ATSE](#)

Student Awards

Mr. Chen Chen (Mphil student supervised by Dr. Xiao Li) has won the Best Innovation and Impact Award at the 2024 International Conference on Construction Project Management and Construction Engineering (iCCPMCE), which was held during November 20 – 23, 2024 in Sydney, Australia.

Miss Siyuan Wu (PhD student supervised by Professor Quentin Z.Q. Yue) has won the Excellent Graduate Student Presentation Award at The 12th China Engineering Geology Conference, which was held during November 22 - 25, 2024 in Shenzhen, China.

Ms. Wentao Zhu (PhD student supervised by Dr. Xiao Li) has won the Best Paper Award at the 2024 International Conference on Construction and Real Estate Management (ICCREM), which was held during November 23 – 24, 2024 in Guangzhou, China.

Mr. Zexiu Zhu (PhD student supervised by Dr. Ray Su) has won the Best Student Paper Award with a paper titled "Performance of a Demountable CFST Column-to-column Connection in the Shear Wall System with Boundary Columns" at The 1st International Conference on Engineering Structures, which was held during November 8 - 11, 2024 in Guangzhou, China.



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Student News

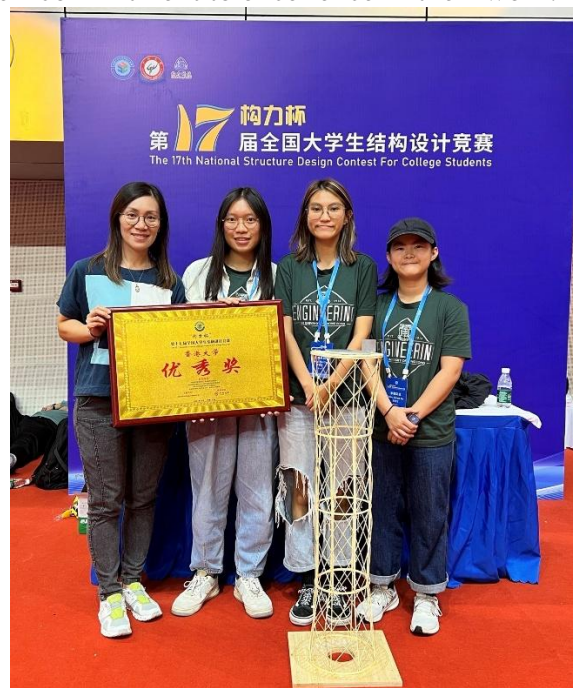
The 17th National Structural Design Contest for College Students

Recognized as one of the most prestigious structural design contests for college students in mainland China, the National Structural Design Contest for College Students encourages participants to develop innovative solutions for modern engineering challenges through collaboration. This year's competition, the 17th National Structural Design Contest, took place at Guangzhou University. Representing Hong Kong as the sole invited team, Fung Tsoi Ying, Leung Hei Yan, and Man Kwun Po, all third-year civil engineering students, participated under the guidance of Dr. Ada Law from November 8 to 10, 2024.

The theme of this year's competition was 'Structural Stability of High-Rise Structures', reflecting the increasing prevalence of such structures in mainland China's urban landscapes. With 121 teams from universities across China taking part, the competition required teams to construct their models using provided materials within a tight 12-hour timeframe spread over 2 days. The models underwent rigorous testing to assess their structural integrity, including monitoring horizontal displacement and acceleration under varying loads.

During the competition, our team had the opportunity to interact with and exchange ideas with other top-tier teams from different universities. They also enjoyed building new friendships and sharing HKU souvenirs. Witnessing the diverse yet effective models crafted with precision by other teams was truly enlightening for our students. It served as a reminder of the importance of striving for excellence in engineering solutions and provided inspiration for their future endeavors in the field.

Overall, the National Structural Design Contest was a valuable and eye-opening experience for our students, showcasing their dedication to the field of civil engineering and their commitment to excellence in their work.



Department of Civil Engineering eNews (September and October 2024)

Staff Awards

The HKIE Best Transactions Paper Prize 2024

Professor Francis Au (right), Dr. Yingqi Liu (first one from the left, PhD 2021) and Mr. Ho Kit Siu (second one from the left, BEng 2019, MSc(Eng) 2023) have been awarded the HKIE Best Transactions Paper Prize 2024 for the paper titled "Long-term performance of hybrid MiC buildings considering concrete creep and shrinkage."



Figure 1. A group photo taken during The Prize Presentation Ceremony on September 13, 2024 (Friday).

HKU Scholars in the Top 1% ranked by Clarivate Analytics

The following researchers are ranked by Clarivate Analytics in the top 1% worldwide by citations in their research fields:

- Dr. Xiao Li;
- Prof. Xiao-yan Li;
- Prof. Wei Pan;
- Prof. Kaimin Shih;
- Prof. Wai Yuen Szeto;
- Prof. Chuyang Tang;



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- Prof. Sze Chun Wong;
- Prof. Jun Yang; and
- Prof. Tong Zhang.

For full details, please access the webpage via this link:
<https://hub.hku.hk/local/top1pc/top1pc.jsp?year=2024>

World Top 2% Scientists by Stanford University's List 2024

The following researchers are ranked by Stanford University's List 2024 in the top 2% Scientist worldwide in their research fields:

By career long (2023):

- Prof. Francis Au;
- Prof. A.W. Jayawardena;
- Prof. Albert Kwan;
- Prof Mohan Kumaraswamy;
- Prof. Wei Pan;
- Prof. Kaimin Shih;
- Dr. Ray Su;
- Prof. Wai Yuen Szeto;
- Prof. Leslie George Tham;
- Prof. Chuyang Tang
- Prof. Sze Chun Wong;
- Prof. Jun Yang;
- Dr. Hailong Ye;
- Prof. Quentin Zhongqi Yue; and
- Prof. Tong Zhang.

By single year (2023):

- Prof. Francis Au;
- Prof. Ji Chen;
- Dr. May Chui;
- Dr. Jintao Ke;
- Prof Mohan Kumaraswamy;
- Prof. Albert Kwan;
- Dr. Xiao Li;
- Prof. Wei Pan;
- Prof. Kaimin Shih
- Dr. Ray Su;
- Prof. Wai Yuen Szeto;
- Prof. Chuyang Tang;
- Prof. Sze Chun Wong;
- Prof. Jun Yang;
- Dr. Hailong Ye;



- Dr. Jing Yu; and
- Prof. Quentin Zongqi Yue; and
- Prof. Tong Zhang.

For full details, please access the webpage via this link:
<https://elsevier.digitalcommonsdata.com/datasets/btchxktzyw/7>

Staff News

Adjunct Professor A. W. Jayawardena authored his 4th book and it is published by Cambridge Scholars Publishing.

For full details, please access the webpage via this link
<https://www.cambridgescholars.com/product/978-1-0364-1100-8>

Professor W. Pan, Head of Department, was elected Fellow of the Hong Kong Institution of Engineers on September 6, 2024.

Professor CY Tang's group published a series of papers in the prestigious journal *Nature Communications*:

- Highly porous metal-organic framework (MOF) nanosheets have shown promising potential for efficient water sorption kinetics in atmospheric water harvesting (AWH) systems. However, the water uptake of single-component MOF absorbents remains limited due to their low water retention. To overcome this limitation, Dr. Zhang Lingyue, a Research Assistant Professor working with Professor CY Tang, developed a strategy for fabricating vertically aligned MOF nanosheets on hydrogelmembrane substrates (MOF-CT/PVA) to achieve ultrafast AWH with high water uptake, achieving 91.4% saturation within 15 min. This construction approach significantly enhances the water vapor adsorption, offering a potential solution for the design of composite MOF-membrane harvesters to mitigate the freshwater crisis. More details can be found in the *Nature Communications* paper: Zhang, L.; Li, R.; Zheng, S.; Zhu, H.; Cao, M.; Li, M.; Hu, Y.; Long, L.; Feng, H.; Tang, C. Y.*, Hydrogel-embedded vertically aligned metal-organic framework nanosheet membrane for efficient water harvesting. *Nature Communications* **2024**, *15*, 9738. <https://www.nature.com/articles/s41467-024-54215-z>
- Chlorinated organic pollutants widely exist in aquatic environments and threaten human health. Catalytic approaches are proposed for their elimination, but sluggish degradation, incomplete dechlorination, and catalyst recovery remain extremely challenging. The work by Dr. Xiao Qian, a postdoc working with Professor CY Tang, demonstrates efficient dechlorination using ferrous oxide/graphene oxide catalytic membranes with strong nanoconfinement effects. The catalytic membrane shows complete dechlorination of dichloroacetic acid to chloride, with nearly 100% reduction



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efficiency within a record-breaking 3.9 ms, improving the first-order rate constant by more than six orders of magnitude compared to current catalysis. More details can be found in the *Nature Communications* paper: Xiao, Q.; Li, W.*; Xie, S.; Wang, L.; Tang, C. Y.*, Ultrafast complete dechlorination enabled by ferrous oxide/graphene oxide catalytic membranes via nanoconfinement advanced reduction. *Nature Communications* **2024**, *15*, 9607. <https://www.nature.com/articles/s41467-024-54055-x>

- Nanofiltration (NF) membranes are commonly supplied in spiral-wound modules, resulting in numerous drawbacks for practical applications (e.g., high operating pressure/pressure drop/costs). Vacuum-driven NF could be a promising and low-cost alternative by utilizing simple components and operating under an ultra-low vacuum pressure (<1 bar). Nevertheless, existing commercial membranes are incapable of achieving practically relevant water flux in such a system. Mr. Gan Bowen, a PhD student supervised by Professor CY Tang, fabricated a silk-based membrane with a crumpled and defect-free rejection layer, showing water permeance of $96.2 \pm 10 \text{ L m}^{-2} \text{ h}^{-1} \text{ bar}^{-1}$ and a Na_2SO_4 rejection of $96.0 \pm 0.6\%$ under cross-flow filtration mode. In a vacuum-driven system, the membrane demonstrates a water flux of $56.8 \pm 7.1 \text{ L m}^{-2} \text{ h}^{-1}$ at a suction pressure of 0.9 bar and high removal rate against various contaminants. Through analysis, silk-based ultra-permeable membranes may offer close to 80% reduction in specific energy consumption and greenhouse gas emissions compared to a commercial benchmark, holding great promise for advancing a more energy-efficient and greener water treatment process and paving the avenue for practical application in real industrial settings. More details can be found in the *Nature Communications* paper: Gan, B.; Peng, L. E.; Liu, W.; Zhang, L.; Wang, L. A.; Long, L.; Guo, H.; Song, X.; Yang, Z.*; Tang, C. Y.*, Ultra-permeable silk-based polymeric membranes for vacuum-driven nanofiltration. *Nature Communications* **2024**, *15*, 8656. <https://www.nature.com/articles/s41467-024-53042-6>

Professor S.C. Wong has been reappointed as a Member of the Environment and Conservation Fund Committee and Chairman of its Practice and Action Projects Subcommittee, effective from October 16, 2024, to October 15, 2026.

Professor S.C. Wong has been appointed as a Council Member of the Hong Kong Metropolitan University, effective from October 1, 2024, to September 30, 2027.

In Memoriam of Professor Hon Chuen Chan (陳漢銓)

Professor Chan Hon Chuen, former Head of Department of Civil Engineering, passed away on October 16, 2024 at the age of 93.



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Prof. Chan obtained his bachelor degree in Civil Engineering from HKU in 1960 and obtained his Ph.D degree in structural engineering from Imperial College London in 1965.

Professor Chan worked in our department for 31 years from 1968 until his retirement in 1999. From 1994 to 1998, he was appointed Head of Department.

Professor Chan specialized in structural engineering, his main research interests were in the areas of higher order finite element method, shearwalls and corewalls, and plate and space structures.

His presence and wisdom will be dearly missed by all who had the privilege of knowing him.



Department of Civil Engineering eNews (July and August, 2024)

Departmental Event

Engineering Competition for Youth – Building a paper tower crane

The Structural Division of the Hong Kong Institution of Engineers, the Department of Civil Engineering of The University of Hong Kong, and the Technological and Higher Education Institute of Hong Kong jointly organized an engineering competition for youth at Tam Wing Fan Innovation Wing on July 19, 2024. Participants from secondary schools were required to use paper to build a paper tower crane. The team from The Church of Christ in China Kwei Wah Shan College won the Champion. The competition aimed to stimulate students' interest in structural engineering and improve problem-solving abilities. The competition was a great success, and we look forward to more of such competitions in the future.



Figure 1. Dr. Ray Su gave an introductory of the competition to participants.



Figure 2. All the paper tower cranes in display.



Figure 3. In the middle of the competition.

Staff Awards

Professor Sze Chun Wong has been ranked 75th by the international academic website Research.com among the top 100 best scholars nationally in their respective disciplines in 2024.

Professor Jun Yang has been awarded with “Best Teacher Award (RPG)” in Faculty Recognition Ceremony on July 2, 2024.

Staff News

Dr. Xiao Li awarded with Guangdong-Hong Kong Technology Cooperation Funding Scheme (TCFS)

Dr. Xiao Li received a fund from the Guangdong-Hong Kong Technology Cooperation Funding Scheme (TCFS) as PI with a project titled “HRC-MAPROS: Human-Robot Collaboration-Oriented MiC Adaptive Production Robotics System.” The participating organizations include the Chinese Academy of Science (Shenzhen Institute of Advanced Technology), China Construction Science & Technology Group Co., Ltd, and China Resources Land. This project has three objectives: (1) To optimize the design of MiC flexible production robotics systems and develop the multi-robot collaborative control method for adaptive production; (2) To develop a human-robot collaboration-oriented intelligent work packaging approach for dynamic production planning and adaptive production scheduling; (3) To establish the graph-based interoperable and communication-efficient platform with multi-modal knowledge distillation and reuse method.

Dr. Jiaji Wang awarded with NSFC Young Scientists Fund for Modular integrated Construction (MiC)

Dr Jiaji Wang was awarded the NSFC Young Scientists Fund project titled “Research on nonlinear behaviour of modular steel-concrete composite buildings considering semi-rigid inter-module connections”. MiC involves the assembly of prefabricated, three-dimensional modules into a cohesive building structure. The proposed project will develop steel-concrete composite MiC for Hong Kong buildings, which combine the lightweight and high tensile strength of steel with the compressive properties of concrete. Composite MiC will further reduce costs, self-weight and carbon emission and achieve high performance under severe wind or earthquake excitation. The mechanical behaviour of the connections in a steel-concrete composite MiC structure is more complicated. It is essential to investigate the semi-rigid connection's force transmission mechanism through scaled experimental models and advanced nonlinear numerical simulations. This research project focus on the fundamental mechanical behaviour of semi-rigid connections and floor composite effect in composite modular structures. By conducting large-scale experiments and developing constitutive models in Finite Element software, we aim to establish a numerical simulation framework tailored to modular composite structures. Accelerated computing using state-of-the-art Physics-informed Neural Operator Solver PINOS will also be investigated. The ultimate goal is to develop a digital twin model and design theory for efficient and accurately simulating the nonlinear behavior of composite MiC structures, thereby enhancing the safety and efficiency of MiC construction in Hong Kong and beyond.

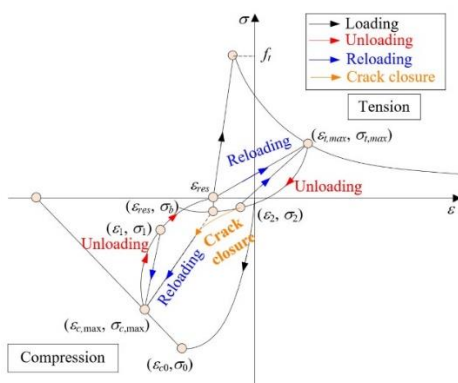


Figure 1. ABAQUS UMAT Concrete constitutive model for high-fidelity simulation of MiC.

For full details of Dr. Wang, please access his website via this link:
<https://wangjiajithu.github.io/hku/>

Professor Sze Chun Wong has been reappointed as a member of the Planning Sub-Committee of the Land and Development Advisory Committee, effective from July 1, 2024, to June 30, 2027.



Student Awards

Ms. Long Ching Chan (CivE 4 2023-2024) has been awarded with Best Presentation Award Model Building Competition 2024.

Mr. Chi Yung Hung (CivE 4 2023-2024) has been awarded with Best Presentation Award Model Building Competition 2024.

Mr. Tak San Lau (CivE 4 2023-2024) has been awarded with Best Presentation Award Model Building Competition 2024.

Mr. Chun Yan Lok (CivE 2 2023-2024) has been awarded with Chun Wo Foundation Scholarship 2023-2024.

Mr. Chun Pong Man (CivE 4 2023-2024) has been awarded with HKU Foundation Scholarship 2023-2024.

Mr. Chun Wing Edison Pak has been awarded with First Prize at HKIE Trainee of the Year Award 2023



Figure 1. Photo of Mr. Pak at the prize presentation ceremony.

Mr. Chun Wing Edison Pak, a MSc student of the Department of Civil Engineering, has been awarded with the prestigious First Prize in the Hong Kong Institution of Engineers (HKIE) Trainee of the Year Award 2023.

During the prize presentation ceremony, Mr. Pak received the certificate and trophy plate from the HKIE President Ir. Dr. Barry Chi-Hong Lee, alongside Director of Civil Engineering and Development Ir. Hok Shing Fong, in recognition of his remarkable accomplishments.

Mr. Ka Ming Tang (CivE 4 2023-2024) has been awarded with Talent Development Scholarship 2023-2024.

Mr. Tsz Yeung Tsang (CivE 4 2023-2024) has been awarded with Best Presentation Award Model Building Competition 2024.



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Mr. Yinyi Wei (PhD student of Dr. Xiao Li) has been awarded with Best Presentation Award at the 2024 IEEE International Conference on Automation in Manufacturing, Transportation, and Logistics (iCaMaL 2024), with a paper titled “Graphic-augmented Text-based Floorplan Generation”.



Figure 1. Photo of Mr. Wei at the prize presentation ceremony.

Mr. Pak Hei Wong (CivE 4 2023-2024) has been awarded with Best Presentation Award Model Building Competition 2024.

Ms. Yi Shan Wong (CivE 4 2023-2024) has been awarded with Talent Development Scholarship 2023-2024.

Mr. Pak Ho Anson Wu (CivE 4 2023-2024) has been awarded with Best Presentation Award Model Building Competition 2024.

Mr. Jintao Xue (PhD student of Dr. Xiao Li) has been awarded with the Best Conference Paper Second Prize at the Annual International Conference for Chinese Scholars in Industrial Engineering (CSIE 2024), with a paper titled “Graphic-based Product2Task-Worker-Machine Mapping in Modular Construction”.



Figure 1. Photo of Mr. Xue at the prize presentation ceremony.



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Department of Civil Engineering eNews (May to June, 2024)

Staff Awards

Professor CY Tang, a Chair Professor of Environmental Engineering, is one of the thirteen distinguished HKU scholars recognised by the international academic website Research.com among the best scholars globally in their respective disciplines in 2024. Professor Tang ranks 7th in China and 63rd globally in the Engineering & Technology discipline. The rankings are determined by a scientist's D-index (Discipline H-index), which solely considers publication and citation data within a specific discipline. This recognition highlights the significant contributions of Professor Tang to his research field—membrane and water technology. Professor Tang has also been recognised as a Clarivate Highly Cited Researcher since 2021. He serves as a Co-Editor of Desalination and an Editorial/Advisory Board Member of several flagship journals in relevant research areas, including Environmental Science & Technology Letters and Journal of Membrane Science.



Figure 1. Photo of thirteen distinguished HKU scholars.

For full details, please access HKU Media via this link: <https://hku.hk/press/press-releases/detail/27432.html>; and access Research.com via this link: <https://research.com/u/chuyang-y-tang>.



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Ir. Dr. Ray Su has been awarded the Structural Excellence Award 2024 by the Hong Kong Institution of Engineers, Structural Division for his outstanding paper titled "Assessment of out-of-plane structural defects using parallel laser line scanning system" published in Computer-Aided Civil and Infrastructure Engineering in 2023. His paper introduces a non-contact vision-based method for damage detection and measurement that outperforms traditional AI building inspections. The method is highly accurate, with an error of around 0.5 mm, and can recognize and quantify defects' size and depth. This low-cost technique utilizes laser lines to detect even small textureless defects such as initial cover budging or delamination through deep learning methods.



Figure 1. Photo of Ir. Dr. Su.

For full details, please access Sing Tao via this link: <https://std.stheadline.com/realtime/article/1995929/>; access Faculty news via this link: <https://engg.hku.hk/News-Events/News/issue/2024-06#8172>; and access videos via these two YouTube links: <https://youtu.be/2ujDSf1v79E?si=3PbsKNMKpxNvNKuE>; <https://youtu.be/tMZaZgG1uzc?si=nmSgaU2A4u82mMaV>.



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Staff News

Professor K. Shih has been appointed as Associate Dean (Teaching and Learning - UG), effective from July 1, 2024 to June 30, 2027.

Professor S.C. Wong has been reappointed as a member of the Advisory Committee for the Accredited Programme of MTR Academy, effective from August 1, 2024, to July 31, 2026.

Professor S.C. Wong has been reappointed as Associate Dean (Development and External Relations), effective from September 1, 2024 to August 31, 2027.

Professor S.C. Wong has been reappointed as a member of the Land and Development Advisory Committee, effective from July 1, 2024, to June 30, 2027.

Department of Civil Engineering eNews (April 2024)

Departmental Event

HKU signs MoU with Centre of Science and Technology Industrial Development of Ministry of Housing and Urban-Rural Development

The University of Hong Kong (HKU) and the Centre of Science and Technology Industrial Development (CSTID) of the Ministry of Housing and Urban-Rural Development (MOHURD) signed a Memorandum of Understanding (MoU) during the Mainland and Hong Kong Construction Forum 2024 on March 26, 2024. The MoU seeks to strengthen the University-Industry collaboration on exploring opportunities to promote the effective use of Modular Integrated Construction (MiC) for quality housing and to support the research and development of MiC in Hong Kong and the Mainland.

Prof. Wei Pan, Head of Department of Civil Engineering and Director of MiCLab, HKU and Mr. Feng Zhang, Chief Engineer of CSTID represented the two organisations in the MoU signing. The signing was witnessed by Mr. Xianxin Zeng, Director-General, Department of Construction Market Supervision of MOHURD, Ms. Bernadette Linn, Secretary for Development of the HKSAR Government, Mr. Yong Zhang, Director-General, Department of Housing and Urban-Rural Development of Guangdong Province, and Mr. Shuiqiu Ye, Deputy Director-General, Department of Educational, Scientific and Technological Affairs of the Liaison Office of the Central People's Government in the HKSAR.



Figure 1. A photo taken during the Forum.

Scholarship Presentation Ceremony 2023-2024

The Department of Civil Engineering held its highly anticipated Scholarship Presentation Ceremony for the 2023-2024 academic year on April 16, 2024 in the prestigious Convocation Room of the Main Building of HKU. This yearly event celebrated the outstanding achievements of deserving students and recognized the invaluable support of donors, scholarship representatives and distinguished guests.

Prof. Wei Pan, Head of Department of Civil Engineering, captivated the audience with his inspiring speech. He congratulated award recipients, expressed gratitude to all attendees and acknowledged the Department's rich history and remarkable success, *“HKU Civil Engineering is one of the oldest departments of our university. We have achieved a tremendous amount of success and glories, and you are part of that. HKU Civil Engineering is also a major driving force for not only creating new knowledge, but also serving the community in many areas including sustainable infrastructure, water and environment, and Modular Integrated Construction (MiC), to name a few. You will sustain that driving force.”*



Figure 1. Prof. Pan, Head of Department, giving his welcome speech.

The ceremony was graced by the presence of the esteemed Guest of Honour, Ir. Ricky Lau, JP, Permanent Secretary for Development (Works) of the Government of the HKSAR. Ir. Lau delivered a motivational speech, commending the MiC Lab of HKU for its groundbreaking research and innovation in MiC, *“In addition to the drive from the Government side, the development of MiC in the region does require dedicated support from our universities. On this, the MiC Lab of HKU is the best initiative of leading systematic and innovative research in MiC and its related technologies.”*



Figure 2. Ir. Ricky Lau, JP, giving his Guest of Honour speech.

In recognition of Ir. Lau's presence and support, he was presented with a Pewter Plate engraved with the HKU design, symbolizing appreciation for his commitment to education and his contribution to the ceremony.



Figure 3. Ir. Ricky Lau, JP (left), receiving a gift from Prof. Pan (right).

The Scholarship Presentation Ceremony also provided an opportunity to express gratitude to the generous donors whose support have made these scholarships possible. Their generosity has made a profound impact on the lives of the students. Their belief in students' potential and their investment in education have opened doors of opportunity for students, enabling them to pursue their dreams and aspirations, thus contributing to the advancement of civil engineering and the betterment of society.

To express appreciation for their presence and presenting Scholarship Certificates to the deserving award recipients, the donors and the Scholarship representatives were presented with a Certificate of Appreciation.

The Department of Civil Engineering extends its gratitude to Ir. Ricky Lau, JP, the generous donors, scholarship representatives, and all attendees for making the Scholarship Presentation Ceremony a resounding success.



Figure 4. Group photo taken at the end of ceremony.

For full details, please visit newspaper link by clicking here: [HKU Media](#)

Seoul Metro Visit

A strong delegation of 34 staff from Seoul Metro visited the Department of Civil Engineering and the Institute of Transport Studies on April 23, 2024. The delegates came from engineering, operation, planning, sales and safety divisions.

Prof. Reynold Cheng, Prof. Yong-Hong Kuo, Prof. Zhan Zhao, Prof. Jiangping Zhou and Dr. Jiali Zhou from HKU presented our latest metro-related research to them, including passenger analytics using smart card data; metro-related data science; operations of the railway system and metro development. There was good interaction and discussion.



Figure 1. A photo taken during the meeting.

Staff Awards / Activities / News

Staff Awards

Dr. Xiao Li and his team won a Gold Medal at the 49th International Exhibition of Inventions Geneva

Dr. Xiao Li and his team won a Gold Medal at the 49th International Exhibition of Inventions Geneva with a project called “Hybrid Pose Adjustment (HyPA) Robot for Assembly Process in Modular Integrated Construction (MiC).” HyPA is tailored to automate the Modular Integrated Construction (MiC) assembly process, which aligns with the HK government’s initiative to deliver 430,000 new housing units efficiently over the next decade. This innovative technology proposes a novel robot configuration and integrates sensors and actuators to finely adjust the pose of MiC modules, effectively addressing pose adjustment challenges. Key components, including the horizontal steering system, cable control system, center of gravity (CoG) adjustment system, thruster array, and position and orientation sensing system, collaborate to ensure precise positioning and alignment of modules, thus optimizing the MiC assembly workflow to increase productivity and reduce labor and safety issues.

During this trip to Europe, Dr. Li and his team also held the HK/Germany joint research project meeting with Prof. Frank Petzold, Prof. André Borrmann, and their teams at TUM, Munich, Germany. They also had a workshop on digital collaboration with Prof. Philippe Block’s team and visited NCCR digital fabrication at ETH, Zurich, Switzerland.



Figures 1. – 6. Photos taken during Europe trip.

For full story, please access newspaper articles by clicking here:
[HKU Media;](#)

Staff Activities

Keynote on MiC

Prof Wei Pan, Head of Department, delivered an invited Keynote Speech titled “Modular Integrated Construction (MiC)” at the Mainland and Hong Kong Construction Forum 2024 in Guangzhou on March 26, 2024.



Figure 1. Prof Pan's Keynote Speech at the Forum.

Dr. Jiaji Wang was invited to present an online Keynote Speech at 2024 Engineering Structures (Asia-Pacific): Young Scientists Forum - AI in Civil Engineering

On April 10, 2024, Dr. Jiaji Wang presented an online Keynote Speech at 2024 Engineering Structures (Asia-Pacific): Young Scientists Forum- AI in Civil Engineering. The Speech is titled “AI accelerated Computational Mechanics and Structural Health Monitoring: Exact Displacement boundary physics-informed neural network (EPINN)”. The forum had six presentations in total and attracted more than 14,000 online views from the civil engineering community. Dr. Wang presented the recent progress of AI for civil engineering, including the AI solver for solid mechanics and digital twin for structural health monitoring of bridges under traffic loads. The Speech also presented future development trend of latest neural operators to solve structural design optimization problems and inverse problems.

人工智能加速计算力学与结构健康监测：精确位移边界条件的物理驱动神经网络EPINN



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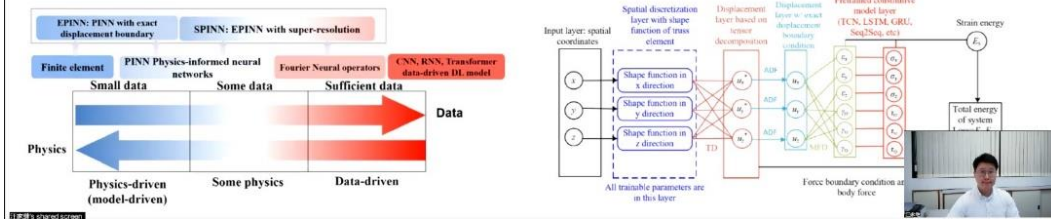



Figure 1. Cover page of the Keynote Speech.



ENGINEERING STRUCTURES

2024 Engineering Structures (Asia-Pacific): Young Scientists Forum – AI in Civil Engineering


题目: 人工智能加速计算力学与结构健康监测：精确位移边界的物理驱动神经网络(EPINN)

报告人: 汪家继 助理教授

香港大学 土木工程系

时间: 2024年4月10日 (周三) 19:05-19:35

腾讯会议: 247 361 895 (密码: 67983) + 爱思唯尔同步直播



报告简介:

近年来, 人工智能算法的快速发展为结构力学性能仿真模拟和结构健康监测提供了新思路与新技术。其中, 物理驱动机器学习算法通过融合物理方程和数据集, 针对大量计算力学反问题取得了较好的拟合结果。迄今为止, 物理驱动机器学习模型往往难以作为求解器直接求解固体力学正问题, 其效率与精度难以达到有限元求解器。此外, 物理驱动机器学习用于真实复杂结构的模拟仍处于起步阶段。本报告着重介绍一种精确位移边界条件的物理驱动神经网络 (EPINN), 该模型使用最小势能原理作为损失函数, 使用卷积神经网络精确重构了有限单元法的形函数, 使用张量分解构建高维位移试函数, 并针对位移场施加了精确位移边界条件, 从而显著提升了物理驱动神经网络的计算效率。初步研究表明该方法针对典型三维问题, 与传统物理驱动神经网络相比实现了100倍以上的加速比。探讨该模型应用于复杂工程结构力学响应模拟的未来发展方向, 包括基于时序卷积网络的材料与结构模拟代理模型和时程分析等。此外, 针对桥梁健康监测的广泛需求, 本报告也进一步介绍了一种用于桥梁健康监测的数字孪生模型, 可基于位移或加速度传感器实现端到端的桥梁损伤分布场预测, 实现了基于健康监测设备的车桥耦合系统实时精准损伤识别。

个人简介:

汪家继, 香港大学土木工程系助理教授, 博士生导师。于2014年和2019年获清华大学本科及博士学位, 从事钢-混凝土组合结构、物理驱动机器学习、结构数字孪生模型、非线性本构模型等方面的研究工作。发表SCI论文46篇, 以第一作者或通讯作者发表国际知名期刊论文36篇, 授权国家发明专利2项。曾获中国钢结构协会科学技术奖特等奖, 优先地震工程奖学金, 清华大学优秀学者博士奖学金等。担任美国土木工程师学会大中华分会理事, 参与北京市新首钢大桥、银川绿地中心、深圳东宝河新安大桥等多个项目的科研工作。主持香港大学启动经费, 日本学术振兴会特别研究员项目及多个超级计算机应用项目。

Figure 2. Abstract of the Keynote Speech.

Distinguished Speech on MiC

Invited by the Institution of Civil Engineers (ICE) Hong Kong Association, Prof. Wei Pan, Fellow of ICE, delivered a Distinguished Speech titled “Revolution of Civil Engineering through MiC Innovations” at the ICE Hong Kong Association 25th Anniversary Conference on April 18, 2024. ICE was established in 1818 and now has 97,000 members globally, with its mission to improve lives by ensuring the world has the engineering capacity and infrastructure systems it needs to enable our planet and our people to thrive.



Figure 1. Prof. Pan’s speech during the conference.

Staff News

Prof. Sze Chun Wong was appointed as an external member of the Project Board and co-convenor of the Independent Railway Expert Advisory Committee, The Government of HKSAR, for two years with effect from November 1, 2023.

Prof. Sze Chun Wong was appointed as a member of the Lantau Development Advisory Committee, The Government of HKSAR, for two years with effect from February 1, 2024.

Department of Civil Engineering eNews (March 2024)

Staff Award

Clarivate Highly Cited Researchers 2023

Prof. Chuyang Y. Tang and Prof. Tong Zhang, listed in alphabetical order, were two of the University's fifty-one scholars recognized in Clarivate's list of Highly Cited Researchers for 2023.

On March 14, 2024, an award ceremony took place in Loke Yew Hall to celebrate their remarkable research achievements. Both professors have consistently produced multiple Highly Cited Papers™, which rank in the top 1% by citations within their field and publication year in the Web of Science™ over the past decade. Their work has garnered significant attention from international peers, showcasing their ground breaking research and their considerable academic influence.

HKU acknowledges the significance of this achievement, as it boasts the highest number of HKU scholars, 51 in total, to be featured on the list. Furthermore, HKU's notable improvement in rankings has also contributed to Hong Kong's inclusion among the top 10 regions and nations for 2023, according to Clarivate Analytics.



Figure 1. Group photo taken in the Awards Ceremony.

For full story, please access newspaper articles by clicking here:

[HKU Media 1](#); [HKU Media 2](#) and [HKU Media 3](#)

Dr. Xiao LI awarded Environment and Conservation Fund as PI with the title of “CarbonGuard: A Blockchain-enabled IoT-BIM Platform for Automated Estimation, Reliable Monitoring, and Proactive Reduction of Carbon Emissions in Modular Integrated Construction (MiC)”

Buildings account for 90% of electricity consumption and over 60% of the city's carbon emissions in Hong Kong. Beyond building operation, the construction stage releases significant carbon emissions in a short period. Modular integrated construction (MiC) has

been extensively promoted as an innovative construction approach and is expected to be used to deliver massive public housing in the next decade. However, monitoring MiC's carbon emissions has been a labor-intensive, unreliable, and passive process, typically conducted after construction activities have concluded. Such a post-estimation approach is impractical as it comes too late to act and only provides retrospective data for future projects.

This project aims to develop a blockchain-enabled IoT-BIM (BIBP) platform designed for estimating, monitoring, and reducing carbon emissions in MiC.

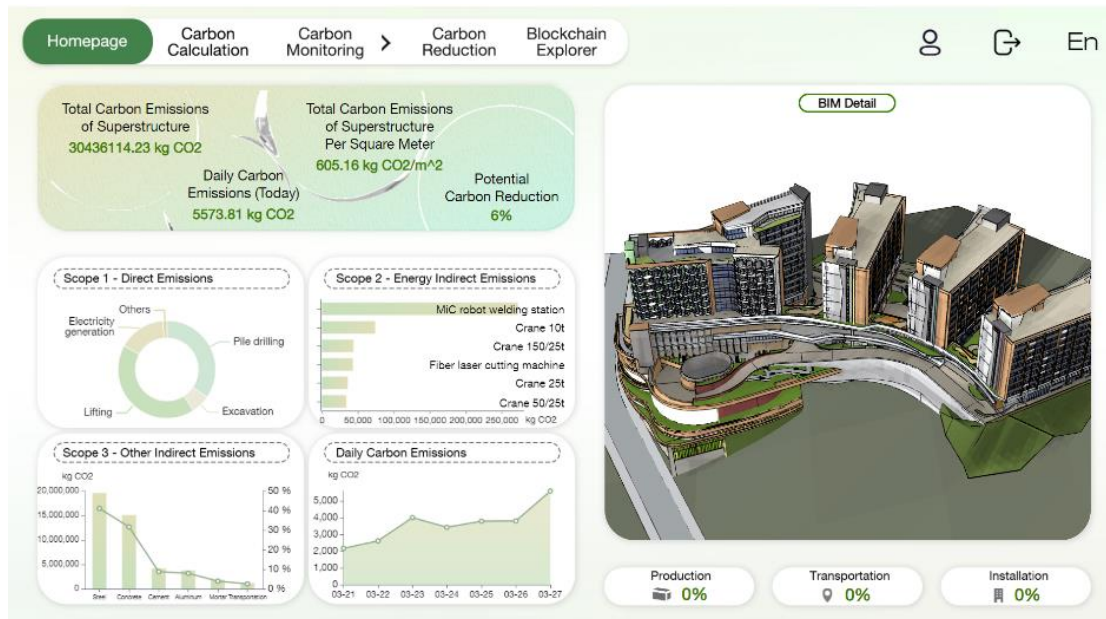


Figure 1. Blockchain-enabled IoT-BIM (BIBP) platform for carbon.

For full story, please access newspaper articles by clicking here: [ECF GovHK](https://www.ecf.gov.hk/)

Dr. Xiao LI awarded NSFC/RGC CRS as Co-PI (1 million HKD) with the title of “The mechanism and policy optimization of multi-stakeholder cross-regional collaboration in the construction industry of the GBA”

In this project, HKU collaborates with Tsinghua University, HKPolyU, Central University of Finance and Economics, and Xiamen University. Our HKU team takes the role of establishing an intelligent platform for simulating stakeholders' interactions, collaboration behaviour, and collaboration performance that underpins collaboration policies.



Figure 1. Policy simulation platform for construction industry collaboration.

For full story, please access newspaper articles by clicking here: [HKU Scholars Hub](#)

Project Mingde

The Shaking Table Competition 2024

The Shaking Table Competition 2024, organized by our Department and Project Mingde Student Association (PMSA), was held on March 7, 2024. This exciting competition served both educational and entertainment purposes, aimed at encouraging students to apply their engineering knowledge and creativity to design and construct a small-scale physical model. The models were tested under an earthquake load applied through the shaking table. Each team was given limited materials, mainly balsa wooden sticks and super glue, and a fixed amount of time to construct a model according to the pre-announced specifications. They were also required to present their engineering justifications to the esteemed judge, Prof. Francis Au, the former Head of Department.

This year's competition was attended by five teams, and we are pleased to announce the winning was team A, comprised of Lau Tak San, Wong Pak Hei, Hung Chi Yung, and Chan Long Ching, who are all fourth-year civil engineering students. The team received a cash prize of HK\$1000 and a Certificate of Champion. We extend our congratulations to the winners on their impressive victory, and we commend all participants for their hard work and dedication to the competition.



Figure 1. Group photo of the winning team with the judge.



Figure 2. Models built by Team A to E (from left to right).