



## The 154<sup>th</sup> Dean's Roundup

This will be the last Dean's Roundup blog from me, but not the last DRup. Acting Dean Yeh wants to keep the tradition going and to hand it over to the incoming new Dean as a forum for sharing achievements across the FoA family.

It's been an amazing 11 years for your outgoing Dean. I could summarise highlights of our journey together and the many accomplishments that have made me so proud to have been at the helm of such a talented and likeable group of colleagues and students. But it wouldn't do justice. The 154 issues of DRup over the decade are best left to speak for themselves. Even they don't capture the full story.

I will sign off with a simple reflection not about research – which was the agenda I was principally hired to address in 2013 – but teaching culture. Two distinct teaching cultures co-exist in FoA. There is still room for better appreciation, sharing and learning across that cultural border. A goal, or perhaps motivating dream, would be for it to become less a border and more a professional pedagogic distinction. Method of choice, not method of habit. Method to explain, celebrate and improve, not method to defend.

At a recent REC visiting lecture that triggered lively Q&A, I spontaneously invited the audience to continue the discussion at my home over drinks and eats in a *Salon* setting (the talk was about the work of American economist Charles Tiebout). The 18<sup>th</sup> century *Salons* of Paris, London and elsewhere, and the *Kaffeehauses* of early 20<sup>th</sup> century

Vienna brought together intellectuals who were each taught, and themselves taught, in very different pedagogic traditions. The artists had their ateliers, the mathematical philosophers had their blackboards, scientists their laboratories, social scientists their surveys and lecture theatres, and the Austrian political economists their marginalist logic. Carl Menger invented his *subjective theory of value* through empirical observations of trade, and developed the formal logic of marginalism through discussions in Vienna's Café Landtmann. Many great minds in the fading Halcyon days of the Austro-Hungarian empire talked across subject borders, drank and invented. Talking with either a stimulant social drug (caffeine) or depressive social drug (alcohol) worked magic for multicultural intellectualism. It amplified and propagated a continued wave of European enlightenment. The social institution operated like the *Yaji* (elegant gatherings) of ancient China.

Let's call the two principal teaching and learning cultures in FoA *studio culture* and *didactic culture*. Didacticism is out of favour at the moment so I will be thought politically incorrect by our colleagues who are professional members of Advance HE. Bear with me and assume that *Socratic* teaching principles and related modern student-based learning approaches, are enriching both of our prevailing pedagogic cultures.

With the motivation of facilitating greater pedagogic multiculturalism in pursuit of new intellectual journeys and heights, here's what we all need to know about each other. Excuse the caricatures. It's an artistic sketch, not an engineering drawing. A discursive experiment, not a set of normative propositions.

**The studio teacher:** Creates a new 'course' (learning experience/studio) every year. Keeps it fresh and new. Rejoices in novelty and unplanned learning routes. Is proud of being able to quickly and expertly create meaningful learning experiences from opportunities actively sought out. Opens up rather than closes down. Explores solutions first, before systematic analysis of problems and sub-problems. Facilitates learning through exploring solution space when the problem is not fully specified (so studio is only partially a problem based-learning method). Imbues students with a *designerly* approach to thinking, observing and analysing. Helps students develop their own individual *design languages*. May not be happy with the idea of encoding those languages in any formal way, preferring only to see them manifest in what is designed. Retains a degree of commitment to apprenticeship, atelier and other aspects of intentional sub-culture as a learning method. Highly values students' ability to orally defend their judgements on their feet under cross examination. May not be too motivated by being a world-renowned teaching specialist in a particular sub-field of knowledge. Is likely to be more motivated to be known as a great designer who produces great designers, with the greatest teaching achievements being their students winning design awards, getting into great design schools and going onto be famous designers and design teachers themselves. Seeks out

teaching opportunities partly because studio work is regarded as research. By the end of the teaching semester they are exhausted from the sheer number of creative hours spent with students in the studio, often long into the evenings. It is mentally demanding because there is often no right and wrong.

And so on. These are some of the wonders and strengths of the studio culture.

**The didactic teacher:** Wants to teach only (or mainly) subjects in a specific field of knowledge as defined by a set of research interests. Prefers just one specific field, but could be pushed to two or three. May also have an interest in teaching general and introductory classes covering wider knowledge, but only in as much as it covers foundational material for their research focus. Aims to be the best teacher of this specific subject in the world. Develops a highly thought-through, possibly novel approach to telling the story of that knowledge domain, such that the particular way of teaching it, even if the domain is taught repeatedly throughout the world, is branded by the teacher's own scholarship and research. Is in this way, not just a communicator of knowledge but a globally known and possibly unique interpreter of a 'curated' sub-set of knowledge, aiming to extend and deepen that knowledge by refining its logic, evidence-base, and underlying methodology. Looks for ways of turning this highly focused teaching into new knowledge, via theorising, novel philosophical reflection and informing and extending the accepted narrative by reference to current research, especially the teacher's own. Prefers to teach the same course over and over again, refining the knowledge base and delivery year on year in pursuit of the above. Can only realistically teach 3 subjects per year (2 would be better, 4 is just bearable), because each course is approached with attention to the logic, validity and reliability of every minor point made. Expects students (from first year undergraduate upwards) to read research papers associated with every lecture, seminar, workshop, lab etc, and requires the knowledge thus gained from reading to help keep up with the didact's narration as the weeks go by. Ideally measures students' attainment by testing how well they can reproduce the inferential reasoning and underlying knowledge of the specific domain covered. May not prioritise training students in applying this knowledge, especially at earlier stages. May regard the application of knowledge as a pedagogic priority best left to later undergraduate years and postgraduate education, once basic domain knowledge has been mastered. At the end of the teaching semester they are exhausted by the sheer mental energy of researching and delivering the latest refinement of their subject narrative in all its point-by-point logical details, observational methods, exemplars and so on, and by the demands of marking and giving formative feedback that is accurate and helpful in praising evidence of successfully acquired domain knowledge and correcting what is not. A teacher in this culture can spend three weeks of full working days labouring over the process of marking term papers (essays)

for a modestly sized class, and another three weeks marking essay style exam scripts. It is mentally demanding because it has to be right.

And so on. These are some of the wonders and strengths of didactic teaching culture. As is evident from my sketch, there are also downsides and weaknesses in both didactic and studio cultures. But they are two strong and noble traditions that have done a lot to advance civilisation. Both face pressures to adapt – more student-directed learning, less authoritarianism and hierarchy, more discovery, more iteration, more data, more independent inquiry, AI exploration of solution space (generative design) and problem space (machine learning), more performative analytics in both designing and policy analysis, more professional interdisciplinarity and flexibility required of our students, greater cross-disciplinary complexity in the problems we train our students to understand and address, and more.

I have an idea that since FoA is now relatively comfortable with its various research sub-cultures and has reached an elevated research reputation in its various fields, that it could be time to make some bold adjustments to our teaching cultures. Throwing away nothing that is valuable, but embracing the AI-enabled university with insights and teaching methods from the best of our rich pedagogic traditions.

It's been great working with you all. And I mean, all. Thank you all for enriching my life over the past decade.

Chris Webster  
Dean, FoA

## Faculty of Architecture

### 1. New colleagues

- A warm welcome to the following colleagues, who joined our Faculty in January-March 2024:



**Dr Jiafu An**  
**Assistant Professor**  
**Department of Real Estate and Construction**

Dr An received his PhD degree in Finance from the University of Edinburgh. Before that, he completed a Master of Financial Management degree with distinction from the same University, and a Bachelor of Finance degree from Newcastle University. Before his tenure began at the University of Hong Kong in 2024, Dr An taught at the University of Aberdeen and the University of Portsmouth in the UK, as well as Lingnan University in Hong Kong. He is also a certified Chartered Financial Analyst (CFA) charter holder.

Dr An's research interests include real estate finance, financial technology, green finance, cryptocurrency, and the historical aspects of finance. His dedication to research has been recognised with awards from the Financial Management Association and the European Financial Management Association. His findings have been featured in well-regarded journals across fields. Dr An is also a core member of the University's Institute for Climate and Carbon Neutrality (ICCN).



**Mr Sau Kai Chan**  
**Research Associate**  
**Division of Landscape Architecture**

Mr Chan obtained his Master of Landscape Architecture degree from the University of Hong Kong in 2021, and Bachelor of Engineering degree in Landscape Architecture from the East China University of Science and Technology in 2019. Before joining the Division, Mr Chan had two years of practical experience in AECOM Hong Kong.

Mr Chan's research interests include adaptive and resilient urbanism, community and social re-connection, and sustainable urban typology. He is currently assisting on the research of community engagement, ecological and cultural revitalisation for indigenous Hong Kong community, under the supervision of Mr Ivan Valin and Ms Natalia Echeverri.



**Ms Geraldine Rachel Dening**  
**Assistant Professor**  
**Department of Architecture**

Ms Dening received her Master of Architecture degree from the University of Cambridge, and a Diploma in Architecture from UCL, as well as a Graduate Diploma from the University of Westminster.

Prior to this, Ms Dening was a Senior Lecturer at De Montfort University where she ran BA and MArch design studios, a history and theory seminar course on social housing, coordinated the master's in architectural design, and managed the professional practice module. She was also a Design Fellow at Cambridge University, where she co-ran an MArch design studio.

Ms Dening's research explores the causes of the UK housing crisis and its relationship to and impact on public housing and its residents. Focused initially on housing estates in London, her work uses architectural design methodologies to demonstrate that refurbishing, improving and increasing housing capacity on existing estates, rather than redeveloping them as high value properties for capital investment, is a more socially beneficial, environmentally sustainable and financially viable solution to the population's housing needs than the demolition of the city's public housing during a crisis of housing affordability, enabling, as it does, the continued existence of the communities they house.



**Dr Ivan Wing-hong Fung**  
**Post-doctoral Fellow**  
**Department of Real Estate and Construction**

Dr Fung completed his PhD at the City University of Hong Kong in the field of Construction Management. His research endeavours encompass a wide range of topics, including Construction and Project Management, BIM Applications, Automation in Construction Safety and Management, Engineering Education, Industrial Safety Psychology, SHEQ (Safety, Health, Environmental & Quality) Management, Resilience Engineering, Risk Management, and the advancement of Sustainability and Smart Cities. Dr Fung is currently working with Dr Isabelle Chan at REC and has expanded his research interests to include the application of Gen AI in Education and the Architecture, Construction, and Engineering (ACE) sectors.

Dr Fung has been Adjunct Professor (Automation in Safety Engineering) at Southwest Petroleum University, China, since 2021. Prior to this, he worked as Assistant Professor at City University of Hong Kong's Department of Architecture and Civil Engineering from 2015 to 2021.

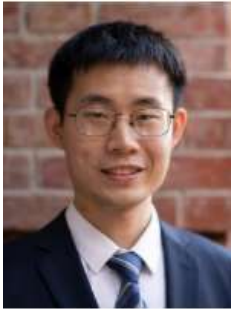
Dr Fung has published three books, several consultancy reports, and over 100 international journal and conference papers. He has been granted four patents related to Blockchain, IoT and MiC technologies. Dr Fung has supervised three completed PhD theses.



**Dr Ronghao Jiang**  
**Post-doctoral Fellow**  
**Department of Urban Planning and Design**

Dr Jiang obtained his PhD degree from the Department of Geography at HKU. Before that, he received his BSc in Geography and BEc in Economics from South China Normal University, MSc in Urban Management and Development from Erasmus University Rotterdam, and MSc in Human Geography from Wuhan University. His research interests span land and housing development, urban redevelopment, and economic geography. Dr Jiang received Graduate Student Paper Awards (2020 and 2023) from the American Association of Geographers, HKU Dissertation Year Fellowship 2023, and Peking University-Lincoln Institute of

Land Policy Dissertation Fellowship 2023-2024. He is working with Dr Mandy Lau at DUPAD currently.



**Dr Maosu Li**  
**Post-doctoral Fellow**  
**Department of Urban Planning and Design**

Dr Li received his PhD from HKU in 2024. Before that, he completed a Bachelor's degree with First Class Honours in Geographic Information Science from Mao Yisheng Honor's College at Southwest Jiaotong University.

Dr Li's research interests lie in Urban Informatics, Computing, and Analytics, through i) 3D City Information Modelling, ii) Machine Learning, and iii) Data Management and Analysis. Under the supervision of Professor Anthony Yeh, Dr Li currently focuses on advancing the automatic assessment of 3D window views at the urban scale for real estate, urban planning, and architectural design, using up-to-date city information models and machine learning techniques.



**Dr Changxue Shu**  
**Assistant Professor**  
**Division of Landscape Architecture**

Dr Shu received her PhD in Preservation of Architectural Heritage from Polytechnical University of Milan in 2013. Before that, she obtained a Master of Science degree from The *Bauhaus-Universität Weimar*, a Master of Architecture degree and a Bachelor of Architecture degree from Tongji University.

Dr Shu's research focuses on advancing dialogues between the disciplines of architecture and history of science. Her research received support from the European Union's Horizon 2020 research and innovation programme, the Research Foundation Flanders (FWO), Needham Research Institute – University of Cambridge, Paul Getty Foundation, the National Research Council of Italy – Institute for Conservation and Valorization of Cultural Heritage (CNR-ICVBC / ISPC), Max Planck Institute for the History of Science, and the Society for the History of Technology, among others.





**Dr Davide Spina**  
**Assistant Professor**  
**Department of Architecture**

Dr Spina received his PhD degree from ETH Zurich. Prior to that, he obtained his Master of Arts degree from UCL and Bachelor of Science in Architecture degree from Roma Tre University.

His research focuses on real estate development, the history of technology in architecture, architecture and media, labour in construction, and methods in architectural research.



**Dr Mark Tam Kam Ming**  
**Assistant Professor**  
**Department of Architecture**

Dr Tam obtained his Doctor of Science degree from ETH Zurich. Before that, he completed a Master of Engineering degree at MIT, and a Master of Architecture degree and an Honours Bachelor's degree in Architectural Studies at the University of Waterloo.

Dr Tam's interdisciplinary research is dedicated to developing performance-driven conceptual structural design methods and harnessing digital manufacturing processes to optimise performance through the strategic deployment of material and geometric complexities.



**Dr Tan Tan**  
**Assistant Professor**  
**Department of Real Estate and Construction**

Dr Tan obtained both his PhD degree and Master of Science degree in Project and Enterprise Management from University College London. Prior to that, he completed a Bachelor's degree in Architecture from Huazhong University of Science and Technology. Before joining HKU, Dr Tan held a postdoctoral position at the Delft University of Technology (TU Delft) in the Netherlands and the National Centre of Competence in Research (NCCR) Digital Fabrication in Switzerland.

Dr Tan's research draws into the intersection of architecture, technology and business to bridge the connection between

design and construction, especially for studying modern solutions to sustainability challenges facing the future built environments of retrofit, extension, and redevelopment. His primary fields of research interest include:

- Modern Methods of Design for Industrialised Construction (e.g. DfMA, modular design, and computational design)
- Digital Collaboration in Digital Fabrication (e.g. BIM, human-robot collaboration, and interactive XR)



**Dr Ke You**  
**Post-doctoral Fellow**  
**Department of Real Estate and Construction**

Dr You obtained his PhD degree in civil engineering and management from Huazhong University of Science and Technology in March 2024. His previous laboratory experience included at the National Center for Technology Innovation in Digital Construction (NCTI-DC). Dr You has participated in several projects at national and provincial levels. His research focuses on intelligent construction and engineering management, and some of his peer-reviewed articles have been published in international journals. Dr You is currently under the supervision of Professor Frank Xue.



**Dr Ya Zhao**  
**Post-doctoral Fellow**  
**Department of Urban Planning and Design**

Dr Zhao received her PhD degree from HKU in 2023. She also obtained her Master's degree in Real Estate from HKU and a Bachelor's degree in Land Management from Zhejiang University. Her research interests include urban economics, urban governance, transit-oriented development and land policy. Dr Zhao is currently working under the supervision of Dr Jiangping Zhou.



**Dr You Zheng**  
**Post-doctoral Fellow**  
**Department of Real Estate and Construction**

Dr Zheng obtained her Doctor of Economics degree further to her Master's and Bachelor's degrees in the same discipline. Her research interests include regional development, urban networks, energy policy, and environmental assessment. She is interested in using econometric models and policy assessment methods to analyse regional economic activities. She is currently collaborating with Dr Alex Shi on research projects, and in charge of a number of national, provincial and ministerial-level projects. Her peer-reviewed articles have been published in international journals.



**Dr Yang Zhou**  
**Post-doctoral Fellow**  
**Department of Urban Planning and Design**

Dr Zhou received his PhD degree in Transportation Engineering from Tongji University in 2021. During 2019-2020, he was a visiting PhD student at the University of Washington in Seattle, USA. His research focuses on human spatio-temporal data analysis, travel behaviour modelling, and smart mobility. Dr Zhou is currently working under the supervision of Dr Tianren Yang.

## 2. Dr Chao Ren

- has been awarded the University Knowledge Exchange Excellence Award for 2023, for her work in collaboration with Professor Yuguo Li on urban climate modelling methods to guide climate resilience in city plans, which has been adopted by cities around Asia and Europe and influenced national-level policy in Beijing.

This is the first time that FoA has taken home this prestigious prize since 2014.



[More information](#)

## 3. Mr Anderson Lee

- has been elevated by the American Institute of Architects (AIA) to its prestigious Fellowship status (FAIA), the Institute's highest membership honour, for his exceptional work and contributions to architecture and society.



Anderson is Associate Professor (Practice) at the Department of Architecture, and was President of AIA Hong Kong Chapter in 2018. He is the only member of all AIA's international chapters to have advanced to Fellow this year.

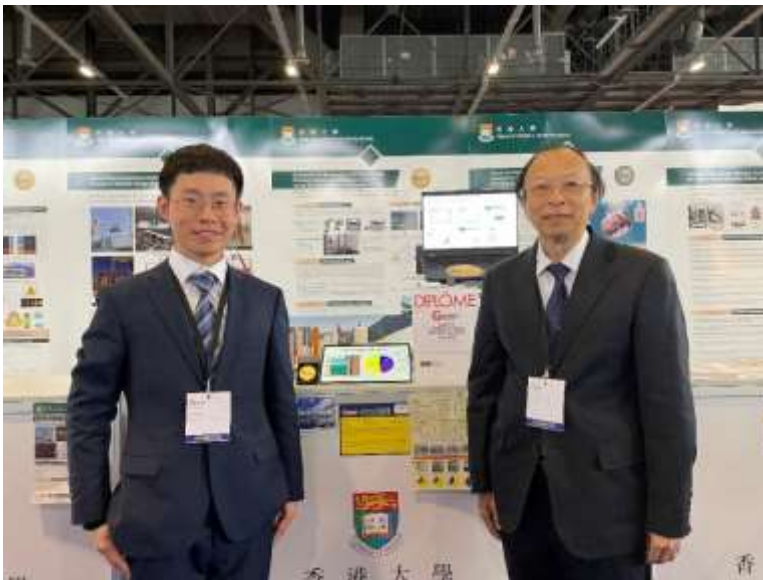
The AIA fellowship programme was developed to recognise architects who have achieved a standard of excellence in the profession and made a significant contribution to architecture and society at a national level. Only 3% of AIA members have received this distinction.

New Fellows will be honoured at the AIA Awards Gala, to be held at the National Building Museum in Washington D.C. on 7 June 2024.

[More information](#)

#### 4. International Exhibition of Inventions Geneva 2024

- Two teams from the Faculty of the Architecture joined the [49<sup>th</sup> International Exhibition of Inventions Geneva 2024 \(IEIG\)](#) in Geneva, Switzerland, from 17 to 21 April 2024. The two entries were '[Automatic AI Generation of Photorealistic Window Views and Openness Indexes Using 3D City Information Models \(CIMs\)](#)', by Professor Anthony Yeh and Dr Maosu Li (DUPAD) and Dr Frank Xue (REC), and '[Schema Mediation Method for Converting Unified Robotics Description Format to Industry Foundation Classes](#)', by Dr Junjie Chen and Professor Wilson Lu (REC). The first project won a Gold Medal and the second a Bronze Medal.



DUPAD's Professor Yeh (right) and Dr Li (left) at the Exhibition Booth of IEIG 2024

## **Automatic AI Generation of Photorealistic Window Views and Openness indexes Using 3D City Information Models (CIMs):**

This AI-driven system revolutionises architectural design and property marketing and valuation by automating the generation of photorealistic window views and window view openness indexes (WVOI) using 3D city information models (CIMs). Overcoming the limitations of time-consuming and expensive traditional manual photography methods, the technology employs machine learning algorithms to accurately capture and quantify various aspects of window views, including sky, greenery, buildings, sea, and roads. This innovation can automatically provide photorealistic window views and window view openness indexes for buildings in Hong Kong and beyond, making architectural design and property marketing and valuation more accurate, especially the pre-sale of buildings under construction.



REC's Dr Chen (middle) and his PhD students Mr Yonglin Fu (left) and Mr Jinfeng Lou (right) at the Exhibition Booth of IEIG 2024

## **Schema Mediation Method for Converting Unified Robotics Description Format to Industry Foundation Classes:**

Boasting efficiency, consistency, and autonomy, robots hold the potential to address numerous long-standing challenges within the building industry. However, the distinct dominant software languages in the robotics and building sectors, namely the Unified Robot Description Format (URDF) and Industry Foundation Classes (IFC), respectively, hinder effective communication between the two fields.

Our innovative solution, Building RoboAvatar (BRobo), aims to tear down this 'Babel Tower' by establishing a common language that connects robots and buildings seamlessly. BRobo's comprehensive compatibility with the software ecosystem of the building sector significantly reduces barriers in exchanging critical information between robots and buildings, making it 10.7 times faster, 2.2 times cheaper, and ensuring 100% accuracy. By bridging the gap between these two heterogeneous information sources, our invention paves the way for numerous value-added applications, including barrier-free building design, enhanced well-being, smart living, and smart inspection.

## 5. An Urban Oasis for Foodies and the Neighbourhood Live Case Competition

- Students from across the Faculty won in this competition jointly organised and sponsored by Wang On Properties and APG Asset Management, and co-organised with HKU Real Estate Society. Each student participant demonstrated remarkable innovation, presenting visionary development schemes for No. 101 and No. 111 King's Road to an esteemed jury panel, which included Mr Graeme Torre (Managing Director of APG Asset Management Asia), Mr Nick Tang (CEO of Wang On Properties) and Professor Kelvin Wong from REC.

The Competition provided an opportunity for students to conduct in-depth real estate analyses in interdisciplinary studies, with a strong emphasis on fostering community engagement and sustainability. This learning experience will drive their innovation with greater vitality, expanding their professional career prospects and making a positive contribution to the community.

### Champion Group: Food Praxis



Team members:

LIU Tin Wai Elzaphan	[Master of Science in Urban Planning]
LEE Lok Ching Flora	[Bachelor of Arts in Conservation]
LEE Cheuk Lam	[Master of Science in Urban Planning]
BIAG Carmela Emilia Santa Ana	[Master of Science in Urban Planning]
SIN Kay Yan Karen	[Master of Science in Environmental Mgt]

### **First Runner-up Group: Green Palate**



Team members:

Lee Yan Ming	Chester	[Bachelor of Arts in Urban Studies]
Tse Ming Yan		[Bachelor of Arts in Urban Studies]
Yu Ko Chieh		[Bachelor of Arts in Urban Studies]
Chim Chin Tung		[Bachelor of Arts in Architectural Studies]

### **Second Runner-up Group: Phoenix**



Team members:

Xie Keyu		[PhD in Real Estate]
Zhang Can		[PhD in Construction]
Wang ShuangShuang		[PhD in Real Estate]
Wang Renfeng		[PhD in Urban Planning]



## 6. HKIS Outstanding Dissertation Awards 2023

The following students have received the HKIS Outstanding Dissertation Awards 2023. A presentation of the Awards will be arranged in July 2024 together with the HKIS Scholarship Presentation.

- (i) The HKIS Outstanding Dissertation Awards 2023: Outstanding Final Year Dissertation Awards

Award	Project Title	Student Name
<b>Top Award</b> (Planning and Development)	The Spatial-Temporal Associations between Socioeconomic Status and Urban Green Space Provision in Hong Kong at a TPU Level	Safin Abdelnour WAKIM [BAUS 2023]
<b>Merit Award</b> (Planning and Development)	Certainty and Discretion: A Review of Small House Development in Plan-making and Planning Control	CHU Chit Hei Sebastian [BAUS 2023]
<b>Merit Award</b> (Planning and Development)	A Feasibility Study on Using Blockchain Technology to Protect Intellectual Property Rights in Building Information Modelling	FONG Ritchie [BSc(Surv) 2023]
Finalist (Planning and Development)	An Empirical Study on the Relationship between the Land Uses in Urban Renewal Authority Redevelopment and the Neighborhood Residential Property Prices	CHAN Lok Kiu Rocky [BSc(Surv) 2023]
<b>Top Award</b> (Building Surveying)	An Empirical Study on the Effect of Green Management Certificate on Residential Housing Prices in Hong Kong	NG Cheuk Ying [BSc(Surv) 2023]
<b>Merit Award</b> (Building Surveying)	Modular Integrated Construction in Hong Kong: Evaluation of Modular Transitional Housings	HA Chun Ming [BSc(Surv) 2023]

<b>Top Award</b> (General Practice)	Effects of Competition Level on the Pricing of First-hand Residential Properties	PUN Cheryl Sze-yau [BSc(Surv) 2023]
Finalist (General Practice)	An Empirical Study on the Effect of Climate Change on the Prices of the Residential Flats in the Coastal Areas in Hong Kong	LAU Hoi Tung [BSc(Surv) 2023]
<b>Merit Award</b> (Property and Facility Management)	Which Environmental Measures Matter More to Real Estate Firms' Financial Performance? A Case in Hong Kong	TANG Tsz Lok [BSc(Surv) 2023]
Finalist (Property and Facility Management)	Incentivizing Green Building Features through China Certified Emission Reductions (CCER) System: A Behavioral and Feasibility Study on Building-integrated Photovoltaics (BIPV) in Hong Kong	CHAN Sheung Lam [BSc(Surv) 2023]
<b>Merit Award</b> (Quantity Surveying)	Application of Blockchain Smart Contract for Construction Quality Assurance in Hong Kong: Potentials and Limitations	LEE Yuk Ying [BSc(Surv) 2023]
Finalist (Quantity Surveying)	A Study on the Implications of the Security of Payment Legislation on the Construction Industry in Hong Kong Through the Experience of Technical Circular (Works) NO. 6/2021	NG Ka Huen [BSc(Surv) 2023]

(ii) The HKIS Outstanding Dissertation Awards 2023: Dissertation/Thesis Awards for Postgraduate Students

<b>Award</b>	<b>Project Title</b>	<b>Student Name</b>
<b>Merit Award</b> (PhD)	Developing Circularity of Construction Waste in Emerging Economies: An Environmental Kuznets Curve Approach	Dr Zhikang BAO [REC, 2022]
<b>Merit Award</b> (PhD)	The Transaction Price Patterns of First-Hand Residential Developments in Hong Kong	Dr LU Siru [REC, 2022]
Finalist (PhD)	Governing Physician Mobility Against China's Uneven Development: A Labor Market Segmentation Perspective	Dr YAN Xiang [DUPAD, 2022]
Finalist (PhD)	Surface Urban Heat Island Effect and Urban Landscape Patterns in Chinese Cities: New Measurements and Multi-Scale Linkages	Dr ZHANG Anqi [DUPAD, 2022]
<b>Top Award</b> (Master)	The Flattening Bid-rent Curve in Hong Kong: An Investigation using Spatial Big Data	CHANG Le [MUA 2023]
<b>Merit Award</b> (Master)	Barriers to Achieving Net Zero Energy Building in Urban China: An interpretive structural Modeling (ISM) Study	NGAI Nam Hei [MSc(CPM) 2023]
Finalist (Master)	The Impact of the Hukou System Overhaul on Housing Prices in China	XIE Keyu [MSc(CPM) 2023]
Finalist (Master)	Urban Cooling Design: A Digital Tool to Predict Warming in Street Canyons using Machine Learning	TIAN Lai [MUD 2023]

7. Hong Kong PhD Fellowship Scheme (HKPFS) and HKU Presidential PhD Scholarship (HKU-PS) 2024-25

- As of 18 April 2024, the following PhD candidates have been awarded the Research Grant Council's Hong Kong PhD Fellowship and/or the HKU Presidential PhD Scholarship in the 2024/25 admission exercise:

**HKPFS and HKU-PS Awardees**

<b>Name</b>	<b>Dept.</b>	<b>Primary Supervisor</b>	<b>Co-supervisor(s)</b>
Mr Wellage Chandima SILVA	DoA	Dr Xiaoxuan Lu	Dr Eunice Seng; Dr Creighton Connolly
Miss Yuchen GAO	REC	Prof Wilson Lu	Dr Tan Tan
Mr Jiaqi WANG	REC	Dr Llewellyn Tang	Prof Reynold Cheng (Department of Computer Science)
Miss Zhuoran ZHANG	REC	Dr Tan Tan	Prof Wilson Lu
Miss Yuan GAO	DUPAD	Prof Shenjing He	Dr Bin Chen
Miss Yunsong LIU	DUPAD	Dr Tianren Yang	Dr Jianxiang Huang
Miss Lai TIAN	DUPAD	Dr Jianxiang Huang	Prof Jiangping Zhou
Mr Jinfeng XIE	DUPAD	Prof Anthony Yeh	Dr Xiaohu Zhang

**HKU-PS Awardee**

<b>Name</b>	<b>Dept.</b>	<b>Primary Supervisor</b>	<b>Co-supervisor</b>
Miss Xintong LYU	DUPAD	Dr Waishan Qiu	Dr Jianxiang Huang
Mr. Dabao GUO	DUPAD	Dr Yulun Zhou	Dr Alec Kirkley; Dean Chris Webster

8. QS World University Rankings by Subject 2024

- In the latest QS World University Rankings by Subject 2024 for Architecture and Built Environment, FoA rises to 12<sup>th</sup> globally and 3<sup>rd</sup> in Asia, while continuing to top Hong Kong – we have been consistently rated in the world's top 15 as well as the city's best for a decade since 2015.

The QS World University Rankings by Subject is a major global league table for higher education. Their rankings are based on analyses of academic reputation, employer reputation, citations per paper, and research productivity and impact.

[More information](#)

## 9. HKU Alumni Day 2024

- FoA organised a series of activities to engage our alumni on the University's first Alumni Day on 16 March 2024. [Programme Rundown](#).



'Planting Knowledge – Teaching Trees' campus tour guided by Mr Gavin Coates, DLA.



'Smart Technologies and Future Urban Development' – Talk by Professor Anthony Yeh, DUPAD.



'Modernisation of an Old Profession in the Era of Industry 4.0 and a Decarbonisation Journey' – Talk by Professor Wilson Lu, REC, and Mr Kevin O'Brien, Chief Executives of Gammon Construction Limited.



Robotic Fabrication Lab Tour by Mr Christian Lange, ARC – with Mr Andrew Lee (BArch 1956), Chairman of Andrew Lee King Fun & Associates Architects Limited; Ms Winnie Ho (BAAS 1986, BArch 1988, PDipCPM 1995), Secretary for Housing; and Dean Chris Webster, in the audience.



'Architecture in Print: The Kenneth Frampton Book Collection' by Dr Eunice Seng and Dr Tao Zhu, ARC.



The use of AR technology in architecture, presented by Dr Kristof Crolla and the Building Simplicity Lab, ARC.



A sharing by Dr Junjie Chen, REC, on the research and development of iLab, and a discussion on the roles of digital technologies in built asset management, joined by the Secretary for Housing, Dean Chris Webster, Professor Wilson Lu and Dr Frank Xue. Digital solutions developed by iLab, e.g., MiC Three Treasures, robot digital twin, and Scan-to-BIM, were also showcased at the iLab tours.

## Department of Architecture

### 1. Mr Christian Lange

- received a group of Southern District Council Members on 24 April 2024, and introduced to them innovative architectural design projects made possible by the cutting-edge facilities of our Robotic Fabrication Lab.





## 2. Presentation Ceremony of 70th Anniversary Plaques of Architectural Society

- was held on 10 April 2024. The specially designed plaques were presented to Dean Chris Webster, Professor Weijen Wang, Dr Eric Schuldenfrei, Ms Joanna Fong (Chairwoman of Architectural Students Association), the late Mr Lo Kuen, Senior Laboratory Superintendent (1950-1988), with his son Mr Jackson Lo receiving the plaque on behalf of him, and Mr Kwok Ying-wah, senior administrative colleague of the Department (1962-2006).

Honorary Professor Stephen Lau Siu-yu, former Architectural Society Chairmen Mr Tong Chun-wan (1975-76) and Mr Antonio Ching Wai-chuen (1980-81), also participated as plaque presenters.



From right: Mr Tong Chun-wan, Mr Kwok Ying-wah, Mr Antonio Ching, Mr Jackson Lo and his wife Mrs Lo

### 3. Mr Roberto Requejo Belette

- curated the exhibition 'PLAY OBJECTS: Object-oriented Approaches to Designing Environments of Play' at the HKU Architecture Gallery in PMQ, Central, from 17 April to 6 May 2024.



About the exhibition:

*With a focus on designing environments of play, the work of Imaginary Objects (iO) can often be described as groups of distinct objects coming together to create form and space. This approach makes the projects adaptable, flexible, and translates into a diverse formal identity that doesn't rely on a single prescribed image. The finished work becomes an assemblage of objects that dilutes the distinction between objects and architecture, form and space and potentially toy and playground.*

*The exhibition reflects on the work of iO by looking at three distinct projects for play and aims to provide insight into the design principles, the construction sequences and the final deployment of the projects. Beyond serving as a conceptual driver, the object-oriented approach translates into reconfigurability, demountability, and ease of transport. In this manner, the projects can be understood as experiments, each project influencing how the next is approached and configured. The work of iO has been featured in prominent publications such as Archdaily, Dezeen, art4d, DsignSomething, the Cloud, and the Standard.*

*iO has received numerous international recognitions including shortlists for the Archdaily Building of the Year Awards both in 2021 and 2022, as well as the Blueprint Awards 2021.*

Exhibition Curator: Roberto Requejo Belette

Assisted by: Lee Man Wai Monique

Design Lead: Roberto Requejo Belette and Yarinda Bunnag

Project Team: Khomchan Chotivora-Anan Mark, Beam Napat Lee, Mind Thanutchra Pueriphanvicha

[More information](#)

## Division of Landscape Architecture

### 1. Dr Chao Ren

- has been selected as the Chief Editor of [\*Urban Climate\*](#) with effect from 1 January 2024. *Urban Climate* is a new SCI journal with a rising Impact Factor over the past few years, due to the rapidly growing field of urban climatology and urban-scale climate change. It also falls in the first Quartile Scopus Citescore.



## Department of Real Estate and Construction

### 1. Professor Kelvin Wong, Dr Jin Zhu and Dr Alex Shi

- together with four PhD students visited the College of Civil Engineering and Architecture (CCEA) at Zhejiang University (ZJU) on 23-24 November 2023, as part of their China Vision project. They received a warm welcome from ZJU, including Professor Xian Xu (Head of Department), Professor Hailong Wang (Institute Director) and Professor Jiangpeng Shu (Associate Head) and research students.

During the productive meeting, both parties took the opportunity to introduce and discuss the histories, remarkable developments, teaching programmes, and cutting-edge research initiatives undertaken by their respective institutes. This facilitated a deeper understanding of each other's work and explored potential avenues for future collaboration in research and teaching endeavours.

Additionally, the REC team visited Shaoxing Chengtou Construction Industrial Manufacturing Co., Ltd., a state-owned manufactory company that produces prefabricated building components. There, they learnt about the company's technological innovations and management structure, gaining insight into the latest developments in prefabricated building components and how they promote a greener and more sustainable construction industry.



### 2. Mr Kasing Yu

- led the final cohort of BA(Conservation) students in a field study in Kyoto, Nara and Osaka in early March 2024. It was our honour to have Hori Daisuke, Assistant Director of Cultural Properties Preservation Section, Kyoto City to share his insights on the conservation, planning and operation of World Heritage Sites in Kyoto. Besides visiting remote sites such as Miyama with traditional thatched houses, the students had the opportunity of participating in an intangible cultural heritage workshop on the making of Japanese onigawara (demon) roof tiles. The students were also lucky enough to have caught the earliest sakura blossom near Kyoto.



- was interviewed by RTHK's documentary programme 'Hong Kong United', in the episodes of '漫遊築覺 - 港島南區歷史建築：石澳巴士總站' (Strolling through Historic Buildings – Shek O Bus Terminus) and '漫遊築覺 - 上環歷史建築：磅巷台階' (Strolling through Historic Buildings – Pound Lane), in which he introduced the design of Shek O Bus Terminus and Pound Lane in Sheung Wan.

The interviews came out on 18 December 2023 and 15 January 2024 respectively. They are available online:



[2023-12-18 Shek O Bus Terminus](#)



[2024-01-15 Pound Lane](#)

- was interviewed in a podcast series '安居', co-produced by RTHK and the Hong Kong Housing Authority, in the episode of '遷室·宜居', in which he highlighted the importance of inheriting the historical and cultural values of Wah Fu Estate in its redevelopment project.

The interview came out on 21 January 2024 and is available online:  
<https://www.rthk.hk/tv/dtt31/programme/momentsofpublichousing>



### 3. Dr Isabelle Chan

- delivered an invited speech on 'Underground Space, Wayfinding and Human Health', in the 'Women Researchers in the Built Environment' CIB Presidential Seminar Series at Purdue University on 8 December 2023.

**PURDUE UNIVERSITY** **cib** **International Council for Research and Innovation in Building and Construction**

**Underground Space, Wayfinding & Human Health**

**Isabelle Y.S. Chan**  
BEng(Env), PhD, FISHP, MRICS, MCIOS, MRICM  
Department of Real Estate and Construction  
The University of Hong Kong

- was invited to serve as the facilitator for the 'Forum on Housing Issues and the Construction Sector in Hong Kong (有份起, 有份住)', organised by the Construction Industry Council (CiC) on 9 December 2023.



- was invited by CiC to deliver a speech on 'A Survey Result on the Public's Perception Towards the Construction Industry' in the Hong Kong Young Construction Forum.







## Department of Urban Planning and Design

### 1. DUPAD faculty members

- in collaboration with the Urban Systems Institute (USI), successfully co-hosted the inaugural conference titled 'Towards New Paradigms for Urban Research' at Loke Yew Hall on 11-12 January 2024. The conference brought together a diverse group of 147 participants from mainland China, Hong Kong, Macau, and overseas, including Ireland, UK, USA, Kuwait, and South Korea. The event was attended by 18 distinguished academic guests and 14 notable figures from government and industry.

Professor Peng Gong, Professor Bo Huang, Professor Shenjing He, Dean Chris Webster, Professor Anthony Yeh, Dr Tianren Yang and Dr Xiaohu Zhang served as esteemed members of the conference committee. The conference provided a platform for academic exchange and collaboration among scholars and professionals exploring new paradigms for urban research, advancing urban systems, smart cities, and urban planning practices.

Further details about the conference and Urban Systems Institute can be found at [www.usi.hku.hk](http://www.usi.hku.hk).



## 2. DUPAD faculty members and PhD students

- attended the Joint Asia-Pacific Network for Housing Research Conference and Australasian Housing Researchers' Conference (APNHR-AHRC). The Joint Conference took place at the University of South Australia in Adelaide during 21-23 February 2024, focusing on the theme of 'Re-imagining a Better Housing Future'.

In her role as the Chair of APNHR, Professor Shenjing He delivered an opening remark at the conference. She also gave a speech on housing challenges in China during the conference dinner, served as chair for a parallel session titled 'APNHR Intergenerational Housing Working Group,' and led a special session on 'Rethinking "the Community Question": Neighborhood-based Social Capital and Neighborhood Governance in Post-pandemic Cities.'

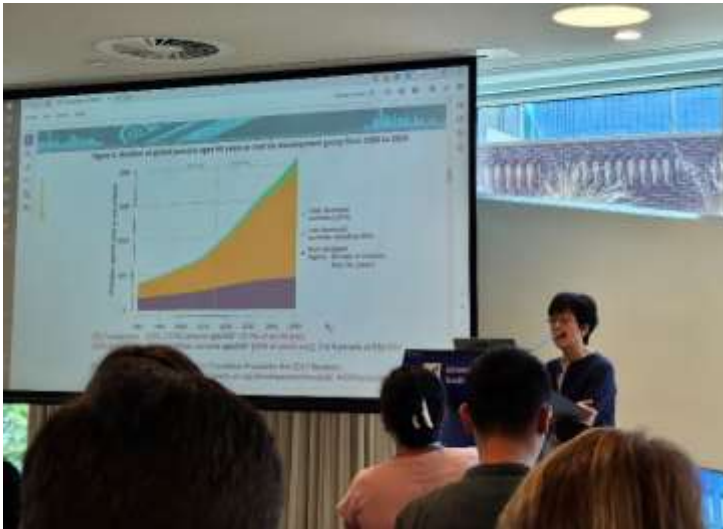


Professor Shenjing He giving an opening remark



Professor Shenjing He giving a speech at the conference dinner

Professor Rebecca L.H. Chiu delivered a keynote speech titled 'Reimagining a Multifaceted Housing Future: Through the Lens of Social Sustainability.'



Other faculty members and students also presented their works at parallel sessions and contributed to the Joint Conference:

- 'Micro-apartments, Household Clutter and Sense of Home' presented by Dr Mandy Lau. She also served as chair for a session on 'Housing as Economic, Social and Health Infrastructure.'
- 'How Homeless People Make their Homes in Post-repatriation Chinese Cities? A Case of Shanghai' presented by Dr Jin Zhu. He also served as chair for a session on 'Creating Sustainable and Resilient Homes and Communities.'
- 'Understanding Individuals in their 50s and 60s' Housing Decision Making Process for Later Life: A Life Course Approach' presented by Dr Vanessa Lo.
- 'Translating Expat Living as Financial Assets: A Case of Financialization of Housing in a Global City' presented by PhD student Mr Mingze Bai.
- 'Mobilising Urban Village Houses into Local Social Housing Provision: Towards a Hybrid Mode of Social Housing (Re)production China' presented by PhD student Mr Zhiming Chen.

### 3. Dr Waishan Qiu

- was awarded the 3rd prize as a student supervisor, in '2024 Yuanye Awards International Competition' (園冶杯大學生國際競賽) of the Conference of Green, Low-Carbon and High-Quality Urban Development in Nanjing, China, on 12-14 April 2024. Dr Qiu also delivered a speech about AI in Urban Design during the Conference.



4. Dr Si Qiao (PhD 2022) and Dr Maosu Li (PhD 2024)

- received awards at the HKU Research Postgraduate Award Presentation Ceremony on 4 March 2024, at Lecture Hall II of the Centennial Campus.

Dr Si Qiao (supervised by Professor Anthony Yeh) won the HKU Foundation Award for Outstanding Research Postgraduate Students 2021-22. Dr Maosu Li (jointly supervised by Professor Yeh of DUPAD and Dr Frank Xue of REC) received both the HKU Foundation Publication Award for Research Postgraduate Students 2023 and the Best Poster Presenter Award at the HKU Research Postgraduate Symposium 2024.

The Awards for Outstanding Research Postgraduate Students are to recognise MPhil or PhD graduates/candidates who have submitted a thesis of exceptional quality and have demonstrated outstanding performance in other academic aspects.

The HKU Foundation Publication Award for Research Postgraduate Students is to give due recognition to RPg students who have published a journal article of exceptional quality in the related research study area. Dr Maosu Li has been selected as one of the recipients of the Award based on his paper titled 'A room with a view: Automatic assessment of window views for high-rise high-density areas using City Information Models and deep transfer learning', co-authored by Professor Yeh, Dr Xue and Ms Yijie Wu (PhD student), published in *Landscape and Urban Planning*, 226(2022), 104505. DOI: <https://doi.org/10.1016/j.landurbplan.2022.104505>



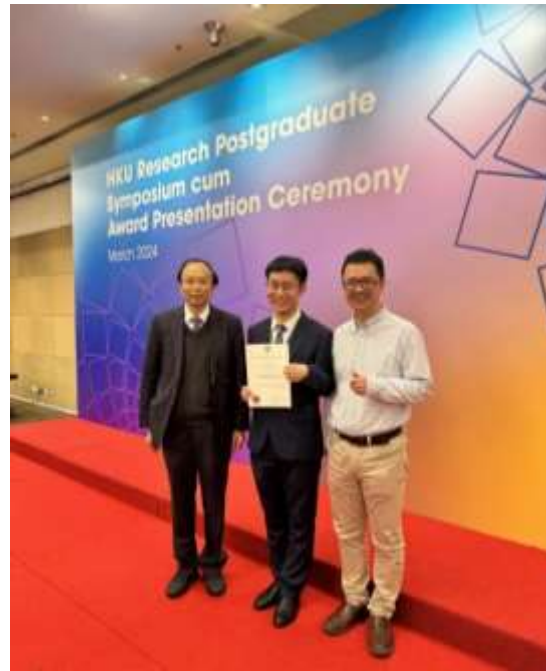
Dr Maosu Li receiving the HKU Foundation Publication Award for Research Postgraduate Students 2023 from Dr Patrick Poon, Deputy Chairman of the HKU Foundation



The Best Poster Presenter Award goes to Dr Maosu Li



Dr Qiao Si receiving the HKU Foundation Award for Outstanding Research Postgraduate Students 2021-22 from Dr Patrick Poon, Deputy Chairman of the HKU Foundation



Dr Qiao Si (photo on the left), recipient of the HKU Foundation Award for Outstanding Research Postgraduate Students 2021-22, with her supervisor, Professor Anthony Yeh; Dr Maosu Li (photo on the right), recipient of the HKU Foundation Publication Award for Research Postgraduate Students 2023 and Best Poster Presenter Award, with his supervisors, Professor Anthony Yeh (DUPAD) and Dr Frank Xue (REC)

## 5. MUA and MUDT students

- won Champion, 1st Runner Up and Top 5 Finalist Awards in the Student Category of the 'Location Matters! Tech Challenge Competition' organised by the Hong Kong Science and Technology Park (HKSTP) and the Development Bureau.

MUA (Master of Science in Urban Analytics) and MUDT (Master of Science in Urban Design and Transport) GIS students of DUPAD won the Awards that aimed to encourage innovative proposals to demonstrate how the integration of spatial data from the CSDI (Common Spatial Data Infrastructure) portal and the HKSTP available spatial data, can transform community experiences in HKSTP, or further across Hong Kong. There were over 40 teams from the tertiary institutes participating in the Student Category of the competition. Apart from winning the Champion Award, the Champion team also won a 'Best Use of Data' prize.

The awards were presented by the panel judges on 23 February 2024 at the HKSTP. The winning teams and their awards are as follows:



### Champion and Best Use of Data

Team: ZZZ

Members: Wenhe Xu (MUA), Yiyang Liu (MUA), Yueshan Li (MUA), Xiangyi Meng (MU DT)

### 1<sup>st</sup> Runner Up

Team: Green Box

Members: Pinglu Gong (MUA), Sirui Chen (MUA), Zhining Chen (MUA), Yufan Tong (MUA), Yingying Zhu (MUA)

### Top 5 Finalist

Team: Good Times

Members: Ka Wai Lam (MUA), Yeye Jin (MUA), Yan Shan (MUA), Zhichen Xu (MUA), Zhao Yang (MUA)



The Champion Team (second from left: Wenhe Xu, Xiangyi Meng, Yueshan Li and Yiyang Liu)



The First Runner Up Team (second from left: Yingying Zhu, Sirui Chen, Zhining Chen, Pinglu Gong and Yufan Tong)



The Best Use of Data Team (from left: Wenhe Xu, Xiangyi Meng, Yueshan Li and Yiyang Liu)

## 6. Professor Rebecca Chiu

- served as one of the jurors of the HKIH Elite Awards 2024, organised by The Hong Kong Institute of Housing.



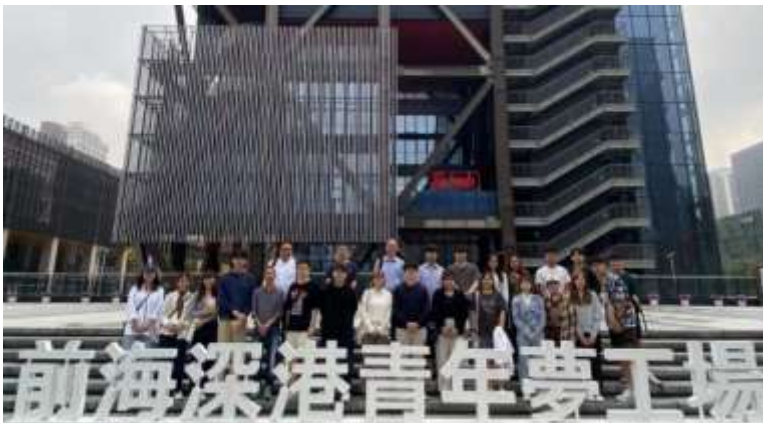
## 7. Professor Shenjing He and Dr Jin Zhu

- visited universities in Melbourne as they were invited to explore future collaborations in teaching and research. On 19 February 2024, they visited La Trobe University and were received by Professor George Liu, Associate Dean of Academic Partnerships for the School of Psychology and Public Health, and Dr Jason Jiang. They explored future collaborations in interdisciplinary research on housing, migration, and health issues. On 20 February 2024, they visited the Faculty of Architecture, Building and Planning of the University of Melbourne. They received a warm welcome by Professor Nicholas Phelps (Associate Dean International) and Professor Michele Acuto (Associate Dean Research), Professor Sun Sheng Han, Dr Hao Wu, and other colleagues from the Faculty and the Melbourne Centre of Cities. In addition to research collaborations, both sides discussed possibilities in joint teaching programmes in the fields of urban studies and urban management.



## 8. Professor Jiangping Zhou and Mr Roger Tang

- organised a study trip to Shenzhen on 4-6 March 2024 for MSc Urban Planning Year 1 students to explore the opportunity of close collaboration between Hong Kong and Shenzhen in developing the western areas of the Northern Metropolis into a 'High-end Professional Services and Logistics Hub', as part of the Strategic and Community Planning studio. In-depth exchange and visits were arranged with the Urban Planning & Design Institute of Shenzhen, Shenzhen-Hong Kong Science and Technology Innovation Cooperation Zone Development Co., Ltd, Qianhai Authority, etc., to understand the latest development directions and initiatives of Shenzhen.



## Centre of Urban Studies and Urban Planning

### 1. Professor Anthony Yeh

- has published the following paper:

Dong, L., Duarte, F., Duranton, G., Santi, P., Barthelemy, M., Batty, M., Bettencourt, L., Goodchild, M., Hack, G., Liu, Y., Pumain, D., Shi, W.Z., Verbavatz, V., West, G.B., **Yeh, A. G. O.**, & Ratti, C. (2024). Defining a city - delineating urban areas using cell-phone data. *Nature Cities*. <https://doi.org/10.1038/s44284-023-00019-z>

**Abstract:** *What is a city? Researchers use different criteria and datasets to define it - from population density to traffic flows. We argue there is one dataset that could serve as a proxy of the temporal and spatial connections that make cities what they are: geolocated data from the world's more than 7 billion cell-phone users. Cell-phone data are a proxy of people's presence in a given area and of their movement between areas. Combined with computational methods, these data can support city delineations that are dynamic, responding to multiple statistical and administrative requirements, and tailored to different research needs, thus accelerating ongoing work in urban science.*

### 2. Dr Jun Ma, Dr Feifeng Jiang and Dean Chris Webster

- have published the following paper:

**Jiang, F. F., Ma, J., Webster, C.J.**, Wang, W., & Cheng, J.C.P., (2024). Automated site planning using CAIN-GAN model. *Automation in Construction*, 159, 105286. <https://doi.org/10.1016/j.autcon.2024.105286>

**Abstract:** *Automated site planning, powered by deep generative methods, excels in creating solutions responsive to existing city structures but often overlooks user-specific design scenarios, leading to less performative solutions across varied urban contexts. Overcoming this challenge requires integrating domain knowledge and nuances of the built environment to enhance context-awareness in automated site planning. This study therefore proposes the context-aware site planning generative adversarial networks (CAIN-GAN) framework. In the case study of New York City (NYC), CAIN-GAN demonstrates its capability to not only synthesize visually realistic and semantically reasonable design solutions, but also evaluate their performance in urban sustainability for informed decision-making. This context-aware, learning-based, data-driven, and user-guided generation process signifies a pivotal advancement in more performative and tailored design solutions. Future studies will focus on refining the CAIN-GAN framework to accommodate diverse user-centric design needs and enhance human-machine interaction in urban development.*

### 3. Dr Waishan Qiu

- has published the following papers:

- (i) Zhao, Q., He, Y., Wang, Y., Li, W., Wu, L., & **Qiu, W.** (2024). Investigating the civic emotion dynamics during the COVID-19 lockdown: Evidence from Social Media. *Sustainable Cities and Society*, 107, 105403. <https://doi.org/10.1016/j.scs.2024.105403>

**Abstract:** Shanghai implemented strict "citywide static management" under the "zero-COVID" policy when the pandemic re-emerged in 2022, sparking a unique public emotion wave. This research examines the correlations between the spatial-temporal heterogeneity of the negative emotion and the micro-level built environment based on civic emotion extracted from social media from the spatial justice perspective. Specifically, it obtains Weibo posts during March, April and May 2022 to cover the pre- and during lockdown periods to identifies negative emotions from public voices. Secondly, it expands commonly used negative emotions with words related to a unique emotion – helpless during Shanghai's lockdown. It then applies natural language processing (NLP) to grade the negative emotion across Shanghai. Third, it describes built environment, housing economy, socio-demographic and pandemic spread data as independent variables. Lastly, utilizing Ordinary Least Squares (OLS), Spatial Lag and Geographically Weighted Regression (GWR) models, it explores the correlations between emotion and the independent variables, to analyze the influential factors of negative emotions as expressed on social media. Our findings reveal significant spatial heterogeneity and temporal dynamics of the correlation between local emotions and complex socio-economic attributes, critically supporting the urgency and importance of spatial justice. This data-driven approach retraces the local voices and discloses negative emotions under lockdown measures. The study contributes to the understanding of urban resilience and emotional well-being in the face of public health crises, offering insights into sustainable urban planning and policy-making for resilient cities.

- (ii) Shi, W., Xiang, Y., Ying, Y., Jiao, Y., Zhao, R., & **Qiu, W.** (2024). Predicting Neighborhood-Level Residential Carbon Emissions from Street View Images Using Computer Vision and Machine Learning. *Remote Sensing*. 16(8): 1312. <https://doi.org/10.3390/rs16081312>

**Abstract:** Predicting urban-scale carbon emissions (CEs) is crucial in drawing implications for various urgent environmental issues, including global warming. However, prior studies have overlooked the impact of the micro-level street environment, which might lead to biased prediction. To fill this gap, we developed an effective machine learning (ML) framework to predict neighborhood-level residential CEs based on a single data source, street view images (SVIs), which are publicly available worldwide. Specifically, more than

30 streetscape elements were classified from SVIs using semantic segmentation to describe the micro-level street environment, whose visual features can indicate major socioeconomic activities that significantly affect residential CEs. A ten-fold cross-validation was deployed to train ML models to predict the residential CEs at the 1 km grid level. We found, first, that random forest ( $R^2 = 0.8$ ) outperforms many traditional models, confirming that visual features are non-negligible in explaining CEs. Second, more building, wall, and fence views indicate higher CEs. Third, the presence of trees and grass is inversely related to CEs. Our findings justify the feasibility of using SVIs as a single data source to effectively predict neighborhood-level residential CEs. The framework is applicable to large regions across diverse urban forms, informing urban planners of sustainable urban form strategies to achieve carbon-neutral goals, especially for the development of new towns.

- (iii) He, Y., Zhao, Q., Sun, S., Li, W., & Qiu, W. (2024). Measuring the Spatial-Temporal Heterogeneity of Helplessness Sentiment and Its Built Environment Determinants during the COVID-19 Quarantines: A Case Study in Shanghai. *ISPRS International Journal of Geo-Information*, 13(4):112. <https://doi.org/10.3390/ijgi13040112>

**Abstract:** The COVID-19 outbreak followed by the strict citywide lockdown in Shanghai has sparked negative emotion surges on social media platforms in 2022. This research aims to investigate the spatial-temporal heterogeneity of a unique emotion (helplessness) and its built environment determinants. First, we scraped about twenty thousand Weibo posts and utilized their sentiments with natural language processing (NLP) to extract helplessness emotion and investigated its spatial-temporal variations. Second, we tested whether “helplessness” was related with urban environment attributes when other real estate economic and demographic variables were controlled using the ordinary least squares (OLS) model. Our results confirmed that helplessness emotion peaked in early April when the lockdown started. Second, residents in neighborhoods characterized by higher rents and property management fees, higher population density, lower housing prices, lower plot ratios, or surrounded by less tree view and higher perceived visual complexity, are found to exhibit higher degree of “helplessness”. This study provides an effective data-driven framework to utilize social media data for public sentiments monitoring. The helplessness emotion identified is a unique mental distress under strict quarantine measures, which expands the growing literature of urban governance in the post-pandemic era. Decision makers should pay attention to public opinions and design tailored management measures with reference to civic emotion dynamics to facilitate social sustainability and resilience in face of future crises.

4. Professor Bo-sin Tang and Anvar Mukhamedjanov (PhD student)

- have published the following paper:

**Mukhamedjanov, A.**, Isamukhamedova, D., & **Tang, B.S.** (2024). Green Spaces for Summer Cooling: Case Study of Tashkent, Uzbekistan. *International Review for Spatial Planning and Sustainable Development*, 12(2), 163-180. [https://doi.org/10.14246/irspsd.12.2\\_163](https://doi.org/10.14246/irspsd.12.2_163)

**Abstract:** *Urban vegetation is an effective urban feature to protect citizens from urban warming. The aim of this study is to assess the temperature in the urban 'cooling islands' in Tashkent, Uzbekistan to keep them cool in summer. The area of the tree canopy, planting density, spatial structures and microclimatic data were observed in 30 green zones over three summer months to determine their thermal overheating. The observed data was then compared with the daily weather forecasts. The results show that while large tree canopies are crucial for maintaining a cool microclimate through shading, small shrubs, and lawns, which are popular in local landscaping, are not effective. Planting density is weakly related to a cool microclimate in green spaces. The best cooling results are achieved when the tree canopy shades more than 75% of the area. These results provide new insights for the development of more sustainable strategies and standards for the design and maintenance of cool green spaces in Tashkent and other Central Asian cities with similar climates.*

5. Dr Zhan Zhao, Ms Fangyi Ding and Ms Shuting Chen (PhD students)

- have published the following paper:

**Ding, F., Chen, S., & Zhao, Z.\*** (2024). Incorporating walking into ride-hailing: The potential benefits of flexible pick-up and drop-off. *Transportation Research Part D: Transport and Environment*, 127, 104064. <https://doi.org/10.1016/j.trd.2024.104064>

**Abstract:** *Ride-hailing enjoys global popularity as a door-to-door mobility service, but its pick-up and drop-off inefficiencies and resulting environmental costs are often overlooked. This research examines the potential efficiency and environmental benefits of a flexible pick-up and drop-off (PUDO) strategy, which seeks to improve the routing efficiency by shifting the PUDO locations within short walking distance. A two-stage heuristic method is developed to identify suitable PUDO locations while considering both the detour and congestion factors. Using DiDi Chuxing trip data from central Chengdu, China, we find that 8%–23% of trips can be improved, reducing driving distance and time by up to 15%, and saving 11.6–51.1 GJ of energy consumption and 0.8–3.7 tons of CO<sub>2</sub> emissions in a single working day. Further built environment analysis reveals that areas with one-way and narrow streets, more diverse land use, higher income population, and better*



*public transportation accessibility would benefit more from the proposed strategy. These insights highlight the potential of integrating walking into urban mobility solutions for improved efficiency and environmental sustainability.*

6. Dr Zhan Zhao, Ms Yuebing Liang, Ms Fangyi Ding (PhD students) and Mr Yihong Tang (MPhil student)

- have published the following paper:

**Liang, Y., Zhao, Z.\*, Ding, F., Tang, Y., & He, Z.** (2024). Time-dependent trip generation for bike sharing planning: A multi-task memory-augmented graph neural network. *Information Fusion*, 106, 102294. <https://doi.org/10.1016/j.inffus.2024.102294>

**Abstract:** *Due to its various social and environmental benefits, bike sharing has been gaining popularity worldwide and, in response, many cities have gradually expanded their bike sharing systems (BSSs). For a growing station-based BSS, it is essential to plan new stations based on existing ones, which requires predicting not only the overall trip intensity at each station but also its temporal distribution, an issue underexplored in the literature. To this end, this study investigates the problem of time-dependent trip generation for BSS planning (TTGP), which aims to forecast the number of trips generated by new stations at different time periods. This task, however, is challenging due to the lack of historical data for newly planned stations and complex spatiotemporal dependencies in bike sharing demand. To address these challenges, we propose a multi-task memory-augmented graph neural network for TTGP by leveraging its surrounding urban contexts and the historical demand features of nearby existing stations. Specifically, a feature extractor is developed, consisting of a graph neural network and a memory network to encode urban context and historical demand features, respectively, and a gate network to learn the reliability of different features. Furthermore, a multi-task demand predictor is designed to predict the daily trip intensity and its hourly distribution as two distinct tasks. Finally, extensive experiments on real-world data from New York City demonstrate the superior performance of our method compared with existing baselines.*

7. Dr Zhan Zhao

- has published the following paper:

**Lin, Y., Xu, Y.\*, Zhao, Z., Tu, W., Park, S., & Li, Q.** (2024). Assessing effects of pandemic-related policies on individual public transit travel patterns: A Bayesian online changepoint detection based framework. *Transportation Research Part A: Policy and Practice*, 181, 104003. <https://doi.org/10.1016/j.tra.2024.104003>

**Abstract:** During a pandemic or natural disaster, people may alter transit usage behavior due to perception of changes in the environment. To effectively respond to these crises, it is important for governments and public transit agencies to understand when these changes occurred and how they were affected by relevant policies and responsive strategies. In this study, we develop a methodological framework based on Bayesian online changepoint detection (BOCD) to identify the occurrence time, direction, and persistency of changes in individual-level transit usage. We demonstrate the effectiveness of this framework in informing government decision-making in the context of COVID-19. Using Jeju Island, South Korea as a case study, we apply the framework over a nearly two-year smart card dataset collected from the beginning of 2019 till nine months into the pandemic. By focusing on frequent transit users, we detect when these users significantly changed their transit usage frequency during the pandemic and identify several types of users who experienced different behavior change patterns. Besides demonstrating the great heterogeneity in individual-level behavior changes, we perform a regression analysis to further understand how these changes were affected by key government policies (e.g., Risk alert, Social distancing, Public transit policy, and Eased social distancing). Our results suggest that only certain sets of policies appear to have significant effects. In particular, introducing Risk alert would cause a 277% to 317% increase in the number of users who reduced transit usage frequency. Policies that eased social distancing, though, would cause a 134% to 155% increase in the number of users with travel frequency increase. The proposed BOCD framework enables a scalable solution to identifying and understanding changes of individual transit behavior. The methodology and findings are beneficial for developing targeted policies and interventions to facilitate daily travel and public transit operations during public health crises.

8. Dr Yulun Zhou and Ms Sunyu Wang (PhD student)

- have published the following paper:

**Wang, S.,** Xu, K., & **Zhou, Y\***. (2024). Cost-effective sensor placement optimization for large-scale urban sewage surveillance. *Sustainable Cities and Society*, 105250. <https://doi.org/10.1016/j.scs.2024.105250>

**Abstract:** Large-scale urban sewage surveillance is becoming a fundamental urban sensing infrastructure in cities. Sewage surveillance generates vital information for extensive urban applications, ranging from early outbreak detection in a pandemic to post-pandemic, long-term public health monitoring tasks such as antibiotic-resistant virus monitoring and community drug use detection.

One emerging question is how to derive a cost-effective sensor placement plan in city-scale sewage networks having complicated topologies. Inspired by remote sensing, we first provide a general multi-objective formulation of the optimal sensor

*placement problem on directed networks. Then, we introduce a connectivity-based objective evaluation approach and embed it into an NSGA-II algorithm to enable efficient optimization on large-scale directed graphs. The effectiveness of the proposed method is verified on a real-world sewage network in Hong Kong serving more than 500,000 urban residents.*

*Results show that the proposed method efficiently generated optimal sensor placement plans on city-scale networks. Optimized sensor placement plans outperformed human placement heuristics by a significant margin of 102%, highlighting the necessity for data-driven decision support for large-scale urban sensing. Methodologically, this study provides a benchmark problem and datasets for network-based spatial optimization studies. Codes and datasets developed in this study are open sourced to support future research in a real-world scenario.*

**Keywords:** *Optimal sensor placement, Network-based spatial optimization, Multi-objective genetic algorithm, Sewage surveillance, Pandemic control*

## 9. Professor Shenjing He and Dr Qiong He

- have published the following paper:

**He, Q., & He, S.** (2024). Disentangling the intersectional field of education and housing in China: Genesis, strategies and discontents. *Environment and Planning A: Economy and Space*, 0308518X241228453.

**Abstract:** *Drawing on the Bourdieusian concept of 'field' and the theorization of 'intersectionality', this paper proposes a concept 'intersectional field' to disentangle the complex interrelations between housing and education in China, where they mutually constitute and co-produce yet trouble and counteract with each other, whereby exerting simultaneous exclusion in cultural and economic (re)production. Drawing on policy documents and 38 in-depth interviews with various stakeholders in China, we first delineate the genesis and evolution of this intersectional field. We then demonstrate how middle-class parents rationalize and strategize their heavy investment in cultural and economic reproduction against the most recent policies that seemingly aim to de-intersect/decouple these two fields. We show that the intersectional field of housing and education in China emerges from state-imposed rules while being increasingly self-reinforced. It was also temporarily counteracted and suspended responding to the escalated crises of housing unaffordability and over-competition over quality schooling opportunities, through policies like franchising key schools from the city centre to the suburb and random allotting enrolment. These changes in the 'rules of the game' indeed bring uncertainties to the intersectional field. However, while discontent to this intersectional field abound, these actions are self-constrained by the internal logic of the intersectional field and thus unable to bring fundamental changes. Those with limited socio-economic capacities remain extremely disadvantageous in both fields. The policy intervention turns out to be merely a spatial reordering that*

*relocates and expands the fierce competition from the city centre to the suburbs while repositioning the suburbs to be the focal point for strategic investment in the intersectional field.*

#### 10. Dr Qiong He

- has published the following paper:

Zhang, Y., & **He, Q.\*** (2024). Parent-or self-reliance? Understanding young homeowners' housing quality in Beijing from an intergenerational and dynamic perspective. *Housing Studies*, 1-25.

*Abstract: Parental support increasingly influences young people's housing outcomes. Using OLS models, this study examines the relative effects of parental and own socioeconomic status and political resources on young homeowners' housing quality and their temporal dynamics in Beijing, China. We find that the market transition theory has explanatory power for both generations. However, the socioeconomic status of parents outweighs that of young homeowners in influencing their multifaceted housing qualities. These housing qualities are also positively associated with parents', but negatively with the young homeowners' political resources. This indicates power persistence theory does not stand for the younger generation, but parental political advantages derived from the socialist system are remanent in shaping contemporary youth's housing stratification. The more recent the acquisition of homeownership by young adult children, the stronger the positive influence of parental attributes, but the weaker the influence of the younger generation's own attributes. This demonstrates the intergenerational reproduction of housing stratification and socio-spatial inequality becomes more pronounced as housing affordability declines.*

## Future Urbanity & Sustainable Environment (FUSE) Lab

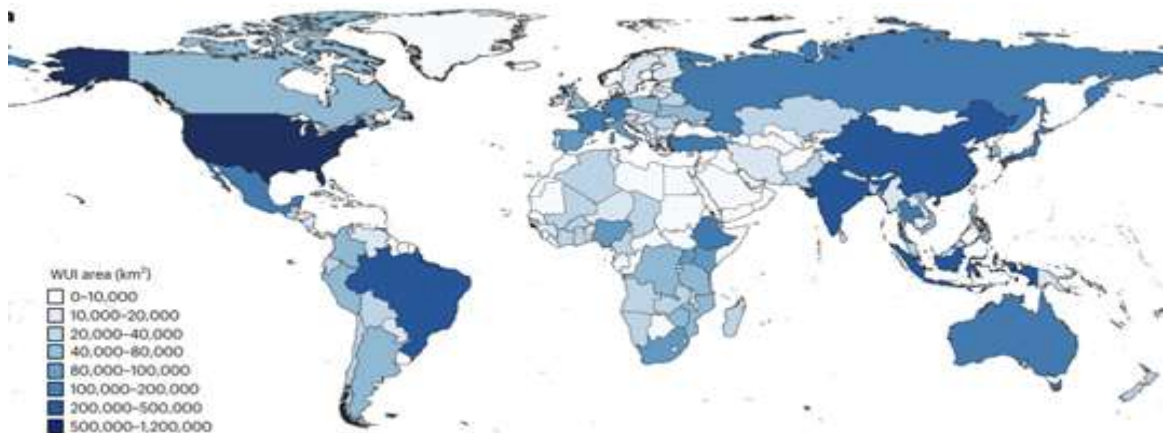
1. Dr Binley Chen, Dr Shengbiao Wu, Professor Peng Gong and Dean Chris Webster

- have published the following paper:

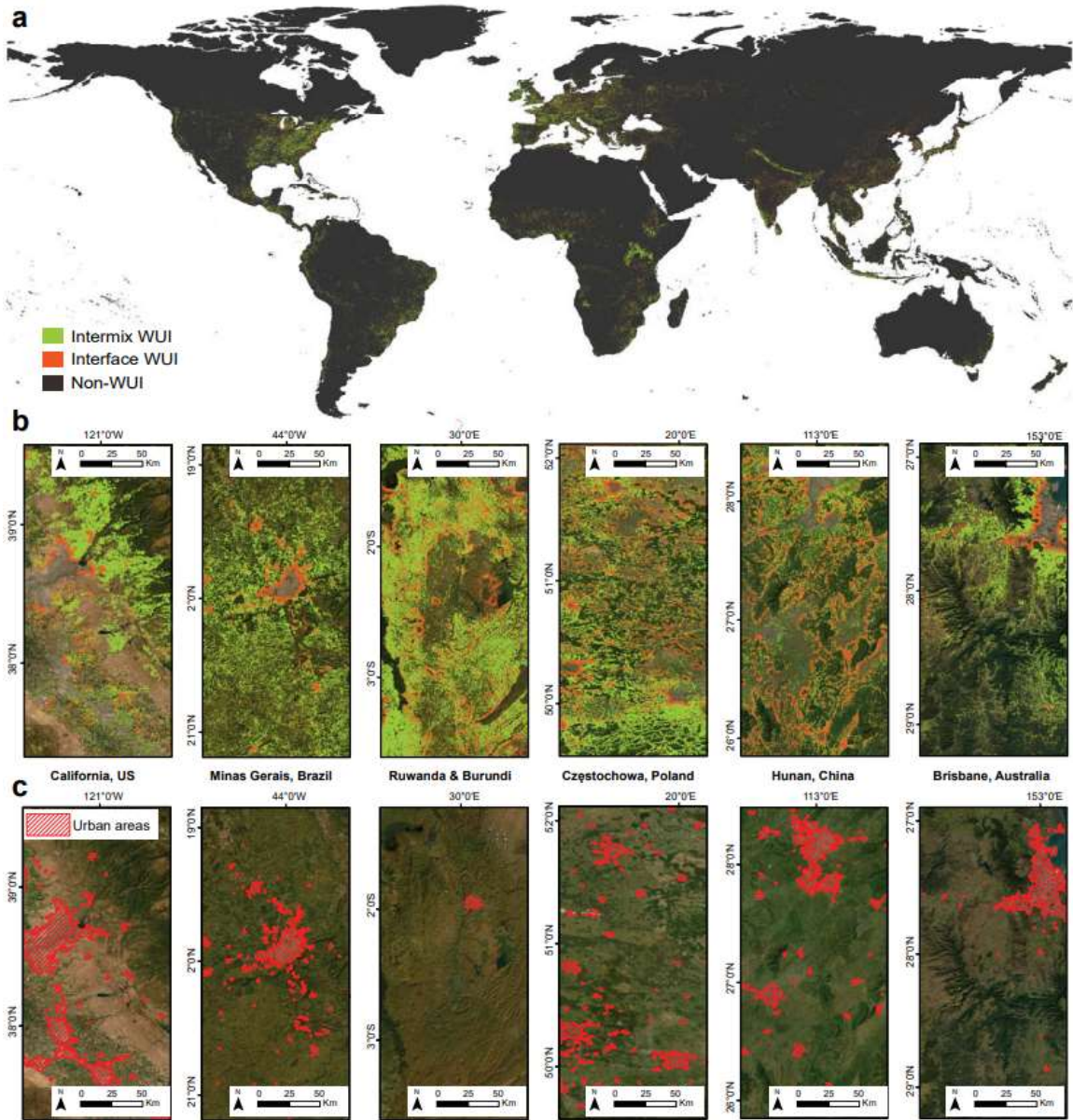
**Chen, B.\***, **Wu, S.**, Jin, Y., Song, Y., Wu, C., Venevsky, S., Xu, B., **Webster, C.** & **Gong, P.** (2024). Wildfire risk for global wildland–urban interface areas. *Nature Sustainability*. <https://doi.org/10.1038/s41893-024-01291-0>

**Abstract:** Intensifying wildfires and human settlement expansion have placed more people and infrastructure at the wildland–urban interface (WUI) areas under risk. Wildfire management and policy response are needed to protect ecosystems and residential communities; however, maps containing spatially explicit information on the distribution of WUI areas are limited to certain countries or local regions, and therefore global WUI patterns and associated wildfire exposure risk remain unclear. Here, we generated the global WUI data layers for 2020 baseline and 1985–2020 time series by incorporating fine-resolution housing and vegetation mapping. We estimated the total global WUI area to be 6.62 million km<sup>2</sup>. Time-series analysis revealed that global WUI areas experienced a substantial increase of 12.56% between 1985 and 2020. By overlapping 2001–2020 wildfire burned area maps and fine-resolution population dataset, our analysis revealed that globally, 7.07% (12.54%) of WUI areas housing 4.47 million (10.11 million) people are within a 2400-m (4800-m) buffer zone of wildfire threat. Regionally, we found that the United States, Brazil, China, India, and Australia account for the majority of WUI areas, but African countries experience higher wildfire risk. Our quantification of global WUI spatiotemporal patterns and the associated wildfire risk could support improvement of wildfire management.

[HKU Press Release](#)



Statistics of global WUI areas at the country level.



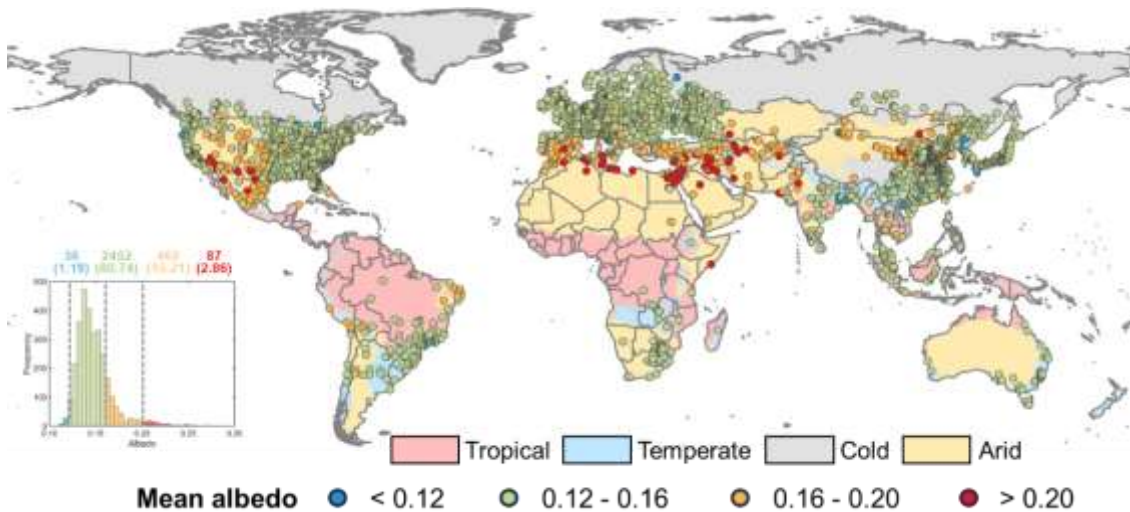
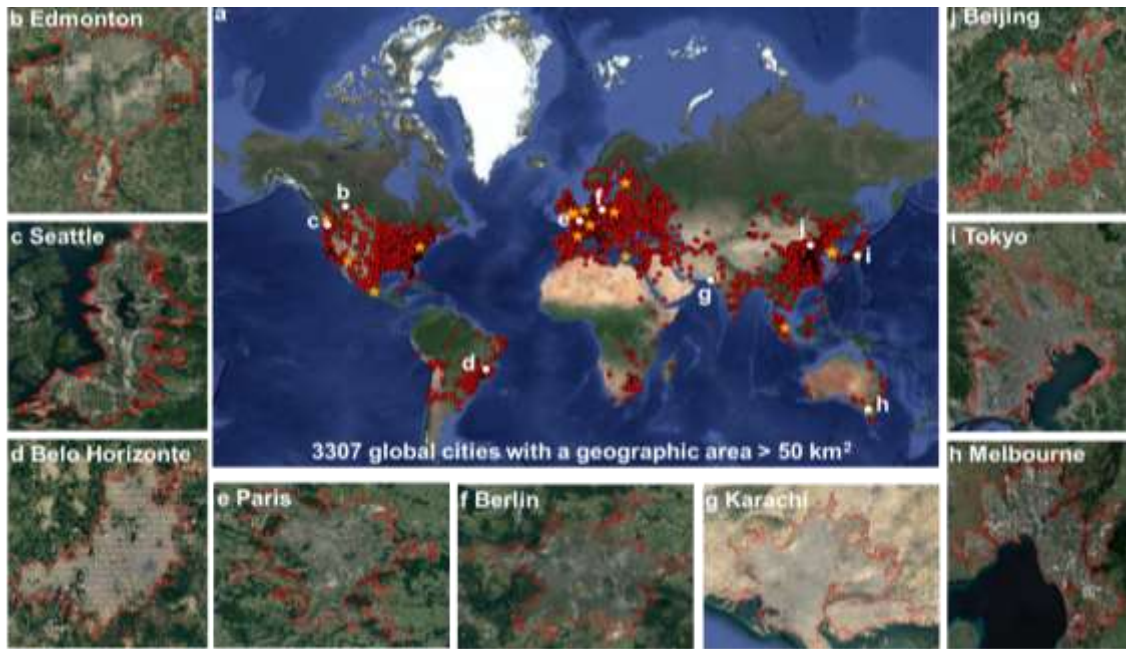
Global distribution of WUIs. (a) Geographic distribution of global WUI areas, (b) zoomed-in subsets of intermix WUI and interface WUI areas and (c) global urban areas overlaid on high-resolution satellite imagery across different continents in 2020.

## 2. Dr Shengbiao Wu, Dr Jiafu An and Dr Binley Chen

- have published the following paper:

**Wu, S.**, Lin, X., Bian, Z., Lipson, M., Laforteza, R., Liu, Q., Grimmond, S., Velasco, E., Christen, A., Masson, V., Crawford, B., Ward, H., Chrysoulakis, N., Fortuniak, K., Parlow, E., Pawlak, W., Tapper, N., Hong, J., Hong, J., Roth, M., **An, J.**, Lin, C. & **Chen, B.**\* (2024). Satellite observations reveal a decreasing albedo trend of global cities over the past 35 years. *Remote Sensing of Environment*, 303, 114003. <https://doi.org/10.1016/j.rse.2024.114003>

**Abstract:** *Urban surface albedo is an essential biophysical variable in the surface energy balance across all scales, from micro-scale (materials) to the globe, changing with land covers and three-dimensional structures over urban areas. Urban albedos are dynamic over space and time but have not yet been quantified over global scales due to the lack of high-resolution albedo datasets. Here, we combined the direct estimation approach and Landsat surface reflectance product to generate a 30-m-resolution annual surface albedo dataset for 3037 large cities (area > 50 km<sup>2</sup>) worldwide for the period from 1986 to 2020, allowing spatial patterns and long-term temporal trends to be explored with possible causal drivers, and quantification of the surface radiative forcing from these albedo changes. Evaluation of this new albedo dataset using global urban flux tower-based measurements demonstrates its high accuracy with an overall bias and root-mean-square-error (RMSE) of 0.005 and 0.025, respectively. Analysis of the dataset reveals an overall decreasing trend of albedo during the 35-year evaluation period (1986–2020), which is robust accounting for uncertainties from training sample representativeness, Landsat data uncertainty, seasonal variation, and snow-cover contamination. Our results reveal that urban greening (measured by the positive Normalized Difference Vegetation Index (NDVI) trend) can well explain the total variances in the albedo trend for the 35-year period through two different pathways of tree planting and urban warming-enhanced vegetation growth. The decrease in urban albedo caused a warming effect indicated by positive surface radiative forcing, with a global city-level average surface radiative forcing of 2.76 W·m<sup>-2</sup>. These findings enhance our understanding of urbanization's impacts on albedo-related biophysical processes and can provide information to quantify urban surface radiation energy and design effective mitigation strategies to reduce urban warming.*



3. Dr Shengbiao Wu, Ms Wenbo Yu (MPhil student), Dr Jiafu An and Dr Binley Chen

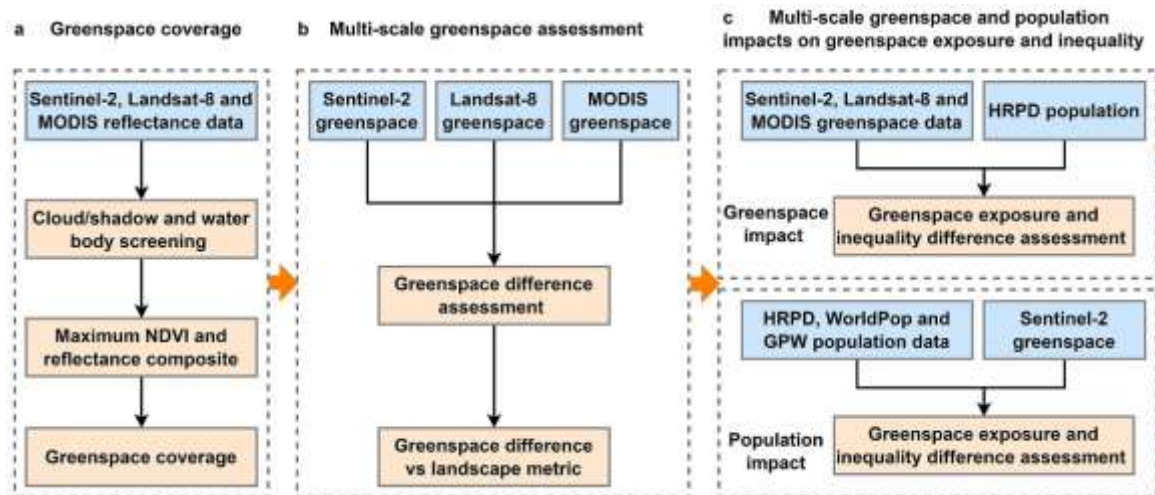
- have published the following paper:

**Wu, S., Yu, W., An, J., Lin, C., & Chen, B.\*** (2023). Remote sensing of urban greenspace exposure and equality: Scaling effects from greenspace and population mapping. *Urban Forestry & Urban Greening*, 90, 128136. <https://doi.org/10.1016/j.ufug.2023.128136>.

**Abstract:** Satellite observations are increasingly used to characterize greenspace coverage, exposure, and equality assessment for environmental and health studies. Given the difference in spatial resolutions (namely, scale effect), different



satellite datasets capture distinct levels of landscape details in urban green environments. However, existing studies on measuring scale effects are limited to the greenness mapping in a few sampled cities regardless of the scale effects from population mapping and the associated controls from greenspace landscape configurations. To close this knowledge gap, we conducted a comprehensive inventory of the scale effects, using widely used satellite-based greenness (i.e., 10-m Sentinel-2, 30-m Landsat-8, and 500-m MODIS) and population (i.e., 30-m HRPD, 100-m WorldPop, and 1-km GPW) mapping datasets over 679 major cities (urban area > 50 km<sup>2</sup>) in the United States. Results show that (1) compared with high-resolution Sentinel-2, Landsat-8 and MODIS overestimate greenspace coverage and human exposure but underestimate the inequality of human exposure to greenspace; (2) the differences in greenspace coverage and exposure across satellite sensors are linearly correlated with the greenspace provision magnitude; (3) landscape configuration explains the greenspace coverage differences across different satellite sensors. Aggregated and fragmented landscape metrics correlate positively and negatively with greenspace coverage differences, respectively; and (4) the spatial resolution of greenspace mapping shows a decreasing control while population data has tiny impacts on the inequality measurement of human exposure to greenspace. These findings answer how varying-scale satellite datasets cause a discrepancy in the measurement of greenspace coverage, human exposure, and inequality assessment. We advocate that researchers should select appropriate satellite-based greenness datasets by accounting for trade-offs between specific research benefits and costs to better position future greenspace-related environment and health outcome studies.

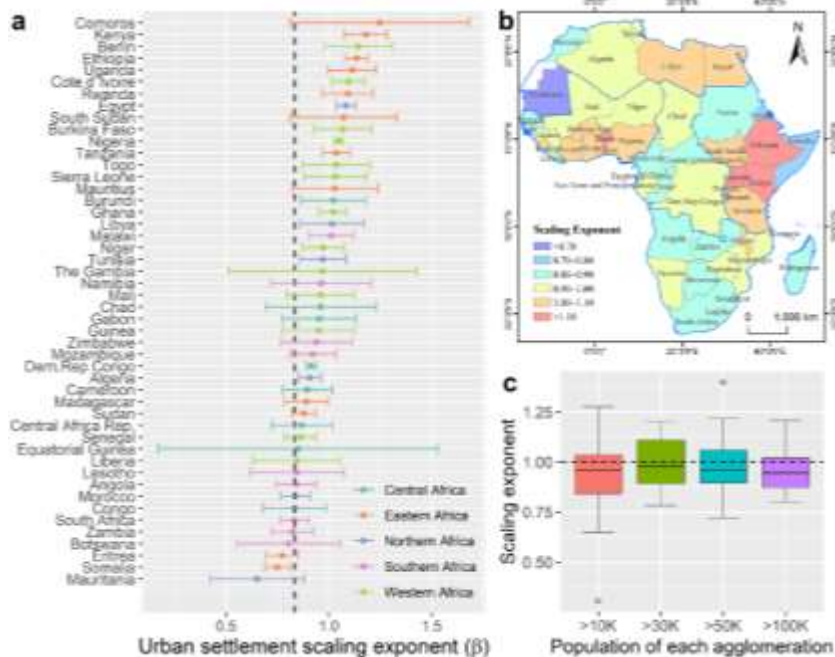


4. Dr Gang Xu (Visiting PDF), Dr Binley Chen and Professor Peng Gong

- have published the following paper:

**Xu, G.\***, Zhu, M., **Chen, B.**, Salem, M., Xu, Z., Li, X., Jiao, L. & **Gong, P.** (2023). Settlement scaling law reveals population-land tensions in 7000+ African urban agglomerations. *Habitat International*, 142, 102954. <https://doi.org/10.1016/j.habitatint.2023.102954>

**Abstract:** Allometric urban scaling law quantifies disproportional relationships between urban indicators and city size, which has been reported across developed countries and parts of the global south, but its applicability in Africa is neglected. Here, taking built-up areas derived from remote sensing in more than 7000 African agglomerations in 2015 as examples, we systematically investigate this settlement scaling law from continental, regional, and country levels. Results show that the built-up area linearly scales with population across the African continent and within northern and western Africa, while it sub-linearly scales with population in southern ( $\beta = 0.85$ , 95% CI: 0.808–0.891) and central ( $\beta = 0.93$ , 95% CI: 0.906–0.957) Africa, but super-linearly ( $\beta = 1.10$ , 95% CI: 1.068–1.121) in eastern Africa. National settlement scaling exponents ( $\beta$ ) vary from 0.65 to 1.25 with an average of 0.96, whose 63.6% variance can be explained by their share of built-up area, share of metropolitan population, GDP per capita, and proportion of slum dwellers. Residuals of scaling fitting reflect local population-land tensions. Western and eastern Africa are relatively rich in buildable land resources, while northern Africa is relatively poor. This study expanded the settlement scaling theory in Africa and multiple indicators are needed to further understand the rapidly evolving African urban systems.

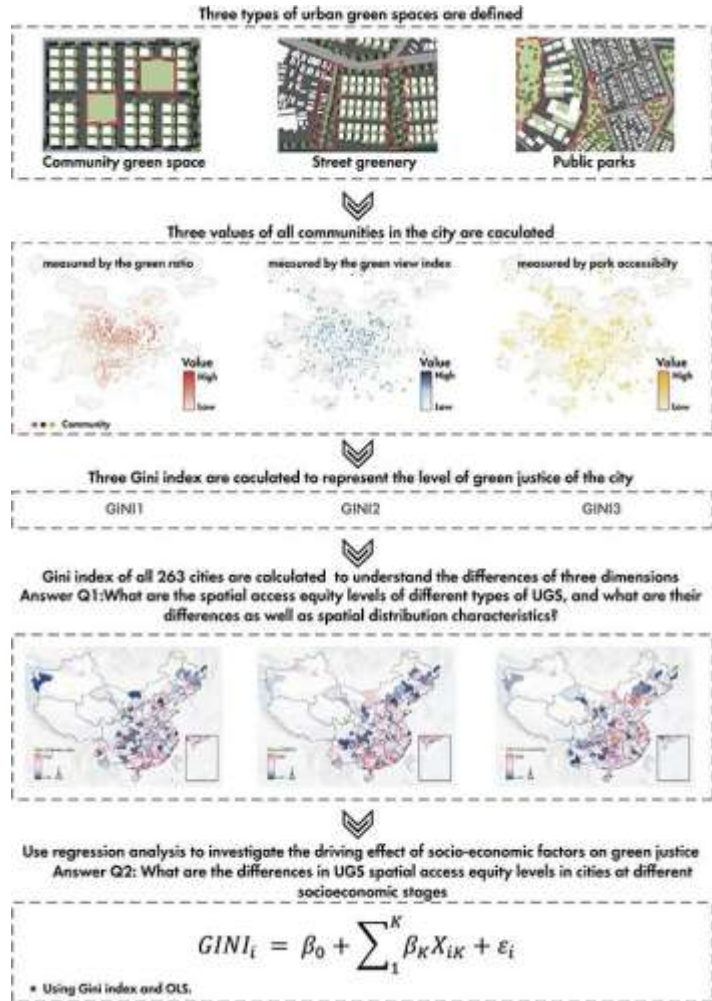


5. Dr Binley Chen

- has published the following paper:

Lu, Y., Chen, R, **Chen, B.** & Wu, J. (2024). Inclusive green environment for all? An investigation of spatial access equity of urban green space and associated socioeconomic drivers in China. *Landscape and Urban Planning*, 241, 104926. <https://doi.org/10.1016/j.landurbplan.2023.104926>

**Abstract:** *The inequitable distribution of urban green spaces (UGS) has attracted increasing attention given the important role of green environments for sustainable development. However, many recent studies have yielded different results between cities in different geographic regions and development stages and even within the same city. Hence, this study addresses two research gaps in the green justice literature: (1) What are the spatial equity levels of different types of UGS, and what are their differences as well as spatial distribution characteristics? (2) What differences exist in the spatial equity levels of UGS in cities at various socioeconomic stages? On the basis of these gaps, we explain why contradictory findings have been found in the existing literature. This*



*This study focuses on three types of UGS in China, namely, community green spaces, street greenery, and public parks, and explores the driving effects of socioeconomic factors on the spatial equity of UGS in 263 Chinese cities. The results show that GDP and the population growth rate increase the spatial equity of community green spaces and street greenery. By contrast, economic development and increased in-migration can worsen the equity level of public green space accessibility. Our study provides evidence and insights for Chinese central and local governments to implement highly effective and sustainable greening programs to promote inclusive urban greening in Chinese cities.*

- was awarded Geospatial World 50 Rising Stars 2024.



#### 6. Dr Shengbiao Wu

- received China New Talents in Science and Technology with Shining Potential Award.



## Healthy High Density Cities Lab

1. Dr Yvonne Ka Yan Lai, Ms Sarika Kumari, Professor John Gallacher, Dean Chris Webster and Dr Chinmoy Sarkar

- have published the following papers:

- (i) **Lai, K.Y., Kumari, S., Gallacher, J., Webster, C., & Sarkar, C.** (2024). Nexus between residential air pollution and physiological stress is moderated by greenness. *Nature Cities* 1, 225–37. <https://doi.org/10.1038/s44284-024-00036-6>

**Abstract:** *Urban living is synonymous with a higher exposure to environmental stressors such as air pollution and associated physiological stress; however, the modifying role of greenness has been understudied. We included 190,200 participants from a UK-wide cohort to examine the modifying role of residential greenness on associations between air pollutants and composite physiological stress (CPS) constructed from 13 biomarkers of three physiological functions and two organs. We found that living in areas with higher air pollutants was associated with higher CPS, whereas higher residential greenness was inversely associated with CPS. Relative to participants exposed to low air pollution and high greenness (least-impacted group), those exposed to high air pollution and low greenness (double-impacted group) had higher odds of their CPS being in the highest quartile (22% (95% confidence interval (CI): 12–31%) for PM<sub>2.5</sub>, 18% (95% CI: 9–28%) for PM<sub>10</sub>, 17% (95% CI: 7–27%) for PM<sub>2.5–10</sub> and 13% (95% CI: 4–23%) for NO<sub>x</sub>), with evidence of synergistic interactions between the pollutants PM<sub>10</sub>, PM<sub>2.5–10</sub> and NO<sub>x</sub> and greenness exposures on the risk of high CPS. Considerable between-city variability was observed. The evidence points to the need for nature-based interventions, such as optimizing urban greenness for healthy cities with lower stress levels and related health burdens.*

- (ii) **Lai, K.Y., Kumari, S., Gallacher, J., Webster, C., & Sarkar, C.** (2024) Association between Residential Greenness and Allostatic Load in UK Biobank: a cohort study. *Environmental Science & Technology*, 58(11), 4884–93. <https://doi.org/10.1021/acs.est.3c04792>

**Abstract:** *The association between residential greenness and allostatic load (AL), a marker of composite physiological burden and predictor of chronic disease, remains understudied. This study comprised 212,600 UK Biobank participants recruited over 2007 and 2010 at the baseline. Residential greenness was modeled as the normalized difference vegetation index (NDVI) from high spatial resolution (0.50 m) color infrared imagery and measured within a 0.5 km radial catchment. AL was measured as a composite index from 13 biomarkers comprising three physiological systems (metabolic,*

*cardiovascular, and inflammatory systems) and two organ systems (liver and kidney). Multilevel mixed-effects generalized linear models with a random intercept for UK Biobank assessment centers were employed to examine the association between residential greenness and AL. Each interquartile range (IQR = 0.24) increment in NDVI greenness was associated with lower AL (beta ( $\beta$ ) = -0.28, 95% confidence interval (CI) = -0.55, -0.01). Consistently, relative to the lowest NDVI greenness quintile, participants in the highest quintile had lower AL ( $\beta$  = -0.64, 95% CI = -1.02, -0.26). The proportion of the association between greenness and AL mediated by the physical activity was 3.2%. In conclusion, residential greenness was protectively associated with AL, a composite marker of wear and tear and general health.*

*Keywords: residential greenness, allostatic load, physical activity, UK Biobank*

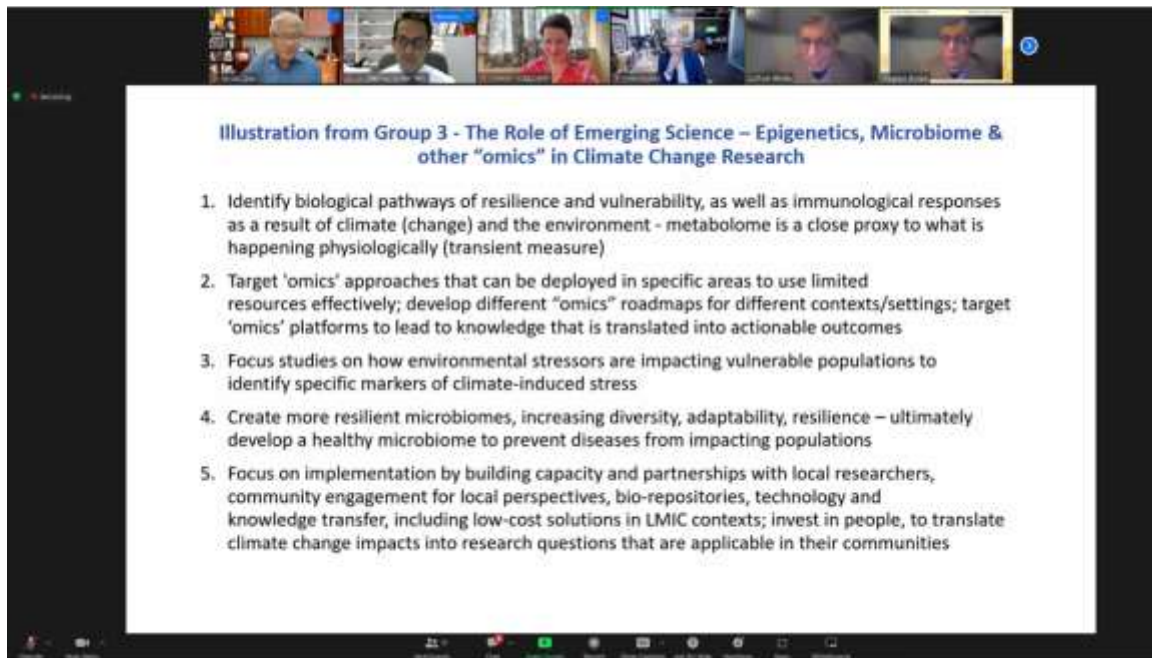
## 2. Dr Chinmoy Sarkar

- has been selected for the 18-month international policy project of US National Academy of Medicine (NAM) and UK Academy of Medical Sciences (AMS). The project, entitled 'Future Champions in Global Health research', convenes future research leaders from US and UK to develop key policy actions on climate change and health.
- was invited to the first AMS-NAM Workshop Exploring Climate Change and Health with Next Generation of Research Leaders held in London on 25-26 March 2024.



Dr Sarkar at the AMS Workshop in London

- was invited to NAM's project funded by Kaiser Permanente under its Climate Grand Challenge. He spoke in the Virtual Convening 'Addressing Research Gaps at the Intersection of Climate Change, Health, and Equity' on 22 April 2024, on the panel for theme 3 *Innovative Research and Data Methodologies to Address Climate Impacts on Health*, moderated by Professor Zulfikar Bhutta and with panellists including Professor Christopher Murray and Professor Tracey Holloway.



- was invited by the National Research Foundation, Prime Minister's Office of Singapore, to join its Overarching Panel to adjudicate on the HD4 Program on *Health-driven Design for Cities*, on 16 February 2024.

# iLab

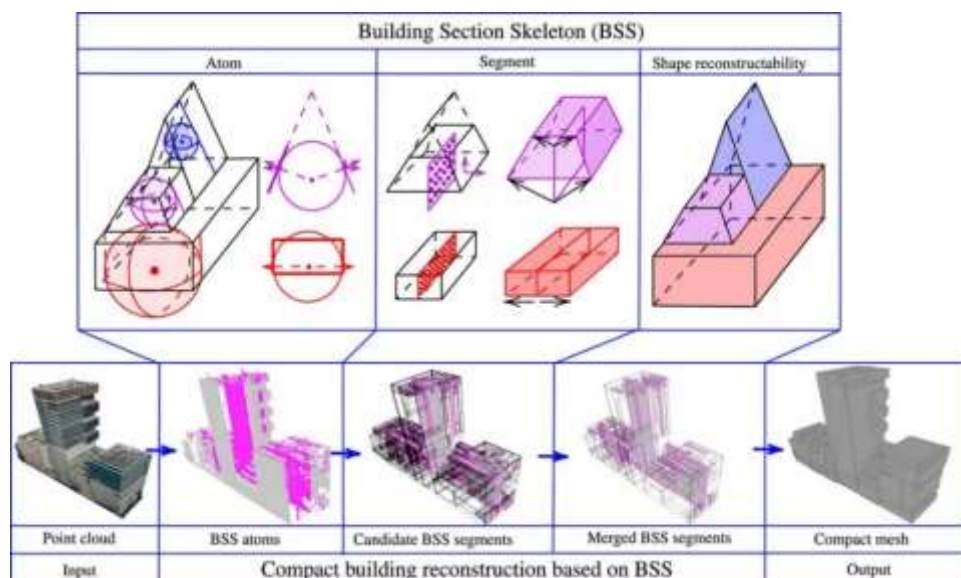
## 1. iLab members

- have published the following papers:

- (i) **Lou, J., Wang, B., Yuan, Z., & Lu, W.** (2024). Willingness to pay for well-being housing attributes driven by design layout: Evidence from Hong Kong. *Building and Environment*, 251, 111227. <https://doi.org/10.1016/j.buildenv.2024.111227>

**Abstract:** *By shifting most of the site work to factories, manufacturing becomes a critical phase in modular construction. Human-robot collaboration (HRC) is a promising approach to enhancing modular construction manufacturing (MCM) productivity while maintaining necessary flexibility. However, little attention has been paid to understanding, in a holistic manner, the past, present, and future of HRC in MCM. To fill in this gap, this study presents a review of 78 relevant publications on HRC in MCM, focusing on tasks, human roles, and interaction levels. HRC solutions are found applicable to various MCM tasks whereas existing research primarily focuses on timber component production. It also reveals that humans can play diverse collaborative roles and interact with robots at varying levels. Potential opportunities, challenges, and future directions are further discussed. The review deepens the understanding of HRC in MCM and inspires future research.*

- (ii) **Wu, Y., Xue, F., Li, M., & Chen, S. H.** (2024). A novel Building Section Skeleton for compact 3D reconstruction from point clouds: A study of high-density urban scenes. *ISPRS Journal of Photogrammetry and Remote Sensing*, 209, 85-100. <https://doi.org/10.1016/j.isprsjprs.2024.01.020>





**Abstract:** Compact building models are demanded by global smart city applications, while high-definition urban 3D data is increasingly accessible by dint of the advanced reality capture technologies. Yet, existing building reconstruction methods encounter crucial bottlenecks against high-definition data of large scales and high-level complexity, particularly in high-density urban scenes. This paper proposes a Building Section Skeleton (BSS) to reflect architectural design principles about parallelism and symmetries. A BSS atom describes a pair of intrinsic parallel or symmetric points; a BSS segment clusters dense BSS atoms of a pair of symmetric surfaces; the polyhedra of all BSS segments further echo the architectural forms and reconstructability. To prove the concepts of BSS for automatic compact reconstruction, this paper presents a BSS method for building reconstruction that consists of one stage of BSS segments hypothesizing and another stage of BSS segments merging. Experiments and comparisons with four state-of-the-art methods have been conducted on 15 diverse scenes encompassing more than 60 buildings. Results confirmed that the BSS method achieves frontiers in compactness, robustness, geometric accuracy, and efficiency, simultaneously, especially for high-density urban scenes. On average, the BSS method reconstructed each scene into 623 triangles with a root-mean-square deviation (RMSD) of 0.82 m, completing the process in 110 s. First, the proposed BSS is an expressive 3D feature reflecting architectural designs in high-density cities, and can open new avenues to city modeling and other urban remote sensing and photogrammetry studies. Second, for practitioners in smart city development, the BSS method for building reconstruction offers an accurate and efficient approach to compact building and city modeling. The source code and tested scenes are available at <https://github.com/eijijiy/sobss>.

- (iii) **Ghansah, F. A., Lu, W. S., & Ababio, B. K.** (2024). Modelling the critical challenges of quality assurance of cross-border construction logistics and supply chain during the COVID-19 pandemic. *Engineering, Construction and Architectural Management*. Vol. ahead-of-print No. ahead-of-print. <https://doi.org/10.1108/ECAM-01-2024-0016>

**Purpose:** The COVID-19 pandemic has impacted the construction industry, yet still, it is unclear from existing studies about the critical challenges imposed on quality assurance (QA), particularly Cross-border Construction Logistics and Supply Chain (Cb-CLSC). Thus, this study aims to identify and examine the critical challenges of QA of Cb-CLSC during the COVID-19 pandemic.

**Methodology:** The aim is achieved via an embedded mixed-method approach pragmatically involving a desk literature review and engaging 150 experts across the globe using expert surveys, and results confirmed by semistructured interviews. The approach is based on Interpretive Structural Modelling (ISM) as its foundation.

**Findings:** The study revealed ten critical challenges of QA, with the top four including “the shortage of raw construction material (C7)”, “design changes (C6)”, “collaboration and communication difficulties (C1)” and “changes in work practices (C10)”. However, examining the interrelationships among the critical challenges using ISM confirmed C7 and C10 as the most critical challenges. The study again revealed that the critical challenges are sensitive and capable of affecting themselves due to the nature of their interrelationship based on MICMAC analysis. Hence, being consistent with why all the challenges were considered critical amid the pandemic. Sentiment analysis revealed that the critical challenges have not been entirely negative but also positive by creating three areas of opportunities for improvement: technology adoption, worker management, and work process management. However, four areas of challenges in the QA include cost, raw material, time, and work process, including inspection, testing, auditing, communication, etc.

**Practical implication:** The finding provides a convenient point of reference to researchers, policymakers, practitioners, and decision-makers on formulating policies to enhance the effectiveness of construction QA during the pandemic through to the post-pandemic era.

**Originality:** The study enriches the extant literature on QA, Cb-CLSC, and the COVID-19 pandemic in the construction industry by identifying the critical challenges and examining the interrelationships among them. This provides a better understanding of how the construction QA has been affected by the pandemic and the opportunities created.

- (iv) **Ghansah, F. A., & Lu, W. S.** (2024). Managerial framework for quality assurance of cross-border construction logistics and supply chain during pandemic and post-pandemic: lessons from COVID-19 in the world’s factory. *Engineering, Construction and Architectural Management*. <https://doi.org/10.1108/ECAM-10-2023-1050>

**Purpose:** While the COVID-19 pandemic has impacted the construction industry, it is still unclear from prior studies about adequately positioning the quality assurance (QA) for the post-pandemic era and future pandemics, especially cross-border construction logistics and supply chain (Cb-CLSC). Thus, this study aims to develop a managerial framework to position the QA of Cb-CLSC during pandemics and post-pandemics by taking lessons from how COVID-19 has impacted the existing QA systems and has been managed successfully.

**Design/methodology/approach:** This is achieved pragmatically through an embedded mixed-method design involving a literature review, survey and interview from experts within the Hong Kong SAR–Mainland China links, typically known as the world’s factory. The design is further integrated with the partial least squares structural equation modelling (PLS-SEM) approach.

**Findings:** The study revealed 10 critical managerial practices (MPs) to position the QA to be adequate for the post-pandemic and during future pandemics, with the top three including “strict observance of government regulations (MP1)”, “planning ahead the period of quality assurance with the quarantine days in host countries (MP6)” and “modification of contract to cater for uncertainties (MP4)”. This attained a relatively good percentage agreement of 53% between the industry and academia. However, the top four MPs regarded as very effective include “implementing digital collaborative inspections with subcontractors and trades (MP8)”, “implementing a digital centralized document and issue management system (MP7)”, “strict observance to government regulations, including vaccination of workers, social distancing, use of prescribed nose masks, etc. (MP1)” and “planning ahead the period of quality assurance with the quarantine days in host countries (MP6)”. Two underlying components of the MPs were revealed as policy-process (PP)-related practices and people-technology-process (PTP)-related practices, and these can be modelled into a managerial framework capable of effectively positioning the QA to be adequate during pandemics through to the post-pandemic era.

**Practical implications:** The findings of this study depicted significant theoretical and practical contributions to the proactive management of QA activities during pandemics through to the post-pandemic era. It could empower organisations to pay attention to smartly and innovatively balancing people, processes, pandemic policy and technology to inform decisions to effectively position the QA for the post-pandemic era and survive the risks of future pandemics.

**Originality/value:** The study contributes to the body of knowledge in that it develops a managerial framework to position the QA of Cb-CLSC during pandemics and post-pandemics by taking lessons from how COVID-19 has impacted the existing QA systems and has been managed successfully. It is original research with invaluable primary data in the form of surveys and interviews from experts within the Hong Kong SAR–Mainland China links, typically known as the world’s factory.

- (v) **Chen, J. J., Lu, W. S., Pan, Y. P., & Fu, Y. L.** (2024). Building “RoboAvatar”: Industry foundation classes (IFC)-based digital representation of robots in the built environment. *ASCE Journal of Computing in Civil Engineering*. Volume 38, Issue 4. <https://doi.org/10.1061/JCCEE5.CPENG-5723>

**Abstract:** Digital representation of robots as Avatars, called “RoboAvatars”, is a premise for value-added construction applications such as simulation, layout design, and task planning. Existing RoboAvatars are described in data schemas predominantly from the robotics community, which prevents their smooth applications in the built environment. To fully unleash the power of

robotics, this research aims to develop a Building RoboAvatar by adopting the industry foundation classes (IFC) as the de facto standard in the building industry. Firstly, the Building RoboAvatar is defined from a built environment perspective, and then substantiated with IFC. A translator called RoboIFCTrans is developed to facilitate the exploitation of the numerous readily available RoboAvatars represented by the Unified Robot Description Format (URDF). Experiments demonstrated the effectiveness of Building RoboAvatar in representing robot information needed for the built environment, which encompasses the “whole-part” robot structure and properties in terms of productivity, capability, etc. The RoboIFCTrans can accurately generate IFC representations of diverse robots (TurtleBot, UR-5, Diablo) within 41.9 s. Practical implications of the IFC-based Building RoboAvatars were illustrated by two use cases. The research contributes to building a “Tower of Babel” between the construction and robotics communities. The source code is made publicly open, in hope of encouraging future research to explore more exciting opportunities (e.g., robot-oriented design, digital twin) enabled by the Building RoboAvatar.

- (vi) **Wu, L., Lu, W. S., & Chen, C.** (2024). Compliance checking for cross-border construction logistics clearance using blockchain smart contracts and oracles. *International Journal of Logistics*. <https://doi.org/10.1080/13675567.2024.2328718>

**Abstract:** This research aims to develop a deployable blockchain smart contract and oracle model for automated and transparent customs compliance checking in cross-border construction logistics. A scene analysis is conducted to extract requirements, and then a blockchain-enabled model is prototyped and tested in two case studies. We find that the prototype is feasible, and the performance is satisfactory in terms of compliance checking time ( $t = 1523$  to  $1530$  seconds), accuracy ( $a = 55.9\%$  to  $100\%$ ), private data collection ( $p = 100\%$ ), and information transparency ( $l = 0.787$  to  $1$ ). The innovation of this research is to combine blockchain smart contracts and oracles to achieve automation and transparency in cross-border construction logistics.

- (vii) **Wu, L., Lu, W. S., & Chen, C.** (2024). Compliance checking for cross-border construction logistics clearance using blockchain smart contracts and oracles. *International Journal of Logistics*. <https://doi.org/10.1080/13675567.2024.2328718>

**Abstract:** This research aims to develop a deployable blockchain smart contract and oracle model for automated and transparent customs compliance checking in cross-border construction logistics. A scene analysis is conducted to extract requirements, and then a blockchain-enabled model is prototyped and tested in two case studies. We find that the prototype is feasible, and the performance is satisfactory in terms of compliance checking time ( $t = 1523$  to  $1530$  seconds), accuracy ( $a = 55.9\%$  to  $100\%$ ), private data collection ( $p = 100\%$ ), and information transparency ( $l = 0.787$  to  $1$ ). The innovation of this

research is to combine blockchain smart contracts and oracles to achieve automation and transparency in cross-border construction logistics.

- (viii) **Lu, W. S., & Wu, L.** (2024). A Blockchain-Based Deployment Framework for Protecting Building Design Intellectual Property Rights in Collaborative Digital Environments. *Computers in Industry*, 159-160, 104098. <https://doi.org/10.1016/j.compind.2024.104098>

**Abstract:** *Protecting intellectual property rights (IPR) in the architecture, engineering, and construction (AEC) industry is a long-standing challenge. In the collaborative digital environments, where multiple professionals use digital platforms such as building information modelling to collaborate on a design, this challenge has intensified. This research harnesses the functions of blockchain technology to propose a blockchain-based framework to protect design IPR in the AEC industry. Adopting a design science approach, a framework is proposed and then further developed into a system that is implemented, illustrated, and evaluated in a case study. The system uses non-fungible tokens to tokenize design IPR and deploys blockchain's decentralized consensus mechanisms, distributed ledgers, and cryptographic algorithms to safeguard the IPR and its transactions. This prototype system is found feasible with satisfactory performance in enhancing the efficiency of IPR registration and protection, reducing cost, improving information transparency, and reinforcing immutability. Researchers and practitioners are encouraged to develop the framework for different applications such as real-life design IPR protection and design management.*

- (ix) **Tan T., Zheng, L., Xue, F., Bao, Z., Fang, Z., & Liu, X.\*** (2024). MIVES Multi-Criteria Framework to Sustainability Index of Design for Manufacture and Assembly. *Journal of Civil Engineering and Management*, 30(3), 234–247. <https://doi.org/10.3846/jcem.2024.20953>

**Abstract.** *Embracing sustainable strategies that consider Design for Manufacture and Assembly (DfMA) has become a rapidly growing trend in urban development. Continued uncertainty on the sustainability assessment of design could drive a series of indecisive decision-making among design alternatives, further disrupting the potential opportunities toward sustainable DfMA. However, there is a lack of research on sustainable design assessments for DfMA and establishing a sustainable index. This research establishes an integrated value model for the sustainability assessment framework and DfMA sustainability index to address this challenge. This model integrates Building Information Modelling (BIM) with MIVES, a customisable Multi-Criteria Decision Making (MCDM) tool. The pilot case of this framework is the retrofit of a commercial building's façade system, which demonstrated the capability of the proposed framework. Data collection and analysis include the comparisons between five design alternatives. This research furthers previous studies and has three-fold significance: 1) Establishing reasonable multi-criteria for the*

sustainable DfMA indices; 2) Adapting the MIVES approach for comparative analysis across three building phases to make it compatible with DfMA; 3) developing a quantitative analysis method for sustainable design assessment of DfMA in the construction industry.

- (x) **Yuan, L., & Lu, W. S.** (2024). Centennial evolution of Hong Kong 1910–2050: A building material metabolism perspective. *Energy, Ecology and Environment*. <https://doi.org/10.1007/s40974-024-00322-y>

**Abstract:** Building materials and their centennial metabolic patterns offer a perspective from which to understand a city's past, present, and future, but existing studies mostly focus on short-term metabolism. By investigating Hong Kong's building material stock and flow (or building material metabolism, BMM), this study aims to understand the centennial evolution of a city with a rich history, international status, advanced economy, and close connection with the world. We quantify BMM using the stock-driven approach, deriving flows based on stock changes, and interpret its patterns based on temporal and correlation (with socioeconomic factors) analyses, respectively. We find that, by the mid-2030s, total building material stock may saturate at around 417.93 Mt with a rough inflow–outflow balance of 13.29 Mt/year, but stock per capita has plateaued at about 53.67 t/capita since the mid-2010s. The long-term changes in both building material stock and flow comply with an S-curve, shaped mainly by industrialization and subsequent deindustrialization but also fluctuating due to key socioeconomic events. Based on a stock productivity comparison, we also find that Hong Kong has achieved and sustained an advanced economy via a lower BMM requirement than its western counterparts, indicating a more material-efficient development pathway. These findings not only provide insights into the centennial BMM trajectory and its interaction with socioeconomic factors, but also offer historical experience and sustainable development implications for developing economies, especially those in mainland China and throughout Asia.

- (xi) **Ghansah, F. A., & Lu, W. S.** (2024). Evaluating the impact of COVID-19 mitigation measures on quality assurance of cross-border construction logistics and supply chain. *International Journal of Quality & Reliability Management*. Vol. ahead-of-print No. ahead-of-print. <https://doi.org/10.1108/IJQRM-01-2024-0024>

**Purpose:** While COVID-19 mitigation measures (CMMs) aided in steady recovery during the pandemic, they also impeded movement across economies/borders, affecting quality assurance (QA) of Cross-border Construction Logistics and Supply Chain (Cb-CLSC). However, prior studies on the pandemic in the construction project industry have not revealed how CMMs have impacted QA. Thus, this study aims to evaluate the impact of the CMMs on the QA of Cb-CLSC.

**Methodology:** This is achieved by adopting an embedded mixed-method approach involving a desk literature review and engaging 150 experts from different economies across the globe using expert surveys, and results verified via semi-structured expert interviews. Structural equation modelling-based multiple regression analysis (SEM-MRA) was integrated to examine the impact of the CMMs on the QA, along with descriptive and content analysis.

**Findings:** The study confirmed that CMMs have not only impacted the QA negatively but also influenced the positioning of the QA for the post-pandemic era and probably to survive the risks of future pandemics. Among all the identified CMMs, the top three critical measures include “lockdown (CMM2)”, “use of personal protective equipment, such as nose masks, disinfects, etc. (CMM5)”, and “electronic/virtual meetings (CMM7)”. However, CMM5 possesses the highest contributory power to form CMM in impacting the QA, and this can be regarded as largely positive by strengthening health and safety management systems. Its negative impact lies with the project cost increment and the inconveniences of using nose and face masks.

**Practical Implication:** This study provides a better understanding to construction practitioners and policy makers on how the pandemic policies, i.e., CMMs, have impacted QA and can aid in formulating planning and operational decisions to adequately position the QA for the post-pandemic era and to endure the risks of future pandemics.

**Originality:** The study contributes to knowledge in that it provides a better understanding of how the pandemic policies, such as CMMs, have impacted QA and can aid in formulating planning and operational decisions to adequately position the QA for the post-pandemic era and to endure the risks of future pandemics. This area of study has been given limited attention among prior studies during the pandemic.

- have the following papers accepted for publication:

- (i) **Lu, W. S., Lou, J. F., Ababio, B. K., Zhong, R. Y., Bao, Z. K., Li, X., & Xue, F.** (2024). Digital technologies for construction sustainability: Status quo, challenges, and future prospects. *npj Materials Sustainability*. Accepted.

**Abstract:** The nexus between digital technologies (DTs) and sustainability in the built environment has attracted increasing research interest in recent years, yet understanding of DT utilization and its impact on construction processes remains fragmented. To address this gap, this study conducts a systematic review of the construction sustainability literature to analyze and synthesize research findings on the application of DTs at various stages of the construction lifecycle. We undertake an in-depth content analysis of 72 articles, with findings revealing that prominent DTs for construction sustainability include building

*information modeling, Internet of Things, big data, and artificial intelligence. We also identify that that the application of DTs for sustainability across the construction lifecycle are clustered in four areas: namely (1) integration and collaboration; (2) optimization, simulation and decision-making; (3) tracking, monitoring and control; and (4) training. Based on existing knowledge gaps, future research opportunities are identified, including the development of integrated and interoperable systems, long-term performance and resilience, and advanced simulation and modeling techniques. This study contributes to the literature on construction digitalization by offering a complete overview of research investigations in relation to construction sustainability, and identifying research crucial to advancing a DT-enabled sustainable built environment*

- (ii) **Yang, Z. Z., & Lu, W. S.** (2024). Lean modular integrated construction (MiC) production phase planning under uncertainties: A big data-driven optimization approach. *ASCE Journal of Construction Engineering and Management*. Accepted.

**Abstract:** *Phase planning is one of the most important components of lean-based production planning that provides basic guidelines for the entire production process. In modular integrated construction (MiC) projects, the complicated and drawn-out features of their manufacturing/production process pose difficulties for informed phase planning decisions under uncertainties. However, owing to the nascent nature of MiC, traditional approaches have little prior knowledge of the uncertainties. This research aims to address this problem by proposing a data-driven optimization method based on a set of valuable historical production data to hedge against uncertainties during production. A real-life case study is then conducted to validate this optimization approach. The planning solution, including (a) the critical production path, (b) the detailed production schedules, and (c) the production process simulated, balances production schedules and uncertainties to ensure feasible and robust phase planning. This optimization method can make full use of historical production data rather than approximations of the probability distributions to handle uncertainties in the phase planning process. This research provides an innovative and robust solution for MiC production managers to efficiently make phase planning under uncertainties. It enriches the literature on phase planning and contributes to lean MiC manufacturing. The biggest novelty of this research is to open up a window for researchers and practitioners to look into MiC production in factories, which are traditionally like a 'black box' unknown to us.*

- received distinguished delegates from the Civil Engineering and Development Department (CEDD), HKSAR Government, on 26 January 2024. Led by Mr Harry Ma, Deputy Director of CEDD, and Dr Julian Kwan, Assistant Director (Technical) of CEDD, the delegates included more than 10 Heads and Deputy Heads of its Civil Engineering Office, Geotechnical Engineering Office, Sustainable Lantau Office, East, South, and North Development Offices.



Joined from iLab were Chair Professor Wilson Lu (Digital Construction), Dr Frank Xue, Dr Junjie Chen, Ar Ada Fung (FoA Distinguished Fellow and iLab Fellow), Dr Louis Chu (Deputy Director of Estates Office), and more than 20 PhD students. At the event, iLab members introduced innovative technologies including:

- BIM and blockchain-enabled MiC Three Treasure (三寶);
- i-Core-enabled large-scale precast civil works cross-border logistics safety;
- monitoring and Just-in-Time (JIT) planning;
- big data-enabled AI inspector for gauging construction waste off-site sorting; and
- computer vision-enabled robotics for safe waste sorting.



- received delegates from the Highways Department (HyD) led by Mr Jimmy Chan, Director of Highways, on 23 February 2024. The visit was joined by Ar Ada Fung, Former Deputy Director of Housing, Hong Kong Housing Authority (HKHA) of HKSAR, Dr Louis Chu, Deputy Director of Estates Office, HKU, and iLab members including Dr Frank Xue, Dr Junjie Chen, and Dr Mike Wu.

They discussed the potential use of Modular Integrated Construction (MiC) “Three Treasure” (三寶) (i.e., blockchain-based e-InStar for remote e-inspection, e-

TranStar for MiC cross-border logistics, and e-InstalStar for MiC onsite installation) in highway projects, which are also embracing MiC or offshore modularity and prefabrication principles. They also explored whether the award-winning i-Core technology (e.g., for monitoring large-scale precast construction components) can be implemented in highway projects, how digital technologies can facilitate people to comply with construction regulations, and best practices to avoid poor occupational health and safety (OHS) in the construction industry.

The visit was concluded by an iLab tour. Further collaboration will be explored between iLab and HyD.



## 2. Professor Wilson Lu

- led his construction waste research team to organise a face-to-face meeting with the chief and senior engineers from the Civil Engineering and Development Department (CEDD) on 4 January 2024, to discuss the practical application of 'AI Inspector' in Hong Kong's construction waste management facilities (off-site sorting facilities and landfills). The AI Inspector is an artificial intelligence product developed by Professor Lu's research team.



## 3. Dr Frank Xue

- started his service at RGC as a Panel Member (Engineering) for the Assessment Panel for Competitive Research Funding Schemes for the Local Self-financing Degree Sector (APSF), from March 2024 to February 2026. The APSF oversees the implementation details of the Faculty Development Scheme, Institutional Development Scheme, and Inter-Institutional Development Scheme of RGC, prioritises proposals for funding, and monitors approved projects for the Local Self-financing Degree Sector. More information: <https://www.ugc.edu.hk/eng/rgc/about/membership/apsf.html>
- gave an invited talk titled 'Bridging the gap between point clouds for GeoAI: Role of supervised, reinforced and unsupervised learning', at the Workshop on GeoAI and Big Data for Urban, Environment, and Sustainability, on 20 December 2023 at the Hong Kong Polytechnic University.



- participated in the '2023 Forum on Spatial Information Technology Enabled Cultural Heritage Conservation' on 9 December 2023 at the School of Architecture, Tsinghua University.



#### 4. Dr Tan Tan

- delivered a guest lecture to the master's programme at the Department of Civil, Environmental and Geomatic Engineering of University College London, as part of the module 'Engineering for Circular Economy (CEGE0008)'. Dr Tan gave an online teaching session titled 'Modularity for Sustainable Construction'.



was interviewed by the Swiss National Centre of Competence in Research (NCCR) in Digital Fabrication on his recent move to HKU and FoA.

[Full interview](#)



- has published the following paper:

**Tan, T.\***, Mills, G., & Papadonikolaki, E. (2024). Exploring Multidimensional Modularity: Strategies to Reduce Complexity in Design Activities. *Journal of Management in Engineering*, 40(3). <https://doi.org/10.1061/JMENEA.MEENG-5596>

**Abstract.** *Modularity is an approach to simplify systems and reduce complexity. However, existing research suggests that a mono-dimensional modularity strategy, focusing solely on one dimension, such as product, process, or organization, might not fully achieve these goals in design activities. This research investigates how combining strategies from various dimensions of modularity can reduce the complexity of large-scale engineering design. The Huoshenshan Hospital, a 1,000-bed hospital designed and built in 10 days, provided an extreme case study of the first emergency hospital to address COVID-19. The research identified 10 different aspects, termed ‘proximities’, which relate to how people perceive the four dimensions of modularity, specifically across organization–process–product–supply-chain dimensions. Additionally, it identified three types of reinforcement relationships aimed at diminishing complexity in design activities: modular alignment (i.e., synchronized alignment and asynchronous alignment), modular complementarity (i.e., subtraction complement and addition complement), and modular incentive relationships. This research highlights that these three types of reinforcement relationships between different dimensions of modularity can reduce complexity, allowing subsystems to support the system in working as a whole.*

## MetaBIM Research Lab

### 1. 3D architectural drawings technology

- In collaboration with the Home Affairs Department, the MetaBIM Research Lab has launched a groundbreaking pilot programme for three-dimensional (3D) architectural drawings.

This innovative initiative aims to enhance fire safety and firefighting capabilities within aging built assets over 60 years old. By providing building owners with a better understanding of fire safety indications, we can alleviate potential fire risks and improve the overall safety of our local community and tenants.

Under this technology-driven programme, the Home Affairs Department will invite district councillors to nominate buildings within the Yau Tsim Mong District to participate. This is an incredible opportunity to leverage the power of 3D technology and make a tangible difference in our city's fire safety measures.

[News coverage on \*Headline Daily\*](#)

### 2. Dr Llewellyn Tang

- signed an agreement with Fortress Hill Methodist Secondary School, in the capacity of Founder of Llewellyn & Partners Co. Ltd. (LPC), a HKU start-up, to explore the application of Virtual Reality and Augmented Reality technologies to enhance the learning experience of students with special educational needs.

[News coverage on \*Mingpao Daily\*](#)



- received the honors from Hong Kong Chamber of Commerce in Guangxi as Vice Chairman and Leader of the first 'Hong Kong Youth (Mainland) Entrepreneurship Service Centre' in Nanning, Guangxi. The Service Centre aims to help Hong Kong's young entrepreneurs succeed, while bringing world-class university commercialised technology into the region and the belt and road initiatives.



- received the Outstanding ESG Solution for Smart Cities Award and the Appreciation Certificate of ESG from the Fintech Awards 2023.



- was invited to attend the BSI Global Built Environment Summit in Shanghai in early March 2024. The Summit brought together industry leaders and experts from around the world to discuss key topics such as BIM, digital twins, smart cities, AI, carbon management, and sustainable development practices. It served as an international platform for knowledge exchange and collaboration within the engineering and construction industry. During the event, Dr Tang delivered a keynote speech titled 'Digitisation Empowers Carbon Neutrality: Creating New Opportunities for Carbon Trading', covering three core areas: ISO digitalisation, carbon neutrality, and carbon trading.





## Ronald Coase Centre for Property Rights Research

### 1. Professor Lawrence Lai

- has published the following paper:

**Lai, L.W.C.** (2024), Reflections on Doxiadis' Theory of Planning for Human Settlements, *Ekistics and the New Habitat: The Problems and Science of Human Settlements*, Vol. 82, No. 2, 43-66. [Publisher: OJS/PKP; ISSN 2653-1313 (Online)]  
[ekisticsjournal.org/index.php/journal/issue/view/347](http://ekisticsjournal.org/index.php/journal/issue/view/347)



**Abstract:** *This paper, dedicated to the late Panayis Psomopoulos, reflects on why C.A. Doxiadis' theory of planning for human settlements is a laudable theory that is human-centred, bottom-up, multi-disciplinary, as well as a practical tool backed by a clear model with unambiguous criteria or measures that can articulate with other tools for planning an open society in a complex world. Within the context of recent commentaries on his theory, practice and teaching, the reflections are based on eight research papers by Doxiadis from which the salient features of his theory are presented with evidence adduced in the form of quotes from his papers according to his viewpoints on history, value, and the science of and action for human settlements.*

**Keywords:** *Doxiadis; human settlements; ekistics; kinetics; planning theory.*