

Cities, eusocial colonies and the question of what we study

I've just returned from a month-long tour of UK and Poland, including delivering lectures at Cambridge, UCL and Manchester. The Poland event was a round table on the philosophy of science, which proved very lively. The topic of my talks involved a debate about phenomenology in urban scholarship. Precisely: what is the appropriate unit of analysis for urban scholarship? Any first or second-year undergrad would respond that this depends on the purpose of study. But in pursuit of specialist knowledge, our theories, models, and ontologies have fragmented. We may risk losing sight of the meaningful whole. This week we interviewed for a landscape professorial post and in one of the job lectures, we heard a fascinating story of a single famous garden in Italy. The unit of analysis was that garden. Nothing really mattered outside of the story. That may be appropriate for the scholarship of famous gardens. Good if you draw out some generalisable lessons that inform the global scholarship of historical gardens. But for a particular study, simply focusing on the garden of interest may be fine. Like a case study of a historic building, an architect, a famous historic urban plan, a city metro system, an urban protest movement or any other urban phenomenon of interest, such stories can be inspiring, as indeed was the story of the Italian garden.

Urban social, environmental and natural science concerns itself with discovering general principles and laws. The professionally-focused scholarship and teaching in FoA means we also focus on prediction and explanation. Choice of unit of analysis becomes important. At Manchester University in particular, my talk about modelling city dynamics as whole urban systems stirred some controversy. The University of Chicago's Neil Brenner, a critical geographer, has a recent book arguing that the city itself is not an immutable, or stable or singularly important unit of analysis. A city is only the sum of the networks that make it work and the groups that inhabit it, the

industries that feed it, the ecological systems that sustain it, and the governments and markets that order it. I would agree with that. But the recent incursion of natural science into urban studies brings with it a somewhat different perspective. Cities are indeed a collection of complex self-organising networks (energy, finance, commuting, migrating, waste, water, air, votes, markets, etc.), but none of these in and of themselves is a persistent complex self-organising system. Cities, on the other hand, are persistent. Cities persist for decades, centuries and millennia. The industrial structure of a city may only persist for a matter of decades. It evolves, with some industries shutting down and new ones arising. But the urban milieu continues. The endemic poverty in many rust-belt urban regions, such as the industrial Valleys of South Wales, has its roots in intergenerational culture stretching back three, four or more generations. It is complexly aggravated by local democratic governmental processes, chronic under-investment in education, unwillingness to migrate, local fiscal poverty cycles and so on. The sub-systems constantly change, but the linear settlements that grew into the South Wales coal and iron-laden hills have persisted for almost 150 years.

So in my lectures, I argued that cities may be better viewed as a natural science phenomenon – clusters of interacting humans, living together in human super-colonies, which are so much more than their individual parts at any one point in time. Borrowing a biological idea and using it imprecisely – cities are colonies of eusocial animals, co-habiting for mutual benefit, and collectively producing wealth and welfare via the division of labour. Technically, a eusocial species is defined as one in which a division of labour has evolved, including physical reproduction. We have not yet reached that stage in human civilisation, but watch this (sci-fi) space. There are two mega eusocial colonies in Europe that start in the northern tip of Italy. One is the so-called ‘blue-banana’, Europe’s central axis of urbanisation that bends north-north-west, ending up in Manchester and passing through the Randstad and other highly urbanised regions. The other is a mega colony of Argentine ants that curves from Italy along the Mediterranean coast and ends up in the south-west corner of the Iberian peninsula on the Spanish-Portuguese border. It is made up of millions of individual colonies – ant cities. There are Argentine ant cities near the mega-colony that are not part of it – not sharing the division of labour (the European common Argentine ant market). But in the mega colony, an Italian worker ant can travel all the way down to Portugal and enter the queen’s bed-chamber. The ant’s equivalent to Schengen – Europe’s system for passport-free movement of labour – is pheromone-based. Ants in the colony have evolved a chemical signal that is recognised by other ants in the 6,000 km-long mega-colony.

Cities, we now know, in more scientific detail than ever before, evolve and grow in relation not just to the forces directly affecting their immediate urban area and hinterland. They grow and evolve in relation to the division of labour and growth dynamics of all other cities within the city system of which they are a part. So the unit of analysis of those interested in studying and predicting the behaviour of a city should in one sense be the entire urban system. Next it might be a single city of interest, or a neighbourhood within it. But to understand and predict, it would be wise to view and model that city as part of a mega- super-colony. That is, in part, the exciting agenda of HKU’s new Urban Systems Institute (USI).

We may be interested in a sub-system, such as the housing market or health system or street network or metro system or green space network. Or a single park that has become a relatively stable 'island eco-system' within a sea of impervious surfaces. But when looking at growth and performance of a city, we may want to focus on the holistic dynamics. For example (and drawing on work being conducted in DUPAD and the Urban Systems Institute – by Chen Chen, Zhang Xiaohu and myself), how does environmental performance (air pollution, urban metabolism, waste generation, waste treatment investment etc.) grow with city size, as a natural expression of spontaneous order that evolves as humans interact in city colonies of different sizes? That would be equivalent to asking 'how does the ratio of food-gathered to population size change as a single ant colony grows?'. Asking such questions would give us rules for better managing and planning individual cities, and whole urban systems (e.g. managing regional 'levelling-up' of the lagging regions of North or South-West China). The same question may be asked about economic output (GDP), or innovations (patents). What economic geographers and urban economists call agglomeration economies (economies of scale that grow, typically above pro-rata, as city population size grows), are generated and experienced in the collective. The city becomes the appropriate unit of analysis because the city behaves as a collective entity – as a super-organism. We may be able to predict very accurately a city's economic performance by measuring its precise industrial structure. This is useful for industrial policy. But it may be of more profound significance to measure economic performance of human colonies of different sizes, since the colonies (cities) are the persistent human systems, expressed in terms of built environment, and they are the persistent phenomenon subject to management, planning and design. In the study of Darwin's famous Galapagos finches, the study of beak morphology was the best predictor of life expectancy and life-time productivity (number of off-spring) during the severe drought years of the 1970s. Beaks themselves are not the object of conservation management. The species (18 different sub-species) are. The species constitute 18 distinct existentially-threatened organic systems, thought worthy of study and management. A focus on cities as holistic urban systems that last through anthropogenic time, gives a welcome challenge to an urban scholarship that has focused on more ephemeral manifestations of humanity's endeavours.

Congratulations for the many achievements listed in the remainder of this Dean's Roundup. FoA goes from strength to strength.

Chris Webster

Dean, FoA, HKU

Faculty of Architecture

1. New colleagues

- A warm welcome to the following colleagues, who joined our Faculty in May-July 2023:



Dr Janice Ying-en Ho

Post-doctoral Fellow
Division of Landscape Architecture

Dr Ho received her PhD in Public Health from the Chinese University of Hong Kong (CUHK), following a high distinction BSc degree with a double major in Environmental Science and Psychology from the University of Michigan-Ann Arbor.

Prior to joining HKU, Dr Ho was a postdoctoral fellow at the Jockey Club School of Public Health and Primary Care at CUHK, and a visiting doctoral researcher at the Barcelona Institute for Global Health (ISGlobal). She worked previously at the Collaborating Centre for Oxford University and CUHK for Disaster and Medical Humanitarian Response (CCOUC), World Resources Institute in Washington D.C., and the World Green Organisation in Hong Kong. Dr Ho's research interests include climate adaptation and urban heat resilience, impacts of extreme temperatures on human health and behaviours, impacts of the built environment on the health of vulnerable populations, thermal comfort, and disaster risk and vulnerability.

Under the supervision of Dr Chao Ren, Dr Ho carries out research projects addressing the health impacts of extreme weather events and their potential mitigation by better urban planning and design of the built environment.



Dr Xidong Chen

Post-doctoral Fellow
Division of Landscape Architecture

Dr Chen completed his PhD degree in Cartography and Geographic Information System at the University of Chinese Academy of Sciences, following his BEng degree in Remote Sensing Science and Technology at Henan Polytechnic University. Dr Chen is interested in research topics related to national and global fine-resolution (10 m/30 m) land cover mapping, land cover change detection, and water environment monitoring.



Dr Feiyang Zhang

Post-doctoral Fellow
Division of Landscape Architecture

Dr Zhang received his PhD degree from the Department of Geography, HKU. He studied urban planning for his bachelor's and master's degrees at Sun Yat-sen University and the University of Southern California, respectively. Before pursuing his PhD, Dr Zhang had also practised urban planning in Shenzhen. His research interests include age-friendly cities, climate-resilient cities, and urban mobility. Under the supervision of Dr Chao Ren, his current research focuses on the impacts of extreme hot weather events on cities and the potential urban planning and policy responses.

2. Results of RGC's GRF and ECS (2023/24 Exercise)

List of GRF funded projects:

Department	PI	Project title	Awarded amount (HKD)	Duration (month)
DoA	Professor Joshua Bolchover	Infill Urbanism: Demonstrating a Model for Sustainable and Affordable Housing in Lalitpur, Nepal	1,451,361	24
DoA	Dr Geraldine Borio	Seoul Urban Mountains: Reading the City through its Voids	650,000	24
DoA	Dr Bin Chen	From 2D to 3D greenspace exposure: A novel 'Pixel-Voxel' integration of green volume estimates and environmental exposure models	941,884	36
DoA	Dr Xiaoxuan Lu	Entangled frontiers: The evolution of hydrosocial territories of Shenzhen	1,039,646	30
DoA	Dr Eike Schling	Kinetic Asymptotic Structures (KAS) - Adaptive lamella gridshells for lightweight roof and façade applications	1,000,520	24
REC	Dr Frank Xue	As-built building information modeling (BIM) of RC details from radar images: A derivative-free optimization (DFO) approach based on Yee's model	793,117	36
DUPAD	Dr Creighton Connolly	Assessing the potential of urban heritage conservation in the development of green cities in Asia	781,600	36
DUPAD	Dr Mandy Lau	A qualitative study of the inter-relationship between micro-homes and household consumption practices	1,036,000	24

List of ECS funded project:

Department	PI	Project title	Awarded amount (HKD)	Duration (month)
DUPAD	Dr Colleen Chiu-Shee	Can ECO-logical visions bring sustainable futures? Cross-border comparisons of ecological restoration and climate adaptation in post-industrial cities	1,101,875	36
HKU Musketeers Foundation Institute of Data Science & DUPAD	Dr Alec Kirkley	Parameter-free Hierarchical Network Partitioning of Multivariate Spatial Data	538,415	24

*Dr Colleen Chiu-Shee subsequently withdrew from ECS of her own accord.

3. The 47th Round URC PDF/RAP Scheme

The University Research Committee (URC) has approved funding for the following PDF/RAP posts at the Faculty:

Post Allocated	Department	PI	Research Area	Funding
PDF	REC	Professor Wilson Lu	Construction Management	50%
PDF	REC	Dr Shuai Shi	Urban Entrepreneurship, Land Development, and Transportation Technology	50%
PDF	DUPAD	Dr Tianren Yang	Urban Systems Modelling and Simulation	50%
PDF	DUPAD	Professor Anthony Yeh	Urban Planning and Transport	50%
Upgrade of PDF	DUPAD	Dr Jiangping Zhou	Urban/Transport System Resilience	URC Contribution: 30%
PDF	DoA	Dr Bin Chen	Urban Environment, Exposure, and Equality	50%
PDF	DoA	Dr Chao Ren	Climate Change, Machine Learning	50%

4. URC Seed Fund for Collaborative Research 2022/23

Applicant	Department	Project Title	Awarded Amount from URC	Matching Fund from Faculty
Professor Wilson Lu	REC	Next generation e-inspection system for modular integrated construction (MiC): A blockchain-enhanced transfer learning approach	HK\$498,880	HK\$498,880
Dr Jun Ma	DUPAD	Generative AI-assisted urban renewal planning: Augmented AI-human collaboration with large language models	HK\$500,000	HK\$500,000
Dr Cui Guo	DUPAD	Long-term exposure to air pollution and Alzheimer's disease: A multi-scale study	HK\$499,365	HK\$500,000
Dr Xiaohu Zhang	DUPAD	Generative design for sustainable urban futures: A search for Pareto efficient design schemes	HK\$500,000	HK\$500,000
Professor Shenjing He	DUPAD	Enhancing housing-related wellbeing for Hong Kong's low-income residents under diverse housing pathways: A Security +	HK\$499,910	HK\$499,910

		Empowerment → Wellbeing (SEW) Framework		
Total			HK\$2,498,155	HK\$2,498,790

5. Faculty of Architecture Research Output Prize

- (i) Dr Creighton Connolly has been awarded the FoA Research Output Prize 2023 for his co-authored book:

Ali, S. H., **Connolly, C.**, & Keil, R. (2022). *Pandemic Urbanism: Infectious Diseases on a Planet of Cities*. Polity Press.

- (ii) Dr Binley Chen, Dr Shengbiao Wu, Dr Yimeng Song, Dean Webster and Professor Peng Gong have received the Jury Merit Award endorsed by the Chairperson and the panel members of the Selection Committee of the FoA Research Output Prize 2023 for their co-authored paper:

Chen, B., Wu, S., Song, Y., Webster, C., Xu, B., & **Gong, P.** (2022). Contrasting inequality in human exposure to greenspace between cities of Global North and Global South. *Nature Communications*, 13, 4636. <https://doi.org/10.1038/s41467-022-32258-4>

6. Dr Fank Xue

- participated as the Faculty's representative at the Hong Kong openBIM/ openGIS Awards 2023 Final Presentation and Award Ceremony, held at the Zero Carbon Park in Kowloon Bay on 25 May 2023.

This year, the Awards were categorised into four areas, namely Project, Professional Research, Student Research, and Technology. Submissions shortlisted for the final presentation came from various local and overseas universities, industries, professions and government departments.



7. Obituary

- It is with profound sadness that our Faculty has learned of the recent passing of Dr Jimmy Leung Cheuk-fai, SBS. We pay tributes to the former Director of Planning (HKSAR), who was also our Honorary Professor (DUPAD) and PhD graduate (REC), for his years of dedication and contributions to the Faculty, the Built Environment industries and society at large:



Department of Urban Planning and Design

We are saddened by the loss of Dr Jimmy Leung Cheuk-fai, SBS, Former Director of Planning and a highly dedicated Honorary Professor of our Department since 2013. Dr Leung passed away on Wednesday, 26 July 2023, at the TWGH Fung Yiu King Hospital in Sandy Bay, Pokfulam.

Dr Leung was a member of our Advisory Committee and RTPI-HKU Partnership Board before becoming our Honorary Professor. He brought in a wealth of knowledge and expertise gained from years of experience in the industry. His insights and recommendations had helped the Department to stay relevant and competitive in the ever-changing academic landscape.

Throughout the years, his significant contributions and passion for teaching and research had greatly enhanced the teaching of our MSc in Urban Planning and MSc in Urban Analytics programmes, as well as in the research arena. He distinguished himself as an exceptional educator, mentor, and visionary leader in urban planning.

We shall remember Dr Leung as a visionary urban planner, a serious scholar, and a passionate teacher. He was always cheerful, thoughtful and willing to lend a listening ear, offer guidance, and provide unwavering support to staff and students of our Department.

We extend our deepest condolences to Dr Leung's family. Rest in peace, Dr Jimmy Leung. We will always remember you in our Department.

Professor Shenjing He
Head of Department
Department of Urban Planning and Design

Professor Anthony Yeh
Chair Professor
Department of Urban Planning and Design

Department of Real Estate and Construction

We express our sadness in the passing of a respected scholar and distinguished member of Department of Real Estate and Construction (REC) community, Dr Leung Cheuk-fai Jimmy, SBS.

Dr Leung was the former Director of Planning of the HKSAR Government, a training supervisor in Town Planning Office, then friend and later student of Professor Lawrence Lai of REC. His doctoral degree was acquired from REC after he retired from his Director position of the Planning Department of the HKSAR Government. His doctoral thesis on revitalisation of industrial buildings, informed by Coasian economics, earned him the Hong Kong Institute of Surveyors (HKIS) Outstanding PhD Dissertation Award in 2022.

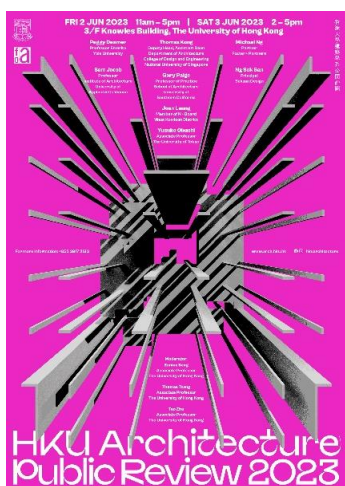
Dr Leung has made huge research contributions to the built environment by publishing articles in the HKIS journal *Surveying & Built Environment* and participating actively in academic fora and seminars organised by REC. He also taught part-time in REC when researching on his PhD thesis. Those who know him find him a virtuous helpful gentleman who never said anything negative about anyone.

After a long period of enduring sickness with great serenity, Dr Leung passed away on 26 July 2023 in hospital. Shortly before he rested in peace, Professor Bo Tang and Dr Kenneth Tang whom he knew well as government and university colleagues paid him the last visit. Mass for the repose of his soul was celebrated on 27 July 2023 in Hong Kong and Melbourne.

Department of Architecture

1. Public Review 2023

- The Public Review is a special occasion to share our work at ARC with a panel of architects, educators as well as members of the public, through discussion and presentation of a selection of Master of Architecture (MArch) thesis projects. It is an opportunity to discuss and explore architectural topics that concern the city and the world.



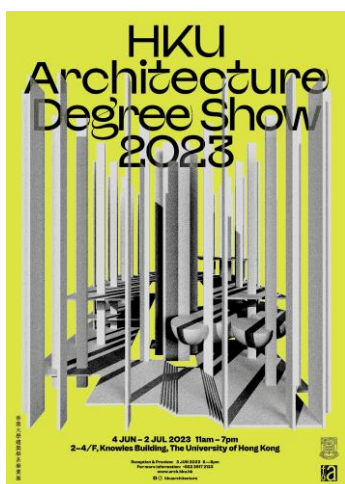
Date:
2 June 2023 – 3 June 2023
11:00 am – 5:00 pm

Venue:
Room 318, 3/F, Knowles Building,
The University of Hong Kong

[More Information](#)

2. Degree Show 2023

- The Degree Show is an annual exhibition of thesis projects produced by the Master of Architecture [MArch] final-year students. It also features works from our overall MArch, PhD, Bachelor of Arts and Sciences in Design+ and Bachelor of Arts in Architectural Studies Programmes. These projects represent our students' reflection, vision and imagination of the built-environment, their concerns with the social and cultural milieu as well as their determination to engage in and design new spaces for contemporary conditions in our societies.



Date:
4 June 2023 – 2 July 2023
11:00 am – 7:00 pm

Venue:
2-4/F, Knowles Building,
The University of Hong Kong

[More Information](#)

3. Discussion Lecture Series



Date:
7 June 2023
2:30 pm – 3:00 pm

Venue:
Room 419, 4/F, Knowles Building,
The University of Hong Kong

Lecture Title:
'Pipe, Plantation, Patumbah'

Speaker:
Will Davis

[More Information](#)

4. Mr Fai Au

- won Bronze at the Shenzhen Global Design Award (SDA) 2023, for his built project ['Snowland Air Base' \(by O Studio Architects\)](#), a private airport in Zhangjiakou, Hebei Province, China.





SDA 2023 was organised to coincide with the Shenzhen Design Week, to recognise and reward outstanding designers from around the world in four categories: Urban Design; Fashion Design; Digital Design; and Communication Design. More information: <https://www.s-d-a.org/>

5. Ms Tianying Li and Mr Haotian Zhang

- received the Young Talent Award (新銳獎) at the 9th Bi-City Biennale of Urbanism\Architecture (UABB) Shenzhen, for their project 'Flooded House'. They were one of the four award recipients among all the participants under the age of 40.

'Flooded House' is a commissioned installation in the 'Cosmic Cities' section at the main exhibition venue, Jinwei Brewery Factory. Invited by the Chief Curator, Mr Wang Zigeng, Haotian and Tianying participated as emerging voices alongside eight other celebrated architectural teams, namely Wang Shu and Lu Wenyu (Amateur Architecture Studio), Ma Yansong (MAD), Hua Li (TAO), Liu Yichun (Atelier Deshaus), Meng Yan (Urbanus), Zhang Bin (Atelier Z+), Li Han and Hu Yan (Drawing Architecture Studio), and Chen Chen (reMIX Studio), to reflect on the post-anthropocenic condition of contemporary cities.

- [More information in Chinese](#)
- [Video summary of 'Flooded House'](#) (produced by film collaborator Qian Guo, research team members Chris Lu and Xingdi Li, and supported by the Design Trust)



'Flooded House'
by Tianying Li and
Haotian Zhang at
UABB Shenzhen

3. Dr Chao Ren

- has published the following co-authored papers:

- (i) Wang, H., Yang, J., **Chen, G., Ren, C.**, & Zhang, J. (2023). Machine learning applications on air temperature prediction in the urban canopy layer: A critical review of 2011–2022. *Urban Climate*, 49, 101499. <https://doi.org/10.1016/j.uclim.2023.101499>

Abstract: *Arising as an efficient and flexible model of the rental business amidst the rising asset economy, short-term-rental (STR) platforms such as Airbnb are prevalent globally and have induced neighborhood changes in many aspects. Debates on Airbnb-induced gentrification concern scholars and policymakers worldwide. Nonetheless, most existing studies consider it a unidirectional process, and the dynamic interactions and mutual influence between Airbnb and gentrification remain unexamined. To address this salient lacuna, this study unravels the changing dynamic of Airbnb-gentrification interactions in central Beijing during the COVID-19 pandemic. Through matching housing transaction records in the secondary market and Airbnb's data, we develop two indexes and employ a series of regression models, as well as difference-in-difference estimation to unravel the variegated Airbnb-gentrification patterns, their interrelation, and the impacts brought by the pandemic. Results reveal a general pattern of intensifying gentrification caused by clustering Airbnb. Meanwhile, in neighborhoods experiencing different stages of gentrification, heterogeneous outcomes of Airbnb development are unveiled concerning impacts on rentals and housing prices during the pandemic. Our findings provide a more nuanced understanding of the dynamic Airbnb-gentrification interrelation and add to the ongoing debates on "fifth-wave gentrification".*

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- (ii) Zheng, Y., **Ren, C.**, Shi, Y., Yim, S. H. L., Lai, D. Y. F., Xu, Y., Fang, C., & Li, W. (2023). Mapping the spatial distribution of nocturnal urban heat island based on Local Climate Zone framework. *Building and Environment*, 234, 110197. <https://doi.org/10.1016/j.buildenv.2023.110197>

Abstract: A spatial understanding of street-scale urban heat island (UHI) is essential but challenging in Hong Kong, due to its highly heterogeneous urban environment and a limited weather station monitoring network. Night-time mobile measurements were conducted during the summertime of 2014 to monitor UHI variation at local level. Three measurement routes and a total of 80 sample sites were selected according to the Local Climate Zone (LCZ) framework. The measured climatic data and urban morphology data were synergized and analyzed at LCZ scale through Geographical Information System (GIS). Stepwise Multiple Linear Regression (MLR) and Partial Least Square Regression (PLSR) were applied to quantify the connections between urban form and local UHI conditions of LCZ. Mean sky view factor, total street length, and pervious surface fraction of LCZ sites have been found to be the most explanatory variables of local UHI intensity, and over 50% of UHI variations can be explained by both statistical models of stepwise MLR and PLSR. An UHI evaluation map of urban areas in Hong Kong has been developed based on the statistical models, through which UHI hotspots have been identified. LCZ-based UHI mitigation strategies were further developed for climatic planning of Outline Zoning Plan areas. The results indicate that urban forms have significant influences on UHI development at local scale, and an optimal design of urban morphology is necessary for UHI mitigation and climate adaptation.

- (iii) Zhao, J., **Chen, G.**, Yu, L., **Ren, C.**, Xie, J., Chung, L., Ni, H., & Gong, P. (2023). Mapping urban morphology changes in the last two decades based on local climate zone scheme: A case study of three major urban agglomerations in China. *Urban Climate*, 47, 101391. <https://doi.org/10.1016/j.uclim.2022.101391>

Abstract: Urbanization has been bringing extensive land use and land cover change over the last several decades, which has an impact on the urban climate and also further affects public health and energy consumption, due to human activities. The local climate zone (LCZ) classification system was proposed in 2012 to depict the complexity of urban morphology. However, until the present, LCZ long-time series product was rarely seen for its mapping difficulty. This study proposed a framework for mapping annual LCZ time series with spatial-temporal consistency in the three major urban agglomerations in China and the temporal and spatial pattern of LCZ time series was also revealed. The result showed that the high-rise and open urban LCZ types tended to occupy higher proportion in the urban area in the past two decades and urban morphology varied much in urban expansion areas and urban renewal areas. From 2000 to 2020, the differences in urban morphology between the three urban agglomerations and urban areas of different urban sizes narrowed, but the differences between urban areas with different land uses widened.

- (iv) Yin, S., Hua, J., **Ren, C.**, Liu, S., Lin, H., Huang, S., Wang, K., Ma, J., & Xiao, Y. (2023). Impact of synoptic condition on urban microclimate variation: A measurement study in a humid subtropical city during summer season. *Urban Climate*, 47, 101350. <https://doi.org/10.1016/j.uclim.2022.101350>

Abstract: *The urban microclimate is not only predominated by synoptic weather features but also closely related to heterogeneous characteristics of urban morphology. This study conducted an on-site field measurement campaign in Guangzhou, China from July to August 2021 to investigate the urban microclimate variation under typical synoptic conditions according to the Spatial Synoptic Classification (SSC) scheme. The climatic data were collected from eight locations installed in three residential neighborhoods. Cooperating with the statistical test, the results of deviation analysis demonstrate inconsistent urban microclimate variations among different SSC weather types. Under the moist moderate and moist tropical synoptic conditions, the urban microclimate variations between locations are insignificant. According to the results of the correlation analysis, the associations between morphological factors relating to building density and thermal environment are negative at noon but positive in the afternoon and night. The highest correlation coefficient is found between the ground coverage ratio and mean radiant temperature during nighttime under the extreme moist tropical weather types (0.58), but it turns out to be -0.29 at noon. These findings suggest that the application of the SSC benefits understanding reasons for microclimate variation within urban areas and detecting critical urban morphological indicators for achieving better thermal environments.*

- (v) **Yang, Y.**, Peng, C., Yeung, C. Y., **Ren, C.**, Luo, H., Lu, Y., Yip, P. S. F., & **Webster, C.** (2023). Moderation effect of visible urban greenery on the association between neighbourhood deprivation and subjective well-being: Evidence from Hong Kong. *Landscape and Urban Planning*, 231, 104660. <https://doi.org/10.1016/j.landurbplan.2022.104660>

Abstract: *The well-being benefit of urban greenery has been extensively documented broadly, though less is known about its moderation effect on the relationship between neighbourhood deprivation and subjective well-being. Some scholars also argued that the inconclusive associations between urban greenery and subjective well-being might be partially attributed to the various measuring methods of greenery and the difficulty to measure visible greenery objectively. In this study, we applied three approaches to objectively measure different aspects of urban greenery, including overall greenery by Normalized Difference Vegetation Index (NDVI), visible greenery by Google Street View (GSV) images, and park proximity by geospatial data. We captured two dimensions of neighbourhood deprivation: socio-economic disadvantage and social fragmentation. Using data from the first wave (2015) of the Hong Kong Panel Survey for Poverty Alleviation (N = 1752), the association between urban greenery, neighbourhood deprivation, and subjective well-being was investigated with multilevel linear regression models, while controlling other covariates. We found that subjective well-being level was negatively*

associated with social fragmentation but no socio-economic disadvantages, while positively associated with overall greenery and visible greenery. Additional moderation effect analysis reveals that the negative linkage between social fragmentation and subjective well-being was significantly mitigated by visible greenery. These findings demonstrated the importance of visible greenery in enhancing subjective well-being, especially for residents in deprived neighbourhoods, and offered new insights to support urban planning and public health strategies to create a healthy living environment.

- (vi) Liu, S., Kwok, Y. T., & Ren, C. (2023). Investigating the impact of urban microclimate on building thermal performance: A case study of dense urban areas in Hong Kong. *Sustainable Cities and Society*, 94, 104509. <https://doi.org/10.1016/j.scs.2023.104509>

Abstract: *Urban microclimate conditions could be an important factor influencing building thermal performance. However, most studies on urban building energy modeling (UBEM) use the typical meteorological year (TMY), often developed from observations of exposed/ rural sites, as input weather data. This study aims to assess the impacts of urban heat on building thermal performance by coupling a high-resolution urban climate simulation with UBEM. The simulated building thermal performance was compared with and without urban microclimate considerations, using weather data from the TMY, weather observations from an urban oasis, and outputs from the urban climate model. The physical parameters of typical building archetypes used in the UBEM were calibrated against indoor-measured data during summer days. Without considering urban microclimate, there was an underestimation of up to 140% of the average overheating risks of urban buildings. Furthermore, neighboring urban contexts and building ventilation rates considerably affected the thermal performance of individual buildings within high-density urban areas. The study reveals that neglecting the influence of the urban microclimate can result in a notable error in the building thermal performance assessment even at the urban level.*

- (vii) Li, Y., Ouyang, W., Yin, S., Tan, Z., & Ren, C. (2023). Microclimate and its influencing factors in residential public spaces during heat waves: An empirical study in Hong Kong. *Building and Environment*, 110225. <https://doi.org/10.1016/j.buildenv.2023.110225>

Abstract: *Creating thermally comfortable living environment under the new normal of heat waves requires pertinent knowledge as references. In subtropical residential areas, various types of public spaces exist, whose microclimate differences during heat waves, as well as their relationship with surrounding building and greenery characteristics, have not been systematically investigated. We therefore evaluated microclimate performances in three typical types of residential public spaces, i.e., open squares, vegetated spaces, and semi-outdoor spaces, and their relationship with surrounding built environment during summertime heat waves. Field measurement of microclimate parameters was conducted in two selected public housing estates in Hong Kong, followed by calculation of thermal*

comfort indices. Their relationship with building and greenery factors was analyzed. Results show inconsistent patterns in different microclimate variables among three types of spaces across different times of the day, while thermal comfort conditions in the three types of spaces are significantly different. In vegetated spaces and open squares, three-dimensional factors play dominant roles in determining microclimate and thermal comfort condition, with sky view factor (SVF) contributing the most. We detected key SVF threshold for effective thermal comfort enhancement around 0.4, based on which we discussed building and greenery optimization in similar urban context from a point-based SVF perspective and its potential application in practice. In semi-outdoor spaces, two-dimensional land-cover composition contributes greater than three-dimensional factors. This study provides empirical evidence on thermal performance of residential public spaces, which can assist practitioners in achieving adaptation to heat waves in high-density urban contexts in subtropical regions.

- (viii) Hu, C., Tam, C.-Y., Li, X., Huang, K., **Ren, C.**, Fung, K. Y., & Wang, Z. (2023). Mega-city development impact on hourly extreme rainfall over the South China Greater Bay Area under near-future climate warming. *Urban Climate*, 48, 101389. <https://doi.org/10.1016/j.uclim.2022.101389>

Abstract: *The impacts of near-future urban development and global warming forcing on hourly extreme rainfall over the South China Greater Bay Area (GBA) area have been investigated, by dynamically downscaling General Circulation Model (GCM) outputs using the Weather Research and Forecasting Model (WRF) at convection-permitting resolution, coupled with an Urban Canopy Model (UCM). Three downscaling experiments corresponding to different urban land cover (1999 and projected 2030) and climate (1951-to-2000 and 2001-to-2050 GCM simulations) were designed. Effects of near-future climate change and 1999-to-2030 urban development on GBA extreme precipitation were then examined, using boundary conditions derived from GBA extreme rainfall events in the Geophysical Fluid Dynamics Laboratory Earth System Model (GFDL-ESM2M) historical and RCP8.5 simulations. Results show that climate change and rapid urban development forcing have comparable positive effects on the intensity as well as heavy hourly rainfall probability over the GBA urban area. Global warming tends to increase heavy rainfall probability (from 40 to 60 mm/h) by about 1.3 to 1.8 times, but at the same time suppress the probability of light rainfall (from 1 to 10 mm/h) by about 20%. Urban development increases urban rainfall probability within the whole range of intensity, with frequency for very heavy rainfall (> 90 mm/h) almost doubled. It is worth mentioning that impacts due to rapid urban development can be as important as global warming forcing in the near future in exacerbating hourly extreme rainfall over the GBA coastal megacity.*

- (ix) **Ho, J. Y.**, Shi, Y., Lau, K. K. L., Ng, E. Y. Y., **Ren, C.**, & Goggins, W. B. (2023). Urban heat island effect-related mortality under extreme heat and non-extreme heat scenarios: A 2010–2019 case study in Hong Kong.

Abstract: The urban heat island (UHI) effect exacerbates the adverse impact of heat on human health. However, while the UHI effect is further intensified during extreme heat events, prior studies have rarely mapped the UHI effect during extreme heat events to assess its direct temperature impact on mortality. This study examined the UHI effect during extreme heat and non-extreme heat scenarios and compared their temperature-mortality associations in Hong Kong from 2010 to 2019. Four urban heat island degree hour (UHIdh) scenarios were mapped onto Hong Kong's tertiary planning units and classified into three levels (Low, Moderate, and High). We assessed the association between temperature and non-external mortality of populations living in each UHIdh level for the extreme heat/non-extreme heat scenarios during the 2010–2019 hot seasons. Our results showed substantial differences between the temperature-mortality associations in the three levels under the UHIdh extreme heat scenario (UHIdh_EH). While there was no evidence of increased mortality in Low UHIdh_EH areas, the mortality risk in Moderate and High UHIdh_EH areas were significantly increased during periods of hot temperature, with the High UHIdh_EH areas displaying almost double the risk (RR: 1.08, 95%CI: 1.03, 1.14 vs. RR: 1.05, 95 % CI: 1.01, 1.09). However, other non-extreme heat UHI scenarios did not demonstrate as prominent of a difference. When stratified by age, the heat effects were found in Moderate and High UHIdh_EH among the elderly aged 75 and above. Our study found a difference in the temperature-mortality associations based on UHI intensity and potential heat vulnerability of populations during extreme heat events. Preventive measures should be taken to mitigate heat especially in urban areas with high UHI intensity during extreme heat events, with particular attention and support for those prone to heat vulnerability, such as the elderly and poorer populations.

- (x) Han, L., Lu, L., Fu, P., Ren, C., Cai, M., & Li, Q. (2023). Exploring the seasonality of surface urban heat islands using enhanced land surface temperature in a semi-arid city. *Urban Climate*, 49, 101455. <https://doi.org/10.1016/j.uclim.2023.101455>

Abstract: Understanding the seasonal variations in surface urban heat island (SUHI) in different local climate zones (LCZs) is crucial to efforts to reduce the impacts of urban warming on local residents. However, such an understanding is constrained by the lack of land surface temperatures (LSTs) at both high spatial and temporal resolutions. This study created time series LSTs by fusing Landsat 8 satellite data and gap-filled MODIS products to further analyses of the SUHI seasonality in a semi-arid city, Xi'an, China. The results showed that LSTs of the open building types were generally lower than those of the compact building types. The highest SUHI intensity (7.17 °C) was found in 'compact mid-rise buildings' (LCZ2), whereas lowest (3.62 °C) was found in 'open high-rise buildings' (LCZ4) in July. The SUHI intensity peaked about 17–23 days later than the background LST. The annual SUHI hysteresis cycles exhibited an anti-clockwise concave-up

pattern in the monsoon-influenced hot-summer humid continental climate (Dwa per Köppen-Geiger climate scheme). The SUHI intensity in autumn was higher than in spring under the same background LST. These results provide valuable information for developing heat mitigation strategies in different seasons.

- (xi) **Chen, G.**, Hua, J., Shi, Y., & **Ren, C.** (2023). Constructing air temperature and relative humidity-based hourly thermal comfort dataset for a high-density city using machine learning. *Urban Climate*, 47, 101400. <https://doi.org/10.1016/j.uclim.2022.101400>

Abstract: Global warming causes new challenges for urban citizens and metropolitan governments in adapting to the changing thermal environment. However, fine-scale spatiotemporal mapping of urban thermal environments has been inadequate. Therefore, this study takes a typical high-density city, Hong Kong, as an example and utilises a machine learning algorithm, the random forest (RF), to carry out 100 m resolution hourly thermal environment mapping, including air temperature (T_a), relative humidity (RH) and the net effective temperature (NET), for the summer season (May to September) of 2008–2018, considering meteorological drivers, topography and local-climate-zone-based landscape drivers. The validation results show that the developed dataset achieves satisfactory accuracy. The mean values of R^2 , root mean square error (RMSE) and mean absolute error (MAE) for T_a achieve 0.8723, 1.1160 °C and 0.8227 °C, respectively, while those for RH reach 0.7970, 5.3816% and 3.8641%. In addition, the thermal comfort index, NET, reveals that people in built-up areas feel hotter than measured by T_a during the night due to the urban heat island effect. We believe this newly developed thermal comfort dataset can provide novel, reliable and fine-grained data support for urban climate research areas such as urban heat islands, heat exposure, heat-related health risk assessment, and urban energy consumption estimation.

- (xii) Cai, M., **Ren, C.**, Shi, Y., **Chen, G.**, Xie, J., & Ng, E. (2023). Modeling spatiotemporal carbon emissions for two mega-urban regions in China using urban form and panel data analysis. *Science of The Total Environment*, 857, 159612. <https://doi.org/10.1016/j.scitotenv.2022.159612>

Abstract: Global warming causes new challenges for urban citizens and metropolitan governments in adapting to the changing thermal environment. However, fine-scale spatiotemporal mapping of urban thermal environments has been inadequate. Therefore, this study takes a typical high-density city, Hong Kong, as an example and utilises a machine learning algorithm, the random forest (RF), to carry out 100 m resolution hourly thermal environment mapping, including air temperature (T_a), relative humidity (RH) and the net effective temperature (NET), for the summer season (May to September) of 2008–2018, considering meteorological drivers, topography and local-climate-zone-based landscape drivers. The validation results show that the developed dataset achieves satisfactory accuracy. The mean values of R^2 , root mean square error (RMSE) and mean absolute error (MAE) for T_a achieve 0.8723, 1.1160 °C and 0.8227 °C, respectively, while

those for RH reach 0.7970, 5.3816% and 3.8641%. In addition, the thermal comfort index, NET, reveals that people in built-up areas feel hotter than measured by Ta during the night due to the urban heat island effect. We believe this newly developed thermal comfort dataset can provide novel, reliable and fine-grained data support for urban climate research areas such as urban heat islands, heat exposure, heat-related health risk assessment, and urban energy consumption estimation.

- has published the following book chapter:

Liu, S., Yin, S., Hua, J., & Ren, C. (2023). 'Climate-responsive architectural and urban design strategies for adapting to extreme hot events'. In F. Pacheco-Torgal & C.-G. Granqvist (Eds.), *Adapting the Built Environment for Climate Change: Design Principles for Climate Emergencies* (1st ed., pp. 253-269). Elsevier, Woodhead Publishing.

Description: *Adapting the Built Environment for Climate Change: Design Principles for Climate Emergencies* analyzes several scenarios and proposes various adaptation strategies for climate emergencies (heat waves, wildfires, floods, and storms). Divided into three themes, the book offers an organized vision of a complex and multi-factor challenge. It covers climatic resilience and building refurbishment, implications for service life prediction and maintainability, and climate adaptation in the maintenance and management of buildings. Sections cover infrastructure materials, climate emergency adaptation and building adaptation to heat waves, wildfires, floods and storms. The book will be an essential reference resource for civil and structural engineers, architects, planners, designers and other professionals who have an interest in the adaptation of the built environment against climate change.

4. Dr Linda Shetabi

- moderated the panel discussion for the Heritage Innovation Symposium 2023, on 15 June 2023 at Yuet Ming Auditorium, HKU. The event was organised by New World Development, UNESCO and Culture for Tomorrow, with HKU and DLA as partnering organisations.





Dr Linda Shetabi
Lecturer, Division of Landscape
Architecture



Department of Real Estate and Construction

1. The Hong Kong Institution of Engineers – Safety Specialist Committee (HKIE-SSC) Student Project Competition 2022

HKIE-SSC STUDENTS PROJECT COMPETITION 2022

The main theme of competition is "Smart Safety". All the applicants are now under assessment by our penal assessors, the final result as below:

	Project Title	Student (Winner)	Supervisor	University
Group A: Doctorate Degree				
Champion	A study on Fire Hazard and Smoke Control in Large Railway Interchange Stations	Xie Wei	Prof. Eric Wai Ming Lee	Department of Architecture and Civil Engineering, CityU
Runner-up	Impacts of Human-Automation Interaction in Temporary Structure Safety: A Case in Automated Scaffolding Design	Chen Hao	Dr. Isabelle Chan	Department of Real Estate and Construction, HKU
Runner-up	Red Light Running Behavior and Safety of Pedestrians at Signalized Crossings	Zhu Dianchen	Ir Dr. Tony Sze	Department of Civil and Environmental Engineering, PolyU
Group B: Master Degree				
Champion	Identifying Key Safety Climate Factors Influencing Construction Workers in Hong Kong	Kong Tze Wai, Teresa	Prof. Steve Rowlinson / Dr. Isabelle Chan	Department of Real Estate and Construction, HKU
Group B: Bachelor Degree				
Champion	A Cross-sectional Study of Ageing Workers in a Construction Site and their Possible Factors Related to Higher Fatal Accident Rate	Nikko Yip	Mr. Frankie Ng	Middlesex University, London - Open University of Hong Kong / Li Ka Shing School of Professional and Continuing Education
Runner-up	Evaluating the effectiveness of BIM Application in Help Improving Construction Safety in Hong Kong	Wong Pui Kwan, Anthony	Prof. Steve Rowlinson	Department of Real Estate and Construction, HKU
Runner-up	A Study on the association Between safety Climate and Work Safe Behavior in Repair, Maintenance, Alteration and Addition (RMAA) Works	Yeung Chun Wang	Dr. Nicole Yiu	Department of Civil and Environmental Engineering, PolyU

Jury Panel (1st April 2023)
 Ir Dr. Joseph CHI,
 Ir Dr. C. M. HO,
 Ir K. C. LAU,
 Ir Paul CHAN &
 Ir George AU





Three students won in the Competition, with the theme of 'Smart Safety', as follows:

Kong Tze Wai, Teresa (Champion)

MPhil

Project Title: Identifying Key Safety Climate Factors Influencing Construction Workers in Hong Kong

Chen Hao (Runner Up)

PhD

Project Title: Impacts of Human-Automation Interaction in Temporary Structure Safety: A Case in Automated Scaffolding Design

Wong Pui Kwan, Anthony (Runner Up)

BSc(Surveying)

Project Title: Evaluating the Effectiveness of BIM Application in Help Improving Construction Safety in Hong Kong

2. HKIS QSD Scholarship 2023

- BSc(Surveying) Year 3 students Mr Chan Cheuk Yi, Mr Cheng Sung Hei and Miss Yeung Yuet In have been awarded the Hong Kong Institute of Surveyors' Quantity Surveying Division Scholarship. This scholarship is a recognition of the students' outstanding performance in key quantity surveying subjects including measurement, contract law and quantity surveying practice. They were invited to attend the presentation ceremony on 3 July 2023.



Top left: Chan Cheuk Yi
Top right: Yeung Yuet In
Left: Cheng Sung Hei



3. MSc(DMBA) Information Session x CEO Talk

- was held on 9 May 2023, featuring an engaging presentation by Professor Milan Radosavljevic, Vice-Principal and Pro Vice-Chancellor for Research, Innovation and Engagement at the University of the West of Scotland, who shared his expertise on the power of data for project management. Students learned about strategies for making projects less difficult and gained valuable insights into the role of data in simplifying workflows.



4. REC Research Seminar Series

- invited Professor Chimay Anumba, Dean of College of Design, Construction and Planning at the University of Florida, to give a talk on 'Leveraging Cyber-physical Systems and Digital Twins for Construction Projects', on 7 June 2023 at Knowles Building.

The talk was positioned in the construction industry, which is increasingly seeking to leverage emerging technologies as it continues the quest for greater levels of productivity, quality, safety, sustainability, and cost effectiveness. Two related technologies, which have the capacity to play an important role, are Cyber-Physical Systems (CPS) and Digital Twins (DT). These enable the synergistic integration of virtual models and the physical environment and are now being increasingly recognised as vital for improved construction project information management, more efficient project delivery, and enhanced facilities management. A critical aspect of the deployment of CPS and DT in construction is ensuring bi-directional coordination between the physical components and their virtual representations or digital twins. This guest lecture drew on examples from research prototypes to highlight the key features and benefits of these technologies and the associated systems. It also outlined the lessons learned from developing a variety of systems for several aspects of the delivery of constructed facilities.

The talk attracted a full-house attendance.



5. Professor Wilson Lu

- received the PolyU Graduate School Outstanding Research Postgraduate Alumni Award 2023.

PolyU Graduate School

OUTSTANDING

Research Postgraduate

Alumni Award 2023

 <p>Prof. LU Weisheng Wilson Professor and Head Department of Real Estate and Construction The University of Hong Kong <i>Doctor of Philosophy, 2006</i></p>	 <p>Dr POON Chi-kin Lawrence Head of Innovative Technology & CEO Advisor of Applied R&D Hong Kong Applied Science and Technology Research Institute <i>Doctor of Philosophy, 2004</i></p>	 <p>Early Career Stream Dr WANG Lei Leo "Hundred-Talent Program" Research Fellow College of Energy Engineering Zhejiang University <i>Doctor of Philosophy, 2018</i></p>
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Department of Urban Planning and Design

1. 2023 ESRI Young Scholars Award (Hong Kong)
6. This year, DUPAD continued to perform well at the ESRI Young Scholars Award (Hong Kong), with winners hailing from the BA(US), MUA and PhD programmes:

Champion Award (Individual)

Mr Evan Chi Cho Cheung [BA(US) 2022 and PhD student]

Project: A Walk to Remember – Measuring Objective Walkability with Environmental Considerations in Hong Kong [[Story Map Presentation](#)]

Second Runner-up and Best Story Map Design (Individual)

Ms Poon Ka Yiu [BA(US) Year 3 student]

Project: 3D Pedestrian Network Analysis — Road to a Walkable District [[Story Map Presentation](#)]

Second Runner-up (Group)

Mr Guo Peizhuo, Mr Wong Wai Ip and Mr Xue Huiyuan [MUA Year 1 students]

Project: Healthcare Services for the Elderly in Hong Kong – An Analysis for the Current Situation and the Future Obstacles [[Story Map Presentation](#)]

Presentation and Award Ceremony was held on 28 June 2023 at H6 CONET to recognise these winning GIS projects. In the ceremony, Mr Clarence Leung from the Secretary for Home and Youth Affairs delivered the opening speech and presented prizes to the award winners.



Evan Cheung, together with Professor Jack Dangermond, President of ESRI, at the ESRI China (HK) User Conference on 4 April 2023, with the presence of Professor Anthony Yeh (far left) and Dr Kenneth Tang (far right).



Evan Cheung presenting his winning project at the ESRI China (HK) User Conference



Evan Cheung receiving Champion Award from Mr Clarence Leung



Poon Ka Yiu receiving Champion Award from Mr Clarence Leung



(From left) Wong Wai Ip, Guo Peizhuo and Xue Huiyuan

Dr Kenneth Tang, Adjunct Associate Professor, was also awarded 'Outstanding GIS Educator' for his exceptional effort in nurturing GIS talents for Hong Kong.



(From left) Dr Paul Tsui, CEO of Esri China (HK), Dr Kenneth Tang and Mr Clarence Leung

The ESRI Young Scholars Award (Hong Kong) aims to recognise exemplary work in geospatial sciences by undergraduate and postgraduate students in Hong Kong. It gives students the opportunity to be part of the world's largest spatial technology conference – Esri User Conference. The top three winners of the individual category will be awarded summer internship at the Urban Renewal Authority, while other outstanding applicants will be awarded internship at ESRI China (Hong Kong). For more details of the winners, visit: https://web.esrichina.hk/ysa/result_announcement.aspx.

2. Dr Creighton Connolly

- received the Emerging Scholar Award from the Regional Development and Planning Specialty Group of the American Association of Geographers (AAG) at its Annual Meeting in Denver, USA, on 26 March 2023.



3. Dr Si Qiao

- received the TGSG Outstanding Thesis and Dissertation Award from the Transportation Geography Specialty Group of the American Association of Geographers (AAG) at its Annual Meeting in Denver, USA, on 26 March 2023. Established in 1994, the Award is to recognise outstanding theses and dissertations in transportation geography. There are two awards each year, one for the best Master's thesis and one for the best PhD dissertation. This is the first time for a Hong Kong student to win [the award](#). Dr Qiao's awarded thesis is 'Understanding Ride-hailing and Inventing Future Transit: Pathways to Spatial Justice', supervised by Professor Anthony Yeh.

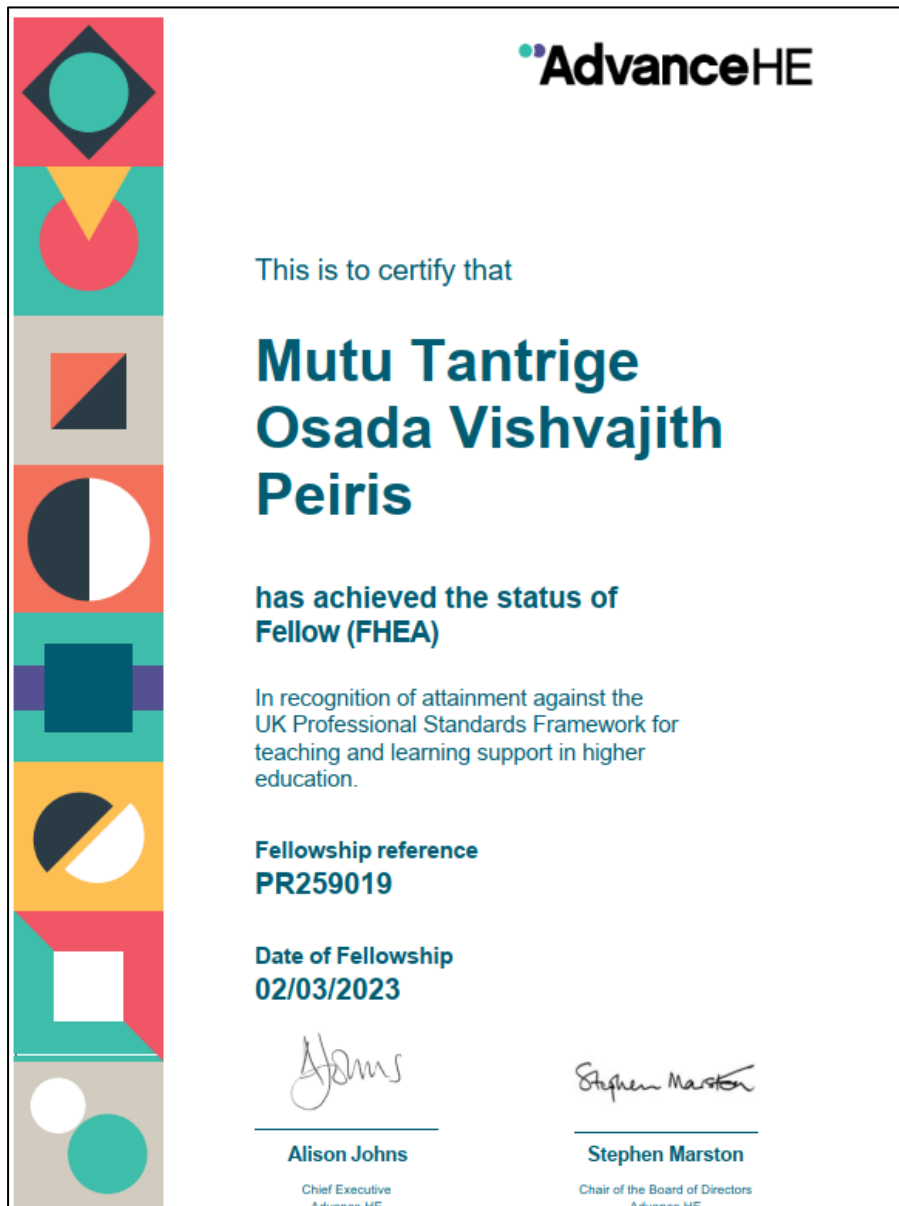


4. Mr Peiris Mutu Tantrige Osada Vishvajith (PhD student)

- received from the HKU Advance Higher Education (HE) Scheme, a local CPD scheme administered by the Centre for Enhancement of Teaching and Learning (CETL) and accredited by Advance HE in the UK, a Fellowship (FHEA) in recognition of his teaching and learning contribution.

A PhD student supervised by Professor Anthony Yeh, Peiris is also qualified for mentoring and reviewing HKU Advance HE fellowship applications. Fellowship of Advance HE is an official recognition of individual university teachers/tutors' contribution to learning and teaching, and is regarded as a teaching qualification in the tertiary education sector.

- [HKU Advanced HE Fellowship Scheme](#)
- [Advance HE Fellows in HKU](#)
- [List of Mentors and Reviewers, Advance HE](#)



5. Professor Anthony Yeh

- received two medals at the 48th International Exhibition of Inventions of Geneva on 28 April 2023:

Silver Medal

Winning Project: 'Smart Address Plates for Pedestrian Indoor Navigation and Location-Based Services and Management' (Professor Yeh as PI)

Traditionally, pedestrian navigation uses Location Positioning System (LPS) with trilateration to find the user's position, which has very high positioning error for outdoor GPS and indoor positioning. This new solution adopts a cost-effective innovative Location Confirmation System (LCS) to accurately locate and guide the user to the destination by using Smart Address Plates (SAP) that transmit stored geographic coordinates with innovative 3D Smart Address (SA) codes to the users even without WiFi or telephone signals. This SAP system can help to find shops/offices/restaurants/car parking spaces inside a multi-storey building accurately while providing location-based services and management for precise target marketing. It is highly scalable, connecting shops/rooms on a floor to a building, then to a district and to the whole city through a Smart Address Plate Management System (SAP-MS).

The Smart Address Plates and Location Confirmation System were developed by Professor Anthony Yeh (PI), Dr Zhong Teng and Dr Run Shi from the Department of Urban Planning and Design, The University of Hong Kong.

Bronze Medal

Winning Project: 'Remote e-Inspection System for the Manufacturing and Delivery of Offsite Modular Construction' (Professor Yeh has Co-I)

*This e-Inspection System is a Modular Construction Supply Chain Quality Assurance system that includes i-Core (an IoT device attached to each MC module to monitor the position, humidity, temperature and collision data), e-InStar (an App for uploading the checking result of each production step in a remote factory to the block chain), e-TranStar (an App for monitoring the location and condition of the MC module in the transport process) and a blockchain-based backend. Designed for offsite modular construction use to help solve housing problems, it reduces resources required for supervision and paperwork while ensuring tamper-proof data, helping overcome the current difficulties in monitoring the quality of production and transportation from remote sites. The system has been piloted in an HKU project in Hong Kong with two 17-storey buildings using 952 MiC modules. This project has also received the **Hong Kong ICT Smart Mobility (Smart Logistics) Gold Award** in November 2022 and the **12th Guangdong-Hong Kong IoT Competition Best IoT Innovation Award** in December 2022.*

The system was developed by Professor Wilson Lu, Director of the iLab of the Faculty of Architecture, together with Professor Anthony Yeh, Chair Professor of the Department of Urban Planning and Design, and Mr KL Tam, Former Director of the Estates Office of the University of Hong Kong.

Prior to this year's awards, Professor Yeh also won a Gold Medal in Geneva back in 2018 for his project entitled 'Angle Difference Method for Vehicle Navigation in Multilevel Road Networks'.



Professor Anthony Yeh explaining his Smart Address Plates and Location Confirmation System for Pedestrian Indoor Navigation to Professor Dong Sun, Secretary for Innovation, Technology and Industry of the HKSAR Government, in the 48th International Exhibition of Inventions of Geneva.



Professor Anthony Yeh (PI) and Dr Run Shi winning Silver Medal in the 48th International Exhibition of Inventions of Geneva for the project 'Smart Address Plates for Pedestrian Indoor Navigation and Location-Based Services and Management'.



Professor Anthony Yeh winning Bronze Medal in the 48th International Exhibition of Inventions of Geneva for his Co-I project 'Remote e-Inspection System for the Manufacturing and Delivery of Offsite Modular Construction'. From left: Professor Yeh, Professor Wilson Lu (PI) and Mr Liupengfei Wu.



Professor Anthony Yeh winning Silver and Bronze Medals in the 48th International Exhibition of Inventions of Geneva, for his two projects 'Smart Address Plates for Pedestrian Indoor Navigation and Location-Based Services and Management' (PI) and 'Remote e-Inspection System for the Manufacturing and Delivery of Offsite Modular Construction' (Co-I) respectively.

Centre of Urban Studies and Urban Planning

1. Dr Mandy Lau

- has published the following paper:

Lau, M. H. M. (2023). Intergenerational Interactions, Ageism and Ableism in Community Settings. *Journal of Intergenerational Relationships*, 1-17. <https://doi.org/10.1080/15350770.2023.2206387>

Abstract: *The literature on cross-age interactions suggests that more communication between older and younger generations can foster mutual understanding. Existing studies on intergenerational programs focus more on the perspectives of older people, while young adults' perceptions of intergenerational interactions are less well-understood. Through 448 surveys and 23 qualitative interviews with youth in Hong Kong, this study explored what motivates youth to communicate with retirees beyond their family. The findings reveal that youth in this study had relatively superficial interactions with retirees in community settings, which is partly explained by ageism. Nevertheless, they preferred connecting with retirees who are able to offer transformational benefits that enhance personal growth, which points towards novel forms of ableism based on learning abilities. The paper concludes by considering the implications of these findings for intergenerational programs, especially the importance of uncovering the latent skills of older people, to extend the possibilities for more in-depth intergenerational interactions.*

2. Professor Anthony Yeh and his team

- have published the following papers:

- (i) Zhang, M. Z., Luo, Z. X., Qiao, S., & Yeh, A. G. O. (2023). Financialization, Platform Economy and Urban Rental Housing: Evidence from Chengdu, China, *Applied Geography*, 156, 102993. <https://doi.org/10.1016/j.apgeog.2023.102993>

Abstract: *Since the 2010s, two worldwide trends have reshaped the urban housing system and induced drastic neighborhood change: the financialization of rental housing and the rise of the platform economy. In China, with continued investment from speculative financial institutions, platform companies aggressively acquired rental houses from individual landlords to develop a platform-based housing rental economy. How does this new rental economy affect housing supply, rents and inequality? This research answers this question by taking Chengdu, China as a case study. A mixed method approach of big data analytics, hedonic pricing model, and field investigations were used to unpack: (a) the pattern of platform houses distribution and its indication of spatial strategies of the financialized platform economy to grab land rent; (b) the effect of such new housing rental economy on housing rents; (c) the effect of the degree of financialization on platform houses' rental prices. The results inform the debate on the disrupt effect of platform economy and housing financialization on equitable urban development, particularly the heterogeneity*

among cities and countries. This paper contributes to understanding financial investors' glocalization strategy and the state's territorialization strategy as two crucial factors for the variegation of rental housing financialization.

- (ii) Xu, J. L., Du, Z. E., & Yeh, A. G. O. (2023). Localization, Regionalization, and Domesticization of Satellite Industrial Platform and Urban Transformation: A Case Study of Dongguan in the Pearl River Delta, China, *Cities*, 139, 104368. <https://doi.org/10.1016/j.cities.2023.104368>

Abstract: Satellite industrial platforms, a type of industrial district with a congregation of branch facilities of externally based multi-plant firms, have been undergoing a new wave of industrial, organizational, and geographical restructuring over the last decade worldwide. Given the inadequate understanding of the causal relationship between industrial district restructuring and urban transformation, this study uses Dongguan, a satellite industrial platform in the Pearl River Delta of southern China from the 1980s to 1990s, as a case study to examine the restructuring process from 2005 to 2020 and its resulting impacts on urban transformation. First, the restructuring of Dongguan from a satellite industrial platform to a multiscale embedded industrial complex is characterized by declining exogenous forces (e.g., Foreign Direct Investment (FDI) and export) and rising domestic intervention and local embeddedness. Second, the restructuring of Dongguan away from a satellite industrial platform is a hybrid process of changes in the localization of suppliers, territorial embeddedness of transnational corporations, regionalization of high-technology complexes, and orchestration of national production networks and their realignment toward the domestic market. Third, the restructuring of Dongguan from a satellite industrial platform to a multiscale embedded industrial complex has led to urban transformation in social structure, spatial configuration, and living environment beyond the "exogenous urbanization mode. This study seeks to advance the understanding on the restructuring process of satellite industrial platforms in light of evolving global, national, and local circumstances and their resulting urban transformation.

- (iii) Shi, R., & Yeh, A. G. O. (2023). Do Similar Social Groups Have Similar Mobility in a City? Social Areas and Mobility in Shenzhen, China, *Cities*, 138, 104350. <https://doi.org/10.1016/j.cities.2023.104350>

Abstract: Social area analysis has been applied to analyze how urban space is spatially arranged. Related studies have divided urban residents into different groups whose socioeconomic status are similar. However, few studies have attempted to explore the mobility of these social groups, especially for developing countries where census data with travel information are not readily available. This study explores whether people in the same social area have similar work mobility and whether location matters from an aggregated neighborhood perspective. A case study is conducted in Shenzhen, China with fine-grained census and mobile phone data. The neighborhood committee based census and cell tower based mobile phone data are integrated into 500 m grid for analysis. Results show that different social areas have significantly different work mobility, and the within-group heterogeneity is also prominent. Three location factors are examined and it is found that there exist variations in

the influence of spatial factors on work mobility for different social areas. Findings of this study will supplement current knowledge about social areas, location and mobility in urban China at the mesoscale. In addition, the methodology provides a feasible framework of integrating city-scale socioeconomic information and mobility data from different sources for future urban studies.

- (iv) Zhang, M., Qiao, S., & Yeh, A. G.-O. (2022). Disamenity effects of displaced villagers' resettlement community on housing price in China and implication for socio-spatial segregation. *Applied Geography (Sevenoaks)*, 142, 102681. <https://doi.org/10.1016/j.apgeog.2022.102681>

Abstract: *In the 2010s, the return of the state in land expropriation and urban (re)development processes has resulted in a new type of neighborhood in urban China, namely, displaced villagers' resettlement community (DVRC). The government aimed to promote the social integration of land-lost peasants into urban society by placing DVRCs in areas with good accessibility and mixed land-use development. However, some studies found that the territorial stigmatization of DVRCs as poor and uncivilized neighborhoods has caused the depreciation of houses in DVRCs. Does this disamenity effect spill over to nearby houses? If yes, does this disamenity effect vary across space? This research uses Chengdu, the largest city in Western China, as the case study. A big data approach is used to analyze the list price of 53,969 houses and their housing attributes. An ordinary least squares hedonic model is used to determine the effect of the proximity to DVRC on house price at an overall statistical level. Then, a mixed geographically weighted regression model is used to examine the spatial heterogeneity of this disamenity effect. The empirical results support the account that DVRCs depreciate nearby houses. In these underdeveloped suburban areas, the proximity to DVRCs is positively associated with housing prices because of its function as a proxy for the prospective proximity to urban service facilities. These findings indicate that the government trial of social integration promotion is not that successful and help identify areas that require interventions the most to mitigate socio-spatial segregation.*

3. Dr Zhan Zhao

- has published the following paper:

Lin, Y., Xu, Y.*, Zhao, Z., Park, S., Su, S. & Ren, M. (2023). Understanding changing public transit travel patterns of urban visitors during COVID-19: A multi-stage study. *Travel Behaviour and Society*, 32, 100587. <https://doi.org/10.1016/j.tbs.2023.100587>

Abstract: *COVID-19 has caused huge disruptions to urban travel and mobility. As a critical transportation mode in cities, public transit was hit hardest. In this study, we analyze public transit usage of urban visitors with a nearly two-year smart card dataset collected in Jeju, South Korea – a major tourism city in the*

Asia Pacific. The dataset captures transit usage behavior of millions of domestic visitors who traveled to Jeju between January 1, 2019 and September 30, 2020. By identifying a few key pandemic stages based on COVID-19 timeline, we employ ridge regression models to investigate the impact of pandemic severity on transit ridership. We then derive a set of mobility indicators – from perspectives of trip frequency, spatial diversity, and travel range – to quantify how individual visitors used the transit system during their stay in Jeju. By further employing time series decomposition, we extract the trend component for each mobility indicator to study long-term dynamics of visitors’ mobility behavior. According to the regression analysis, the pandemic had a dampening effect on public transit ridership. The overall ridership was jointly affected by national and local pandemic situations. The time series decomposition result reveals a long-term decay of individual transit usage, hinting that visitors in Jeju tended to use the transit system more conservatively as the pandemic endured. The study provides critical insights into urban visitors’ transit usage behavior during the pandemic and sheds light on how to restore tourism, public transit usage, and overall urban vibrancy with some policy suggestions.

4. Dr Yifu Ou (PhD 2022, Senior RA), Dr Euijune Kim (Visiting Research Professor), Dr Xingjian Liu and Dr Kyung-Min Nam

- have published the following journal article:

Ou, Y., Kim, E., Liu, X., Nam, K. (2023) Delineating Functional Regions from Road Networks: The Case of South Korea. *Environment and Planning B*, 50(6): 1677–1694. <https://journals.sagepub.com/doi/10.1177/23998083231172198>

Abstract: *We apply a percolation method to South Korea’s road networks and identify major urban clusters. The results show that Korea has developed a highly mono-centric spatial structure, in which the Seoul Metropolitan Area expands to northern Chungnam, far beyond the limits conventionally assumed. A percolation threshold of 1080 m is critical in delineating Korea’s functional regions, and the results at this threshold show great similarity to flow-based maps. Similar model outputs support the percolation approach as an alternative to conventional flow-based methods. The similarity is higher for larger clusters, where the supply of road infrastructure better meets demand thanks to size-biased public resource allocation. Also, the similarity between model outputs tends to increase with a time lag, since road network configurations take time to catch up with the demand revealed in traffic flows. These findings speak for the need for increased connectivity in Korea’s smaller cities.*

5. Dr Kyung-Min Nam

- chaired a plenary session 'Sustainable Urban Development and Planning' at the 17th International Association for China Planning Conference in Tianjin, 28 June to 2 July 2023, and presented the following paper during the Conference:

'Impacts of Urban Rail Transit on Local Air Quality in Hong Kong: A Quasi-experimental Test Based on the Anti-extradition Bill Protests'

Abstract: *We examine the air-quality effects of urban rail transit in Hong Kong with a quasi-experimental design, where interrupted metro rail services during the 2019/20 anti-extradition bill protests are treated as an exogenous shock. Applying a generalized difference-in-difference-in-differences model, we find that nitrogen oxides concentrations increased by 7.8% during the period when metro services were shutdown but there were no on-going protests nearby metro stations. During the rush hours of weekdays, the pollution-generation effects further increased to 29.7%, suggesting substitution effects of urban rail on road traffic for commuting trips. In addition, the pollution-generation effects tend to decline over time, with the elasticity drops from 0.155 to 0.079 when longer shutdown periods are considered. This declining tendency seems to reflect a network-level response to interrupted rail transit services (e.g., increased supply of alternative transit services) and commuter adaptation to the new environment.*

6. Dr Yifu Ou (PhD 2022, Senior RA supervised by Dr Kyung-Min Nam)

- presented the following paper during the 17th International Association for China Planning Conference:

'Metro-line Expansions and Local Air Quality in Shenzhen: Focusing on the Mediating Role of Network Density and Scale in the Traffic Diversion Effects.'

Abstract: *We examine the air-quality effects of urban-rail development in Shenzhen, taking a difference-in-differences approach. Our results demonstrate that the effects of urban rail on local air quality largely vary by time, depending on network density and scale. New station openings in Shenzhen had no significant impacts on local air quality or even worsened it until the 2010 metro-line extension, when the city's metro network density was still low, with limited spatial service coverage. However, urban rail functioned as a significant pollution abator after the 2016 extension as the network grew denser and more comprehensive. The rail-driven anti-pollution effects tended to be further strengthened with externalities arising from improved network connectivity, spilling over the effects beyond newly opened stations to preexisting ones. Shenzhen's case also shows substantial spatial heterogeneity, in that new metro stations in proximity to neighborhoods that share key characteristics in transit-oriented development generate a greater anti-pollution effect.*

1. iLab members

- successfully organised the Hong Kong Generative Design for Modular Buildings Forum 2023 cum the Research Grant Council (RGC) Collaborative Research Fund (CRF) Project ‘Generative DfX in High-rise Modular Building’ (C7080-22GF) Kick-off Meeting at Le Meridien Hotel, Cyberport, on 10 May 2023.



The Forum focused on the theme of generative design for modular buildings in the architecture, engineering, and construction (AEC) sector, lining up speakers from different backgrounds (e.g., architecture, engineering, material, construction, etc.) and top universities (e.g., HKU, The Chinese University of Hong Kong, The Hong Kong Polytechnic University, TU Delft, Tsinghua University, Tongji University, Melbourne University, National University of Singapore, etc.). Dean Chris Webster opened the Forum by sharing his experiences on generative design in urban scale and his views on AI (e.g., ChatGPT) in urban and architectural design. Cutting-edge research and development by scholars and practitioners were presented and exchanged on the Forum.

Generative Design for Modular Buildings Forum 2023

MAY 10TH 2023
Le Méridien, 100 Cyberport Rd, Pok Fu Lam, Hong Kong

SCHEDULE

14:00 – 14:10
Welcome speech
- Prof. Chris Webster (The University of Hong Kong)

14:10 – 14:30
Project briefing
- Prof. Wilson Lu, Dr. Frank Xue, Dr. Junjie Chen (The University of Hong Kong)

14:30 – 14:50
Innovative Materials for Prefabricated Construction
- Prof. Jianguo Dai (The Hong Kong Polytechnic University)

14:50 – 15:10
Prefabrication with Soul
- Prof. Jingxiang Zhu (The Chinese University of Hong Kong)

15:10 – 15:30
Generative Design for Excellence: Lessons from Design Research Case Studies
- Prof. Kristof Crolla (The University of Hong Kong)

15:30 – 15:50
Synergising DfMA and Lean in Construction
- Dr. Shang Gao (The University of Melbourne)

15:50 – 16:05
Discussion session 1

16:05 – 16:20
Tea/coffee break

(continue on the back page...)

SCHEDULE

(... follow the front page)

16:20 – 16:40
7 Day House: Towards Fabrication-aware Generative Design
- Dr. Daniel Hall (Delft University of Technology)

16:40 – 17:00
Generative AI design of Building Structures: Method and Application
- Prof. Xinzheng Lu (Tsinghua University)

17:00 – 17:20
Emerging Robotic Prefabrication Technology for Customization in Architecture
- Prof. Feng Yuan (Tongji University)

17:20 – 17:40
OpenBIM-based Generative Design Optimisation and Precast Construction
- Dr. Vincent Gan (National University of Singapore)

17:40 – 18:00
Allocation of Risk in Temporary Works in the Context of DfMA
- Mr. Iain Mowatt (Temporary Works Consultant Ltd.)

18:00 – 18:25
Discussion session 2

18:25 – 18:30
Closing remark

HOST INSTITUTION



香港大學
THE UNIVERSITY OF HONG KONG

THE UNIVERSITY OF HONG KONG 香港大學
faculty of architecture 建築學系



SUPPORTING INSTITUTIONS





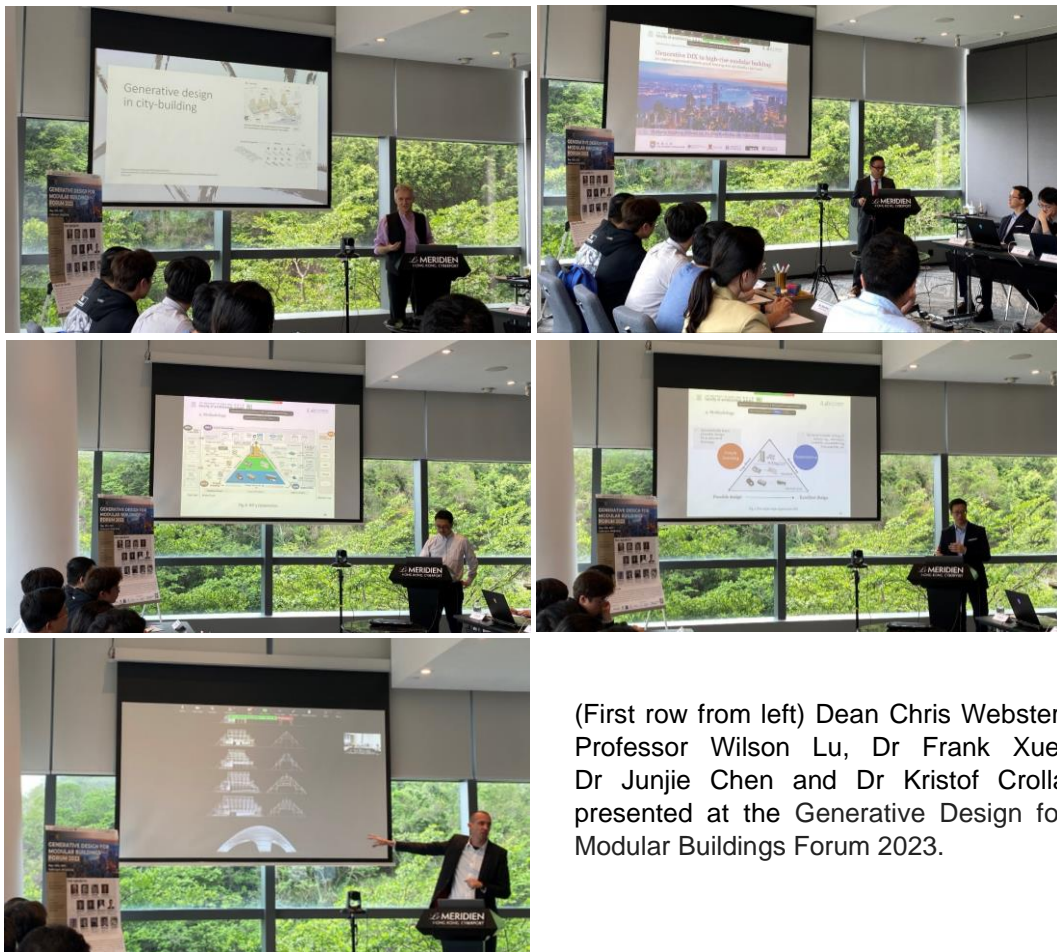
UNIVERSITY OF CAMBRIDGE TU Delft

FUNDING BODIES

Research Grants Council of Hong Kong
香港研究資助局



大學教育資助委員會
University Grants Committee

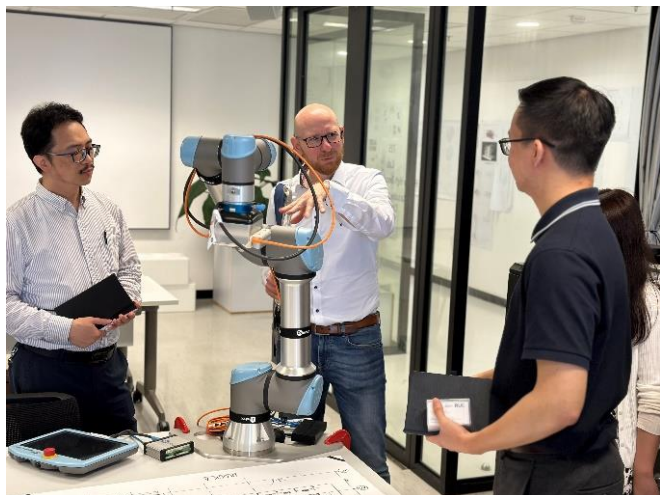


(First row from left) Dean Chris Webster, Professor Wilson Lu, Dr Frank Xue, Dr Junjie Chen and Dr Kristof Crolla presented at the Generative Design for Modular Buildings Forum 2023.



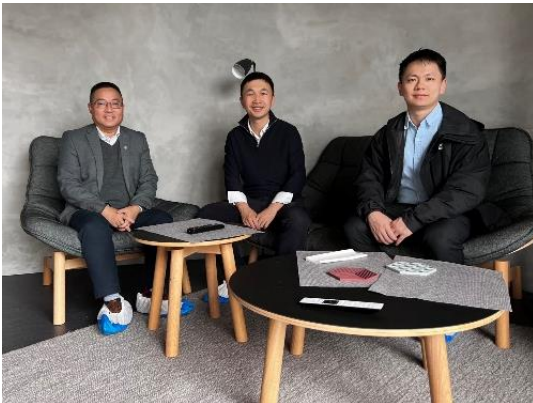
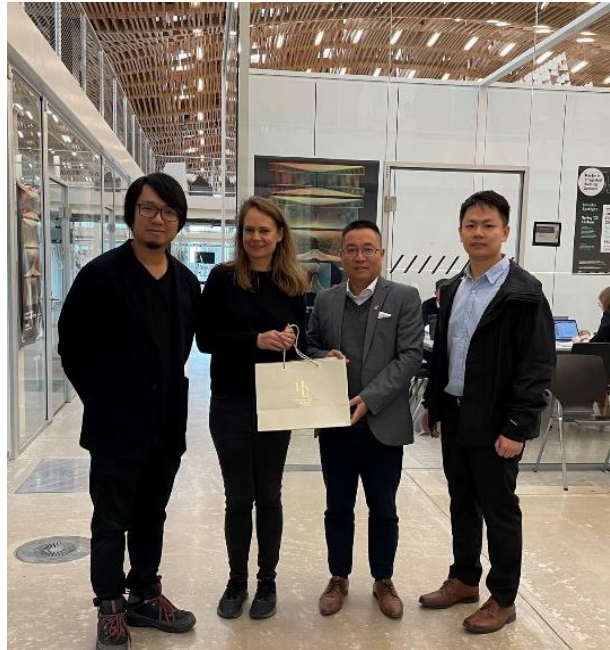
The Forum also served as a kick-off meeting for the Research Grant Council (RGC) Collaborative Research Fund (CRF) project 'Generative DfX in High-rise Modular Building: An Expert-augmented Cascade Graph Learning and Optimisation Approach' (C7080-22GF) led by Professor Wilson Lu. More information about the research project can be found at <https://generativedfx.hku.hk/>.

- welcomed Professor Dr-Ing Markus König, Deputy Head of the National Center for the Digitalization of the German Construction Industry (BIM Germany) on 2 June 2023. During the visit, he presented on the topic of 'Generation of Initial Digital Twins Using Artificial Intelligence'. Dr Frank Xue, Dr Junjie Chen and other members of iLab also introduced iLab's research and conducted a guided tour around the Lab.



2. Professor Wilson Lu and Mr Liupengfei Wu (PhD student)

- visited the Swiss National Centre of Competence in Research (NCCR) Digital Fabrication and DFAB House at ETH, Switzerland on 28 April 2023, joined by Dr Tan Tan (PDF at TU Delft, former Research Assistant at iLab). The [Digital Fabrication](#), initiated in 2014, aims to revolutionise architecture through the seamless combination of digital technologies and physical building processes, whereas [DFAB House](#) is a collaborative demonstrator of the Swiss NCCR Digital Fabrication on the NEST building by Empa and Eawag.



3. Mr Jinfeng Lou, Mr Liupengfei Wu and Ms Zhongze Yang (PhD students)

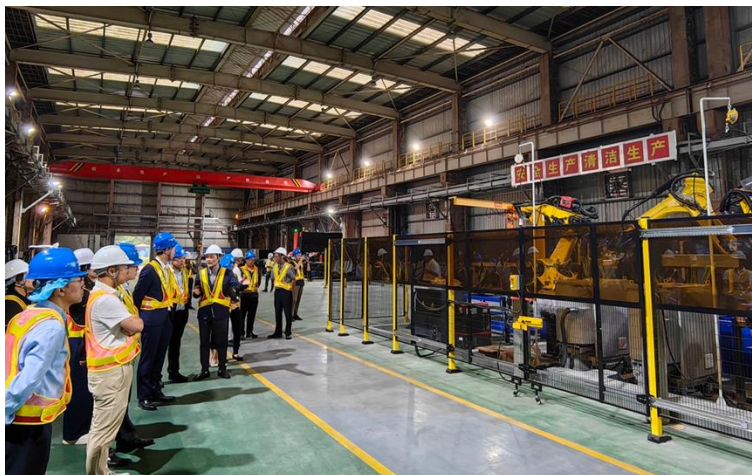
- visited MiC factories in the Greater Bay Area together with representatives from the Hong Kong Development Bureau (DEVB) on 13, 18 and 26 April 2023. These factories included Yau Lee Wah Concrete Precast Products Company Limited and China Construction Science and Industry Corporation Limited in Huizhou, Foshan Meizong Housing Technology Company Limited in Foshan, AluHouse Company Limited in Zhaoqing, Guangzhou Municipal Construction

Group Company Limited in Guangzhou, Eastern Heavy Industry Company Limited and China State Construction Hailong Technology Company Limited in Zhuhai, and CIMC Modular Building Systems in Jiangmen. These trips aimed at understanding what is happening in MiC factories and forming a solid foundation for the MiC factory accreditation scheme. During these trips, the following information was collected:

1. The insight of 'best in class' quality systems to use as the benchmarks for Hong Kong MiC factory accreditation.
2. How the MiC ecosystem, supply chain, quality assurance, and accreditation system were set up and their impact on construction productivity.
3. Sample assessments to benchmark current PRD MiC suppliers.
4. Feedback from manufacturers/suppliers on the concerns of the burden of accreditation.
5. The limitations, obstacles, and objections to the implementation of methods of assessment.
6. Suggestions from suppliers for maximising the confidence in their supply, with minimal administrative burden, by aligning documentation and assessment with other business activity and supporting enabling tools.



iLab students with DEVB representatives and MiC factory staff



iLab students visiting an MiC factory

4. Dr Junjie Chen

- conducted a site visit to Shenzhen Mawan Undersea Tunnel on 7 May 2023. LiDAR point cloud and Ground Penetrating Radar data were collected from the trip, which will contribute to Dr Chen's seed fund project on urban infrastructure defect mapping.



- has been appointed as the Associate Director of iLab, with effect from 8 May 2023. Dr Chen is a Research Assistant Professor at the Department of Real Estate and Construction and has been working with the iLab team in the past several years. He will be operating iLab together with Professor Wilson Lu and Dr Frank Xue.
- delivered a keynote speech titled 'Built environment defect mapping, modeling, and management (D3M): A BIM-centric integrated framework' at the 2023 Frontiers in Smart Construction Research and Engineering International Youth Forum in Wuhan, China, on 5 May 2023. The Forum was jointly organised by Huazhong University of Science and Technology, City University of Hong Kong, Technische Universität Berlin, Hunan University and HKU. It aimed to provide a platform for outstanding young researchers to exchange ideas in the forefront of smart construction.

In the speech, Dr Chen shared his perspectives on leveraging BIM as a centric platform to facilitate the mapping, modelling, and management of built environment defects. The talk drew attention to the unexplored potential of BIM in boosting defect detection performance, aligning defect detection results to the widely accepted Industry Foundation Classes (IFC), and empowering defect management based on the IFC-based common data environment. The research can contribute to renovating the increasingly aging built environment in Hong Kong and beyond.

FRONTIERS IN SMART CONSTRUCTION RESEARCH AND ENGINEERING INTERNATIONAL YOUTH FORUM

智能建造前沿—研究与工程国际青年论坛

会议时间 Time
5月5日 14:00-18:00

会议地址 Address
武汉国际会议中心三楼304 江海厅

时间	议程
14:00-14:05	主持人开场
14:05-14:30	【深度学习与数字孪生应用】 卢超杰 清华大学
14:30-14:45	【基于数字孪生的智能运维与安全管理研究】 刘尚博 北京工业大学
14:45-15:20	【基于机器学习的施工进度预测与优化】 马 昊 华中科技大学
15:20-15:45	【Fully automatic Scan-to-BIM: Consolidation of unsupervised, supervised, and reinforced learning】 薛 帆 香港大学
15:45-15:55	【《Frontiers of Engineering Management》期刊介绍】 周 磊
15:55-16:10	茶 歇
16:10-16:25	【基于机器学习的智能运维研究进展】 李 杰 清华大学
16:25-16:40	【融合BIM的绿色建筑性能设计-建模-模拟-优化策略】 阮俊杰 香港大学
16:40-16:55	【面向施工质量的语义级建模】 李 强 同济大学
16:55-17:10	【基于BIM的装配式建筑智能建造与绿色建造】 周祥敏 上海建工工程科技股份有限公司
17:10-17:25	【基于BIM的智慧城市中的典型应用】 李 强 中国地质大学(北京)地质工程研究所
17:25-17:40	【基于人工智能的人体工效智能预测方法】 尤 科 华中科技大学

联合发起单位 CO-ORGANIZER




5. Dr Frank Xue

- gave a keynote speech titled 'Fully Automatic Scan-to-BIM: Consolidation of Unsupervised, Supervised, and Reinforced Learning' at the 2023 Frontiers in Smart Construction Research and Engineering International Youth Forum cum 2023 Smart Construction Conference of Architectural Society of China, held at Wuhan International Expo Center on 5 May 2023.



- joined the Smart Construction Scientific Committee of Architectural Society of China, as the only member from Hong Kong, with a service term from 2023 to 2028. He also attended the annual meeting of the Committee in Wuhan on 6 May 2023.



6. Professor Wilson Lu

- attended the Global Leadership Forum for Construction Engineering and Management (GLF-CEM) Programs 2023 on 29-30 May 2023 in Salvador, Brazil, and shared his views on the Panel of 'Lessons Learned about Academic Leadership for Future Leaders in CEM', alongside Professor Burcin Becerick-Gerber (Head of Department of Civil and Environmental Engineering at University of Southern California) and Professor Sérgio Scheer (Ex-provost, Federal University of Paraná, Brazil), chaired by Professor Lucio Soibelman (University of Southern California). The GLF-CEM is intended to bring together professors from leading universities around the world who play a leadership and/or administrator role in their respective programmes. The objective is to establish a body of academic leadership in the area of Construction Engineering and Management to discuss and share issues of common concern in research, teaching, academic administration, and opportunities for collaboration. It has held 13 forums around the globe over the past years. For more information about GLF-CEM, visit <https://glf.cem.ecn.purdue.edu/>.



- gave a talk titled 'BIM, big data, and blockchain for smart construction and their implications to Business' to HKU EMBA students in the Faculty of Business and Economics (FBE) on 11 May 2023. In recent years, construction and real estate have become interests of business, while their modernisation faces enormous challenges and opportunities.



- was invited by the Royal Institution of Chartered Surveyors (RICS) to chair a panel discussion for its Hong Kong Construction Conference at Sheraton Hong Kong Hotel on 12 May 2023.

The theme of the Conference this year is 'Revitalizing the Prosperity of Construction Industry'. Particularly, the panel discussion focused on the theme of 'Establishing Modernized Measures to Present and Promote Professional Services in Construction', with the participation of the following four panellists:

- Andrew Macpherson, MRICS, Head of Asset Development, APAC, JLL
- Francesco Tizzani, Group Manager (Digital Construction), Leighton Asia
- Katherine Leung, MRICS, Assistant Director (QS), Architectural Services Department, Hong Kong SAR Government
- Sankar V S, Director, Ove Arup & Partners Hong Kong Ltd.

Professor Lu moderated the 50-minute session to facilitate the panelists to share their views on the characteristics of construction professional services (CPS), the opportunities and challenges of Industry 4.0 technologies, linking to the Tang's Report and recent Construction 2.0 report produced by the Government, and how to retain talents and attract young people to join this exciting industry (e.g., by improving the image problem, appreciating the Z-generation and knowledge works in the new era).



Wilson Lu
Professor, Department of Real Estate and Construction, The University of Hong Kong (HKU)

Prof. Wilson Lu is Professor in the Department of Real Estate and Construction, and Associate Dean (Research) of Faculty of Architecture, The University of Hong Kong (HKU). He is also the Director of Kadoorie, and the immediate past President of the Chinese Research Institute of Construction Management (CRICM). His research interests focus on Construction Management with two directions:

- Construction Informatics: Building Information Modelling (BIM), Smart construction, Big data, and Blockchain;
- Circular Construction: Construction waste management, Circular economy, and public policies.

Prof. Lu is the leader of research grants worth around US\$1 million. He was the reviewer of the ASCE Journal of Management in Engineering (JME) Best Peer Reviewed Paper Award for 2022, Resources, Conservation & Recycling (RCR) Best Paper Award 2021, BuildingSMART International (B2I) Awards 2021 (the Professional Research Category), Hong Kong Construction Industry Council (CIQ) Construction Digitalization Award 2021, HKU Outstanding Young Researcher Award 2018-19, HKU Faculty Innovation Exchange (IE) Award 2018-19, and HKU Faculty Research Career Prize (RCP) Award 2018-19. Prof. Lu has been ranked as the Top 1% Scholar by Clarivate Analytics since 2017.

Andrew Macpherson MRICS
Head of Asset Development, APAC, JLL

With over 25 years of Hong Kong and working in Asia, Andrew has an extensive market knowledge and expertise in the industry. He combines his capital project, asset management and consulting experience to develop solutions that add value to investors and building owners' property portfolios. By leveraging JLL's global and regional capabilities and data in market research, valuation, asset management and leasing, the team provides tailored and fully integrated solutions at all stages of the asset lifecycle, including technical due diligence, strategic advice on acquisition, asset enhancement, leasing approach, operational management and capital gain realisation. Our latest clients are investment funds, developers, owners, prime occupiers, pension funds, family offices and high net worth individuals. Prior to joining JLL, Andrew was the Regional Head of Project & Program Management for Assets in Asia Pacific. Over the years his assignments have included leading large scale building renovation projects, setting up Program Management Offices for the delivery of multiple projects, leading transformation and change management projects, the asset management of a ten 42 property portfolio, Project Director for a US\$10 million car development in the Middle East.

Francesco Tizzani
Group Manager of Digital Construction, Leighton Asia

Francesco is a forward-thinking leader with more than a decade of experience in Engineering and Architecture with a passion for automation and optimisation. By leveraging cutting-edge technology and innovative approaches, Francesco is spearheading change in the construction industry and transforming the way we build our world's future. He is driving the Digital Construction department at Leighton Asia with a strategy to create a sustainable future.

Sankar V S
Director, Ove Arup & Partners Hong Kong Ltd.

Mr. Viluparam holds the responsibility of leading Digital Services for Arup in East Asia. He has over 20 years of experience in design and implementation of transformational smart operational solutions leveraging Internet of Things (IoT) and data analytics across various domains of construction, justice, customs, cabinetry, property, cargo terminals, etc. He has managed several landmark projects in Hong Kong and gained extensive multidisciplinary experience in lead to strategic delivery. His previous work includes board of director position at the Hong Kong Institute of Project Alliance and acting Project Management Institute Hong Kong Chapter Board.

Mr. Viluparam holds MBA (HKUST) with a bachelor's in Electrical & Electronics Engineering. He is a professionally qualified CIPM Project Directors (PM, USA & CSM). He has recently completed the executive course from MIT on Innovation & Leadership.

Katherine Leung MRICS
Assistant Director(Q), Architectural Services Department, Hong Kong SAR Government

Katherine joined the Architectural Services Department as Quantity Surveyor in 1997 and was promoted to Assistant Director (Quantity Surveying) in 2022. She has been involved in various capital works projects (such as schools, government offices, hospital, quarantine facilities, public mortuary, data centre, swimming pool complex, open space, etc.) and provides professional support to project team including preparing project estimates, drawing and engineering procurement and control strategy, monitoring financial position of project, providing cost control and procedural advice, and settlement of final account.

Katherine has also been involved in promoting innovation in Quantity Surveying Branch to enhance the efficiency of quantity surveying practices, innovative applications developed so far includes smart contract advisory system, project cost analysis platform, data digitisation and visualization, AI cost estimation system, auto building works tender price index compilation, etc.

F2F CONFERENCE

I'm speaking at

Hong Kong Construction Conference

12 May 2023

Sheraton Hong Kong Hotel & Towers

Wilson Lu
Professor, Department of Real Estate and Construction, The University of Hong Kong (HKU)

Join me in the conversation



- joined CIC Chairman's Luncheon in discussing AI for Construction – The Challenges to the Architecture, Engineering, Construction, and Operation (AECO) Industry on 12 May 2023 at Hong Kong Club. The event involved a small group of leading experts and practitioners in the area to discuss the opportunities and challenges of AI, particularly in the context of the booming construction industry in Hong Kong.

CONSTRUCTION INDUSTRY COUNCIL
建造業議會

CIC CHAIRMAN'S LUNCH

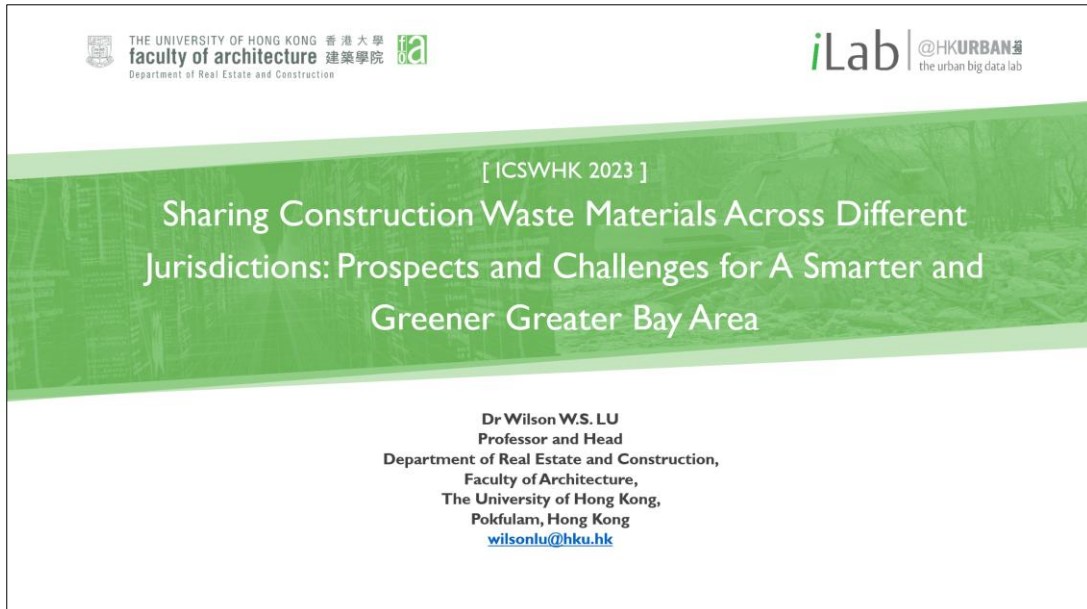
DATE
12 May 2023, Friday

TIME
12:00pm - 2:00pm

VENUE
China & Caernarvon Room,
1/F, The Hong Kong Club
(1 Jackson Road, Central, Hong Kong)



- was invited to give a plenary talk on ‘Sharing construction waste materials across different jurisdictions: Prospects and challenges for a smarter and greener Greater Bay Area’ for the International Conference on Solid Waste 2023: Waste Management in Circular Economy and Climate Resilience (ICSWHK2023), held at the Hong Kong Exhibition and Convention Centre on 2 June 2023.



7. Mr Liang Yuan (PhD student)

- also gave a presentation titled ‘Prediction of Illegal Dumping by Using Geographically Weighted Regression’ at the ICSWHK2023 on 2 June 2023.

ICSWHK is an international conference series chaired by Professor Jonathan Wong, Head and Professor of the Department of Biology at the Hong Kong Baptist University. It has organised five conferences in Hong Kong and is one of the biggest events of its kind in the region.

8. Miss Yijie Wu (PhD Year 2 student)

- received the Talent Development Scholarship (TDS) of Innovation, Science and Technology 2022-23, from the Education Bureau of HKSAR Government.

The Talent Development Scholarship, supported by the HKSAR Government Scholarship Fund, was established in the 2012/13 academic year to benefit a wider range of students with both outstanding academic performance and achievements and talents in non-academic fields such as technology, culture, sports, and arts.

9. Dr Frank Xue and his research team

- won two awards (a gold and a silver) at the 2023 IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), held in Vancouver on 18-22 June 2023, for their 'AI algorithms for construction of 3D models of buildings'.

上海AI实验室等斩获最佳论文
澎湃新闻 | 2023-06-22

这是近十年中国学术机构作为第一单位首次获CVPR最佳论文奖。论文由上海AI实验室、武汉大学及商汤科技联合撰写。

6月21日，全球人工智能和计算机视觉领域顶级国际会议CVPR2023（IEEE Conference on Computer Vision and Pattern Recognition）在加拿大温哥华正式公布奖项。上海人工智能实验室、武汉大学及商汤科技联合论文《以路径规划为导向的自动驾驶》（Planning-oriented Autonomous Driving, UniAD）获最佳论文奖。这是近十年中国学术机构作为第一单位首次获CVPR最佳论文奖。该论文提出了首个感知决策一体化的端到端自动驾驶大模型，开创了以全局任务为目标的自动驾驶大模型架构先河，标志着自动驾驶技术的重要突破。

一年一度的CVPR是计算机视觉领域的顶级会议。2023年，CVPR大会的论文投稿总量9155篇，其中2359篇论文被接收，接收率25.78%。而此次获奖论文是CVPR历史上第一篇以自动驾驶为主题的论文，该论文首次提出感知决策一体化的自动驾驶通用大模型UniAD，能够更好地协助行车规划。

🏆 Challenge Winners

Congratulations to the challenge winners!

- 2D Floorplan Reconstruction :
 - 1st : Tsinghua-CBIMS
 - 2nd : **HKU-iLab**
- 3D Building Model Reconstruction :
 - 1st : **HKU-iLab**
 - 2nd : Tsinghua-CBIMS
 - 3rd : HumanTech

Teams

- **Tsinghua-CBIMS** : Chen PENG, Ziyi KE, Zijian SUN, Yudong LIU, Xinyi DU, Chao DENG, Ge GAO, Ming GU
- **HKU-iLab** : Yijie Wu, Sou-Han Chen, Qianyun Zhou, Siyuan Meng, Dong Liang, Fan Xue
- **HumanTech** : Mahdi Chamseddine, Fabian Kaufmann, Jason Rambach



🌟 Welcome to the 3rd Workshop and Challenge on Computer Vision In The Built Environment
For The Design, Construction and Operation of Buildings organized at 🌟



Press Release: https://www.hku.hk/press/news_detail_26385.html

Media Coverage:

- [Mirage News \(23 July 2023\)](#)
- [Oriental Daily \(24 July 2023\)](#)
- [Skypost \(24 July 2023\)](#)

Real Estate Lab

1. Founded by Professor Kelvin Wong of the Department of Real Estate and Construction, Real Estate (RE) Lab aims to build a real estate intellectual community by bringing together leading scholars, researchers, and practitioners from different disciplines with a common interest in advancing real estate knowledge, enhancing professional practice, and debating policy issues. Research areas include but are not limited to: real estate finance, urban economics, housing policy, sustainable and healthy buildings, and property innovation and technology.

HKU RE Lab is committed to making research ideas and findings in these areas accessible in order to provide thought leadership to the industry, the government, and the community at large.



HKU RE Lab's website: <https://relab.hku.hk/>

Sustainable High Density Cities Lab

1. Dr Jianxiang Huang and Dr Tongping Hao

- have published the following papers using urban data analytics and neural network models:

- (i) **Hao, T.**, Chang, H., Liang S., Jones, P., Chan P. W., Li, L., & **Huang, J.*** (2023). Heat and Park Attendance: Evidence from ‘Small Data’ and ‘Big Data’ in Hong Kong. *Building and Environment*, 234, 110123. <https://doi.org/10.1016/j.buildenv.2023.110123>

Abstract: *Urban heat disrupts the use of parks, although the extent of such disruptions remains disputed. Literature relies on “small data” methods, such as questionnaires, field studies, or human-subject experiments, to capture the behavioural response to heat. Their findings are often in contradiction with each other, possibly due to the small sample sizes, the short study period, or the few sites available in a single study. The rise of “big data” such as social media offers new opportunities, yet its reliability and usefulness remain unknown. This paper describes a study using Twitter data (tweets) to study park attendance under the influence of hot weather. Some 20,000 tweets geo-coded within major parks were obtained in Hong Kong over a period of three years. Field studies have been conducted in parallel in a large park covering the hot and cool seasons and some 40,000 attendance were recorded over three months. Both the “small” and “big data” were analyzed and compared to each other. Findings suggest that a 1 °C increase in temperature was associated with some 4% drop in park attendance and some 1% drop in park tweets. The differences between the two data sources be explained by the ‘leakage’ of indoor tweets to parks caused by GPS drift near buildings. The Universal Thermal Climate Index can better predict self-reported thermal sensations, compared with other biometeorological indicators. This study has contributed to methodologies and new evidence to the study of behaviors and thermal adaptations in an outdoor space, and geo-coded tweets can serve as a powerful data source.*

- (ii) Zhan, J., He, W., & **Huang, J.** (2023). Dual-objective Building Retrofit Optimization under Competing Priorities using Artificial Neural Network. *Journal of Building Engineering*, 70, 106376. <https://doi.org/10.1016/j.jobbe.2023.106376>

Abstract: *Building retrofit has received renewed interests in recent years, driven by energy-savings and indoor environmental quality goals. Digital technologies such as building performance simulation and optimization algorithms have been used to identify optimal retrofit schemes, yet the existing approaches are limited by the slow running speed of physics-based models and sub-optimal results. This study describes a novel framework, the Building Performance Optimization using Artificial Neural Network (BPO-ANN), which can automatically identify optimal building retrofit*

schemes. A robust Artificial Neural Network model was developed and validated as a surrogate to rapidly assess building performances, which was then connected to a genetic algorithm in search of Pareto optimal. The impact of key design attributes on building performances have been assessed using sensitivity analysis. The BPO-ANN framework has been tested in a high-performing campus building in Northern China under two competing objectives: building energy demand and occupant thermal comfort. It can automatically identify optimal design schemes, which were expected to achieve an energy-savings of 4% and reduce the annual thermal discomfort percentage by 4%. Sensitivity analysis suggested that window-to-wall ratio and HVAC setpoint have contributed the most to the performances of the campus building, followed by the roof U-value and wall U-value. The study has contributed methodologically to simulation-based optimization method, with novelties in the use of neural network algorithms to accelerate the otherwise time-consuming physics-based simulation models. It has also contributed a robust procedure in the tuning of hyperparameters in neural network models, with marked improvements in model prediction and computational efficiency.