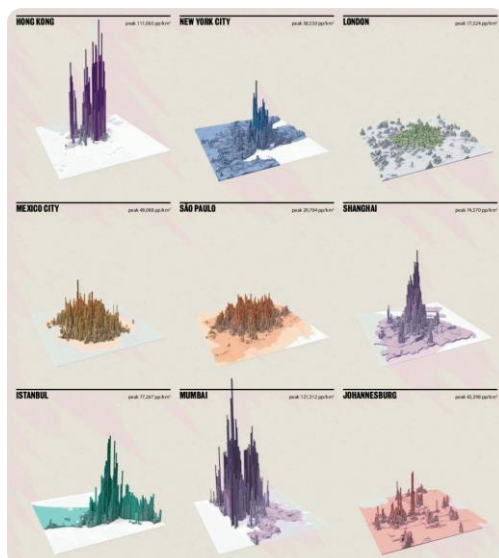


‘Plan the gap’ – the natural shape of cities and down-town Shenzhen’s missing half

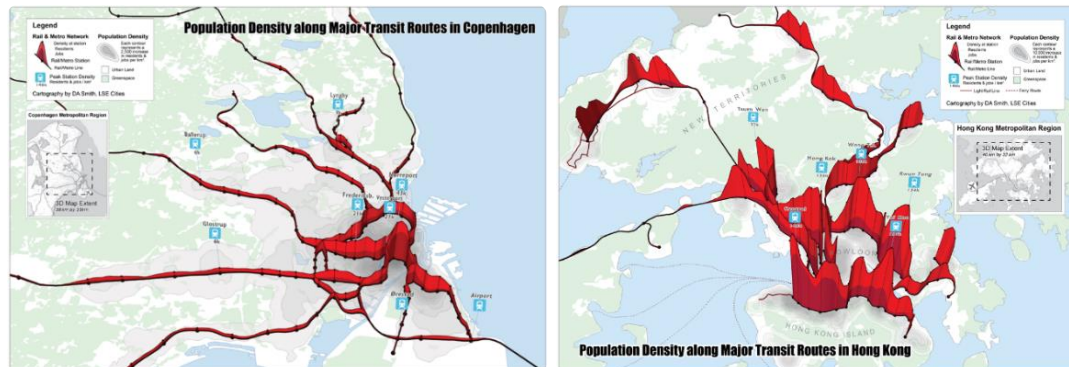
Two weeks ago I joined a panel of HKSAR professionals, academics and politicians to discuss the Northern Metropolis (NM), one of Hong Kong's two mega-projects that will shape its development over the rest of the century. When gathering my thoughts on NM I found myself focusing on the natural shape of a city. What is the natural shape of the city of HK? Much of the discussion and figures shared in the NM talks pictured the NM as the residual land in the far reaches of HK’s New Territories. When talking about the great ambitions of the NM project, one esteemed professional at the meeting said to me ‘don’t forget where it is’. My observation of the talks and plans was that that is indeed what is happening. But not in the sense meant by the friend who made the comment. ‘Where NM is’ is actually not so much at the extreme (chaotic, underused and low value) periphery of ‘Asia’s Global City’, as the other side of the river from the largest, fastest-growing and richest new city in the world. Shenzhen’s missing half.



To consider the idea of ‘the natural shape of a city’, consider these now famous images from LSE’s (London School of Economics) Cities Programme research. The natural shape of a city can best be detected in its human density curve and its land value curve, the two being closely related. The natural shape of a city may be radially regular if unconstrained or geometrically curtailed if constrained in some way. In my NM talk I used the idea of ‘gaps’ in the natural shape.

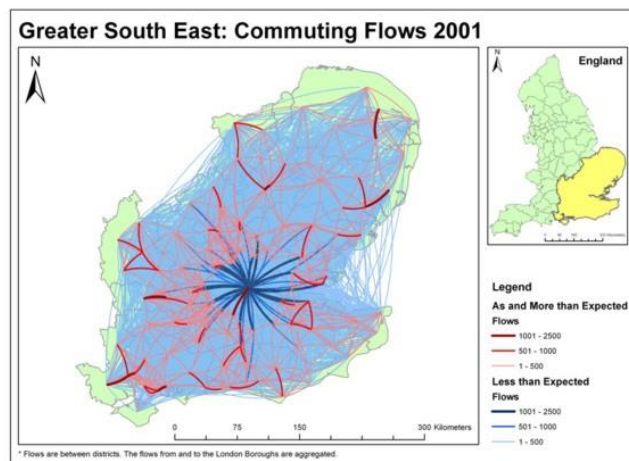
The Natural Shape of Cities (LSE Cities - <https://www.thatsmags.com/china/post/8286/visualizin-g-urban-density-hong-kong-vs-shanghai-vs-the-world>)

Another wonderful graphic from LSE Cities shows how a city's organic shape follows metro and other transportation lines. Hong Kong's energy, people, GDP and land values are, as it were, squeezed through the constraints of its national parks to emerge expansively in its new towns. Copenhagen's organic shape is more natural. Its dendritic form looks like the roots of a Chinese banyan tree spreading along the ground because there are similar processes at work – the dissipation of energy over distance leading to organically falling human density and land values.



Constrained versus unconstrained cities (LSE Cities, 2012 - <https://citygeographics.org/2012/10/12/copenhagen-and-hong-kong-mapping-global-leaders-in-green-transport/>)

While the population of Greater London is around 9 million, the late Sir Peter Hall and his mega-cities group estimated that its natural footprint was more of a city of 21 million stretching from the city of Norwich in the north to Southampton in the south. The



natural diffusion of energy, GDP, people and capital largely ignores attempts to engineer purposeful 'gaps', such as the green belt. The city's organic growth respects them locally to the extent of the strength of development control regulations, but not regionally.

Where would London 'stop' if unconstrained?
(<https://www.lboro.ac.uk/microsites/geography/gawc/rb/rb296.html>)

Here are three iconic internal 'gaps' in a city's natural shape, where natural space-filling dynamic has left one side of a river underdeveloped while the other side prospered. London's second CBD is constructed on a bend in the River Thames that has created what historically became known as 'the Isle of Dogs'. I lived on the Isle for my first job as a city planner in London. After my metro (tube) journey home, I sometimes had to stand waiting for half an hour to enter the island because the 'banana boat' from the Caribbean was passing through the lock into the docks that occupied the site of what is now Canary Wharf CBD. Lack of accessibility is one way that unfilled gaps emerge as a city grows. Pudong remained a gap from the other side of the Huangpu River for a variety of reasons related to dockland ownership, local

government jurisdiction, accessibility, and centrally-planned era urban governance and finance systems. Shenzhen is the third example. The undeveloped side of the river in this case is an extreme illustration of governmental jurisdiction causing the gap in a city's natural shape.

Gaps and discontinuities in the natural shape of a city: three iconic examples:



It is interesting to observe Pudong's and Isle of Dogs's natural geography as peninulars formed by a river meander. There are numerous examples of the same phenomenon in cities the world over, one coming to mind being what is now the 'university island' in Guangzhou. Generalising the idea of gaps in cities, in the extreme, 'missing halves' of cities, we

consider the following list of causes. i) Accessibility, as already illustrated. ii) Holdout – where a large landowner keeps title to land that has high market value, leading to long-lived and persistent under-use of urban land. Many European cities now have wonderful large parks on the site of land once owned by landed aristocratic families. Many of these were handed over to the state with the introduction of punitive land tax after WW2 but for centuries had been natural 'gaps' as their cities grew. There are many small gaps in Chinese cities where land is still under the ownership of legacy state-owned enterprises who would lose their landed asset if they were to combine their land with neighbouring land to realise land uses that fully express the social value of the location. The Isle of Dogs remained undeveloped for decades because it was owned by the Port of London. iii) Regulation can cause gaps, as with London and Beijing's extensive green belts and Hong Kong's protected colonial-era water-

catchments. iv) Topography causes gaps, with the most pervasive and powerful being the ocean. A mountain or a river is less of a powerful barrier. In China, mountains are cut-out. In Hong Kong, they are built on. Rivers start off as definitive barriers but urbanism flows across with the first bridge and then with multiple bridges they are no barrier at all. In fact, their water-side attractions create enhanced urban value and density (as in Shanghai's Bund 100 years ago and in a different way, again now). v) More subtly, the costs of land conversion is another ubiquitous cause of gaps. If the costs of land decontamination putting in the infrastructure, combining fragmented ownership rights and so on, exceed the profit from land development, then a gap will persist. This barrier to urban development is, in fact, the one that defines the natural limit to a city's natural shape. A city stops naturally when the profit from urban land conversion < returns from agriculture.

Causes (i) to (v) all point to the importance of mega-projects, and that brings us back to the Northern Metropolis.

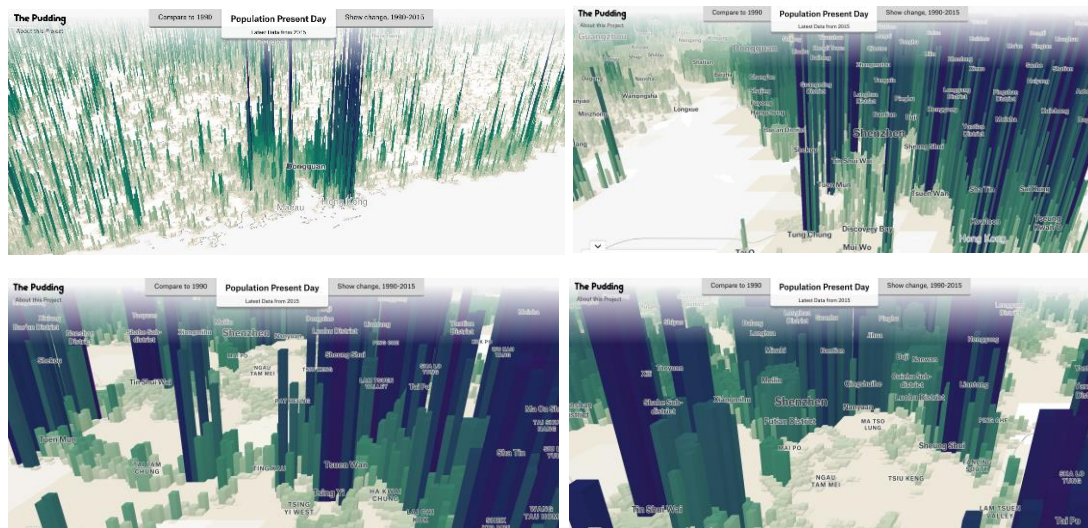
Mega-projects are probably the most efficient way of filling urban gaps. That's why dockland redevelopments and new town projects in UK and Europe tend to be organised by special-purpose development and financing vehicles such as temporary development corporations. The development industry in the USA is more able to organise mega projects for large-scale city expansion via the private market. So, back to the question: what is the natural shape of Shenzhen and Hong Kong considered as a combined 'urban field'. What is the natural shape of HK-SZ? What is the natural shape of the whole GBA with its 11 increasingly interconnected Cities? Where are strategic gaps desirable? Which gaps should be filled?

San Tin Technopole, CED,
<https://hongkongfp.com/2023/07/15/explainer-what-is-hong-kongs-san-tin-technopole-and-why-is-the-planned-tech-hub-controversial/>



My prediction is that GBA cities will increasingly merge into one 100M natural city. What is HK's role in this and how do we plan the gaps, for the next 100 years? The images below come from the wonderful website 'The Pudding' (https://pudding.cool/2018/10/city_3d/). They visualise the shape of Guangdong's 'urban forest', the height of the trees being proportional to population density at that location. One striking observation is the visual insignificance of the gap in the northern New Territories. The Northern Metropolis is not, in reality, an isolated backwater, a

long way from an urban centre. It is, in fact, a gap across the river from Shenzhen's linear sequence of CBD (Luohu, Futian and the newer centre around the Bay). The size of the gap is interesting. It is too small to make this a 'twin-city' phenomenon. The river and wetlands separating Futian from NM is more at the scale of a large urban park, such as Central Park or Hyde Park. Plans for the NM, which should be focusing on how the city will work in 20-30 years and then evolve for decades and centuries thereafter, should consider this gap a central park and work out how to sustainably maintain it and connect two halves of what is likely to become one of the largest, dynamic and wealthiest cities on earth.



GBA cities will increasingly merge into one 100M natural city. What is HK's role in this and how do we plan the gaps, for the next 100 years? (https://pudding.cool/2018/10/city_3d/)

That leaves a hugely exciting planning, urban design and landscape proposition: a world city with a wetland park and heritage village and agricultural reserve/park at its very core. Planners should not be worried about losing land value if they maximally preserve this gap as a large green heritage centre-piece. The distances between the two halves of the city is small enough to mean that the natural land value and density of 'Shenzhen's missing half', will be preserved even if it is pushed back. Just as river-side Pudong acquired land value and human density equal to or greater than the Bund, I predict that NM that becomes SZ's missing half will command Futian-level land values and densities and greater. How much greater will depend on the quality of the urban design and landscape in the place-making that goes on in the NM mega project.

Congratulations to all those mentioned below. The energy represented in these pages is breathtaking!

Perhaps we can draw some of our diverse intellectual, research and design energies together to help influence the shape of Shenzhen's missing half. If anyone is interested in working with me on developing the essay above into a narrative-based paper (with the addition of some data and development of argument), for a popularly-read journal for Western readership (Town Planning Review perhaps?), let me know your ideas.

Chris

Faculty of Architecture

1. New colleagues

- A warm welcome to the following colleagues, who joined our Faculty in August and September 2023:

	<p>Dr Yuanyuan Cai Post-doctoral Fellow Department of Real Estate and Construction</p> <p>Dr Cai received her PhD degree in economic geography at Utrecht University in May 2023. Her thesis concerns the relationship between urban growth, residential welfare and housing markets. Dr Cai's research focuses on regional/urban development, housing markets and labour mobility, with peer-reviewed articles published in international journals. Meanwhile, she also serves as an anonymous reviewer for several journals, such as <i>Cities</i>, <i>German Economic Review</i>, <i>Growth & Change</i>, and <i>Journal of Housing and the Built Environment</i>, and she was awarded 'Excellent Reviewer' by <i>Growth & Change</i> in 2021. At REC, she is collaborating with Dr Jin Zhu on an international student housing project.</p>
	<p>Ms Alessandra Cianchetta Associate Professor Department of Architecture</p> <p>Alessandra is an architect and the founder of AWP/AWILDC. Her design projects include Poissy Galore, a museum set in a park near Paris; an arts district in Liverpool, UK; In-Land living, a series of art barns in Upstate New York; and a series of collectible art pavilions, the first to be launched in Miami's Design District, in collaboration with DACRA.</p> <p>Alessandra has previously worked on large-scale major urban projects such as Paris' CBD La Defense and the PAV masterplan for the State of Geneva, Switzerland.</p> <p>Alessandra has taught design studios and seminars bridging architecture and art at Cornell University, Yale University, University of Virginia, Columbia University GSAPP, The University of Miami, The Cooper Union in New York, the Academy of Fine Arts in Vienna and The Berlage in Rotterdam/Delft, among other leading institutions.</p>



Dr Arnab Dutta
Assistant Professor
Department of Real Estate and Construction

Dr Dutta received his PhD in Urban Planning and Development at the University of Southern California's Sol Price School of Public Policy in Spring 2023. Before that, he completed a Master's degree in Quantitative Economics at the Indian Statistical Institute (Delhi Center) and a BSc in Economics (Hons) at the University of Calcutta.

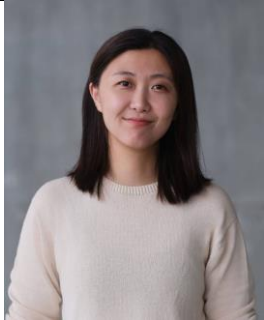

Dr Dutta's research is at the intersection of many fields, including urban and land economics, real estate finance, regional science, economic geography, development economics, migration studies, and climate science, focusing on India. On the one hand, his work studies residential housing markets and how regulatory and institutional environments can affect the proliferation of informal housing. On the other hand, he is exploring how technology, transport infrastructure, and climate change can lead to the movement of people from rural to urban areas, thus affecting labour and housing markets in cities. Dr Dutta has also researched other policy issues concerning transportation regulations, nutrition and health, and sustainable development interventions.



Dr Garvin Goepel
Post-doctoral Fellow (full-time) and Lecturer (part-time)
Department of Architecture

Dr Geopel completed his PhD at the Chinese University of Hong Kong (CUHK). He received his Master of Architecture degree with distinction from the University of Applied Arts Vienna – Studio Greg Lynn and gained professional experience working with several practices including Coop Himmelb(l)au in Vienna.

He gained academic experience by researching at ETH's Block Research Group in Zurich, and at CUHK and HKU's Building Simplicity Lab. His work has been published in leading conferences and journals including ACADIA and *Frontiers*, and he taught AR and design workshops at multiple international institutions. His build design work includes the mixed-reality artwork 'Resonance-In-Sight' for the Hong Kong Museum of Arts as a co-artist. In 2021, he was part of the organising committee for the 26th International Conference of the Association for Computer-Aided Architectural Design Research in Asia (CAADRIA).

	<p>Dr Geopel's research advances studies in collaborative holographic-driven construction, expands opportunities for technology-infused craftsmanship, and reflects on workflows that replace conventional paper drawing-based communication with holographic instruction.</p>
	<p>Dr Hongshan Guo Assistant Professor Department of Architecture</p> <p>Dr Guo received her PhD from Princeton University. Before that, she had completed her Master of Science degree at Columbia University, and a Bachelor's degree in Engineering at Harbin Institute of Technology.</p> <p>Dr Guo's work embodies the synthesis of architectural finesse with the precision of engineering. Layered onto this foundation is an affinity for predictive technologies, owing to her distinctive background that melds the complexities of built environments with advanced computational models. Her research pursuits gravitate towards understanding radiant environments, thermal comfort, and enhancing the human experience within architectural spaces/processes through advanced models/techniques.</p> <p>With a patented technique in time series predictive analytics under her belt — recognised with the Gartner Eye on Innovation Award Americas in 2020, and a strategic role in a Fortune 500 financial company, Dr Guo has harnessed the capabilities of Large Language Models (LLMs). She has pioneered applications that paired architectural and engineering insights with the immense predictive capacities of modern AI alongside generative models such as LLMs and stable diffusion models.</p>
	<p>Ms Han Hsi Ho Lecturer Department of Urban Planning and Design</p> <p>Han Hsi has a BArch degree from the Cooper Union, MArch in Urban Design degree from Harvard GSD, and MBA from HKUST. She is a PhD candidate at Asia Management College, Asia University, Taiwan. Prior to joining DUPAD, she has taught at Washington University in St. Louis and accumulated nearly two decades of international experiences in urban design, city information modelling (CIM), building information</p>

	<p>modelling (BIM), digital transformation consulting, training, and firm management.</p> <p>Han His is a Project Management Professional (PMP), Construction Industry Council (CIC) Certified BIM Manager (CCBM), Professional Member of Hong Kong Institute of Building Information Modelling (MHKIBIM) and certified ESG consultant. She has consulted on Architecture BIM for the Hong Kong International Airport 3rd Runway Project, and is part of the AECOM team to advance Hong Kong Housing Authority's BIM Standards and Guidelines Version 2.0 to 3.0. She also serves as a technical writer for Development Bureau's BIM Harmonisation Standards, as well as Electrical and Mechanical Services Department's BIM-AM Standards and Guidelines.</p>
	<p>Mr Jze Yi Kuo Assistant Professor Department of Architecture</p> <p>Jze Yi completed his MArch and BA degrees at the Architectural Association. His work focuses on exploring methods for bottom-up community development, in three main areas:</p> <ol style="list-style-type: none"> 2. Enriching Local Material/Resources 3. Developing Local Building Techniques 4. Enabling Collectivity through Construction <p>He organises design workshops and participates in different regions' community building works, to test how to enrich local assets through exploring material and construction techniques, including: earth, stone, plant, bamboo, wood, brick, construction waste, household waste and objects. Based on participatory design approaches, some of his construction processes have engaged more than 200 villagers in building local communal facilities.</p> <p>Jze Yi is currently the Deputy Programme Director of the Master of Science in Advanced Architectural Design.</p>



Mr Mono Chiu-on Tung
Assistant Lecturer
Department of Architecture

Mono's immersive design experience at Zaha Hadid Architects and Foster and Partners, adding to a decade learning and working in a technology-rich environment, has driven his belief in exploring the potential of architecture through interactive concepts such as responsive modulation. His master's thesis explored interactive pneumatic structures using air and silicone, resulting in a temporary pavilion that responded dynamically to human activity. The project has been showcased at multiple venues, including on Michael Webb's website.

Mono extended his exploration of the theme in his professional practice, where he integrated cubical modules and algorithmic design into a master planning project enhancing facade performance. Similar principles were applied to a timber modulated sound installation, which construction process was guided by AR technology, ensuring precision of the project. Mono has also collaborated with artists at international festivals, reflecting his commitment to uniting architecture and art while embracing technology at the same time.



Dr Gang Xu
Post-doctoral Fellow
Division of Landscape Architecture

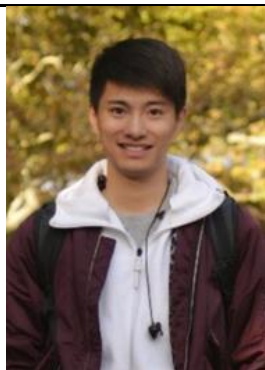
Dr Xu received his PhD and BEng degrees from Wuhan University. His work concentrates on urban studies, and more specifically, urbanisation and complex urban systems. He attempts to understand how urban land expands and its correlation with the population using remotely sensed imagery and geo-technologies. He currently focuses on the urban scaling law to explain how the complex urban system evolves over time. He recently joined DLA to become part of Dr Bin Chen's research team.



Professor Xiaoling Zhang
 Professor
 Department of Real Estate and Construction

Professor Zhang is a tenured Full Professor jointly appointed by the Institute for Climate and Carbon Neutrality (ICCN) at HKU. She received her BBA in Management Science, MS in Resource Management, and PhD in Engineering Management and Economics. Prior to joining REC, Professor Zhang had been listed as 2022 Clarivate Highly Cited Researcher in Cross-Field, and as Stanford’s top 2% highly cited scientists in the field of Environmental Engineering since 2020.

Professor Zhang’s research is primarily centered around the intricate relationship between humans and the environment, with a focus on tackling significant challenges such as urban and industrial ecology, energy, pollution, and the achievement of sustainable development goals (SDGs). Initially, her research delved into areas such as green building, real estate, and enterprise-scale sustainability. In recent years, her research interests have shifted towards exploring affordable yet effective ‘net zero’ technologies and systems, including renewable energy systems and cleaner energy technologies.



Dr Yishuai Zhang
 Post-doctoral Fellow
 Department of Urban Planning and Design

Dr Zhang holds a BE degree from Harbin Institute of Technology, a MS degree and a PhD degree from Tongji University. His research focuses on urban and regional development, urbanisation, urban system, housing and industrial development, big data analysis, social network and complex network analysis, as well as applications of urban spatial analysis, etc. Dr Zhang works with Dr Tianren Yang at DUPAD.

2. 210th Congregation

- This year's Summer Congregation of the Faculty of Architecture was held successfully on 14 July 2023. You may revisit the memorable event of our Class of 2023 via this [photo gallery](#).



3. First Seminar on Geospatial Technology for the Cultural Heritage Conservation in Hong Kong-Zhuhai-Macao (第一屆空間信息技術與港珠澳文化遺產保護研討會)

- was successfully held on 29 July 2023 at the HKU Convocation Room. It was organised by Hong Kong-Zhuhai-Macao Research Station of the Key Scientific Research Base of Application of Spatial Information Technologies in Cultural Heritage Conservation (Tsinghua University), and the National Cultural Heritage Administration (NCHA), China.



The Seminar aims to promote the application research of spatial information technology in the field of digital cultural heritage conservation. It also explores the future directions of smart conservation and energisation of digital cultural heritage, and actively help build a cultural power.

Dr Frank Xue, Dr Katherine Deng, Ar Kasing Yu and Professor Anthony Yeh were invited to deliver talks and participated in the Seminar alongside 30 experts, scholars, teachers, and students from NCHA, Tsinghua University, HKU, Macau University of Science and Technology, Zhuhai Institute of Urban Planning and Design, Guangzhou Okay Information Technology Co., Ltd. and Antiquities and Monuments Office of the HKSAR Government.

4. World's Top 2% Scientists by Citation (October 2023)

- Fourteen FoA members have recently been ranked in the world's top 2% most-cited scientists in their respective fields, measured by long-term and single-year performance.

The scholars were ranked in the Updated Science-wide Author Databases of Standardized Citation Indicators, compiled by a research team at Stanford University and led by Professor John Ioannidis. It is a database of top scientists across the world, created according to standardised citation indicators, including h-index, co-authorship adjusted hm-index, citations to papers in different authorship positions, etc. The latest dataset is based on the 1 October 2023 snapshot from Scopus and is updated to end of citation year 2022.

Citation data as of 2022 (long-term performance)			
Name	Rank (self-citation excluded)	Position	Department
Anthony Yeh	38,978	Chair Professor	DUPAD
Chris Webster	46,734	Dean and Chair Professor	FoA/DUPAD
Wilson Lu	59,317	Head of Department and Chair Professor	REC
Shenjing He	72,390	Head of Department and Professor	DUPAD
K. W. Chau	124,300	Chair Professor	REC
Steve Rowlinson	127,091	Emeritus Professor	REC
Jiangping Zhou	175,378	Associate Professor	DUPAD
Lawrence Lai	230,448	Professor	REC

Citation data in 2022 (single-year performance)			
Name	Rank (self-citation excluded)	Position	Department
Wilson Lu	4,902	Head of Department and Chair Professor	REC
Shenjing He	10,925	Head of Department and Professor	DUPAD
Chris Webster	22,463	Dean and Chair Professor	FoA/DUPAD
Jiangping Zhou	35,199	Associate Professor	DUPAD
Anthony Yeh	38,076	Chair Professor	DUPAD
Chinmoy Sarkar	39,265	Associate Professor	DUPAD
Xingjian Liu	39,934	Associate Professor	DUPAD
Bin Chen	62,291	Assistant Professor	DLA
Chao Ren	69,167	Associate Professor	DLA
Steve Rowlinson	69,485	Emeritus Professor	REC
K. W. Chau	78,007	Chair Professor	REC
Fan Xue	86,817	Assistant Professor	REC
Jun Ma	97,884	Assistant Professor	DUPAD

More information:

<https://elsevier.digitalcommonsdata.com/datasets/btchxktzyw/6>

5. Hong Kong Institute of Planners (HKIP) Awards 2022

- A group of MUP Year 2 students and DUPAD teachers received the HKIP Awards 2022 – Certificate of Merit, for their project entitled ‘Reimagining a Future-ready Kennedy Town and Mount Davis’.

The project initiated a reimagination of a 30-year planning to build a liveable, smart, green, net-zero, resilient and sustainable community in Kennedy Town and Mount Davies. The formulation of the recommended District Development Plan serves as an exemplar bridging strategic plans with community planning through integrating with the national overall development and Hong Kong’s latest strategic planning directions for Kau Yi Chau Artificial Islands.

Team Members:

MUP Year 2 Students:

- Mr FOO Chun Kau
- Ms HO Ka Pui
- Ms LUO Wenting
- Ms MA Fong Ching
- Ms CHOW Sin Yau
- Ms LUI Chin Yan
- Mr LUK Man Ho Michael
- Mr YUEN Chak Long

Teachers:

- Mr TANG Man Hung, Roger – Coordinator and Senior Lecturer
 - Professor TANG Bo Sin – Professor
 - Mr AU Wai Kwong, Elvis – Adjunct Professor
 - Professor Kar-Kan LING – Adjunct Professor
 - Dr TANG Siu Sing, Kenneth – Adjunct Associate Professor
 - Ms LO Oi Ling, Christina – Part-time Lecturer
- Mr Fai Au (Associate Professor of Practice, ARC) and Ms Sunnie Lau (Adjunct Assistant Professor, DUPAD) received the HKIP Awards 2022 – Honourable Mention (Promotion of Planning in Hong Kong), as co-curators of the 2017 Bi-City Biennale of Urbanism \ Architecture (Hong Kong).
 - DUPAD alumna, Ms Mandy Wong Man-kwan (MUP 2017), also received Certificate of Outstanding Achievement at the HKIP Young Planners Award 2022.
 - HKU Press Release: https://www.hku.hk/press/news_detail_26501.html

Selected media coverage:

- [Oriental Daily](#)
- [Hong Kong Economic Times](#)

6. Finalists of RTPI Awards for Research Excellence 2023

- Congratulations to the following Faculty colleagues, students and alumni, who are finalists at the annual awards of the Royal Town Planning Institute:

Early Career Researcher Award

- Mr Dongsheng He [PhD student, DUPAD]
Project: 'The effects of metro interventions on physical activity and walking among older adults: A natural experiment in Hong Kong'
- Dr Si Qiao [PDF, DUPAD]
Project: 'Who are the gig workers? Evidence from mapping the residential locations of ride-hailing drivers by a big data approach'

Student Award

- Ms Ashley Sin-yu Ng [BA(US) 2022, DUPAD]
Project: 'Outdoor thermal environment of open space in public housing in Hong Kong'
- Ms Ka Lai Tsang [MLA 2022, DLA]
Project: 'Re-examination and Optimisation of Green Infrastructure Quality: creating heat resilient neighbourhood in a high density city'

The Sir Peter Hall Award for Excellence in Research and Engagement

- Dr Yiyang Yang [MUD 2015, DUPAD] and Dr Chao Ren [DLA]
Project: 'Moderation effect of visible urban greenery on the association between neighbourhood deprivation and subjective well-being'

More information: <https://www.rtpi.org.uk/events-training-and-awards/awards/rtpi-awards-for-research-excellence/2023-finalists/>

Department of Architecture

1. Discussion Lecture Series



Date: 23 August 2023

Time and Venue:

10:00 – 11:00 at KB419, 4/F, Knowles Building, HKU

15:00 – 16:00 via Zoom

Speakers and Lecture Titles:

- Roberto Requejo Belette
Lecturer, Department of Architecture, HKU
– ‘Injected Play’
- Fai Au
Associate Professor of Practice, Department of Architecture, HKU
– ‘Questions of Density’
- Yiqiu Liu
Scientific Assistant, PhD Candidate, Department of Architecture, Institute of Landscape and Urban Studies, ETH Zurich
– ‘Rethinking Architecture with Critical Urban Studies’
- Geraldine Dening
Senior Lecturer, Leicester School of Architecture, DeMontfort University;
Design Fellow, Department of Architecture, Cambridge University
– ‘Geraldine Dening and Architects for Social Housing: in Practice, Teaching and Research’

More information: <https://www.arch.hku.hk/event /department-of-architecture-summer-2023-discussion-series/>



Date: 28 August 2023

Time and Venue: 14:00 – 14:30 by Zoom

Speaker: Richard Kai Ching Leung [Lecturer, Wenzhou-Kean University;
Founding Partner, Generiek (BE/CN)]

Lecture Title: 'The Subjective Domestic – Manufacturing the Family and Crisis'

More information: https://www.arch.hku.hk/event/_richard-kai-ching-leung/

2. Professor John Lin and Ms Lidia Ratoi

- have designed and built 3D-printed components for an abandoned traditional wooden house in Nanlong Village in southwest China. The prototype project is called 'Traditional House of the Future' and has been covered by the following media:



- o [South China Morning Post](#)
- o [Dezeen](#)
- o [Domus](#)
- o [Designboom](#)
- o [Surfaces Reporter](#)
- o [3dprinting.com](#)
- o [3dprint.com](#)
- o [Frame Magazine](#)
- o [allcadblocks.com](#)

3. Mr Ulrich Kirchhoff

- recently designed a high-rise columbarium in Kwai Chung, Hong Kong – Shan Sum Columbarium is the tallest of its kind in the city, as well as the first private vertical columbarium in Hong Kong. It has been widely reported by the media, including the following:



- [聯合早報](#)
- [The Standard](#)
- [Hong Kong Free Press](#)
- [East Coast Daily](#)
- [CNN](#)
- [India Times](#)
- [Hong Kong Economic Journal](#)
- [Bloomberg](#)
- Bloomberg Businessweek
– The Cities Issue

Photo: Ulrich Kirchhoff

- represented the Faculty to attend the Award Ceremony of the Design Competition for Redevelopment of Open Space at Choi Hoi Road Playground, on 5 August 2023.



Division of Landscape Architecture

1. Public Talks: Landscape and Conservation



Date: 2 August 2023

Time and Venue: 13:30-18:00 via Zoom

Title: HKU Division of Landscape Architecture Public Talks: Landscape and Conservation

Speakers and Lecture Titles:

- Boya Guo
Lecturer, Harvard Graduate School of Design
- 'Redefining Heritage'
- Maxime Decaudin
Senior Lecturer, National University of Singapore
- 'Landscapes in the Longue-durée: Environmental Histories and the Future of Heritage'
- Xiaomin Jin
PhD in History, Representation and Restoration of Architecture, University of Rome 'La Sapienza'
- 'Study of Plants in Shaping the Identity and Culture of the Garden of Ninfa: Conservation of Historic Gardens and Landscape as Living Monuments'
- Clara Rellensmann
Teaching and Research Associate, Department of Architectural Conservation, Brandenburg University of Technology
- 'Counternarratives as a Critical Approach to Heritage Conservation'

- Changxue Shu
Senior Postdoctoral Researcher, Department of Architecture & Raymond Lemaire International Centre for Conservation, KU Leuven
- 'Heritage Value Production and Built Environment: A History-of-Science based Approach'

More information: https://www.arch.hku.hk/event/_public-talks-landscape-and-conservation/

2. Ms Natalia Echeverri and Mr Ivan Valin

- won the A+D Museum 2023 Design Award in the 'small-scale structure' category for their project *Substrates + Stitches*, a soil remediation installation designed and built for the Seoul International Garden Show.



- won in the WWF Wetland Incubator 'Walk and Pitch' Competition, supported by the Hongkong Bank Foundation. Their proposal, *Edge Effect*, aims to enhance ecological and social interaction alongside abandoned fishponds through a series of reprofiling and planting prototypes. They are currently working with WWF to organise the launch exhibit and develop funding and community engagement for pilot project phases.



3. Ms Natalia Echeverri and Dr Cecilia Chu

- received a research grant from Tai Kwun for the project 'Mapping Cultural Landscapes: Towards a Critical Understanding of Landscape Heritage in Hong Kong'.

Principal Investigator (PI): Natalia Echeverri

Co-investigator (Co-I): Cecilia L. Chu

4. Ms Natalia Echeverri

- participated in the 6th APRU Sustainable Cities & Landscapes Conference Galapagos 2023, which took place in Quito and San Cristobal, Galapagos. Natalia was the co-leader of the working group 'Sustainable Urban Design and Urban-Rural Linkage'. The group investigated the impacts of San Cristobal's rural and urban settlements on protected natural area and vice versa.



5. Dr Chao Ren

- has been invited to serve as the leader author of the section *SDG 11 - Sustainable Cities and Communities* of the [United in Science 2023 Report](#) (coordinated by WMO, published by UNEP on 14 September 2023), an annual, multi-organisation, high-level compilation of the latest weather, climate and water-related sciences and services for sustainable development. Dr Ren's urban climate map research has been featured and recommended in this report.



6. Dr Xiaoxuan Lu

- led a group of MLA students to design and build two gardens as part of the upcoming Kunming Dianchi Lake Arts Season 2023, co-organised by Ruan Yisan Heritage Foundation and Kunming municipal government. The project sites are located in Wulong Cun, a historic fishing village situated along the east coast of Dianchi Lake. The team visited the sites in mid-June and presented their design schemes to an interdisciplinary review committee in late July. They then arrived in Kunming in mid-August to build the gardens before the opening of the festival in September. A total of 20 gardens will be built as part of this event. Apart from HKU, the seven other universities that participate in this event are Tongji University, Xi'an Jiaotong-Liverpool University, China Academy of Art, Shenzhen University and three Yunnan-based universities.

HKU Team 1:

Memories of Shell Mound / 貝丘記憶

This project celebrates the long history of human-nature interaction around Dianchi Lake, revealing the irreplaceable role played by snail shells and clay in shaping the cultural identity and material outlook of the lake region. Each clay pole uses traditional and modern materials such as snail and/or oyster shells, ceramic tiles, fabrics, concrete, and glasses as aggregates to reflect the specific epoch of the region's socio-natural history.

Team Members: Mite CHAN King Yeung, Kanisa SATTAYANURAK, Nakarin DOLRASEE, Eddie CHAN Shu Fai, Jun HUI Sin Yee

HKU Team 2:

Archive for Hauntology / 風土歸檔

This project re-examines the deconstruction process of Wulong Cun. The remaining traces in the historic village were collected and reclassified as the raw materials of new interventions. The found construction wastes were recombined to echo the gradually disappearing building structures and the larger village context. The curated material montage acts as an archive of the histories and memories of Wulong Cun.

Team Members: XIANG Linyu, Ziv YANG Zihan, Vicki LIU Jiani, SHI Siyuan, LU Tong

Instructors: Xiaoxuan LU (co-curator), Francisco Daniel CEVALLOS BARRAGÁN

Assistant Instructor: Aristo CHAN Hui Bun



Department of Real Estate and Construction

1. Dr Shoeb Memon

- has published the following papers:

- (i) Sumanarathna, N., Duodu, B., **Memon, S.A.** & Rowlinson, S. (2023). 'Exploring innovation deployment of construction contracting firms through the lens of exploratory–exploitative learning: a Hong Kong case study', *Construction Innovation*, Vol. ahead-of-print No. ahead-of-print. <https://doi.org/10.1108/CI-01-2023-0004>

Abstract: *This study aims to explore the innovation deployment of construction contracting firms through exploratory–exploitative learning and organisational ambidexterity. Firstly, a literature-based conceptual framework was developed to explain innovation implementation through exploratory–exploitative learning and organisational ambidexterity. A prominent Hong Kong construction contracting firm was then selected as the case study to explore its innovation deployment at different organisational levels (i.e. firm and project levels). Qualitative data were attained by conducting 12 semi-structured interviews with industry experts and document analysis. The thematic analysis using NVivo 12 software was adopted to analyse data. Findings reveal that the case study firm successfully fosters innovation when ambidexterity is achieved through the balance between exploratory (i.e. radical innovation) and exploitative learnings (i.e. incremental innovation). Establishing uniform ambidexterity (i.e. 50:50) at the firm or project level is not mandatory to deploy innovation successfully. The ratio can vary based on the characteristics and requirements of construction firms. This paper shall motivate construction practitioners to adopt radical–incremental innovation ambidexterity in firms and ultimately enhance the productivity and efficiency of the construction industry. Previous construction innovation research has frequently explored firm or project-level innovation separately. This study identified a multi-level focus on innovation. Through the lens of exploratory–exploitative theory, different forms of innovation ambidexterity for different levels are suggested rather than one specific ambidexterity.*

- (ii) Ashraf, H., Ejaz, M.K., **Memon, S.A.**, Shen, Y., Maqsoom, A. & Sunindijo, R.Y. (2023). Examining a Two-Step Working Model of Safety Knowledge in Translating Safety Climate into Safety Behavior, *Engineering, Construction and Architectural Management*, Vol. ahead-of-print No. ahead-of-print. <https://doi.org/10.1108/ECAM-09-2022-0906>

Abstract: *Given a baffling contradiction that the availability of safety knowledge may not necessarily lead to workers' safety behavior, this study aims to develop an exploratory two-step working model of safety knowledge in translating safety climate into safety behavior. In particular, this study*

highlights the importance of articulating tacit safety knowledge and improving workers' systematic problem solving (SPS) capacity in a favorable safety climate. This study uses 110 valid responses from Pakistan-based construction workers to test five hypotheses which embody the exploratory two-step working model of safety knowledge. The partial least squares structural equation modeling (PLS-SEM) is used to analyze the data. The results of this study support the two-step working mechanism of safety knowledge in translating safety climate into safety behavior. Furthermore, results suggest that safety climate as a job resource facilitates converting construction workers' tacit safety knowledge into explicit safety knowledge (i.e. safety knowledge articulation) and then enabling them to spot non-conformities in safety management practices (i.e. SPS) and consequently to work safely (i.e. safety behavior). The study has both theoretical and practical significance. In theory, it extends organizational learning theory and job demands-resources (JD-R) theory in the construction safety research domain and elaborates on the mediating role of safety knowledge articulation and SPS for the relationship between safety climate and safety behavior. In practice, it highlights the importance of continuous articulation of tacit safety knowledge and accumulation and use of explicit safety knowledge in construction safety management practices.

2. Dr Isabelle Chan

- was invited to give a speech on 'Occupational Safety and Health in the Era of Digitalization' in the Hong Kong Institution of Engineers (HKIE) – Safety Specialist Committee (SSC) Annual Symposium 2023, on 23 June 2023.



Click this [link](#) for high resolution photos

3. Dr Alex Shi

- was invited to deliver a seminar at the Regional Studies Association's Annual Conference in Ljubljana, Slovenia, during 14–17 June 2023. His presentation was titled 'Christensen's Disruptive Innovation in China: The Effect of Air Pollution on Medical Innovations'.



Abstract: *Where are innovations from? Instead of endogenous drivers such as human capital and R&D, this article addresses this question by investigating the exogenous impact of air pollution on medical innovations. Previous studies have documented the negative externalities of air pollution such as health costs and productivity loss, while little attention has been paid to its induced market demand for medical products. Market actors are argued to be equipped with adaptive capabilities to meet emerging market demands, which can be reflected by local firms' innovation inputs to provide air pollution-related products. Following Christensen's theorem of disruptive innovation, medical innovations are further classified into market-creating, efficiency, and sustaining ones attuned to the structure of customers. Using data of newly-registered drugs and air pollutants from 2000 to 2019, the effect of air pollution, as measured by the spatial concentration of PM_{2.5} and PM₁₀ pollutants, on the medical innovations in 249 Chinese cities is examined by means of zero-inflated negative binomial model. We find that air pollution can stimulate market-creating and efficiency innovations, but market-sustaining innovation is an exception, which is attributed to the stratified customer structure. Additionally, the stimulating effect is moderated by local regulation and knowledge base. Theoretical and policy implications are discussed in the end.*

4. Research Seminar Series

- invited Professor Mirosław J. Skibniewski of the University of Maryland to give a talk on 'Automation and Robotics in Construction: State of the Art and Industry Practice', on 9 August 2023 at Knowles Building. The seminar, co-organised with the Department of Industrial and Manufacturing Systems Engineering, reviewed the types of construction robots developed to date, and their applications in North America. It also discussed future prospects of further implementation of robotics in the construction industry worldwide.



Click this [link](#) for high resolution photos

- invited Dr Liang Dai, Associate Professor at the School of Public Administration of Nanjing University of Finance and Economics, to give a talk on 'The Evolution of Intercity Technology Transfers in the Guangdong-Hong Kong-Macao Greater Bay Area: Evidence from Patent Transfer Networks' on 16 August 2023. The seminar discussed technology transfer which is pivotal in narrowing regional disparities, optimising resource allocation, and fostering collaborative innovation. It examined the evolutionary characteristics of intercity technology transfer networks in the Guangdong-Hong Kong-Macao Greater Bay Area from 2007-2018 and the underlying mechanisms.



Click this [link](#) for high resolution photos

5. Dr Katherine Deng

- has been awarded a Teaching Development Grant for her project 'Building Structures Pedagogy'. Professor Francis Au and Dr Frank Xue are the Co-investigators.

Department of Urban Planning and Design

1. Dr Jun Ma and MUA students (Mr Huiyuan Xue, Mr Peizhuo Guo and Mr Yiyan Li)

- won the Innovation 1st Prize in [Baidu's 2023 National Large Model Application Innovation Challenge Competition](#).

Project abstract: *With the rapid development of generative artificial intelligence technology and products, this national innovation competition aims to enable participants to use their imagination and innovative ideas to develop creative solutions and innovative applications based on large language models. This national competition has attracted more than 2,500 experts, scholars and students from well-known universities, research institutions and technology giants such as Baidu, Alibaba, Tencent and Google to participate. The winning project, 'Application of Large Language Models in Compliance Control for Architectural Design Models', aims to use Large Language Models, such as ChatGPT and Wenxinyiyan, in revolutionising the building and construction industry.*



From left: Mr Li, Mr Xue and Dr Ma

2. Mr Maosu Li (PhD student)

- received the HKU Foundation Publication Award for Research Postgraduate Students 2023 from the Graduate School for his co-authored paper:

Li, M. S., Xue, F., Wu, Y. J., Yeh, A.G.O. (2022). A room with a view: Automatic assessment of window views for high-rise high-density

areas using City Information Models and deep transfer learning, *Landscape and Urban Planning*, 226, 104505. ISSN 0169-2046. <https://doi.org/10.1016/j.landurbplan.2022.104505>

Abstract: Every windowed room has a view, which reflects the visibility of nature and landscape and has a strong influence on the health, living satisfaction, and housing value of inhabitants. Thus, automatic accurate window view assessment is vital in examining neighborhood landscape and optimizing the social and physical settings for sustainable urban development. However, existing methods are labor-intensive, inaccurate, and non-scalable to assess window views in high-rise, high-density cities. This study aims to assess Window View Indices (WVIs) quantitatively and automatically by using a photo-realistic City Information Model (CIM). First, we define four WVIs to represent the outside (i) greenery, (ii) water-body, (iii) sky, and (iv) construction views quantitatively. Then, we proposed a deep transfer learning method to estimate the WVIs for the window views captured in the CIM. Preliminary experimental tests in Wan Chai District, Hong Kong confirmed that our method was highly satisfactory ($R^2 > 0.95$) and fast (3.08 s per view), and the WVIs were accurate ($RMSE < 0.042$). The proposed approach can be used in computing city-scale window views for landscape management, sustainable urban planning and design, and real estate valuation.

Li is a PhD candidate supervised by Professor Anthony Yeh of DUPAD and Dr Frank Xue of REC. The objective of the Award is to give due recognition to RPg students who have published a journal article of exceptional quality in the related research study area. Up to 20 awards are made per year by evaluating all top journal papers submitted from the 10 faculties of the University. Each awardee will receive a cash prize of HK\$5,000.

- won First Prize (Individual Project Track) at the 2022 Smart Cities Innovation Competition (SCIC), organised by the International Society for Urban Informatics (ISUI), for his project 'Automatic Assessment of Window View Openness for High-rise, High-density Areas using 3D Color Point Cloud.'

Abstract: A high window view openness is preferred by urban dwellers, benefits human physical and mental health, and shows impacts on the real estate market, especially in high-rise, high-density urban areas. Thus, an efficient and accurate assessment of window view openness is significant in examining the disparity of sharing of window view openness at the urban scale. Recently, researchers have assessed view distance as a proxy to model window view openness through visibility analysis. However, the assessment is neither inaccurate nor inefficient. First, current assessments often use oversimplified 2.5D/3D models to represent real urban landscapes. Thereafter, the consistently solid surface modeling for all landscape elements overlooks the visual permeability of porous greenery in real urban landscapes. Last,

current visibility analysis tools cannot process high-resolution 3D city information models efficiently, e.g., urban point clouds. This project aims to present both efficient and accurate assessment of window view distance based on color point clouds. First, a Window View Distance Index (WVDI) is defined regarding the visual permeability of greenery. Then, we present an automatic quantification method for WVDI using 3D semantic segmentation and OpenGL rendering on urban-scale point clouds. Preliminary experimental tests in To Kwa Wan, Kowloon, Hong Kong, confirmed that our method was both i) more accurate regarding visual permeability modeling of greenery and ii) efficient (4,000 times faster) using GPU-driven OpenGL rendering than traditional CPU-driven visibility analysis. The proposed approach can be applied in computing urban-scale window view distance for housing selection and valuation, local improvement of urban density, and overall optimization of window view distance for architectural design.



SCIC is an international event under the Smart City Research and Innovation Scheme of ISUI that aims to strengthen academic curiosity and enquiry-based learning among university students in the field of smart city and urban informatics.

3. MUA graduates

- Alan Cheung, Gladys Lai, Lily Leung, Jenny Li, Sophie Tsang and Kenny Yiu (MUA 2022) published the following article in the Hong Kong Institute of Planners Journal in April 2023:

Cheung, A., Lai, G., Leung, L., Li, J., Tsang, S., & Yiu, K. (2023). Camping, but not Tampering. *Planning and Development*, 36.

The students won the Champion of the GIS Competition (Open Category) 2022, organised by the Development Bureau, HKSAR Government.



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Student Corner Camping, but not Tampering – Identifying Potential Campsites with Spatial Analysis to Avoid Excessive Camping in Hong Kong

Authors:
CHENG Kwok Yin, Alan
LAI Eze Wing, Shatyn
LIANG Yi Tai, Lily
LI Pak Yee, Jenny
TSENG Kiu Sin, Sophie
TSE Kiu Wan, Kenny

Alan Cheng, Gladys Lai, Lily Liang, Jenny Li, Sophie Tsang and Kenny Yiu have completed the Master of Science in Urban Analytics at the Department of Urban Planning and Design, the University of Hong Kong when this piece was written. The authors are composed of multidisciplinary professionals working in the public and private sectors, with Kenny, Gladys and Lily being land surveyors, Alan as a registered architect, Sophie as a GIS analyst and Jenny as a civil engineer.

1. Introduction

Hong Kong is an international metropolis providing prime financial, legal, trading, secretarial and consultation services to the world. Through urbanisation in the past decades, Hong Kong stands at the top tier of the world's economy, but meanwhile private dwellings, major infrastructure and development are fast destroying the natural

parkland and beautiful outlying islands and rural areas for the public's enjoyment.

Triggered by the pandemic, overseas vacation becomes luxurious in terms of time and costs. All sorts of staycation as part of our daily life emerges for indoor and outdoor environments. Camping becomes one of the most popular



Figure 1.1: Trend of Camping in Hong Kong (Source: Google and Instagram)

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4. Professor Shenjing He

- was invited to give keynote speeches at the 5th Summer Institute of Cutting-edge Human Geography Research, organised by the Guangzhou Institute of Geography, Guangdong Academy of Sciences, on 19-20 August 2023. The Summer Institute accepted 172 trainees out of over 250 applicants, who are teaching or studying in major universities from Mainland China, Hong Kong, Macao, Germany, New Zealand, the Netherlands and the UK.



5. Professor Anthony Yeh

- gave a keynote speech on 'Urban Spatial Information and Modern Urban Governance' at the Annual Conference on Urban Information of the China Association of City Planning (中國城市規劃協會), organised by the China Association of City Planning and Wuhan City Government in Wuhan on 18-19 August 2023. The keynote was delivered in the Opening Ceremony on 18 August, following speeches by Academician Deren Li and Professor Baoxing Qiu (former Deputy Minister of the Ministry of Housing and Urban-Rural Development). There were over 500 participants in the Conference.



6. Professor Anthony Yeh, Dr Si Qiao (PDF) and Mr Maosu Li (PhD Candidate)

- attended the 18th International Conference on Computational Urban Planning and Urban Management (CUPUM) in Montreal, Canada, on 20-22 June 2023.

CUPUM is one of the longest-established and prestigious conference series in urban computing and analytics that was started at the Centre of Urban Studies and Urban Planning (CUSUP) of the University of Hong Kong in 1989. This time in Montreal, Professor Yeh attended the CUPUM Board Meeting and was invited as one of the panellists in the Plenary Panel Session on 'CUPUM According to ChatGPT', to discuss the impacts of AI and ChatGPT on urban planning and planning education. Dr Qiao presented a paper on 'Integrating Big Data and a Travel Survey to Understand the Gender Gap in Ride-Hailing Usage: Evidence from Chengdu, China' (co-authored with Professor Anthony Yeh and Dr Mengzhu Zhang) in 'Track 2: Transport Methods'; and Mr Li presented a paper on 'Efficient Assessment of Window Views in High-rise, High-density Urban Areas Using 3D Color City Information Models' (co-authored with Dr Fan Xue and Professor Anthony Yeh) in 'Track 4: Three-dimensional Planning 2'.



Professor Anthony Yeh (far left) as one of the panellists in the Plenary Panel Session on 'CUPUM According to ChatGPT'

7. Joint Research Seminar with China Academy of Urban Planning and Design

- was held at CAUPD's headquarters in Beijing on 30 June 2023. During the event, Professor Peng Gong (Vice President, HKU) and Dr Kai Wang (President, CAUPD) delivered keynote speeches on 'The Paradigm Shifts in Urban Planning'. Additionally, Professor Shenjing He, Dr Weifeng Li, Dr Jiangping Zhou, Dr Jianxiang Huang, Dr Xiaohu Zhang, Dr Tianren Yang, Dr Jin Zhu, and six other senior colleagues presented their research, focusing on three key themes within the paradigm shift of the field, namely, liveable urban-rural planning, planning for sustainability, and smart planning. Following the sharing session, a discussion involving over 20 colleagues from both sides took place. The conversation centred around future collaborations on research, teaching and knowledge exchange.



8. Joint Research Seminar with CAUPD-SZ on Twin City Development

- was coordinated by the China Academy of Urban Planning and Design, Shenzhen Branch (CAUPD-SZ) and DUPAD on 25 July 2023. The event aimed to promote dialogue and foster collaboration between the two institutions, with a particular focus on facilitating the development of twin cities. During the event, Professor Shenjing He (DUPAD) and President Yu Fang (CAUPD-SZ) delivered keynote speeches on the unique team advantages that could be harnessed through this collaboration. Additionally, Dr Weifeng Li, Dr Tianren Yang, Dr Xiaohu Zhang and Dr Jin Zhu shared their specific research and pinpointed areas of interest that could benefit from collaborative endeavours. Two senior managers from CAUPD-SZ shared their views on smart planning and provided an overview of their current projects. The event concluded with an engaging discussion on potential areas of collaboration in research, teaching and knowledge exchange. This seminar signifies the first of many steps towards a stronger partnership between DUPAD and CAUPD-SZ.



9. Meeting with HKSAR's Spatial Data Office

- Delegates from the Spatial Data Office of the Development Bureau, HKSAR Government, were warmly welcomed at DUPAD for a discussion on potential collaborations in research, teaching and knowledge exchange. The meeting was initiated by Mr Yue Chun Chan, who provided an insightful introduction to the Hong Kong Common Spatial Data Infrastructure in the meeting. He elaborated on its wide-ranging applications, both within the industry and academia. A host of attendees, including Professor Shenjing He, Dr Jiangping Zhou, Dr Alain Chiaradia, Dr Kyung-Min Nam, Dr Xiaohu Zhang, Dr Alec Kirkley, Dr Cui Guo, Dr Jun Ma and Dr Tianren Yang, together with Mr Ben Chan (Former Deputy Director of Lands Department), Ms Amy Wong (Senior Land Surveyor), Mr Mark Tse (Senior Land Surveyor) and Ms Tammy Ho (Land Surveyor, a DUPAD alumna) joined the meeting, which underscored the

importance of collaboration and shared knowledge in the fields of urban data analytics and modelling.



10. Joint Research Seminar with SYSU SGP

- was held on 7 September 2023, between DUPAD and the School of Geography and Planning (SGP) of Sun Yat-sen University (SYSU) in Guangzhou. The Seminar aimed to promote research collaboration and knowledge exchange between the two institutions. Professors Shenjing He (DUPAD) and Ye Liu (SGP) delivered keynote speeches emphasising the mutual benefits of the partnership. After the speeches, attendees engaged in a lively discussion identifying potential collaborative projects in areas such as funding applications, conferences and student exchanges. The seminar concluded with a campus talk where SYSU professors introduced career opportunities to over 20 DUPAD students. Professor Liu outlined SYSU's recruiting priorities while other professors provided additional details. The seminar and campus talk both signified important steps towards a stronger partnership between HKU DUPAD and SYSU SGP.



11. Alain Chiaradia and Sid Khakhar

- led comparative experiential workshops in Hong Kong, Sha Tin New Town and Central, as part of the 'Walking with Wheels in New Town' in collaboration with HKIUD (Barry Wilson), MIT Node (Sunnie Lau), Tongji University's CAUP (Professor Lingzhu Zhang), CityU's Department of Architecture and Civil Engineering (Professor Gianni Talamini and Professor Louie Sieh), and CUHK's School of Architecture (Professor Jeroen van Ameijde). The workshops aimed to bring sustained attention, increased understanding and empathy while designing products, services, and environments for ageing in high-density built environments dominated by 'integrated' public transport. Using props such as an 'elderly suit' (provided by Eldpathy, which gives the wearer some idea of the physical challenges an elderly person may face), a wheelchair, and a wheeled suitcase, master's students of Urban Design and Transport, Urban Design, Urban Design and Regional Planning undertook journeys that reflect everyday origin-destinations, such as to and from the public transport stops and interchanges (Sha Tin MTR Station and Sha Tin Wai MTR Station, Central MTR and Hong Kong MTR Stations and their respective Public Transport Interchanges). Design thinking sessions to generate interventions in response to journey experiences followed each of the experiential workshops.

In all the workshops across all localities, the participants found it difficult or extremely difficult to navigate their volumetric indoor-outdoor journeys due to inconsistent signage and limited, hard-to-find, or hard-to-access options for step-free access, especially where there was a need to change levels to reach elevated walkways or public transport interchanges. Step-free access is sometimes via 'undignifying' goods lifts or service entrances located out of the way. In any case, the number of these route options is usually very limited. Traversing the ground level on wheels can be extremely frustrating in locations where pedestrian access is designed to be on elevated walkway levels. In one case, a small misreading point of a map led to a journey of 42 minutes to travel a mere distance of 500 metres. Once on the walkways, however, surfaces and access are usually smooth, with the exception of having to open non-automated doors to enter some buildings. Various routing software were used (HKeMobility, Google map, Baidu), which showed incompleteness and poor usability (The elderly-suit includes glasses that simulate presbyopia and age-related macular degeneration). Given the pervasiveness and consistency of road signage overall, double standards apply for walking with wheels in Sha Tin new town contexts, where signage is inconsistent and unhelpful. In Central and Hong Kong Stations, located in an international financial and shopping district, navigation is just as difficult.



12. Joint Workshop with Peking University

- Professor Shenjing He, Dr Weifeng Li, Dr Jiangping Zhou and Dr Tianren Yang, together with 10 PhD students from DUPAD, took part in a joint workshop on territorial spatial planning with Peking University (PKU), from 28 June to 6 July 2023. The event aimed to enhance communication and collaboration between HKU and PKU, comprising seminars, lectures, field trips and student group projects. During the seminar sessions, faculty members from both universities engaged in in-depth discussions on topics such as curriculum design, training approaches, career prospects for students, research accomplishments and collaborative opportunities in the field of urban planning. The student group projects on rural revitalisation involved 16 participants from both universities, providing a platform for valuable exchanges and interactions among the students. This workshop was supported by China's Ministry of Education (China 10,000 Exchange Programme – PIs: Professor Linlin Dai [PKU] and Dr Tianren Yang [HKU]).



13. HKU-PKU Joint Summer School in Urban Science

- was organised on 11-13 July 2023 by DUPAD and the School of Urban Planning and Design (SUPD) at Peking University (PKU). The event was attended by Professor Fulong Wu from UCL, Professor Anthony Yeh, Professor Shenjing He, Dr Weifeng Li, Dr Jiangping Zhou, Dr Jianxiang Huang, Dr Zhan Zhao and Dr Tianren Yang from HKU, as well as Professor Pengjun Zhao (Dean) and five other academic faculty members from PKU. Twenty-five master's students were selected from over 200 applicants across China to participate in this three-day summer school during which they engaged in enriching exchanges with the teachers. The event featured a diverse mix of lectures, symposiums and field trips, with topics centring around smart cities, regional development, resilient cities and urban governance.

Field trips provided the students with hands-on learning experiences in Hong Kong, where they conducted thorough investigations of two typical urban renewal projects, namely Tai Kwun and Central Market. They also visited the City Gallery to gain a deeper understanding of the historical context and future development direction of Hong Kong's urban planning. Additionally, the students engaged in research-oriented discussions with Dr Chinmoy Sarkar, Dr Jun Ma, Dr Xiaohu Zhang, Dr Cui Guo and Dr Creighton Connolly during their HKU campus visit.



Centre of Urban Studies and Urban Planning

1. Alain Chiaradia

- was invited to the GOTech – Smart City Conference: Smart Cities Across the World: A Line in the Desert, A Loop In the Sky, and A Network Underground on 14 July 2023, as the keynote speaker and a panellist.

His keynote: '0 to 1 Smart City and Neighbourhood, What to Learn?' presented a review of the emerging research on Smart City evaluation frameworks.

The other panellists included: Mr Gilad Rosenzweig, Executive Director, MITdesignX; Mr Ricky Sandhu, Founder and Executive Chairman, Urban-Air Port Ltd; Mr Dominik Cajochen, Head of Market + Operations, Cargo sous terrain; Mr Lee Yun Sheng, Senior Industry Solutions Expert, APAC Enterprise Government and Public Utilities Account Department, Huawei.

The GOTech – Smart City Conference was part of the [Business GOVirtual Hong Kong: Expo and Conference](#), held at the Hong Kong Convention and Exhibition Centre on 12-14 July 2023.

Conference Programme: <https://www.govirtualexpohk.com/conference-about>



- has published the following papers:
 - (i) **Chiaradia, A., & Sieh, L. (2023).** From polycentric to 15-minute city, scalar of urban design and transport: walking, waiting and riding. *Time + Architecture: Decoding Volumetric City: Measuring the Complexity of Urban Space* (In Chinese), 2, 14-21. <https://doi.org/10.13717/j.cnki.ta.2023.02.014>

Abstract: *The task of a city design as a service to society while avoiding adverse consequences can be achieved through a combination of individual*

effort and centralised control. This design task is particularly challenging in rapid urbanisation in an era of climate change and demographic transformation, as cities adopt normative imperative to create resilient, sustainable, cohesive, and liveable environments for their populations. Urban design and transport concepts such as polycentric urban development, network urbanism, transport-oriented development, volumetric urbanism, and the fifteen-minute city are proposed to stimulate positive change and contribute to the quality of life in urban settings. This short review defines and contextualises these concepts to emphasise structural and spatial overlap and interdependencies from the point of view of an empirically remotivated understanding of journey time and the implicit multimodality scalar of urban polycentric development analyses. As multiplex volumetric urbanism integrative strategies, we argue that walking, waiting, and riding are the urban design and transport scalars that need design care from network urbanism, including landscape ecological urbanism.

- (ii) Khakhar, S., Zhang, L., & Chiaradia, A. (2023). Comparing walk score, walking and accessibility. *Time + Architecture: Decoding Volumetric City: Measuring the Complexity of Urban Space* (In Chinese), 2, 22-29. <https://doi.org/10.13717/j.cnki.ta.2023.02.022>

Abstract: Taking Sha Tin new town in Hong Kong, this study compares the bi-variables correlation between simulated accessibility using a 3D pedestrian network analysis, a recently developed 3D walkability scoring system based in Hong Kong and actual pedestrian flow levels as walking revealed preferences. A low coefficient of determination was found between walking flow level and HK walk score ($r^2 = 0.11$), while Hybrid betweenness 400m along the network was aligned with previous results ($r^2 = 0.57$). Network analysis' relative ease of use for the evaluation of existing and projected conditions are discussed.

2. Professor Shenjing He

- has published the following papers:

- (i) Li, C., & He, S.* (2023). 'Carrot and stick' approach to housing demolition and relocation under flexible authoritarianism in urban China. *Humanities and Social Sciences Communications*, 10(1), 1-9. <https://doi.org/10.1057/s41599-023-01807-7>

Abstract: In the context of the reconfigured state-society relation, Chinese states' modes of crisis management have profoundly transformed, featuring the state's greater efforts in reconciling the conflicts among the state machinery of capital accumulation, political stability maintenance and the increasingly diversified societal needs. However, how the local state

performs specific missions accordingly in handling day-to-day conflicts on the ground remains under-examined. Accounting for the mundane yet nontrivial conflict resolving strategies featuring ‘carrot and stick’ approach, this article aims to fill this gap by examining the underlying logic, the operational mechanism, and the socioeconomic implications of flexible authoritarianism at the local level, based on an empirical investigation on how local state handles nail households in housing demolition and relocation in Dalian, China. We define ‘carrot and stick’ approach as a manifestation of flexible authoritarianism on the ground, which employs a variety of formal and informal strategies as well as administrative and market instruments to handle nail households-induced conflicts that are constitutive of the renewed state-society relation. This study reveals that the ‘carrot and stick’ approach under flexible authoritarianism has been rationalized as an efficient way for the local state to maintain political and social stability whilst sustaining the momentum of economic growth, thus widely employed in China. This research deepens our theoretical and empirical understanding of the dynamic state-society relation and flexible authoritarianism, and offers a detailed interpretation of why and how such hybrid and flexible ‘carrot and stick’ approach is rendered inevitable under the current politico-economic environment, power structure, legal and institutional configuration in urban China.

- (ii) Yan, X., & He, S.* (2023). Healthcare in cumulatively caused migration: Hong Kong residents’ perceived Mainland healthcare quality and migration intentions in the Greater Bay Area, China. *Habitat International*, 136, 102828. <https://doi.org/10.1016/j.habitatint.2023.102828>

Abstract: *The complex role of healthcare in migration has not been fully understood in existing studies, which are largely limited to the simple examination of migration behaviors associated with the uneven distribution of healthcare services. This study provides a more nuanced understanding by considering the subjective dimension of healthcare quality as an important part of the cumulative causation of migration thesis. We argue that migration behaviors and perceived healthcare quality in the destination are mutually constitutive, entailing a continuous reproduction process of migrations with heterogeneous patterns across social groups. These ideas are explored in the context of the Greater Bay Area, wherein Mainland healthcare quality has long been a major concern for Hong Kong residents’ migration decisions. Based on structural equation modeling analysis of 3,500 responses from a survey of Hong Kong residents conducted in 2020, we found significant conditional mediating effects of perceived Mainland healthcare quality in reproducing HK-to-Mainland migrations. Recent living experiences and migration networks in Mainland are associated with positive perceptions of Mainland healthcare quality, which further enhance future migration intentions. This effect was uneven among HK residents and*

conditional upon individuals' socio-economic status – weakened by a higher education level while non-linearly affected by household incomes. This study enriches the understanding of healthcare-impacted migrations and foregrounds the fundamental role of social infrastructure in facilitating and consolidating regional development.

- (iii) Shan, L., **He, S.***, & Wan, C. (2023). Unraveling the dynamic Airbnb-gentrification interrelation before and after the COVID-19 Pandemic: Evidence from Beijing, China. *Cities*, 137, 104270. ISSN 0264-2751. <https://doi.org/10.1016/j.cities.2023.104270>

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”.*

3. Dr Si Qiao (Post-doctoral Fellow) and Professor Anthony Yeh

- have published the following paper:

Qiao, S., & Yeh, A. G. O. (2023). Understanding the Effects of Environmental Perceptions on Walking Behavior by Integrating Big Data with Small Data, *Landscape and Urban Planning*, 240, 104879. <https://doi.org/10.1016/j.landurbplan.2023.104879>

Abstract: *Human-perceived landscape and amenities are not equivalent to the objective physical world. Traditional big data research that only uses objectively measured environments based on point-of-interest data has difficulty capturing*

the effect of human environmental perceptions on walking behavior. We proposed a conceptual framework to examine the effect of human perception on walking behavior by integrating travel trajectories from the “big data” derived from mobile phones and “small data” obtained from a questionnaire survey of residents living in Chengdu, China. Results show that the human subjective perceived environment is inconsistent with the objectively measured built environment. The walking behavior of individuals is completely regulated by their personal perception of the surrounding environment. Moreover, enhancing the environmental design of pathways leading to retail shops, recreational areas, and shopping centers could significantly enhance perceived accessibility and foster a more pedestrian-friendly neighborhood.

4. Dr Zhan Zhao

- has published the following paper with RPg students Yuebing Liang, Fangyi Ding and Guan Huang

Liang, Y., Ding, F., Huang, G., & Zhao, Z.* (2023). Deep trip generation with graph neural networks for bike sharing system expansion. *Transportation Research Part C: Emerging Technologies*, 154, 104241. <https://doi.org/10.1016/j.trc.2023.104241>

Abstract: *Bike sharing is emerging globally as an active, convenient, and sustainable mode of transportation. To plan successful bike-sharing systems (BSSs), many cities start from a small-scale pilot and gradually expand the system to cover more areas. For station-based BSSs, this means planning new stations based on existing ones over time, which requires prediction of the number of trips generated by these new stations across the whole system. Previous studies typically rely on relatively simple regression or machine learning models, which are limited in capturing complex spatial relationships. Despite the growing literature in deep learning methods for travel demand prediction, they are mostly developed for short-term prediction based on time series data, assuming no structural changes to the system. In this study, we focus on the trip generation problem for BSS expansion, and propose a graph neural network (GNN) approach to predicting the station-level demand based on multi-source urban built environment data. Specifically, it constructs multiple localized graphs centered on each target station and uses attention mechanisms to learn the correlation weights between stations. We further illustrate that the proposed approach can be regarded as a generalized spatial regression model, indicating the commonalities between spatial regression and GNNs. The model is evaluated based on realistic experiments using multi-year BSS data from New York City, and the results validate the superior performance of our approach compared to existing methods. We also demonstrate the interpretability of the model for uncovering the effects of built environment features and spatial interactions between stations, which can provide strategic guidance for BSS station location selection and capacity planning.*

5. Mr Maosu Li (PhD student), Professor Anthony Yeh (DUPAD) and Dr Frank Xue (REC)

- won the Best Conference Paper Award (1st Place) at the Global Smart Cities Summit cum the 3rd International Conference on Urban Informatics, organised by the International Society for Urban Informatics (ISUI) at the Hong Kong Polytechnic University on 20-23 August 2023. The winning paper is titled 'CIM-WV: A 2D Semantic Segmentation Dataset of Rich Window View Contents in High-rise, High-density Areas Based on Photorealistic City Information Models (CIM)'.

More information: <https://www.isocui.org/#/awards/icui2023>



Professor Anthony Yeh and Mr Maosu Li received the Award Certificate from Professor John Shi, President of International Society for Urban Informatics (ISUI)

The paper presented the first public CIM-generated photorealistic window view dataset together with publicly accessible deep learning models, which aim to unlock window view-based applications at the urban scale. This can be used for precise real estate valuation, assessment of multi-level built environment, and window view-related urban analytics.

The Global Smart Cities Summit cum the 3rd International Conference on Urban Informatics is one of the leading conferences on Urban Informatics and Smart Cities, which connected global scholars and industry professionals biannually in Hong Kong.

Among more than 200 submitted paper abstracts and full-length conference papers, 10 papers were nominated for Best Paper Awards. The paper by Maosu, Professor Yeh and Dr Xue ranked first among the 10 best papers for its highly recognised innovation.

6. Professor Anthony Yeh

- received the [Outstanding Achievement in Urban Informatics Award](#) from the International Society for Urban Informatics (ISUI) in the Opening Ceremony of the Global Smart Cities Summit (GSCS 2023) cum the 3rd International Conference on Urban Informatics (ICUI 2023) that was held at the Hong Kong Polytechnic University on 21 August 2023.

The Award was presented by Professor Dong Sun, Secretary for Innovation, Technology and Industry, HKSAR Government. Professor Yeh also delivered a keynote speech on 'Urban Big Data and Urban Planning' on 23 August 2023. Other keynote speakers included Professor Michael Batty (UCL), Professor Michael Goodchild (UCSB), Professor Jianya Gong (WHU), Professor Renzhong Guo (SZU), Professor Carlo Ratti (MIT) and Professor Ying Jin (UC).



Professor Yeh (third from the right) received the Outstanding Achievement in Urban Informatics Award from Professor Dong Sun (second from the left), Secretary for Innovation, Technology and Industry, HKSAR Government

Future Urbanity & Sustainable Environment (FUSE) Lab

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

- have their greenspace exposure research '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, 4363' reported by RTHK's news documentary TV programme *Hong Kong Connection*. Dr Chen was interviewed in [the episode](#).



- have published the following paper:

Wu, Shengbiao, Chen, B.* , Webster, C., Xu, B., & Gong, P. (2023) Improved human greenspace exposure equality during 21st century urbanization. *Nature Communications*, 14, 6460. <https://doi.org/10.1038/s41467-023-41620-z>

Abstract: Greenspace plays a crucial role in urban ecosystems and has been recognized as a key factor in promoting sustainable and healthy city development. Recent studies have revealed a growing concern about urban greenspace exposure inequality; however, the extent to which urbanization affects human exposure to greenspace and associated inequalities over time remains unclear. Here, we incorporate a Landsat-based 30-meter time-series greenspace mapping and a population-weighted exposure framework to quantify the changes in human exposure to greenspace and associated equality (rather than equity) for 1028 global cities from 2000 to 2018. Results show a substantial increase in physical greenspace coverage and an improvement in human exposure to urban greenspace, leading to a reduction in greenspace exposure inequality over the past two decades. Nevertheless, we observe a contrast in the rate of reduction in greenspace exposure inequality between cities in the Global South and North, with a faster rate of reduction in the Global South, nearly four times that of the Global North. These findings provide valuable insights into the impact of urbanization on urban nature and environmental inequality change and can help inform future city greening efforts.

2. Dr Binley Chen and Dr Shengbiao Wu

- have published the following paper:

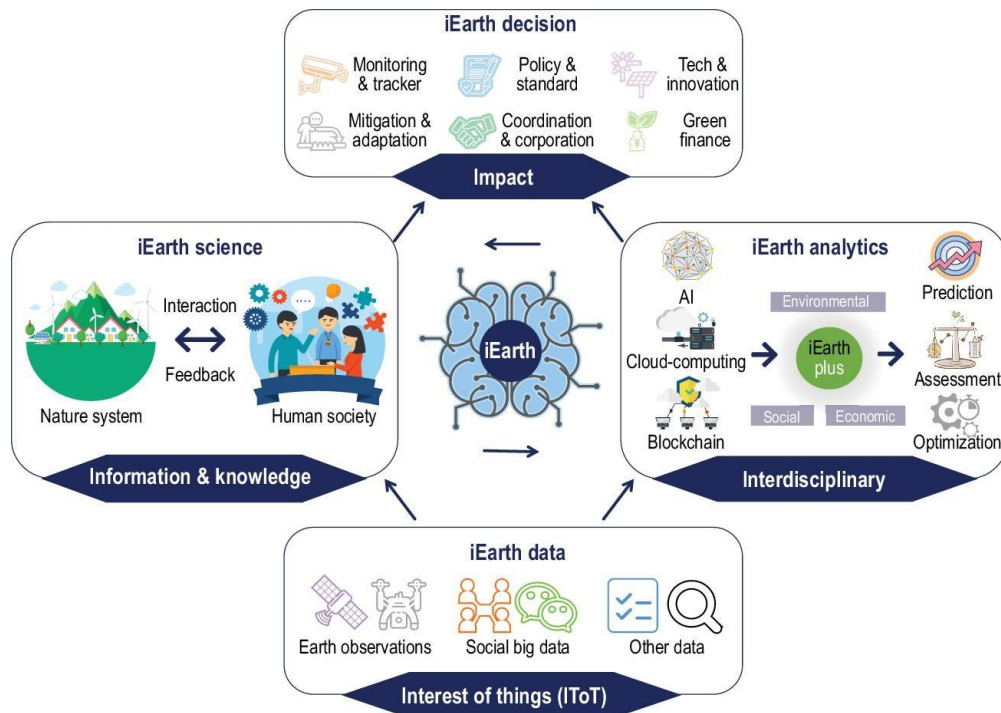
Wei, H., **Chen, B.***, **Wu, S.**, & Xu, B. (2023). Impact of early heat anomalies on urban tree cooling efficiency: Evidence from spring heatwave events in India. *International Journal of Applied Earth Observation and Geoinformation*, 120, 103334. <https://doi.org/10.1016/j.iag.2023.103334>

Abstract: *India's heat waves have recently led to huge losses to the natural ecosystem and human society, and are projected to occur earlier and more frequently in the future. Frequent heat waves around the world in recent years highlight the emerging need for heat mitigation in sustainable urban development. Urban greening has been widely recognized as an effective nature-based solution to mitigate thermal stress. However, knowledge of how recent early heat anomalies affect the growth of urban trees and their cooling efficiency (CE) remains unclear. To inform this issue, here we compared the trees' growth status and CE in 2022 spring heatwave period to that of the same period in 2019–2021 in New Delhi and Haryana, India as a natural experiment, to investigate the relationship between early heat anomalies and urban trees' CE. Results showed that (1) the 2022 warm spring increased the greenness (reflected by Normalized Difference Vegetation Index-NDVI) of urban trees and advanced urban trees' growing stage, but more warming effects of urban trees with higher coverage were observed, which is related to the water use. (2) Interannual pattern of the urban trees' CE in 2022 was different from that of 2019–2021, which is attributed to the changing meteorological variables, i.e., air temperature, precipitation and wind speed from global model Climate Forecast System (CFS), especially the air temperature, and the biophysical responses of trees, using evapotranspiration (ET) as a proxy. We advocate planting more trees in areas with low tree cover percentage, equitable water usage within cities, and more effective thermal mitigation measures are expected to play a sustainable and significant role at the forefront of climate change's worst impacts. Meanwhile, local trait database and field observation data are essential for the selection of urban trees adaptable and climatically useful in extreme heat events in Indian cities.*

3. Dr Binley Chen

- has published the following paper:

Gong, P.*, Guo, H.*, **Chen, B.**, Chen, F., He, G., Liang, D., Liu, Z., Sun, Z., Wu, J., Xu, Z., Yan, D., & Zhang, H. (2023). iEarth: an interdisciplinary framework in the era of big data and AI for sustainable development. *National Science Review*, nwad178. <https://doi.org/10.1093/nsr/nwad178>



Conceptualized framework of intelligent Earth (iEarth)

- was invited to give a keynote speech about 'Geospatial Big Data in Support of Sustainable Urban Environment' at the 1st Youth Forum on Digital Earth, organised by the International Society of Digital Earth, in Beijing on 21-23 August 2023.



- received the International Society of Digital Earth Young Scientist Award.



- received [Big Earth Data: Best and Outstanding Paper Award 2021](#) for his paper, entitled 'Mapping essential urban land use categories (EULUC) using geospatial big data: Progress, challenges, and opportunities'.

4. Dr Shengbiao Wu

- received the 2023 Association of American Geographers (AAG) Early Career Scholar in Remote Sensing Award.



- has been appointed as Associate Editor for two academic journals: *Humanities and Social Sciences Communications* and *Frontiers in Remote Sensing*.

Healthy High Density Cities Lab

1. Dr Rong Zhang (PhD 2023), Dr Yvonne Lai, Dean Chris Webster and Dr Chinmoy Sarkar

- have the following paper accepted:

Zhang, R., Lai, K. Y., Liu, W., Liu, Y., Ma, X., Webster, C., Luo, L.* & Sarkar C.* (2023). Associations Between Short-term Exposure to Ambient Air Pollution and Influenza: An Individual-level Case-crossover Study in Guangzhou, China. *Environmental Health Perspectives* (accepted).

Abstract:

Background: Influenza imposes a heavy burden on public health. Little is known, however, of the associations between detailed measures of exposure to ambient air pollution and influenza at an individual level.

Objective: We examined individual-level associations between six criteria air pollutants and influenza using case-crossover design.

Methods: In this individual-level time-stratified case-crossover study, we linked influenza cases collected by Guangzhou Centre for Disease Control and Prevention from January 1, 2013, to December 31, 2019 with individual residence-level exposure to PM_{2.5}, PM₁₀, sulfur dioxide (SO₂), nitrogen dioxide (NO₂), ozone (O₃) and carbon monoxide (CO). The exposures were measured on the day of onset of influenza symptoms (lag0), 1-7 days before the onset (lags 1-7), as well as an eight-day moving average (lag07). 200m X 200m gridded individual-level exposures to ambient air pollution were estimated using a random forest model and linked to subjects' home addresses. Conditional logistic regression was developed to investigate the associations between short-term exposure to air pollution and influenza, adjusting for mean temperature, relative humidity, population mobility and community influenza susceptibility.

Results: N=108,479 eligible cases were identified in our study. Every 10 g/m³ increase in exposure to PM_{2.5}, PM₁₀, NO₂, CO and every 5 g/m³ increase in SO₂ over 8-day moving average (lag07) were associated with higher risk of influenza with relative risk of 1.028 (95%CI: 1.018-1.038), 1.041 (95%CI: 1.032-1.049), 1.169 (95%CI: 1.151-1.188), 1.004 (95%CI: 1.003-1.006) and 1.134 (95%CI: 1.107-1.163) respectively. There was a negative association between O₃ and influenza with a relative risk of 0.878 (95%CI: 0.866-0.890).

Conclusions: Our findings suggest that short-term exposure to air pollution is associated with greater risk for influenza, except for ozone. Further studies are necessary to decipher underlying mechanisms and design preventive interventions and policies.

- have published the following paper:

Zhang R., Lai, K. Y., Liu, W., Liu, Y., Cai, W., Webster, C., Luo, L.* & Sarkar C.* (2023). Association of climatic variables with risk of transmission of influenza in Guangzhou, China, 2005–2021. *International Journal of Hygiene and Environmental Health*, 252, 114217. <https://doi.org/10.1016/j.ijheh.2023.114217>

Abstract:

Background: Climatic variables constitute important extrinsic determinants of transmission and seasonality of influenza. Yet quantitative evidence of independent associations of viral transmissibility with climatic factors has thus far been scarce and little is known about the potential effects of interactions between climatic factors on transmission.

Objective: This study aimed to examine the associations of key climatic factors with risk of influenza transmission in subtropical Guangzhou.

Methods: Influenza epidemics were identified over a 17-year period using the moving epidemic method (MEM) from a dataset of N = 295,981 clinically- and laboratory-confirmed cases of influenza in Guangzhou. Data on eight key climatic variables were collected from China Meteorological Data Service Centre. Generalized additive model combined with the distributed lag non-linear model (DLNM) were developed to estimate the exposure-lag-response curve showing the trajectory of instantaneous reproduction number (R_t) across the distribution of each climatic variable after adjusting for depletion of susceptible, inter-epidemic effect and school holidays. The potential interaction effects of temperature, humidity and rainfall on influenza transmission were also examined.

Results: Over the study period (2005–21), 21 distinct influenza epidemics with varying peak timings and durations were identified. Increasing air temperature, sunshine, absolute and relative humidity were significantly associated with lower R_t , while the associations were opposite in the case of ambient pressure, wind speed and rainfall. Rainfall, relative humidity, and ambient temperature were the top three climatic contributors to variance in transmissibility. Interaction models found that the detrimental association between high relative humidity and transmissibility was more pronounced at high temperature and rainfall.

Conclusion: Our findings are likely to help understand the complex role of climatic factors in influenza transmission, guiding informed climate-related mitigation and adaptation policies to reduce transmission in high density subtropical cities.

2. Dr Yvonne Lai, Dr Chinmoy Sarkar and Dean Chris Webster

- have the following paper accepted for publication:

Lai, K. Y., Sarkar, C., Gallacher, J., & Webster, C. (2023). Associations of urban built environment with cardiovascular risks and mortality: a systematic review. *Journal of Urban Health*, 100, 745-787. <https://doi.org/10.1007/s11524-023-00764-5>

Abstract: *With rapid urbanization, built environment has emerged as a set of modifiable factors of cardiovascular disease (CVD) risks. We conducted a systematic review to synthesize evidence on the associations of attributes of urban built environment (e.g. residential density, land use mix, greenness and walkability) with cardiovascular risk factors (e.g. hypertension and arterial stiffness) and major CVD events including mortality. A total of 63 studies, including 31 of cross-sectional design and 32 of longitudinal design conducted across 21 geographical locations and published between 2012 and 2023 were extracted for review. Overall, we report moderately consistent evidence of protective associations of greenness with cardiovascular risks and major CVD events (cross-sectional studies: 12 of 15 on hypertension/blood pressure (BP) and 2 of 3 on arterial stiffness; and longitudinal studies: 6 of 8 on hypertension/BP, 7 of 8 on CVD mortality, 3 of 3 on ischemic heart disease mortality and 5 of 8 studies on stroke hospitalization or mortality reporting significant inverse associations). Consistently, walkability was associated with lower risks of hypertension, arterial stiffness and major CVD events (cross-sectional studies: 11 of 12 on hypertension/BP and 1 of 1 on arterial stiffness; and longitudinal studies: 3 of 6 on hypertension/BP and 1 of 2 studies on CVD events being protective). Sixty-seven percent of the studies were rated as “probably high” risk of confounding bias because of inability to adjust for underlying comorbidities/family history of diseases in their statistical models. Forty-six percent and 14% of the studies were rated as “probably high” risk of bias for exposure and outcome measurements, respectively. Future studies with robust design will further help elucidate the linkages between urban built environment and cardiovascular health, thereby informing planning policies for creating healthy cities.*

3. Dr Jianxiang Huang, Dr Michael Ni and Dean Webster

- have the following paper accepted for publication:

Shi, J., **Huang, J.**, Guo, M., **Tian, L.**, **Wang, J.**, Wong, T. W., **Webster, C.**, **Leung, G. M.**, & **Ni, M. Y.** (2023). Contributions of residential traffic noise to depression and mental wellbeing in Hong Kong: A prospective cohort study. *Environmental Pollution*, 338, 122641. <https://doi.org/10.1016/j.envpol.2023.122641>

Abstract: *Prior studies on the association between traffic noise and mental health have been mostly conducted in settings with lower population densities. However, evidence is lacking in high population-density settings where traffic noise is more pervasive and varies by topography and the vertical elevation of the residential unit. This study aimed to assess the mental health impact of residential traffic noise in one of the world's most urbanised populations. Data were analysed from 13,401 participants aged ≥ 15 years in a prospective cohort in Hong Kong from 2009 to 2014. Residential traffic noise level was estimated using 3D-geocoding and validated models that accounted for sound propagation in a highly vertical landscape. The 24-h day-night exposure to traffic noise, denoted as Ldn, was estimated with a 10-dB(A) penalty for night hours. Probable depression and mental wellbeing were assessed using the Patient Health Questionnaire-9 and the Short Form Health Questionnaire SF-12v2, respectively. Mixed effect regressions with random intercepts were used to examine the association between traffic noise and mental health outcomes. Residential road traffic noise (for each increment of 10 A-weighted decibels [dB(A)] 24-h average exposure) was associated with probable depression (odds ratio (OR) = 1.17, 95% CI: 1.05, 1.31), and poorer mental wellbeing (mean difference = -0.19, 95% CI: 0.31, -0.06), adjusting for sociodemographics, smoking, body mass index, self-reported health, proximity to green space, and neighbourhood characteristics (average household income, population density, and Gini coefficient). The results were robust to further adjustment for air pollution. In stratified analyses, residential traffic noise was associated with probable depression and poorer mental wellbeing among students and individuals aged 15–34 years. Residential traffic noise was associated with probable depression and poorer mental wellbeing in a highly urbanised setting. As traffic noise is increasing in urban settings, the public health impact of noise pollution could be substantial.*

4. Dr Yvonne Lai

- was selected in the Urban Land Institute (ULI) Health Leaders Network Cohort 6 and participated in the Fall Forum in Berlin, on 19-22 September 2023.



Group photo with ULI Health Leaders of Cohort 6 at the Modellprojekt Haus der Statistik: Development for Public Good, one of the leading urban development projects for common good, climate-friendly and environmental justice in Europe

- visited the Department of Psychiatry, Oxford University, UK, as an Academic Visitor on 4-8 July 2023, during which she presented on the topic of 'Social and Built Environments and Dementia'.



5. Mr Evan Cheung (PhD student)

- received a scholarship to participate in the CODATA-RDA School for Research Data Science and the CODATA-RDA Advanced Workshops for Research Data Science on IoT/Big Data Analytics, held at the Abdus Salam International Centre for Theoretical Physics (ICTP) in Trieste, Italy, from 31 July to 18 August 2023.



1. iLab members

- organised 'The University of Hong Kong-Chongqing University-Hangzhou City University Joint Research Forum' at KB526, Knowles Building, HKU, on 11 July 2023. It aimed to provide a platform for knowledge exchange and collaboration among scholars and foster further collaboration and networking. Three professors, two lecturers, and 27 young researchers participated in the Forum. Ten presenters from the three universities, including four iLab members, showcased their recent studies as indicated below. Professor Wilson Lu (HKU), Professor L.Y. Shen (Chongqing U) and Professor Xiaoling Zhang (CityU) also provided valuable feedback and shared their lessons for future research.

iLab members	Presentation title
Mr Vikrom Laovisutthichai (PhD student, REC, HKPFS)	Design for Excellence (DfX) for Modular Buildings: A Knowledge Management-based Framework
Mr Frank Ato Ghansah (PhD student, REC, HKU-PS)	Critical Challenges of Quality Assurance of Cross-border Construction Logistics and Supply Chain During COVID-19 Pandemic: An International Expert Survey
Mr Liupengfei (Mike) Wu (PhD student, REC)	A Blockchain Smart Contract and Oracle-Enabled System for Cross-border Modular Integrated Construction Supply Chain Management
Mr Liang (Lanny) Yuan (PhD student, REC)	Data-driven Waste Management: Prediction of Illegal Dumping by Using Geographically Weighted Regression



- welcomed a research group led by Professor Guiwen Liu (Vice President of Chongqing University) from the Department of Construction Management, Chongqing University, on 14 July 2023. Professor Wilson Lu first gave a welcome speech to the visitors. Representatives from iLab, including Mr Liupengfei Wu, Mr Liang Yuan and Mr Ziyu Peng, introduced their research

highlights, respectively, on 'Digital Construction Management: BIM, Blockchain, and Smart', 'Construction Waste Management: Circular Construction and Urban Symbiosis' and 'Generative DfX'. The representatives from Chongqing University also gave presentations: 'Digital Driven Smart Transformation of the Construction Industry' by Professor Chao Mao, 'Intelligent Parsing of Construction Vision Data: Principles and Methods' by Dr Huan Liu, and 'A Machine Learning Aided Approach for Classifying the Housing Structural Safety Management' by Dr Neng Wang. The knowledge exchange provided a platform for research discussion and collaboration between Mainland and Hong Kong universities.



- visited Gammon Construction Limited on 31 July 2023. In the round-table discussion, the representative of Gammon first reviewed the company's past collaboration with iLab and introduced the prospects of the construction industry. Professor Wilson Lu and Dr Junjie Chen then gave a presentation on iLab's current research progress and achievements. The team also visited the Digital & Innovation Centre, presented by the Gammon Digital Team and the BIM Cave. This visit aimed to exchange knowledge and promote the iLab's research results in the industry.



- welcomed representatives from The ICAC and HKU Estates Office on 2 August 2023, in which Professor Wilson Lu introduced the MiC trilogy as used in the HKU Wong Chuk Hang Student Residence and High West student hostel.
 - e-InStar: for remote e-inspection of MiC quality in the factory
 - e-TranStar: for e-monitoring MiC logistics on the road
 - e-InstallStar: for e-planning and monitoring MiC installation

The visitors then tried on the above three mobile applications.



- welcomed Professor Bin Chen, Professor Delin Wang and Dr Saige Wang from Beijing Normal University on 4 September. They gave a talk on 'Resource metabolism of coastal resilient cities'. Professor Wilson Lu then reviewed the exchange activities by iLab members in Beijing Normal University back in July 2023.



2. Dr Junjie Chen

- received a group of visitors from Mainland middle schools led by Professor Yongjun Tang, Professor of Finance and Area Head of Finance, HKU, on 18 July 2023. During the visit, Dr Chen showed them the outstanding research results of iLab, including the MiC three treasures, robotic arms and other technologies.



- visited Tsinghua University Press on 27 June 2023, and was officially appointed as a Young Editor Board Member of the [*Journal of Intelligent Construction \(JIC\)*](#). Newly launched in April 2023, JIC is an international peer-reviewed journal for publishing original research papers, case studies, reviews and comments regarding the use of novel technologies in all domains of civil engineering. The Journal focuses on the application of advanced theories, methodologies, and tools, such as machine learning, sensors, robotics, 5G, internet of things, artificial intelligence, building information modelling, computational methods, etc., in all stages of the construction life cycle.

As a leading publisher in China, Tsinghua University Press has published more than 20 academic journals, many of which attain international recognition and earn an Impact Factor > 5. During the visit, Dr He Chen (Deputy Director of the Journal Center) and Yanqiu Jin (Managing Editor) introduced the history of the publisher and the motivation of launching JIC.

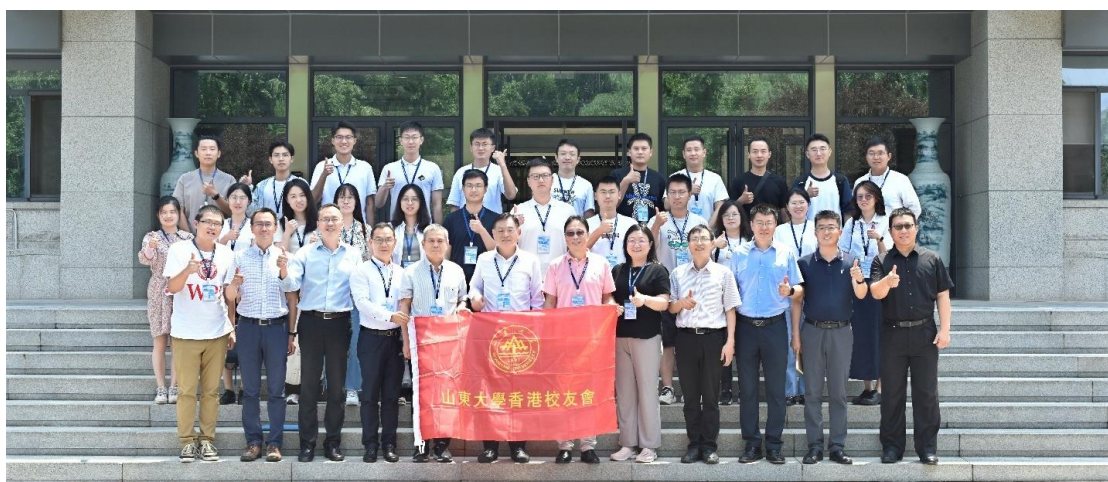


- shared a collaborative project with Leighton Asia in the ConTech Accelerator event on 2 August 2023. In this project, they aim to expand [iLab's MiC Trilogy](#) solution, i.e., e-InStar for quality control, e-TranStar for logistics management, and e-InStallStar for onsite assembly, to boardwalk offsite construction in the Island Eastern Corridor. ConTech Accelerator is jointly launched by the Construction Industry Council (CIC) and the Hong Kong Science & Technology Parks Corporation (HKSTP) to accelerate technology trials and adoption across the construction industry.



3. Ms Zhongze Yang (PhD Year 2 student)

- joined other local PhD students in an exchange study activity in Shandong Province on 22-25 June 2023, during which they paid multiple visits to National Supercomputing Centre in Jinan, Jinan Start-up Area, Shandong University, and Dongyue Fluorine & Silicon Technology Group Co., Ltd.



4. Professor Wilson Lu, Ms Wenjun Gao (PhD student) and Dr Junjie Chen

- were joined by three other PhD students and six undergraduate students to visit Beijing Normal University and Tsinghua University on 25-30 June 2023.

Professor Lu delivered a speech in the opening ceremony, elaborating how the programme overcame external barriers and the significance of reconnecting with leading universities in Mainland China after the COVID-19 pandemic. The six-day visit at Beijing Normal University was a fruitful experience, featuring a series of academic and exploratory activities, including expert lectures, technical modelling courses, thematic workshops, company/project visits, ecological research, panel discussions and presentations. The objectives of the visit were to build bridges between HKU and other universities, exchange talent training methods, provide opportunities for the collision of ideas and brainstorming, and explore potential research collaboration.



At Tsinghua University, the team had a panel discussion with Mr Thomas Ho, Chairman of Construction Industry Council, Mr Kevin O'Brien, CEO of Gammon Construction Ltd, Professor Dongping Fang, Dean of School of Civil Engineering, Tsinghua University, among other industrial leaders and scholarly experts.



Dr Junjie Chen also served as a judge for the 15th Innovation Competition in Construction Engineering and Management (ICCEM15) at Tsinghua University.



5. Dr Frank Xue

- organised the Kick-Off Forum of the ITF project 'Scan-to-BIM Automation System (SBASE) for Built Assets Digitalization in Hong Kong' (ITP/004/23LP) on 3 September 2023, at Knowles Building, HKU. The event was hosted by the Department of Real Estate and Construction with the objective of promoting the application and development of digital technologies such as automated Scan-to-BIM in smart construction, smart BIM, and other related fields. The Forum brought together experts, scholars, teachers, and students from esteemed institutions including Tsinghua University, HKABAEIMA, XenseTech Ltd, GeoSys HK Ltd, HKUST, Huazhong University of Science & Technology, and HKU. It provided a platform for attendees to discuss the latest expertise, knowledge, and advancements in academia and industry, and explored ways in which automatic digital technologies could be used to enhance the construction industry. The knowledge and insights exchanged during the event would serve as a catalyst for future exploration and advancement in the realm of digital technologies, fostering innovation in the construction industry.



- gave a seminar titled 'Design for eXcellence (DfX) with Digital Twins: From Reality Data to Semantic Models to Optimized Design' at the Faculty of Architecture and the Built Environment, TU Delft, Netherlands, on 30 June 2023.



6. Dr Frank Xue and Dr Junjie Chen

- attended the 2023 European Conference on Computing in Construction (EC³ 2023) and the 40th CIB W78 in Greece on 10-12 July 2023, together with eight other iLab members. They made presentations on BIM outputs and impacts, cloud services, and blockchain in buildings and infrastructures.



7. Professor Wilson Lu

- delivered a keynote speech on 'Generative DfX (design for excellence) in high-rise modular buildings: The human and AI ways' at the CRIOCM 28th (2023) International Symposium on 'Advancement of Construction Management and Real Estate', on 5-6 August 2023, Nanjing, China.



- delivered a keynote speech on 'BIM: Lessons learnt and challenges ahead' at the roundtable discussion 'Quality Assurance and Digitalization in the Construction Industry', organised by Asian Development Bank Institute (ADBI) online, on 23 August 2023.



THE UNIVERSITY OF HONG KONG 香港大學



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Roundtable on Quality Assurance and Digitalization in the Construction Industry, 23 August 2023,
Online, Asian Development Bank Institute (ADBI)

BIM: Lessons Learnt and Challenges Ahead

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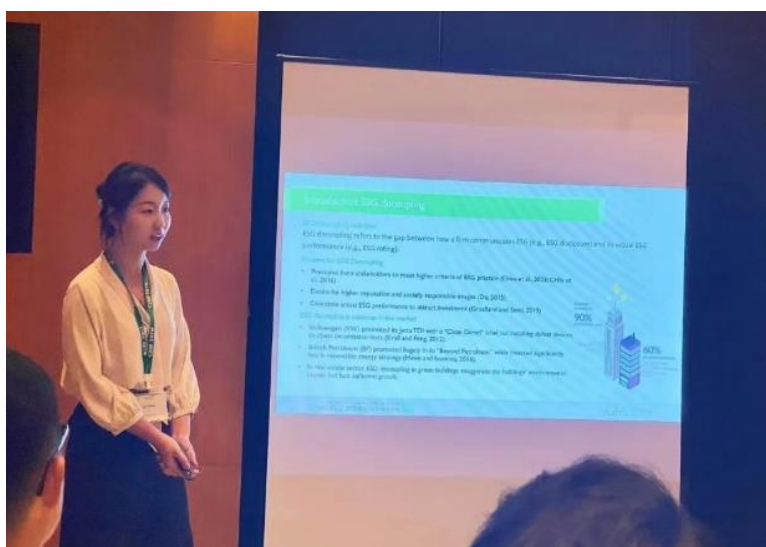


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8. Ms Lu Yang (PhD student)

- served as the discussant in '14AM1-2: AsRES – ESG & Sustainability in Real Estate 1' as part of the 2023 AsRES-GCREC Joint International Real Estate Conference on 14 July 2023, to examine a working paper titled 'Unused housing in urban China and its carbon emission impact' (Zheng et al., 2023). This paper developed a trained deep learning model to discriminate unoccupied houses by classifying photos online. It reached several findings on the unused housing distribution in China and its carbon impact. Yang raised three questions to discuss with the speaker and the audience. The first question was to avoid the bias of this deep learning model and the second and third questions were open questions to discuss the polarising housing supply phenomenon in China. The speaker and audience reacted actively.

Yang also served as a speaker in the '14AM2-6: AsRES – ESG & Sustainability in Real Estate 2' to share her study on ESG decoupling in China. This sharing first introduced the ESG decoupling concept and reasons for firms to engage in ESG decoupling. Several examples were listed to prove ESG decoupling is prevailing in the global market. Later, Yang discussed the relationship between companies' female manager proportion and its ESG decoupling with empirical evidence. The discussant raised several questions and Yang answered them well. In the rest of the Conference, Yang participated in '14PM3-6: AsRES – ESG & Sustainability in Real Estate 3', Opening Ceremony, etc., and actively communicated with other scholars.



- was invited to present her working paper titled 'Selective ESG practices in REITs: from a global perspective', at the Asia Sustainability and ESG Summit 2023 in Bangkok on 18 August 2023. Co-organised by the Hang Seng University of Hong Kong and King Mongkut's University of Technology Thonburi, the Summit aimed to provide a platform for researchers and industry professionals to share research findings and practical insights in the area of ESG integration and business sustainability.

9. Dr Frank Xue and Ms Siyuan Meng (RA, REC)

- won an Outstanding Paper Award with the following conference paper:

Meng, S., Xu, G., Zhang, W., & Xue, F. (2023). Decoding the Past: A Genetic Algorithm-based Method for Extracting Decorative Patterns in Heritage Digital Twins. *Proceedings of the 28th International Symposium on Advancement of Construction Management and Real Estate (CRIOCM2023)*, Springer, in press.



Three more papers were presented at the same conference:

- **Zhao, R. (PhD Year 3), Yang, Z. (PhD Year 3), Liang, D. (PhD Year 3), & Xue, F. (2023).** Automated Machine Learning in the smart construction era: Significance and accessibility for industrial classification and regression tasks. *Proceedings of the 28th International Symposium on Advancement of Construction Management and Real Estate (CRIOCM2023)*, Springer, in press.
- **Wang, J. (PhD Year 2), & Xue, F. (2023).** Emerging trends of ESG in the construction sector: A promising pathway to sustainable and responsible development. *Proceedings of the 28th International Symposium on Advancement of Construction Management and Real Estate (CRIOCM2023)*, Springer, in press.
- **Kong, L. (PhD Year 2), & Xue, F. (2023).** Addressing BIM versioning challenges: A blockchain-ready IFC schema extension for semantic change management. *Proceedings of the 28th International Symposium on Advancement of Construction Management and Real Estate (CRIOCM2023)*, Springer, in press.

10. Professor Wilson Lu and Dr Zhikang Bao (PhD 2022)

- have published the following paper, which is classified as a 'highly-cited paper' by [Web of Science](#):

Bao, Z., & Lu, W. (2023). Applicability of the environmental Kuznets curve to construction waste management: A panel analysis of 27 European economies. *Resources, Conservation and Recycling*, 188, 106667. <https://doi.org/10.1016/j.resconrec.2022.106667>

Abstract: *The environmental Kuznets curve has received widespread attention from researchers and policymakers for its ability to vividly capture the dynamics between economy and environment. While attempts have been made to validate the environmental Kuznets curve and harness its explanatory power in different dilemmatic scenarios (e.g., economic development and greenhouse gas induced climate change), these scenarios do not include construction waste management. Given its impact on economic development and environmental protection, this research investigates whether the environmental Kuznets curve is applicable to construction waste management. We adopt gross domestic product per capita and construction waste generation as economic and environmental indicators, respectively. Considering the stationary and long-term equilibrium effects, a panel dataset derived from 27 European economies is adopted to estimate the inverted-U relationship between gross domestic product per capita and construction waste generation. In the sample economy group, we confirm applicability of the environmental Kuznets curve to construction waste management. This study, therefore, makes a simple but non-trivial theoretical contribution by extending the environmental Kuznets curve to the construction waste management domain. Future studies are recommended to further validate the environmental Kuznets curve using a wider set of economies and longer panel data, and more importantly, to harness its power by implementing it in real-life construction waste management scenarios.*

11. Professor Wilson Lu, Mr Jinfeng Lou and Mr Liupengfei Wu (PhD Year 3 students)

- have the following paper accepted:

Lu, W.S., Lou, J.F., & Wu, L. (2023). Combining smart construction objects (SCOs)-enabled blockchain oracles and signature techniques to ensure information authentication and integrity in construction. *ASCE Journal of Computing in Civil Engineering*. Accepted.

Abstract: *Reliable and accurate information is crucial for decision-making in construction projects. However, stakeholders driven by profit have the potential to manipulate information, compromising information authentication and integrity (IAI). Even worse, digitisation in the construction industry has made IAI*

extremely volatile, e.g., by easily copying, modifying, and falsifying. This study aims to ensure IAI by proposing a four-layer blockchain-based framework for combining smart construction objects (SCOs)-enabled oracles and hash-based digital signature techniques to protect both on-chain and off-chain information. Four deployed smart contracts provide three assurance mechanisms, i.e., signature verification, public data validation, and SCO cross-validation, which have been tested to improve the tampering detection accuracy by 19%, 11% and 27%, respectively. The contribution of this study is to illustrate how a reliable and flexible blockchain oracle system can be established with limited resources to handle the concomitant IAI problem and provide an in-depth understanding of the IAI assurance mechanisms from the proposed framework. Future research can be conducted to reduce the signature size, enhance scalability, and further increase detection accuracy.

12. Mr Frank Ato Ghansah (Year 3 PhD, HKU-PS), Professor Wilson Lu and Mr Benjamin Kwaku Ababio (Year 3 PhD, HKU-PS)

- have published the following paper:

Ghansah, F. A., Lu, W.S., & Ababio, B. K. (2023). Quality assurance of cross-border construction logistics and supply chain during the COVID-19 pandemic: Evidence from the Hong Kong–Mainland China links. *International Journal of Logistics Research and Applications*, 1-21. <https://doi.org/10.1080/13675567.2023.2221180>

Abstract: *This study examines the quality assurance (QA) practices of cross-border construction logistics and supply chain (Cb-CLSC) amid the pandemic by adopting an embedded mixed-method design involving a comprehensive desk literature review and experts across the Hong Kong–Mainland China links. The study revealed 10 critical QA practices, with the top three critical practices comprising ‘understanding requirements, norms, and standards of quality’, ‘assigning clear responsibilities to qualified workers’ and ‘recording and documenting work processes, project routine, and seamless implementations’. This attained a relatively good percentage agreement of 55% between the industry and academia. Sentiment analysis denoted the impacts of the pandemic to be largely neutral, i.e. the created opportunities neutralize the negative impacts. This study deepens the understanding of the subject matter to help practitioners, researchers and policymakers develop innovative approaches and make operational decisions to position QA adequately for the post-pandemic era and endure the risks of future pandemics.*

13. Mr Lang Zheng (RA), Professor Wilson Lu and Ms Qianyun_Zhou (PhD Year 2 student)

- have published the following paper:

Zheng, L., Lu, W.S., & Zhou, Q.Y. (2023). Weather image-based short-term dense wind speed forecast with a ConvLSTM-LSTM deep learning model. *Building and Environment*, 239, 110446. <https://doi.org/10.1016/j.buildenv.2023.110446>

Abstract: Short-term wind speed predication is of great significance for scholars (e.g., understanding wind profiles), practitioners (e.g., building energy management), regulators (e.g., urban microclimate regulation), and even the general public. Current wind speed forecasting methods either generate sparse predictions or occur high cost. This paper reports a novel, inexpensive framework to forecast urban local dense wind speed. The central tenet is a convolutional long short-term memory (ConvLSTM) and LSTM combinatorial deep learning model to learn the features of input historical weather image series coupled with spatial-temporal correlations. The model was trained and tested using Hong Kong datasets. The feasibility and effectiveness of the proposed model are verified and compared with parallel models under different criteria, including mean absolute error (MAE), root mean square error (RMSE) and R-squared (R^2). The experimental results show that: (1) the proposed ConvLSTM-LSTM deep learning model can effectively forecast wind speed regardless of location; (2) the overall MAE, RMSE, and R^2 value of the proposed model are improved by 14.84%, 15.04%, and 7.51%, respectively, compared to the ConvLSTM-full connected (ConvLSTM-FC) model, and by 22.12%, 22.80%, and 12.24%, respectively, compared to the convolutional neural network-LSTM (CNN-LSTM) model; and (3) compared with parallel models, the proposed model has better performance in predicting wind speed series with large amplitude variations and rapid frequency changes.

14. Professor Wilson Lu, Mr Ziyu Peng (PhD Year 3 student), Dean Chris Webster and Mr Liupengfei Wu (PhD Year 3 student)

- have published the following paper:

Lu, W. S., Peng, Z., Webster, C., & Wu, L. (2023). Developing a construction waste material 'passport' for cross-jurisdictional trading. *Journal of Cleaner Production*, 414, 137509. <https://doi.org/10.1016/j.jclepro.2023.137509>

Abstract: By degrading the natural environment and occupying valuable land space, the massive solid waste from construction and demolition activities is looming as a global crisis. Since more than 90% of construction waste is inert and suitable for recycling, promoting waste material cross-border trading is high on the agenda of solving this crisis. However, obstructing this potential trading

is the asymmetric information between stakeholders. Inspired by the ideas of travel passports and the ‘material passports’, this research designs a waste material passport (WMP) to facilitate such cross-jurisdictional trading. It is proposed that the information items such as material types, properties, circularity, handling history, and so on should be included and ready for further expansion. By substantiating it in a semi-hypothetical case study of the Greater Bay Area, China, the WMP is found to be able to reduce information asymmetry in waste trading and cover information gaps to enable a circular economy in the long run.

15. Professor Wilson Lu, Dr Junjie Chen, Mr Yonglin Fu (RA), Mr Yipeng Pan (former RA) and Mr Frank Ato Ghansah (PhD student)

- have published the following paper:

Lu, W., Chen, J., Fu, Y., Pan, Y., & Ghansah, F. A. (2023). Digital twin-enabled human-robot collaborative teaming towards sustainable and healthy built environments. *Journal of Cleaner Production*, 412, 137412. <https://doi.org/10.1016/j.jclepro.2023.137412>

Abstract: *Development of sustainable and healthy built environments (SHBE) is highly advocated to achieve collective societal good. Part of the pathway to SHBE is the engagement of robots to manage the ever-complex facilities for tasks such as inspection and disinfection. However, despite the increasing advancements of robot intelligence, it is still “mission impossible” for robots to independently undertake such open-ended problems as facility management, calling for a need to ‘team up’ the robots with humans. Leveraging digital twin’s ability to capture real-time data and inform decision-making via dynamic simulation, this study aims to develop a human-robot teaming framework for facility management to achieve sustainability and healthiness in the built environments. A digital twin-enabled prototype system is developed based on the framework. Case studies showed that the framework can safely and efficiently incorporate robotics into facility management tasks (e.g., patrolling, inspection, and cleaning) by allowing humans to plan, oversee, manage, and cooperate with the robot via the digital twin’s bi-directional mechanism. The study lays out a high-level framework, under which purposeful efforts can be made to unlock digital twin’s full potential in collaborating humans and robots in facility management towards SHBE.*

16. Mr Ziyu Peng, Professor Wilson Lu and Dean Chris Webster

- have their paper promoted on the *Resources, Conservation & Recycling* journal's Twitter account:



Peng, Z. Y., Lu, W. W. S., & Webster, C. (2022). If invisible carbon waste can be traded, why not visible construction waste? Establishing the construction waste trading 'missing market'. *Resources, Conservation and Recycling*, 187, 106607. ISSN 0921-3449. <https://doi.org/10.1016/j.resconrec.2022.106607>

Abstract: *Of all the solid waste produced by the world's rapidly urbanising regions, a significant proportion flows from construction activities. While construction waste permit trading could incentivise both reduction and recycling, there are no known examples of such trading. Meanwhile, trading carbon permits has been successfully mainstreamed. Drawing on Coase Theorem, our research specifies a cap-and-trade construction waste trading scheme. We investigate various emissions trading schemes to propose and elaborate a preparation-implementation-evolution-review roadmap. In the first step, we decide a waste cap based on social optimum and a benchmarking method to allocate permits. Second, we establish a market that minimises transaction costs. Third, we set up a reward scheme to subsidise low-waste behaviours so that, in the fourth step, the cap can be decreased through regular reviews. Two major risks are identified, namely price volatility and fly-tipping, in response to which we propose a market stability reserve and deposit-refund system, respectively.*

Keywords: *Construction waste management; Cap-and-trade scheme; Carbon trading; Missing market; Coase theorem; Environmental policy*

- have their paper accepted for publication:

Peng, Z.Y., Lu, W.S., Hao, T.P., Tang, X., Huang, J.X., Webster, C. (2023). Cost-aware generative design for urban 'cool spots': A Random Forest-Principal Component Analysis-augmented combinatorial optimization approach. *Energy and Buildings*. <https://doi.org/10.1016/j.enbuild.2023.113317>

Abstract: *Whilst designing cool small neighborhoods (called 'cool spots' in this paper) remains an enormous technical challenge, clients and their designers are also confronting with the perpetual burden of the financial sphere. This research aims to develop a novel methodological approach for designers to search for affordable cool spots in dense urban areas. It does so by conducting genetic combinatorial optimizations augmented by Random Forest (RF) and Principal Component Analysis (PCA) algorithms. What is particularly innovative is to develop a mass-based generative design approach to produce neighborhood options for the subsequent combinatorial optimization. The methodology is tested in a real-world urban renewal project in Hong Kong, which is epitomized by high density and hot and humid weather in the summer. The results show that the design approach can automatically identify high-performance schemes of cool spot design, reducing the daily average thermophysiological equivalent temperature from averagely 29.76°C to at lowest 29.59°C, and decreasing the construction cost by 82.57%. With proper translation, the approach can serve as a useful and robust design assisting tool for designing and developing cool and cost-aware buildings and neighborhoods in urban areas.*

Ronald Coase Centre for Property Rights Research

1. Professor K.W. Chau, Professor Daniel Ho and Professor Lawrence Lai

- have published the following paper:

Wang, A., Ho, D. C. W., Lai, L. W. C., & Chau, K. W. (2023). Public preferences for government supply of public open space: A neo-institutional economic and lifecycle governance perspective. *Cities*, 141, 104463. <https://doi.org/10.1016/j.cities.2023.104463>

Abstract: *There is a global trend urging countries to allow for and even rely on private supplies of public open spaces. However, the opinions of their end users have seldom been sought. Based on questionnaire surveys and hedonic price model, this study shows how the mode of governance (government or private supply), from a lifecycle perspective, affects the quality of and public preferences for government-owned open spaces (GOS) versus privately-owned open spaces (POS). Both stated preference and revealed preference approaches were used since triangulation of the results from both approaches can enhance the reliability of the conclusion. Theoretically, the high transaction costs of outsourcing POS through market contracts leave room for POS providers to optimize their own benefits at the expense of public interest. Based on the case of Hong Kong, the results showed that the public tends to prefer GOS over POS and this is consistently found in stated and revealed preferences. Parks and gardens in GOS were generally perceived to be the best performers, while POS excelled in landscaping but less so in social inclusiveness and vital activities. The preference-governance relationship is intricately affected by managerial capacity, fiscal situations, contracting costs, market competitiveness, characteristics of the quality attributes, etc.*