

## Research Symposium on Low-Carbon, Healthy, and Smart Cities

May 29, 2023, Monday  
 9:00-13:00 K.K. Leung Building LG109  
 The University of Hong Kong

### Introduction

Government policies are promoting sustainable, healthy and low-carbon development agenda, while the rise of digital technologies, from simulation, data analytics, and artificial intelligence has afforded new opportunities in the design and management of cities. In practice, a large proportion of design and planning professionals are yet to respond in full. There is a lack of overall theory and tools in order to drive a bottom-up approach to meet government policy agenda. Business as usual is no longer an option. But the industry needs different approaches / tools to innovate. The Research Symposium on Low-Carbon, Healthy, and Smart Cities, hosted by the HKUrban Lab at the Faculty of Architecture at the University of Hong Kong, brings together researchers, practitioners, and policy makers to discuss a new way forward towards a greener, healthier, and smart future. The half-day event features cutting-edge research on models, theories, and tools in predicting urban environmental footprint, energy consumption and infectious disease transmission. The symposium also invites thought leaders from the development, engineering, and design industry to share new experiences, new thinking, and the leveraging of smart technologies in pushing the envelope of professional practices.

### Symposium Programme (tentative)

	Speaker	Note
9:00-9:15	Prof. Chris Webster [HKU]	Opening Remarks
9:15-9:45	Prof. Phil Jones [Cardiff University]	From Low Carbon Buildings to Net Zero Cities
9:45-10:15	Prof. Yuguo Li [HKU]	TBD
10:15-10:45	Prof. Jianlei Niu	TBD
	Coffee break	
11:00-11:30	Dr. Eric Schuldenfrei [HKU]	Public Housing Design and Infectious Disease Transmission in Hong Kong
11:30-12:00	Dr. Jianxiang Huang [HKU]	Sustainable High Density Cities: Challenges and Case Studies
12:00-12:15	Dr. Jason Tse [Buro Happold Engineering Inc. Hong Kong]	TBD
12:15-12:30	Dr. Alex Lee [Tian Consultancy Technology]	The application of BIM-HVAC tool in urban renewal development in Singapore
12:30-13:00	Roundtable Discussion	
13:00-14:30	Lunch at the Senior Common Room	

## Participants

### **Prof. Chris Webster, Dean of the Faculty of Architecture, the University of Hong Kong**

Prof. Chris Webster is a leading urban theorist and spatial economic modeller. He first studied Artificial Intelligence when taking a MSc in the Department of Computing Mathematics, Cardiff University in the late 1980s, writing a thesis on predicate-calculus based programming languages. Before that, his PhD research developed multi-time period linear programming models to convince the World Bank and the Thai Bank for Agriculture and Agricultural Co-operatives that Thailand's poor farmers in the resource-scarce North Eastern provinces were constrained by production credit availability not by land or labour. As well as optimisation modelling, he has published urban and land research using cellular automata simulation, econometrics, urban remote sensing, spatial epidemiological models, decision-science models, computer vision, machine learning and computational general equilibrium models. He is Dean of HKU Faculty of Architecture and Chair Professor in Urban Planning and Development Economics in HKU's Department of Urban Planning and Design. In 2014 he founded HKUrbanLabs as an incubation platform for novel interdisciplinary research across the Faculty of Architecture's built environment departments and divisions and beyond. He is Senior Departmental Fellow at Cambridge University's Department of Land Economy, and Honorary Professor at University College London's Centre for Advanced Spatial Analysis (CASA). He has published over 250 scholarly papers, book chapters and books on the idea of spontaneous urban order and received over US\$25M grants for research and teaching and learning projects. For ten years he co-edited with Mike Batty, *Environment and Planning B: Planning and Design* (now renamed *Environment and Planning B: Urban Analytics and City Science* to better reflect the journal's leading position in quantitative urban systems theory and research). Professor Webster has sixteen prize-winning academic papers on urban theory and is co-inventor of the prize-winning urban network analysis software sDNA.

### **Prof. Phil Jones, Professor Emeritus, Welsh School of Architecture, Cardiff University**

Prof. Phil Jones is the is chair of Architectural Science and Chair of the Low Carbon Research Institute (LCRI) and the Chairman of the Board of Directors of Warm Wales, a community interest company formed to install energy efficiency measures to existing fuel poor housing in Wales and which so far has delivered over a £50 million program of work since 2006. He has considerable experience of consulting, specialising in building energy and environment design. He has provided environmental consultancy for 50 to 100 buildings, many carried out in collaboration with Kopitsis Bauphysik in Switzerland. Examples of projects include, building physics for the EMPA zero energy office in Switzerland (2006), energy analysis of the Pearl Island development in Qatar (2007), building physics for the Atkins designed Lighthouse low energy tower in Dubai (2008), low carbon urban master-planning, with Hyder (Hong Kong), for the proposed Gateway City in Ras Al Khaimah (2010), environmental analysis of the extension to the Kunsthau Museum in Zurich (2011), analysis of chilled surface cooling for the Parkview Green mall-office-hotel complex in Beijing (2011,) and expert opinion for the Brickell 'Climate Ribbon' Mall in Miami (2012). The Dubai Lighthouse project was awarded the Cardiff

University innovation award (2008). He was appointed (2007) to deliver a series of sustainability awareness raising events to Atkins senior management in UAE, China and UK. In partnership with Neath Port Talbot District Borough Council we were awarded an RIBA regional design award for the Gateway low energy factory development at the Baglan Energy Park, Port Talbot.

***Prof. Yuguo Li, Chair Professor of Building Environment, Department of Mechanical Engineering, The University of Hong Kong***

Prof. Yuguo Li is a Chair Professor of Building Environment, and Honorary Professor of School of Public Health, the University of Hong Kong, current serves as Associate Dean (Research) of Engineering, and was the former Head of Department. He serves as the Editor-in-Chief of the international journal Indoor Air. He was a Principal Research Scientist and the team leader of indoor environments at CSIRO Australia, prior to 2000 when he joined the University. His research interests are in building environment engineering. His current research topics include city climate/environment, environment studies of infection and indoor environment. His work led to the findings of the roles played by airflow in the 2003 Amoy Gardens SARS outbreak. He carried out research on hospital ventilation in preparation for influenza pandemics for Hospital Authority and WHO. He contributed to the dynamic theory of natural ventilation and hospital ventilation. He publishes over 200 journal articles in engineering, environment, climate and health journals including Indoor Air, Climate Dynamics, PNAS and New England Journal of Medicine with over 4500 SCI citations (SCI h-index = 39). He led and co-authored 2009 WHO guidelines on natural ventilation. His research has been supported by 2 RGC CRF, 12 RGC GRF, 1 Horizon2020, 4 RFCID and 3 NSFC grants as PI since 2000 (>HK\$40m). His work has also been supported by WHO, Boeing and Microsoft. He currently serves as the President of the Academy of Fellows of International Society of Indoor Air Quality (ISIAQ). He was the President of Indoor Air 2014. He has given plenary/keynote/invited talks in >80 conferences on topics ranging from environment control of infection, natural ventilation to city climate and environment. He has received the State Scientific and Technological Progress Award, Best Paper Awards of the Indoor Air, the Rydberg Gold Medal of SCANVAC, and the Inoue Memorial Award, SHASE, Japan. He is a Fellow of ASHRAE, ISIAQ, HKIE, and IMechE, and he is a chartered engineer (CEng) with UK Engineering Council.

***Prof. Jianlei Niu, Chair Professor of Building, Environment and Energy, at the Hong Kong Polytechnic University***

Professor Niu is currently Chair Professor of Building, Environment and Energy, at the Hong Kong Polytechnic University. In the period from Feb 12, 2017 to Feb. 9, 2019, he held a position of Professor of Building, Environment and Energy, a conjoint appointment of School of Architecture, Design and Planning and School of Civil Engineering, The University of Sydney. He received his BEng and MSc degrees from Tsinghua University and PhD from Delft University of Technology. He also had an experience of an R&D engineer with a utility manufacturer in UK during his tenure with Tsinghua University, researching on clean coal-combustion technologies. During his tenure with HKPolyU, he secured 16 RGC CERG/GRF grants, along with two ITF grants, two RFCID/HMRF grants and one RGC/NSFC joint grant, and one RGC CRF grant as a Co-PI. He is currently leading a Theme-based-research-scheme(TRS) project "Healthy and Resilient Cities with Pervasive LoCHs", aiming to developed a simulation-based-optimisation(SBO) method to create localised outdoor

thermal-comfort hubs(LoCHs) by design in the urban and estate planning stage. His technology contributions are in a broad area linking thermal and fluid sciences with building environment. He is an editor-in-chief of the Elsevier journal Energy and Buildings, and sits in the editorial board of the Elsevier journal Building and Environment and Journal of Building Performance Simulation, IBPSA's official journal published by Taylor & Francis Journal. He was awarded the fellowship by three leading societies, ASHRAE(American Society of Heating, Refrigerating and Air-conditioning Engineers), ISIAQ(International Society of Indoor Air Quality) Academy of Fellows, and IBPSA (International Building Performance Simulation Association) Academy of Fellows.

***Dr. Eric Schuldenfrei, Head of the Department of Architecture, The University of Hong Kong***

Eric Schuldenfrei received his PhD from the University of Cambridge, he has taught at Princeton, Columbia, and the Architectural Association. His most recent book, *The Films of Charles and Ray Eames: A Universal Sense of Expectation*, focuses on architecture, politics, cinema, and education. Schuldenfrei served as the Curator of Exhibition, Education, Film, and Media for the 2009 Hong Kong & Shenzhen Biennale and has presented his work at DLD in Moscow on the topic of Future Cities, at the V&A museum, Harvard University AsiaGSD series, the University of Cambridge, and the Royal College of Art in London. Together with Marisa Yiu, Schuldenfrei founded ESKYIU – a multi-disciplinary architecture studio integrating culture, art, community and technology. They have been awarded the “Architectural League Prize” and “Design Vanguard” as well as edited the books *Instant Culture* and *Industrial Forest* together.

Current research includes examining architects who created projects as educational experiences. An example of this is how during a critical period from the late 1950s to the early 1960s there was a moment of introspective self-reflection in the West stemming from the events of the Cold War. This moment of uncertainty was crucial, for it provided the incentive to question the values and concerns of society as a whole. In turn, designers began to question their own sense of purpose, temporarily expanding the purview of design to a broader field of inquiry. In the case of individuals such as George Nelson as well as Charles and Ray Eames, they identified an overriding problem related to consumerism and excess in America and sought to resolve the issue by creating a network of communication between universities, governments, institutions, and corporations. The solution of promoting greater education experiences as an alternative to consumerism in America required that different sectors of society functioned in unison to address political, social, economic, and educational concerns. The research reconsiders how design intersects with humanity, culture, and the sciences.

***Dr. Jianxiang Huang, Director of the Sustainable High Density Cities Lab, Department of Urban Planning and Design, The University of Hong Kong***

Dr. Jianxiang Huang is an assistant professor in the Department of Urban Planning and Design at the University of Hong Kong. He has conducted research and teaching in the field of architecture, urban planning, and urban design over two decades in Hong Kong, Mainland China, and the US. His research focuses on 1) urban performance simulation and 2) urban data analytics. In particular, he has developed novel urban environment and energy simulation models to assess urban heat island, building energy performances, air pollution, and airborne transmission of infectious disease; He also studies the human-built environment interactions through the lens of “urban new data,” i.e., social media, POI, behavioural data, and wellbeing. His research has generated society impact; software tools stemming out of his research have been taken up the

industry for real-world applications. and to inform policies. His teaching is anchored in the Master of Urban Design programme of HKU, in which he has contributed to the curriculum development and course innovations. He teaches design studios, theories, data analytics workshops, research methods, thesis and dissertation. He is a LEED accredited professional, a member of the American Institute of Certified Planners, and a former member of the board of directors of the International Association for China Planning. Prior to HKU, he has worked as an urban designer at Sasaki Associates Inc. on many award-winning projects recognized by the Society of College and University Planning, International Downtown Association, the American Institute of Architects, and the Boston Society of Architects. He holds a Doctor of Design from Harvard University, a Master in City Planning from MIT, a Master and a Bachelor in Architecture from Tsinghua University.

- Representatives of the Urban Renewal Authority
- Representatives of the Housing Department of the Hong Kong Government
- Representatives of Buro Happold Engineering Inc.
- Representatives of Tian Consultancy Technology
- Representatives of Skidmore Owen & Merrill Hong Kong

## Venue Map

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