



The Urban Heat 2017 Research Symposium hosted by SHDC on Dec.9, 2017 at HKU campus

# Newsletter

Sustainable High Density Cities

Jan.1 – Dec.31 2017

## Contents

|                          |    |
|--------------------------|----|
| Publications 2017 .....  | 2  |
| Research Funding.....    | 4  |
| Events & Activities..... | 5  |
| Research Projects .....  | 12 |
| Media Coverage.....      | 14 |

**Publications 2017**

- [1]. Guo M.; Huang, J.; Sun, Y.; Li, L.; Shyu, R. 2017, A Spatial Perspective of Noise Complaints: Evidence from Public Nuisance Petition and Social Media data in Greater Taipei Area, Proceedings of the 10<sup>th</sup> Cross-Straight Acoustic Conference, Taipei [Nov.16, 2017]
- [2]. Liang, W., Huang, J., Jones, P.; Hang, J.; Wang, Q., 2017, A Zonal Model for Assessing Street Canyon Air Temperature of High-Dense Cities, submitted to *Building and Environment*.
- [3]. Huang, J.; Yeh, A.; Yang, Y., "Man and Urban Form: How Human-Scale Urban Form Affects Human Wellbeing and Behaviours", Submitted to Landscape and Urban Planning
- [4]. Huang, J.; Jones, P.; Peng, R.; Li, X.; Hou, S., *An Integrated Urban Microclimate and Building Energy Model for Early Stage Design*, Proceedings of the Building Simulation 2017 Conference, San Francisco USA [Aug.7-9, 2017]
- [5]. Jones, P. et al. 2017. Five energy retrofit houses in South Wales. *Energy and Buildings* 154, pp. 335-342. (10.1016/j.enbuild.2017.08.032)
- [6]. Yangang Xing, Phil Jones, Maurice Bosch, Iain Donnison, Morwenna Spear & Graham Ormondroyd (2017): Exploring design principles of biological and living building envelopes: what can we learn from plant cell walls?, *Intelligent Buildings International*, DOI: 10.1080/17508975.2017.1394808
- [7]. Phil Jones, 2017. A 'smart' bottom-up whole-systems approach to a zero-carbon built environment, *Building Research and Information*, <https://doi.org/10.1080/09613218.2017.1374100>.
- [8]. Xing, Y., Jones, P. and Donnison, I. 2017. Characterisation of nature-based solutions for the built environment. *Sustainability* 9(1), pp. 149.
- [9]. Liu, Li, Wu, Di, Li, Xiaojun, Hou, Shanshan, Liu, Conghong and Jones, Phillip John, 2017. Effect of geometric factors on the energy performance of high-rise office towers in Tianjin, China. *Building Simulation* 10 (5), pp. 625-641. 10.1007/s12273-017-0359-y.
- [10]. Yang, Hongwei, Liu, Li, Li, Xiaojun, Liu, Conghong and Jones, Phillip, 2017. Tailored domestic retrofit decision making towards integrated performance targets in Tianjin, China. *Energy and Buildings* 140 (21), pp. 480-500. 10.1016/j.enbuild.2016.12.040.
- [11]. Jason M.Y. Tse and Phillip Jones, Investigation of Adaptive Thermal Comfort in Building Transitional Spaces - Case Studies in Cardiff, UK, *HK Joint Symposium*, Hong Kong 24 November 2017.
- [12]. Alnusairat, Saba and Jones, Phillip 2017. The influence of Skycourt as part of combined ventilation strategy in high-rise office buildings. Presented at: *ECSEE (European Conference on Sustainability, Energy & Environment) 2017*, Brighton, UK, 7-9 July 2017. *East Meets West: Innovation and Discovery*. Naka Ward, Nagoya, Aichi Japan: The International Academic Forum (IAFOR), pp. 49-64
- [13]. Alnusairat, Saba, Jones, Phillip and Hou, Shan 2017. Skycourt as a ventilated buffer zone in office buildings: assessing energy performance and thermal comfort. Presented at: *Design to Thrive, PLEA 2017 Conference*, Edinburgh, 2-5

- July 2017. *Design to Thrive, PLEA 2017 Conference*. Edinburgh, UK: NCEUB 2017 Network for Comfort and Energy Use in Building, pp. 4901-4908
- [14]. Alnusairat, Saba, Hou, Shan and Jones, Phillip 2017. Investigating spatial configurations of skycourts as buffer zones in high-rise office buildings. Presented at: *The 5th eCAADe Regional International Symposium 2017*, Cardiff, 26-28 April 2017.
- [15]. Ji, Qunfeng, Li, C. and Jones, Phillip 2017. New Green Theories of Urban Development in China. *Sustainable Cities and Society* 30 , pp. 248-253.10.1016/j.scs.2017.02.002
- [16]. Du, Hu, Barclay, Michael and Jones, Phillip John 2017. Generating high resolution near-future weather forecasts for urban scale building performance modelling. Presented at: *Building Simulation 2017: 15th Conference of International Building Performance Simulation Association*, San Francisco, 7-9 August 2017. *Proceedings of Building Simulation 2017: 15th Conference of International Building Performance Simulation Association, San Francisco, USA, August 7-9, 2017*. International Building Performance Simulation Association,
- [17]. Li, X., Jones, P. J. and Patterson, J. 2017. Building and community energy retrofit housing in Wales, p 358, *World Sustainable Built Environment Conference 2017 Hong Kong Transforming Our Built Environment through Innovation and Integration: Putting Ideas into Action*, Hong Kong, China, 5-7 June 2017.
- [18]. Du, H., Jones, P. J. and Long, C. 2017. A novel approach to predict real-time urban heat island effect and indoor overheating. Presented at: *Passive Low Energy Architecture (PLEA) 2017*, Edinburgh, UK, 3-5 July 2017.
- [19]. Jones, P. et al. 2017. The SOLCER energy positive house: whole system simulation. Presented at: *Building Simulation 2017: 15th Conference of International Building Performance Simulation Association*, San Francisco, CA, USA, 7-9 August 2017. *Proceedings of Building Simulation 2017: 15th Conference of International Building Performance Simulation Association, San Francisco, USA, August 7-9, 2017*.
- [20]. Phil JONES, Cost & Value: Multiple Benefits of Green Commercial Buildings in Western Countries, p 150, *World Sustainable Built Environment Conference 2017 Hong Kong Transforming Our Built Environment through Innovation and Integration: Putting Ideas into Action*, Hong Kong, China, 5-7 June 2017.
- [21]. Nearly Zero-Energy Care Home Design in Cold Climate in China, p1889 HOU Shan-Shan, Phil JONES, ZHOU Yanmin, p1889, *World Sustainable Built Environment Conference 2017 Hong Kong Transforming Our Built Environment through Innovation and Integration: Putting Ideas into Action*, Hong Kong, China, 5-7 June 2017.
- [22]. Wang K, Li Y, Luo Z, Yin S & Chan PW (2017) Harmonic analysis of 130-year hourly air temperature in Hong Kong: detecting urban warming from the perspectives of annual and daily cycles. *Climate Dynamics*, accepted 2017
- [23]. Wang K, Li Y, Wang Y, Yang X (2017). On the asymmetry of the urban daily air temperature cycle. *Journal of Geophysical Research Atmosphere*, 122(11), 5625-5625, 2017.

- [24]. Fan Y, Li Y, Bejan A, Wang Y and Yang X (2017). Horizontal extent of the urban heat dome flow. Scientific Reports 7, Article number: 11681
- [25]. Wang Y, Di Sabatino S, Martilli A, Li Y, Wong MS, Gutierrez E and Chan PW (2017). Impact of land surface heterogeneity on urban heat island circulation and sea-land breeze circulation in Hong Kong. Journal of Geophysical Research Atmosphere, 122(8), 4332-4352
- [26]. Yang X, Li Y, Luo Z and Chan PW (2017) The urban cool island phenomenon in a high-rise high-density city and its mechanisms. International Journal of Climatology, 37(2), 890-904.

## Research Funding

- [1]. **National Natural Science Foundation of China**, "An integrated model of urban microclimate and building energy." Funding amount RMB 200,000 (Award # 51708473, Project Duration: Jan.01, 2018 - Dec.31, 2020. PI: Jianxiang Huang, HKU Shenzhen Research Institute; Co-I: Phil Jones, Cardiff University
- [2]. **URC Small Equipment Grant 2016/2017**, "A numerical model to assess 3D urban acoustic environment in high-density cities", Funding amount HK\$ 378,778, project duration: Jun.16, 2017 – Jun.15, 2020. PI: Jianxiang Huang (HKU, DUPAD); Co-I: Mengdi Guo (HKU, DUPAD)
- [3]. **The 33rd Round Postdoctoral Fellow Scheme**, "Making Hong Kong Livable – an integrated study on the interrelationship between 'tall, compact, dense' urban morphology, human health and wellbeing – a performance-based design template for urban 'healing' space. 2017-2020  
PI: Jianxiang Huang, Co-I: Phil Jones, Stephen Lau, C.K. Heng, Chad McKee
- [4]. **UK-Guangdong Province Urban Innovation Challenge**, "Smart Urban Sustainability Tracking App for Industry/Individuals (SUSTAIN)." Shortlisted – second round application (Project Duration: May.01, 2018 - Apr.31, 2020)
  - UK team PI: Eric Jensen (Qualia Analytics), Co-I: Phil Jones (Cardiff). Approx. £420,000
  - China team PI: Jianxiang Huang (HKU), Co-I: Jing Wang, Junfeng Zhang (SCUT). Approx. RMB 1,000,000

## Events & Activities

### [1]. March 3, 2017 Lectures at the Shenyang Jianzhu University

A delegate of the Sustainable<sup>HD</sup>Cities visited the Shenyang Jianzhu University (SYJU) in Shenyang, China on March 3, 2017. Prof. Phil Jones delivered a presentation entitled "Low Carbon Building Practices and Policy"; Dr. Jianxiang Huang gave a presentation entitled "Place-Making for Sustainability, Health and Happiness"

The Sustainable<sup>HD</sup>Cities delegate visited the School of Architecture, and the Tianzuo Architectural Science Research Institute, the research established of the School of Architecture. The team met Prof. Fu Yao (Vice Dean), Prof. Chengjing Yuan, Prof. Xu Lu, Prof. Yuan Zhang, and other faculty members during the tour.



Fig. 1 Prof. Phil Jones and Dr. Jianxiang Huang delivered presentations at SJZU



Fig. 2 SHDC delegates with their hosts at the Architectural Museum of Shenyang Jianzhu University. From Left to Right: Prof. Yuan Zhang (Director of Planning, SJZU), Prof. Yao Fu (Vice Dean, SJZU), Prof. Phil Jones (HKU), Dr. Jianxiang Huang (HKU), Prof. Chengjing Yuan (SJZU), Prof. Xu Lu (SJZU), Ms. Yi Xu (HKU), and Ms. Mengdi Guo (taking picture)

### [2]. March 4, 2017 Sustainable<sup>HD</sup>Cities Featured at the UGI Forum

Dr. Jianxiang Huang & Prof. Minjung Maing delivered a presentation at the First Annual Forum of the University-Government Development – Smart New Town Development and Urban Renewal hosted at the Hong Kong Polytechnic University. The presentation, entitled "Urban Thermal Environment & Building Energy Efficiency in High-Density Cities: Empirical studies and Numerical Models". The forum is jointly attended by government officials, industries, and academic researchers.



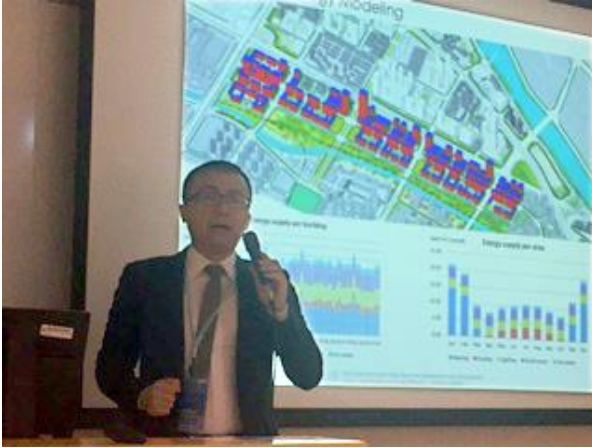


Fig. 3 Dr. Jianxiang Huang during the presentation



Fig. 4 Prof. Phil Jones in discussion with panelists.

### [3]. April 11, 2017 World Sustainable Built Environment Conference

Prof. Phil Jones, Prof. Minjung Maing and Dr. Jianxiang Huang attended and presented 3 academic papers at the World Sustainable Built Environment Conference held in Hong Kong, April, 2017 (Funded by DUPAD Conference and Travel Grant)



Fig. 5 SHDC delegates attending the WSBE Conference, from left to right: Dr. Shanshan Hou (Cardiff), Dr. Xiaojun Li (Cardiff), Ms. Mengdi Guo (HKU), Prof. Phil Jones (Cardiff), Dr. Jianxiang Huang (HKU)



Fig. 6 Ms. Mengdi Guo delivered a presentation at WSBE Conference

### [4]. June 9, 2017 Collaboration with SCUT

SCUT delegates Prof. Phil Jones and Dr. Jianxiang Huang travelled to South China University of Technology (SCUT) in Guangzhou. They met Prof. Yimin Sun (Dean of School of Architecture, SCUT), Prof. Yiqiang Xiao (Vice Dean of School of Architecture, SCUT), Prof. Changxing Peng (Vice Dean of School of Architecture, SCUT), Prof. Ping Sun (SCUT) to discuss strategic collaborations between SHDC of HKU and the National Key Lab of Subtropical Architecture of SCUT. Both sides agreed to strengthen collaboration in applying research in urban design / architectural practices



Fig. 7 SHDC delegates visiting South China University of Technology



Fig. 8 Prof. Phil Jones discussed the application of simulation models in support of urban design in Guangzhou

#### **[5]. June 19, 2017 IACP Yuelu Forum**

Dr. Jianxiang Huang attend and delivered a presentation entitled “Place-Making for Health, Happiness & Sustainability” at the International Associate for China Planning (IACP) Yuelu Forum on Jun.20, 2017



Fig. 9 Dr. Jianxiang Huang together with other speakers at the IACP Yuelu Forum in Changsha



Fig. 10 Dr. Jianxiang Huang delivering a presentation.

#### **[6]. June 27, 2017 the Urban Heat Island Effect Mitigation Strategies Forum**

Prof. Chris Webster and Dr. Jianxiang Huang delivered the key-note speech at the Urban Heat Island Effect Mitigation Strategies Forum (新北市減緩熱島效應國際論壇) held in New Taipei City, Taiwan, Jun.27, 2017 (Funded by New Taipei Government)





Fig. 11 Prof. Chris Webster speaking as the keynote speaker at the Urban Heat Island Effect Mitigation Strategies Forum



Fig. 12 Dr. Jianxiang Huang addressing the audience at the Urban Heat Island Effect Mitigation Strategies Forum

### **[7]. Aug.8, 2017 Building Simulation 2017 Conference, San Francisco**

Dr. Jianxiang Huang and Prof. Phil Jones attended and presented an academic paper entitled “An integrated model for urban microclimate and building energy in high-density cities” at the Building Simulation 2017 Conference held in San Francisco, USA, August, 2017 (Funded by HKU CRCG and DUPAD conference grant)



Fig. 13 Dr. Jianxiang Huang and Prof. Phil Jones presenting at the BS2017 Conference



Fig. 14 Dr. Hu Du presenting at the BS2017 Conference

### **[8]. Aug.1, 2017 Visit of the Urban Renewal Authority**

SHDC team met with delegates of the Urban Renewal Authority and discuss collaborative research opportunities.





Fig. 15 Dr. Weihui Liang presenting to the URA delegates



Fig. 16 Ms. Mengdi Guo presenting to the URA delegates



Fig. 17 Ms. Yi Xu presenting to the URA delegates

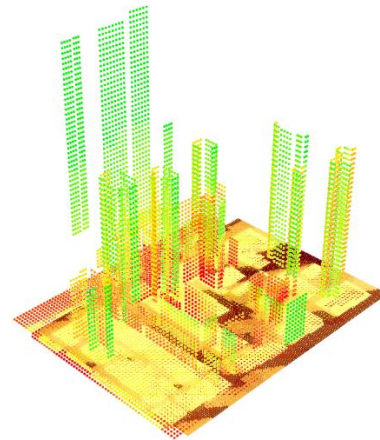


Fig. 18 Applying computer simulation models in support of early-stage development decisions

#### **[9]. Nov.15, 2017 Cross-Straight Acoustic Annual Conference**

SHDC team visited National Taiwan Ocean University Nov.15-17, 2017. The purpose of this visit is to collaborate with Prof. Rong-Jun Shyu and the Acoustic and Vibration Laboratory at the Department of System Engineering and Naval Architecture. Two research meetings were held on Nov.16 and 17 focusing on environmental noise assessment and mitigation. Attendants include Prof. R.J. Shyu of NTOU(許榮均), Mr. C.L. Chen (陳智隆) of NTOU, Dr. Hanlin Li (李寒林) of NTOU, Ms. J. Zhang (張均) of NTOU, Dr. Jianxiang Huang (黃健翔) of HKU. And Ms. Mengdi Guo (郭夢笛) of HKU.



Fig. 19 Jianxiang Huang visiting the Acoustic and Vibration Laboratory at the National Taiwan Ocean University accompanied by Prof. R.J. Shyu on Nov.16



Fig. 20 Jianxiang Huang visiting the Acoustic and Vibration Laboratory

#### **[10]. Nov.16, 2017 Visit of National Taiwan Ocean University**

Dr. Jianxiang Huang (Assistant Professor, DUPAD) and Ms. Mengdi Guo (PhD Candidate, DUPAD) has presented a paper entitled "A Spatial Perspective of Noise Complaints: Evidence from Public Nuisance Petition and Social Media data in Greater Taipei Area" at the 10<sup>th</sup> Cross-Straight Acoustic Annual Conference (第十屆海峽兩岸聲學學術交流研討會) held in Taipei on Nov.16, 2017. They also visited the Acoustic Laboratory of the National Taiwan Ocean University and conducted academic exchanges with local researchers.



Fig. 21 Ms. Mengdi Guo, PhD candidate DUPAD presenting at the 10<sup>th</sup> Cross-Straight Acoustic Annual Conference



Fig. 22 Dr. Jianxiang Huang presenting at the National Taiwan Ocean University

#### **[11].Oct. 20, 2017 80th Anniversary of Tianjin University School of Architecture**



Phil Jones attended the 80<sup>th</sup> anniversary of Tianjin University School of Architecture as a guest of honour. He is also serving as an academic advisor for Tianjin University under the prestigious Overseas Expert Scheme (海外专家计划).



Fig. 23 Prof. Phil Jones attend the 80<sup>th</sup> anniversary of Tianjin University as the Guest of Honour

#### **[12].December 9, 2017 Urban Heat Symposium**

The Urban Heat Symposium was hosted by SHDC team member Prof. Minjung Maing, Prof. Phil Jones, and Dr. Jianxiang Huang at HKU on Dec.9, 2017. The presentations and discussions addressed the importance of urban heat from the standpoints of modelling, smart cities, thermal comfort, heatwaves, integrative and responsive strategies and low carbon city, and more importantly how this can be implemented in practice and policy.

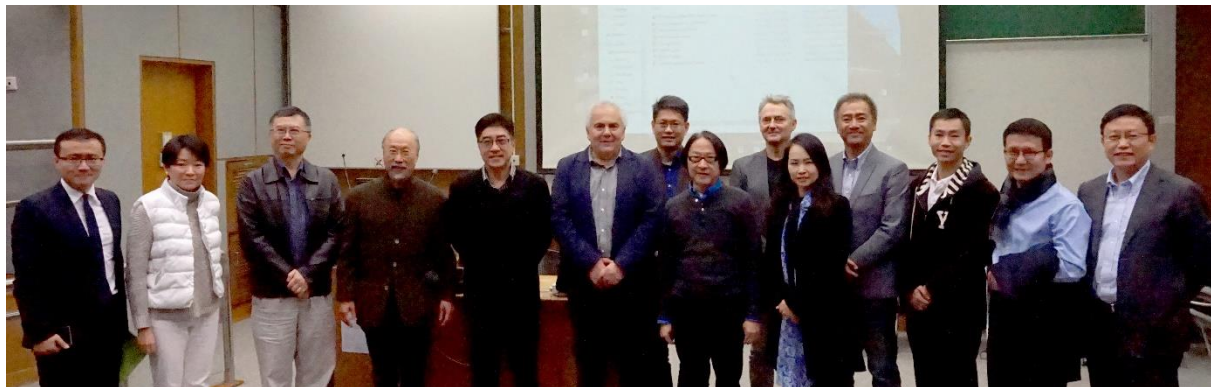


Fig. 24 The SHDC hosting the Urban Heat 2017 Research Symposium on Dec.9, 2017 at the University of Hong Kong, engaging outside communities as well as internal staff. (from left to right: Dr. Jianxiang Huang (HKU Urban Planning, SHDC), Prof. Ren Chao (CUHK), Prof. Yuguo Li (HKU Mechanical Engineering, SHDC), Prof. John Ng (Hong Kong Green Building Council), Dr. Raymond Yau (Swire Property), Prof. Phil Jones (Cardiff University, SHDC), Prof. Chris Chao (HKUST), Prof. Stephen Lau (NUS, SHDC), Prof. Chris Webster (HKU Architecture, SHDC), Prof. Minjung Maing (HKU, SHDC), Mr. Raymond Lee (Hong Kong Planning Department), Dr. Jimmy Tong (Arup Hong Kong), Mr. M.K. Leung (Ronald Lu Partners), Dr. Wei Pan (HKU, SHDC))



## Research Projects

### [1]. District Heating Research

Dr. Jianxiang Huang, Prof. Phil Jones, Ms. Xu Yi, and Ms. Mengdi Guo of the Sustainable<sup>HD</sup>Cities Lab visited Shenyang, China in March 2017. The team conducted energy auditing of district heating systems under cold climates. The research team used infrared thermography to detect pipeline leakage, to explore energy savings potentials and to address the wicked trade-offs between thermal comfort and air quality in Northern China.



Fig. 25 SDHC team visited District Heating Plants in Shenyang

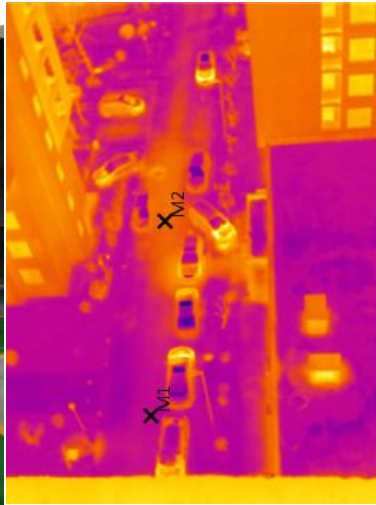


Fig. 26 SDHC team conducted thermography survey in communities

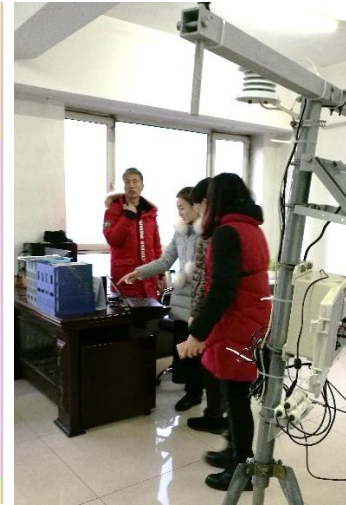
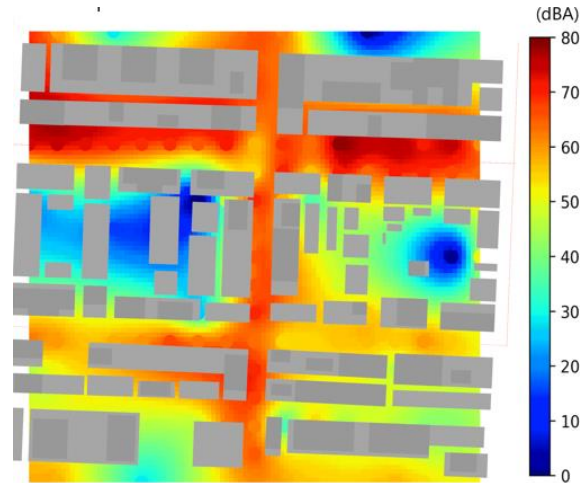
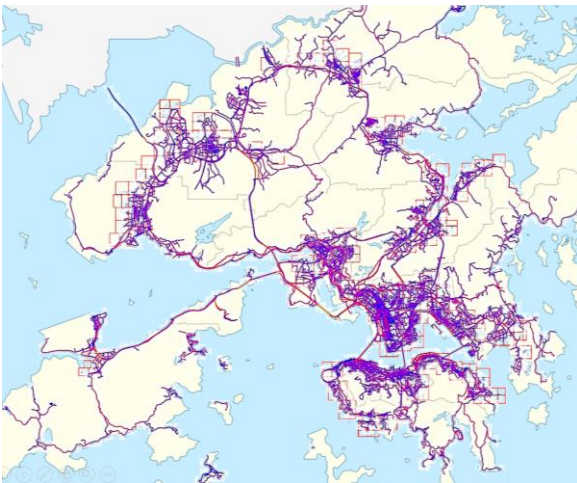


Fig. 27 SDHC team conduct field measurement

### [2]. Traffic Noise and Mental Health

SHDC team Ms. Mengdi Guo and Dr. Jianxiang Huang developed novel technologies to assess the urban acoustic environment and linked noise exposure to mental health outcomes at household level.



*Fig. 28 A territory wide mental health, traffic noise, and GIS database N>40,000*

*Fig. 29 Computer simulation & validation of road traffic exposure in 3D urban environment*

SHDC team Ms Mengdi Guo, Dr. Jianxiang Huang, Ms. Ophelia Liu, and Ms. Yiyao Zong conduct field measurement of traffic noise exposure in Hong Kong's public housing estates.



*Fig. 30 Ms. Mengdi Guo, Ms. Ophelia Liu, Ms. Yiyao Zong conduct field measurement of curbside traffic noise in Shek Kip Mei*



*Fig. 31 Measurement of indoor and outdoor noise exposure in public housing estates in Nam Shan Chuen.*



*Fig. 32 Ms. Mengdi Guo providing training on noise measurement before the measurement campaign*



*Fig. 33 Sound level meter deployed outside of household windows to measure traffic noise exposure in Nam Shan Chuen.*

### **[3]. Street canyon, heat island effect and air pollution**

SDHC team conducted measurement and simulation studies of urban heat island effect and air pollutant concentration experiment in mock-up street canyons In collaboration with Dr. Hang Jian of Sun Yat-sen University and Dr. Ning Zhi of City University of Hong Kong.





Fig. 34 Air pollutant source and sensor deployment on mock-up urban site



Fig. 35 Measurement of Particulate Matters (PM) on mock-up urban site

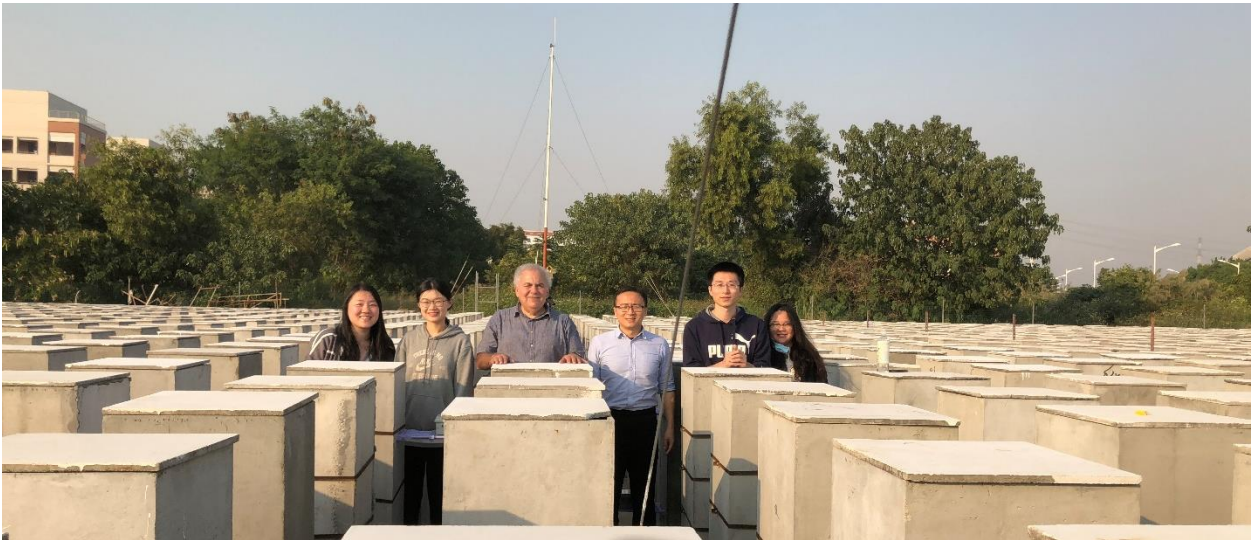


Fig. 36 Experiment team Ms Anqi Zhang (HKU), Ms. Mengdi Guo (HKU), Prof. Phil Jones (Cardiff), Dr. Jianxiang Huang (HKU), Mr. Wei (CityU), and Ms. Kiwi Zhang (CityU)

## Media Coverage

SHDC received media coverage in relation to its research activities

- [1]. The Peak Magazine, January-February 2017 edition, "The Urban Laboratory" Available at <http://www.thepeakmagazine.com/hk/feature/feb2017> Retrieved Feb.02, 2017
- [2]. South China Morning Post "How Hong Kongers' tweets are helping architects to improve urban designs" available at <http://www.scmp.com/news/hong-kong/economy/article/2064389/how-hongkongers-tweets-are-helping-architects-improve-urban> retrieved Jan 26, 2017
- [3]. Xinhua News Agency, Hong Kong's pedestrian bridge system (特别报道《情满香江 20 年》: 行人天桥里的香港——穿梭于空中的城市资讯), A special report for the 20th anniversary of the Hong Kong SAR. Available at [http://m.le.com/vplay\\_30158211.html](http://m.le.com/vplay_30158211.html)



**Sustainable High Density Cities****Co-Directors**

- Jianxiang Huang, Assistant Professor, DUPAD
- Minjung Maing, Associate Professor, DoA

**HKU Members:**

- Prof. Chris Webster, Dean
- Prof. Phil Jones, Distinguished Visiting Professor
- Dr. Wei Pan, Associate Professor, Department of Civil Engineering
- Mr K P Cheung, Associate Professor
- Ms Juan Du, Associate Professor
- Mr Koon Wee, Assistant Professor
- Dr Roger Chan, Associate Professor
- Dr Kwong Tze Man, Assistant Professor
- Dr Weifeng Li, Assistant Professor
- Dr Xingjian Liu, Assistant Professor
- Dr Nam Kyung Min, Assistant Professor
- Prof Anthony Yeh, Chair Professor
- Mr Ivan Valin, Assistant Professor

**Non-HKU Members:**

- Prof Stephen Lau, National University of Singapore
- Dr. Simos Yannas, Architectural Association (London)
- Prof. John, D. Spengler, Harvard University C.T. Chan School of Public Health

**Research Staff / Students**

- Dr. Weihui Liang, Post-Doc Fellow, Faculty of Architecture
- Ms. Mengdi Guo, PhD candidate, Department of Urban Planning and Design
- Ms. Xu Yi, Research Assistant, Faculty of Architecture
- Ms. Rong Peng, Research Assistant, Faculty of Architecture
- Ms. Yiyang Yang, Research Assistant, Faculty of Architecture
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