

## Dean's Roundup (Friday, 6 March 2015)

**Roundup:** *Ceiling function*, the mathematical operation of rounding a number up to the next higher integer.

**Roundup:** a term in American English referring to the process of gathering animals into an area, known as a "Muster" in Australia.

**Rounding up:** when a helmsman cannot control a boat and it heads into the wind

**Roundup:** the plan for an invasion of northern France by Allied forces during World War II (Wikipedia)

**Dean's Roundup:** part blog, part bulletin; part honour roll, part curatorial [cu'ra-to'ri-al (ky'oo'r-ə-tōr'ē-əl, -tōr'-) n. nounised by the Dean from curator + editorial]

Dear All,

### **An experimental BIM platform for prefabricated housing production in the PRD**

By the end of March 2012, there were 2,599,000 permanent residential flats in Hong Kong's housing stock, of which 1,447,000 (56%) were private flats, 761,000 (29%) were public rental housing (PRH), and 391,000 (15%) were subsidized housing. According to Hong Kong Housing Authority's 2012 forecasts, approximately 77,800 PRH and Subsidized Sale Flats will be built between 2012/13 and 2016/17. This policy imperative was reiterated by the Chief Executive of HKSAR, Mr. C.Y. Leung in his Policy Address of 2013, of which a considerable number of pages addressed housing problems – as with the recent 2015 Policy Address. Prefabrication is the preferred technology for meeting HK's ambitious housing targets.

The whole prefabrication sector in Hong Kong has been moved offshore to the Pearl River Delta (PRD), particularly to Shenzhen, Dongguan and Huizhou, following relatively cheap labour and land for prefabrication yards. It is a clever move to have building components prefabricated in the Mainland, transported across the border and assembled on a Hong Kong site. But the process has room for improvement. Research is needed into how to make the process "leaner" using better production management, faster customs clearance, logging and tracking via the Internet of Things (IoT), and Just-in-Time (JIT) on-site installation.

Dr. Wilson Lu (Department of Real Estate and Construction) is part of a project team working on the development of a Radio Frequency Identification (RFID) -enabled construction management system for enhancing the prefabrication of housing production in Hong Kong. The research innovates in a number of ways, including adopting a 'product-to-service' mode of business organization; solving problems related to the interoperability of heterogeneous RFID systems and protocols; developing a service-oriented BIM platform; and linking up a major housing provider client with multiple component manufacturers using a BIM-enabled virtual model of just-in-time cross-border supply chain logistics. Use of the new platform will facilitate (1) more

seamless communication and coordination among multiple stakeholders throughout the project lifecycle; (2) more efficient cross-border prefabrication logistic and supply chain management (LSCM); and (3) better coordination at construction sites for Just-In-Time (JIT) housing production.

At the HKU end, the project had its birth in a 2009 surveying studio where Wilson, recently arrived in HK from the UK, set up the “Digital technologies in construction”, studio, providing undergraduate surveying students an opportunity to explore the applications of digital technologies such as Radio Frequency Identification (RFID) and webcam in improving construction project management. The project also draws on Dr. Lu’s participation in the UK EPSRC-funded project “Immortal Information and Through-Life Knowledge Management (IITKM): Strategies and Tools for the Emerging Product-Service Paradigm” (a five million pound research project involving more than 70 researchers in 14 universities including Reading, Cambridge, Bath, Loughborough and Salford; and industrial collaborators including Rolls-Royce Plc., Airbus Operations, ABB, Balfour Beatty plc., Skanska, and Ministry of Defence). Beyond HKU, the project is supported by the Hong Kong R&D Centre for Logistics and Supply Chain Management (LSCM), which is funded by the Innovation and Technology Commission of the HKSAR Government. The project is led by Prof. Huang, HKU Faculty of Engineering.

***Hong Kong Innovation and Technology Fund (ITF) 2014. Project Title: RFID-Enabled Building Information Modeling (BIM) Platform for Prefabrication Housing Production in Hong Kong. (HK\$ 7,365,020, 24 months). A joint research project by Dr Wilson Lu (Department of Real Estate and Construction, HKU), Prof. George Huang (PI: Department of Industrial & Manufacturing Systems, HKU), Prof. Thomas Ng (Department of Civil Engineering, HKU), and Prof. Geoffrey Shen (Department of Building and Real Estate, the Hong Kong PolyU).***

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**Dean’s Note:** This is a large and significant grant. I am hopeful that HKUrbanLab will get many of these. GRF grants will continue to be our staple blue-chip research-funding source. GRFs are important for personal advancement in the HKU system and feature in the UGC formula for allocating PhD scholarships to universities. But larger projects generally have higher profile and if well designed and managed can have more intellectual and societal impact. President Mathieson and HKU’s University Research Council are pushing research that involve international and industrial partners and funding sources, not as replacement to GRF, but as a stepping-up.

Wilson’s ITF-funded grant will be one of the first projects associated with HKUrbanLab’s new BIM laboratories (Knowles f/7 and Shanghai Study Centre). I would expect our Construction Management colleagues to secure more grants like this with our new BIM facilities in place. As far as I understand it, BIM research in REC will continue to focus on the ability of BIM technology to change operations, structures, practices and cultures in the industry. Research into technical aspects of BIM in our new labs are likely to be at the design and

environmental/energy performance simulation end of the digital urban modeling agenda. About which we shall hear more in future Dean's Roundups...

Congratulations on the achievements listed below.

Chris

## Department of Real Estate and Construction

### 1. Dr. Wilson Lu

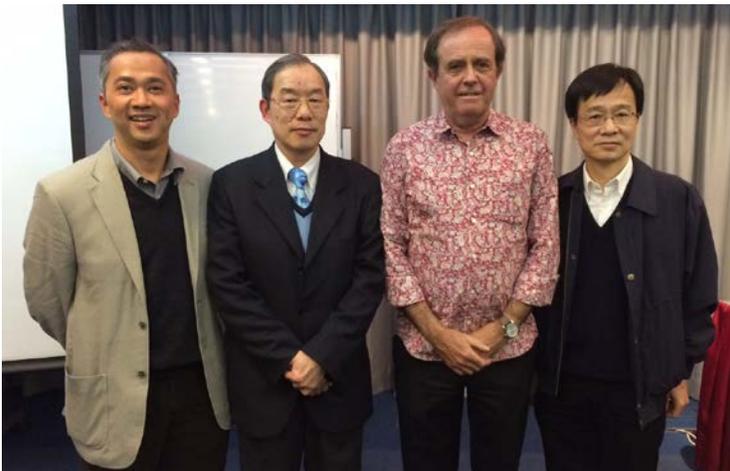
- **Lu, W.S.**, Peng, Y. **Webster, C.** and Zuo, J. (2015). Stakeholders' willingness to pay for enhanced construction waste management: a Hong Kong study. *Renewable & Sustainable Energy Reviews*, Forthcoming (impact factor [IF]= 5.51 and 5-year IF=6.796).

**Abstract:** *Based on the polluter pays principle, construction waste disposal charging schemes (CWDCS) have been deployed by various economies as one of the most effective ways of managing construction waste. Nevertheless, a means of rationalizing these schemes has not been well documented. Using the economic technique of contingent valuation method (CVM), this study aims to investigate stakeholders' willingness to pay (WTP) for enhanced construction waste management (CWM) with a view to providing a scientific foundation for CWDCS rationalization. In considering this WTP in light of repeated exhortations that all stakeholders play a role in the management of construction waste, the study is unique. To ascertain stakeholders' WTP, a payment card-style questionnaire survey was designed and administered to Hong Kong's major CWM stakeholders in February 2014. Interestingly, the results show that there is no statistically significant variation in the WTP of different stakeholder groups. The average maximum WTP is around HK\$232/t for landfill disposal of C&D waste, HK\$186/t for off-site sorting facility (OSF) disposal, and HK\$120/t for public fill reception facility (PFRF) disposal. These values are higher than the existing CWDCS charges (HK\$125/t for landfilling, HK\$100/t for OSF disposal, and HK\$27/t for PFRF disposal) but much lower than the charges proposed to the government. This research provides not only a scientific foundation for the ongoing debate on changes to Hong Kong's CWDCS, but also a valuable reference for other economies facing the challenge of developing charging schemes to deal with construction waste.*

## 2. Professor Steve Rowlinson

- Presented his report “Cost Escalation in the Hong Kong Construction Industry” to a seminar organized by the Chartered Institute of Building in Hong Kong on March 4<sup>th</sup> 2015 (with research team members Drs Koh, Shen, Chan & Tashiro)
- Submitted a proposal to the Australian Research Council entitled “**Productive Safety in Heat: In Search of A Reconciling Institutional Environment**” as Partner investigator with Dr Yunyan Jia of Curtin University (PhD HKU, Architecture) and other colleagues there and at University of Western Australia. This initiative is based on Prof Rowlinson’s Hong Kong CIC funded project on Heat Stress on Hong Kong Construction Sites (completed 2012) and was initiated following his invited presentation at the 1<sup>st</sup> International Workshop on “**Systems Thinking in Workplace Safety and Health in Construction**” at Huazhong University of Science and Technology, Wuhan, China and the One-Day Symposium “**Safety in Context: a stakeholder dialogue**” co-organised by Prof Rowlinson as Visiting Research Professor and Dr Jia at Curtin University, Australia.

The former is part of our KE activities locally and the latter reflects the international standing of the research conducted here in the Faculty.



From left to right: Mr. Lam Wai Choi (CIOB HK Vice-President), Mr. Lau Yu Kwan, Dennis (CIOB HK Council member), Dr. Lee Fook Pui, Billy (CIOB HK Immediate Past-President)



Prof. Rowlinson in a lecture

### 3. Dr. Kelvin Wong

- is awarded by the university a Small Project Funding of \$80,000 to support my research on "Housing prices and household consumption in Hong Kong – a pilot study".

## Division of Landscape Architecture

### 1. Dr. Chinmoy Sarkar and Dean Webster

- Their paper has been accepted in Annals of GIS.

Annals of GIS (2015) – in-press

UK Biobank Urban Morphometric Platform (UKBUMP) – A nationwide resource for evidence-based healthy city planning and public health interventions Chinmoy Sarkar\*, Chris Webster\*, John Gallacher\*\*

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**Abstract:** *The built environment (BE) has emerged as one of the 'first causes' of chronic disease, capable of explaining its socio-spatial variation. There is an increasing need for objective, detailed and precise measurements of attributes of BE that may influence our lifestyle, behaviour and hence physical and mental health.*

*In this paper, we report the UK Biobank Urban Morphometric Platform (UKBUMP), the first ever very large sample size high resolution spatial database of urban morphological metrics (morphometrics), being developed for half-a-million participants of the UK Biobank Prospective study spatially distributed across 22 UK cities. Large scale objective assessment of the BE was conducted employing state-of-the-art spatial and network analyses upon multiple national-level spatial datasets.*

*Prospective large scale objective assessment of the BE enables development of BE-health modelling studies that have the potential to identify causal pathways from specific attributes of the BE to various complex chronic health outcomes as well as well-being. The UKBUMP will act as a national resource, providing a platform for evidence-based healthy city planning and interventions for the first half of the 21st century.*

Keywords: UK Biobank, UKBUMP, urban morphometrics, healthy city, health niche, sDNA

## Division of Urban Planning and Design

### 1. Prof. Rebecca Chiu

- Invited by the Department of Geography and Resource Management Chinese University of Hong Kong to present a seminar on ‘The Future of Home Ownership and Housing Security in Hong Kong: Implications for Fast Growing Chinese Cities’, 26 February 2015.
- Completed a contract research on A Comprehensive Study on Housing in an Ageing Community, commissioned by the Hong Kong Housing Society on 2 March 2015. This is a knowledge exchange activity undertaken by a multidisciplinary team comprising professoriate staff from DUPAD, DoA and Department of Social Work and Social Administration. The research outcomes were used by the Hong Kong Housing Society as a basis for formulating its medium term development strategy, which was passed by its Executive Committee on 12 February 2015. The Summary Report has also been sent to various government bureaus and departments, and a presentation to the Elderly Commission is expected in the near future.

### 2. Mr. Darren Cheung (PhD student)

- Mr. Darren Cheung published a paper with following details:

Cheung, D.M.W. and Tang, B.S. (2015), “Social order, leisure, or tourist attraction? The changing planning missions for waterfront space in Hong Kong”, *Habitat International*, 47, pp. 231-240.

**Abstract:** *Urban waterfronts gain more attention in the 21st century. While waterfront uses are often contested between the government and the community, the literature suggests that economic and property interests generally play significant roles in waterfront redevelopment. Relatively less emphasis is found in the literature to perceive the waterfront as a place for leisure and recreation. This study examines the changing missions for the Victoria Harbour waterfront in Hong Kong. Three epochs of harbour waterfront planning and development are discussed. It argues that leisure and recreational functions are provided in an auxiliary manner in all the three periods of waterfront development. The 19th century Praya aimed at enhancing social order, improving harbour appearance, and providing public access. The 20th century waterfront faced a competing demand between a place for tourism and a place for local people. The contemporary waterfront is further transformed under a selective logic, bringing tourists to the inner harbour waterfront and pushing local recreational needs to the outer harbour waterfront. The harbour waterfront is gradually emerging into a festival market type waterfront.*

3. Mr. Jianzheng Liu (PhD student)

- Mr. Jianzheng Liu (Ph.D. Candidate in DUPAD) and Dr. Jie Li (Senior Research Assistant in DUPAD) won a research grant from Urban China Initiative (UCI) for the year of 2015 (RMB 50,000, 12 months). The title of their research proposal is Urban Climate and its Impact on Mental and Social Well-being of Residents: Empirical Evidence from China. UCI is a joint initiative led by Columbia University, Tsinghua University and McKinsey & Company. UCI grant promotes innovative research on urban development in China and is highly competitive. Only 6 out of 46 research grant applications stand out in tough competition this year. Details about this news can be found in this link

[http://www.urbanchinainitiative.org/en/content/details\\_19\\_62002.html](http://www.urbanchinainitiative.org/en/content/details_19_62002.html)