# Dean's Roundup: 19 December 2016

> 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***ʹ**ra·to**ʹ**ri·al** (kyo͞orʹə-tôrʹē-əl, -tōrʹ-) *n. nounised by the Dean from curator + editorial]*

Dear All,

A very short note this DRup to with you all a Happy Christmas and Prosperous 2017. FoA has its Christmas party this afternoon and I shall say a few words of congratulations to colleagues whose various accomplishments have been published over the year in Dean's Roundup.  A team that has not been praised publicly yet is Christian and Donns' robotics lab. We had a brief but inspiring opening ceremony and sharing session earlier this afternoon. If you haven't visited the robotics lab on Knowles GF yet, please do. Students participating in the robotics studio this semester displayed their work in Sun Yat Sen Square and then the Centennial Campus. As I watched HKU students and the public interact with the fabrications, including young children wandering through the arches in awe, I was struck by the *essential* nature of the architecture. To the person in the street, architecture means form and technology. It is neither pure art nor pure building technology in the popular imagination. In many ways, that is its abiding allure. So Christian's students' productions put down an important marker. They are forward looking, going beyond what the architectural industry outside the university is able or interested in doing. Their structural integrity is laid bare, not only to be seen but to be explored and touched. And the relationship between structure and form can be observed from different angles and at different scales. I saw adults and children experimenting with this by exploring different viewing positions. Amazingly, the structures improve on traditional craftsmanship, in the sense of time-accuracy trade-off. Kicking off with a robotics rendering of traditional Chinese architectural puzzles was a stroke of genius and makes the outputs of this, FoA's first venture into robotics teaching, even more compelling to students, other teachers, collaborators from science and engineering faculties and potential funders.  A very successful experiment and outstanding initial pay-back on the Faculty's and the University's investment in the Robotics lab. Many thanks and congratulations to the team and to the students.

Congratulations to colleagues for the achievements listed below.

Chris

# <u>Teaching and other Achievements</u>

## Faculty of Architecture (FoA)

The following students from our Faculty have been awarded for (i) the 'University Postgraduate Fellowships' for new PhD students admitted in 2016-17 with outstanding academic record; (ii) Hong Kong PhD Fellowships 2016-17; (iii) Fulbright- RGC Hong Kong Research Scholar Award Programme 2016-17. The award presentation ceremony was held at Graduate School Award Presentation Ceremony on Friday, December 16, 2016 at 4:30 p.m. at Rayson Huang Theatre, HKU.

<u>University Postgraduate Fellowships</u>

Jessie Ho Memorial Postgraduate Fellowships - Miss FU Yafan, Department of Real Estate and Construction

Lee Shau Kee Postgraduate Fellowships - Miss LIN Jie, Department of Real Estate and Construction

Philip K H Wong Foundation Postgraduate Fellowships - Mrs. DEWUNDARA MAHA GALAPPATHTHI ARACHCHIGE Nipuni Madhubhashi Sumanarathna, Department of Real Estate and Construction

<u>Hong Kong PhD Fellowships (2016-17)</u>

Miss LUO Yiling and Miss ZHOU Changchang, Department of Urban Planning and Design

<u>Fulbright-Rgc Hong Kong Research Scholar Award Programme (2016-17)</u>

Mr. CHEUNG Ka Shing, PhD, Department of Real Estate and Construction
Mr. WANG Xu, PhD, Department of Urban Planning and Design

# FoA Departments and Divisions

## Department of Architecture (DARCH)

1. Ulrich Kirchhoff

   - awarded BEAM PLUS PLATINUM (provisional) for one of our projects in Central, 48 Caine Road: http://greenbuilding.hkgbc.org.hk/projects/view/74

     BEAM PLUS PLATINUM is the highest environmental grading for buildings in Hong Kong (similar to a Hong Kong version of LEED). It can be applied to all building types but would be rather challenging for residential given the energy management would be harder to control.

## Department of Real Estate and Construction (DREC)

1. Dr. Katherine Y. Deng & Dr. S.W. Poon

   - Over the past few years, the two captioned researchers together with three Adjunct Associate Professors have been continuously involved in a series of heritage research projects granted by the Lord Wilson Heritage Trust. Following last year's publication of the pamphlet titled "Quarrying and built heritage in Hong Kong (1841-1941)", the research team published another pamphlet titled "The culture and heritage of quarrying in Hong Kong". Both have been distributed to government, organizational and industrial stakeholders of quarrying as well as the general public through interdisciplinary talks and seminars in Hong Kong. The research findings are well recognized as exemplified in a latest case below:

     *"Colleagues in Mines Division of GEO are very impressed by the two publications. To me and other professionals of the quarry section, the pamphlets are so inspiring that we find our work on quarry projects socially valuable and missionary."*

     The Quarry Section of the Geotechnical Engineering Office, Civil Engineering and Development Department, now invites the research team to participate in their series of educational programmes/events. The primary intention is to promote public awareness on the invaluable contributions of the quarrying industry to the infrastructural development and prosperity of contemporary Hong Kong, as well as on the sustainable development of both existing and proposed quarry projects territory-wide.

# Department of Urban Planning and Design (DUPAD)

**The Symposium on Mega-City Region Development in China** jointly organized by the *Strategic Research Theme in Contemporary China* and *Centre of Urban Studies and Urban Planning* of the University of Hong Kong was held on 3 December 2016. Mega-city region development is getting more and more important in China and the world. Ten mega-city regions in China accounted for only 11% of the total land area, but possessed 39% of the population and over 60% of the GDP. Urban clusters development is one of the development focuses of the 13th Five Year Plan (2016-2020) of China as well as its new National New-Type of Urbanization Plan (2014–2020) in 2014. Prominent scholars have examined different issues of social and economic development, environment, planning, and governance of mega-city regions in China in this one-day Symposium. They included Prof. Chaolin Gu (Tsinghua University), Prof. Zhigang Li (Wuhan University), Prof. George C.S. Lin (The University of Hong Kong), Dr. Kyungmin Nam (The University of Hong Kong), Prof. Yuemin Ning (East China Normal University), Prof. Jianfa Shen (The Chinese University of Hong Kong), Prof. Donggen Wang (Hong Kong Baptist University), Dr. Jiang Xu (The Chinese University of Hong Kong), Dr. Fiona F. Yang (Zhongshan University), Prof. Anthony G.O. Yeh (The University of Hong Kong) and Prof. Weiqi Zhou (Chinese Academy of Sciences).

1. Dr. Roger Chan

   - Appointed as external examiner of PhD thesis submitted by Zheng Wei, Department of Building and Real Estate, Hong Kong Polytechnic University and attended the viva held on 8 December 2016.

2. Dr. Xingjian Liu

   - The University Research Committee has approved, on the nomination of the Faculty, Dr. Liu's joint paper with Ben Derudder and Kang Wu entitled "Measuring Polycentric Urban Development in China: An Intercity Transportation Network Perspective", published online at Regional Studies, March 3, 2015.

3. Professor Rebecca Chiu

   - Appointed as Visiting Professor of the Department of Estate Management, Faculty of Built environment, University of Malaya from 16 November 2016 to 15 November 2017. Visited the Department 15 – 22 November 2016:

   - Delivered a keynote presentation on "Urban Neighbourhood in Hong Kong: Issues & Challenges" at the Seminar in Real Estate 2016: 2.0, 16 November 2016;

   - Gave lectures on:

        a. Town planning in Hong Kong;
        b. Town planning and planning institutions in Hong Kong;
        c. Sustainable development and housing management;

   - Developed a joint research project on the new Kuala Lumpur- Singapore infrastructure project in relation to the One Belt One Road development strategy; and

   - Visited planning projects and visited the aboriginal community.



   - Invited by the Department of Planning of the Sydney University to deliver a presentation on "Housing challenges of Hong Kong and implications for Chinese cities" at the International Symposium Urbanization and the Production of Space", held at Shanghai Jiao Tong University, 24 Nov 2016 Sydney University, jointly organized by Tsinghua University, Tongji University,

Shanghai Jiao Tong University, Guangzhou Urban Planning and Design Survey Research Institute.

4. Professor Bo-sin Tang

   - Gave a presentation about urban planning and integrated rail-property development in Hong Kong at the Zhejiang University – the Hong Kong Polytechnic University Joint Centre on 10 December 2016.

5. Professor Anthony Yeh

   - Was invited as one of the guest panelists of *Youth Summit 2016* organized by the Home Affairs Bureau and the Commission on Youth on 26 November 2016 at the Youth Square together with Mr. Paul Chan Mo-Po, Secretary for Development, and Mr Wong Kam-sing, Secretary for the Environment, in the session on Future Urban Planning and Development.



   - Prof. Anthony Yeh and Mr. Wong Kam-sing, Secretary for the Environment, and Mr. Paul Chan Mo-Po, Secretary for Development, in the session on Future Urban Planning and Development in the *Youth Summit 2016* organized by the Home Affairs Bureau and the Commission on Youth on 26 November 2016 at the Youth Square.

   - Attended the Academic Committee Meeting of the Guangdong Key Lab on Urbanization, Geographical Environment and Spatial Simulation of Sun Yat-sen University, Guangzhou, China, on 10 December 2016, as Chairman of the Academic Committee.

# Division of Landscape Architecture (DLA)

1. Dr. Cecilia Chu

   - Was nominated as an Executive Board Member of the International Association for the Study of Traditional Environments (IASTE). http://iaste.berkeley.edu

   - Was invited as thesis reviewer for the Master of Architecture Programme at the Chinese University of Hong Kong on Dec 10.

   - Her book chapter, entitled "Envisioning Urban Pasts: Heritage and Emergent Activism in Postcolonial Macau and Hong Kong," was accepted for publication in Urban Asias: Essays on Futurity Past and Present (edited by Tim Bunnell and Daniel P.S. Goh, published by Jovis, forthcoming 2017). https://www.jovis.de/en/books/details/product/urban-asias.html

   - Was invited to submit a book chapter, tentatively titled, "Housing: The Afterlives of Modernist Estates," for publication in the Routledge Handbook of Architectural History (edited by Duanfang Lu. forthcoming 2017).


2. Gavin S Coates

   - participated in this edition of the Pearl Report (from about 10:52 minutes), http://mytv.tvb.com/tc/cat_news/pearlreport/282861 (please browse on Chrome).

# Research Achievements

## HKUrbanLab research groups

### Centre of Urban Studies and Urban Planning (CUSUP)

1. Professor Rebecca Chiu

   - Delivered an invited presentation on <u>Social Roles of Neighbourhood Shopping Centres</u> in the Scholar Series of the Institute of Shopping Centre Management, 2 December 2016

   ***Abstract***: *Hong Kong is the definitive high-rise city of the world. Residential development in this city has been commonly organized in the form of high-rise housing estates. These housing estates often provide a range of community services and facilities for meeting daily needs. In particular, shopping centres of different scales operate in these estates, depending on the population sizes, that is, the clientele. These centres are not only designed to meet daily needs, but also to provide entertainment, recreation and socialization opportunities. It may also contribute to community development, identity shaping and break segregation between and among housing estates. However, its physical form may also be used as a segregating device, creating gated communities. This talk will present research findings on the above social functions of these neighbourhood shopping centres.*

2. Dr. Kyung-Min Nam

   - Delivered an invited presentation at the International Mega-city Region Symposium (December 3, 2016), co-organized by the Strategic Research Theme in Contemporary China and the Center for Urban Studies and Urban Planning, HKU. Details on the presented paper are as follows.

   Title: Environmental Challenges in Chinese Mega-city Regions: Focusing on Air Quality Management

   Author: Kyung-Min Nam

   *Abstract: Mega-city regions in China have received high priority in national air pollution control, as they are home to the main sources of pollution and the vast majority of China's urban population. The mega-city regions are currently part of the key regions subject to more stringent regional air-quality targets than the national standards. The strengthened regional aspects will likely lead to improved outcomes in traditional air-quality control based on administrative boundaries, given the need for industrial relocations and restructuring, prevalent transboundary pollution, and increased rural contributions to secondary pollutant formation. Current regional intervention schemes, however, are still at an early stage of implementation, leaving room for further improvement. The key areas of improvement include the establishment of*

*regional monitoring/reporting systems, cross-municipality policy collaboration, and scientific foundations for policy targets.*

3. Professor bo-sin Tang

   - Attended the 2016 Research Workshop on Community Planning and Governance about "Shareholding Reforms and Institutional Capacity Building for Community Governance in Periurban China: Theory and Practice" at Yiwu, China on 12 December 2016. He gave a presentation to review the urbanization of the countryside in Hong Kong and participated in the workshop discussions. The Workshop involved presentations by representatives and scholars from the Ministry of Home Affairs, Heshilu Village, Renmin University, The Hong Kong Polytechnic University, Zhejiang University, Zhejiang Normal University, and Central University of Finance and Economics.

4. Professor Anthony Yeh

   - Published the following paper, which is the research output of two patents - "Vehicle Positioning for Multilevel Road Network" (PCT (Patent Cooperation Treaty), 2010) and "Inclinometer Methods and Systems for Generating and Calibrating an In-Vehicle Inclination Angle" (US, filed in 2016):

   Yeh, A. G.O., Zhong, T. and Yue, Y. (2016), "Angle Difference Method for Vehicle Navigation in Multilevel Road Networks With a Three-Dimensional Transport GIS Database", *IEEE Transactions on Intelligent Transportation Systems*, DOI: 10.1109/TITS.2016.2567451.

   ***Abstract****: Multilevel road networks such as grade-separated interchanges and elevated roads have been increasingly used to solve traffic congestion in large cities. When navigating a vehicle in a multilevel road network, identifying the location of the vehicle in different road levels is of equal importance to identifying its planar location, particularly for overlapping and parallel roads. Although they can be represented and visualized in the existing navigation system, at present, it is difficult to guide a vehicle through such a multilevel road network because the existing vehicle positioning system uses consumer-grade GPS, and the transport geographic information system (GIS-T) database is mainly 2-D-based. The location of a vehicle on different road levels in multilevel road networks is often overlooked. This paper examines the deficiency of existing approaches in supporting vehicle navigation in multilevel road networks with consumer-grade GPS. It proposes to use an angle difference method that compares the vehicle pitch angle with the inclination angles of different road levels calculated from road elevations stored in the proposed GIS-T database to snap the vehicle to the appropriate road level when the vehicle is entering or exiting a multilevel road network. The angle difference method is implemented based on consumer-grade assisted GPS (A-GPS) and onboard vehicle pitch angle measurement with a smartphone. Experiment results prove that the angle difference method have high accuracy in determining the road level when the vehicle is driving in a parallel multilevel road network.*

# iLab

1. Dr. Wilson Lu

    - Invited to share "Big data for better construction project management" in Gammon's Construction Innovation Initiatives, Aberdeen Boat Club, 7 Dec 2016.

    - Referred by Dr Danial Ho, Dr Wilson Lu was invited to deliver a keynote speech "Bridging BIM and embedded intelligence for better facilities management (FM)" on the Conference "New Era of Building Digitalization". The conference was jointly organised by International Facility Management Association (IFMA) Guangdong Chapter and Royal Institution of Chartered Surveyors (RICS), on 12 Dec 2016 at Four Seasons Hotel, Shenzhen, Guangdong.



Public a paper "**Chen, K., Lu, W.,** Wang, H., **Niu, Y.** and Huang, G.Q. (2016). Naming objects in BIM: A convention and a semi-automatic approach. *ASCE Journal of Construction Engineering and Management*, Forthcoming".

*Abstract: A consistent and easily recognizable name is the primary identifier of an object in building information modeling (BIM). Existing naming conventions vary significantly from one to another, and require extensive manual work that is tedious and error-prone. This study seeks for (a) developing a standardized naming convention for BIM objects, and (b) devising a semi-automatic naming approach for saving the manual work. In the proposed naming convention, a single segment is included by referencing BIM standards and considering BIM users' actual needs; and the semi-automatic approach is formalized for both completed and ongoing BIM models. Validated by a control experiment and feedbacks from project managers and BIM engineers of a real-life project, this research can be immediately applied to realize standardized BIM object names. This study also generates practical implications to BIM-based project management, where standardized BIM object names are required for supporting object identification and information incorporation throughout a project life cycle.*

# Sustainable <sup>HD</sup> Cities

1. Three full papers were submitted to WB16 Conference:

   (i) An Integrated Urban Microclimate and Building Energy Model for Early Stage Design

   ***Abstract***: *The energy performance of an urban building is depended on its surroundings, such as the cast shadows of the nearby buildings, variable air temperature due to radiative trapping in street canyons and anthropogenic heat sources. Existing building energy models are limited in the consideration of the micro-scale variations of the surrounding environment, which can be significant for high-density cities like Hong Kong. In this paper, an integrated urban microclimate and building energy model was developed to assess the energy performance of a cluster of buildings in high-density cities. Results are evaluated by the field measurement data conducted in the Sai Ying Pun neighbourhood in Hong Kong. Measured air temperature, wind speed, and building wall temperature are compared with those simulated by the model. The study enriched modelling literature at the scale of building clusters and contributed to the methodologies of integrated simulation in urban microclimate and building energy. The model has potentials to support building design and urban planning at early stage.*

   *Keywords: Building Energy Simulation, Urban microclimate, Numerical Modelling, High-Density Cities*

   (ii) Thermal Environment and Outdoor Activities in Public Housing Estate Open Space

   ***Abstract***: *Hong Kong's outdoor open spaces are both underused and in short supply. This is a missed opportunity that can be otherwise realized to promote health and social interactions for local communities. In light of rising chronic diseases due to physical inactivity, it is essential to design open spaces that are well attended. In this study, we tested the hypothesis that an unfavourable thermal environment is a key factor affecting the use of existing outdoor open spaces in Hong Kong. Our purpose is to quantify the correlation between behavioural patterns and microclimate variables in outdoor open spaces. Fieldworks are conducted on 3 open spaces in the upper and lower Ngau Tau Kok, a public housing estate in Hong Kong. Meteorological measurements were taken on-site; occupant activities were recorded and together with a questionnaire study. Results revealed strong negative correlations between heat stress and headcount for the elderly and sitting people. Pedestrian-level wind speed and radiation intensity correlated with observed behaviours and self-reported preferences. We concluded that the outdoor thermal environment is a key factor to the occupancy of open spaces in Hong Kong that should be carefully designed.*

   *Keywords: Thermal Environment, Outdoor Activity, Open Space, Public Housing Estate*

(iii) A Simulation-Based Method to Assess 3D Urban Noise Environment in High-Density Cities

*Abstract*: *Urban noise is a major nuisance and health hazard in Hong Kong. Existing assessment methods are limited in their capacity to process complex urban configurations, many do not apply to high-density cities. We developed a numerical model to assess urban acoustic environment in high-density cities, targeting individual or household noise exposure. The model is based on ray-tracing technique and calculates the attenuation of sound energy from noise sources to designated receivers. It takes into account geometric spreading, air absorption, material reflection coefficient and scattering properties of surfaces. A careful balance is maintained between accuracy and computing efficiency. The model is being evaluated in lab experiment and field measurement. Our purpose is to provide a planning tool to tackle the complex spatial configuration in high-density cities. Outcomes will enrich literature of acoustic simulation. The new model allows us to accurately assess individual noise exposure as well as noise sections in 3D urban space, facilitates population-based health research, and supports urban planning and design projects for healthier acoustic environment.*

Keywords: Design process, Acoustic Simulation, Urban Noise Environment

2. An abstract of the paper entitled "An Integrated Urban Microclimate and Building Energy Model for Early Stage Design" has been accepted by the IBPSA Building Simulation 2017 conference to be held in San Francisco from 2 to 4 August 2017.

*Abstract*: (following the BS2017 standard format)

Background: The energy performance an urban building depend on its surroundings: nearby buildings cast shadows; air temperature vary due to radiative trapping in street canyons and anthropogenic heat sources. Existing building energy models are limited in accounting for micro-scale variations of the surrounding environment, which may significantly modify building energy performance in high-density cities like Hong Kong.

The current state-of-the-art: Modeling of building energy at urban scale remains a nascent field (Reinhart & Cerezo Davila 2016). Rarely are there tools that can assess the interactions between urban microclimate and building energy performances (Bouyer et al. 2011). Limited attempt of coupling CFD with BEM were made (Toparlar et al. 2015; Gracik et al. 2015), yet CFD tends to be computationally expensive, unsuitable to assess large districts and complex urban configurations (Yang and Li 2009), and it cannot be easily coupled with other simulation platforms (Novoselac & Srebric 2002). Recent advancement such as CitySim (Robinson et al. 2009) and UMI (Christoph F et al. 2013) made substantial progress; limitations persist when these models are applied in high-density cities.

Methods Applied: We developed an integrated model between an Urban Microclimate Model (UMM) (Huang et al., 2015) and a Building Energy Model (BEM) of HTB2 (Jones et al., 2013) (WSA, 2014). The UMM provides localized external air temperature to BEM, while external building surface temperature and HVAC exhaust data, calculated by BEM, will be provided to UMM in return. Each thermal zone of a building is included into the multizone system within

which mass and energy are exchanged. To evaluate predicted localized air temperature (Ta) and surface temperature of building facades (Ts), we conducted field studies in Sai Ying Pun, a high-density neighbourhood in Hong Kong on Dec. 9 & 13, 2014.

Deficiencies: This method may exhibit large uncertainties when applied to cities of lower density or in places where wind-driven flow dominates. The computing power of average PC may limit the temporal resolution of UMM to match with those of the BEM (annual hourly).

Contribution: This approach allows rapid assessment of building energy at urban scale in a way that is useful for early stage design. The proposed model can be particularly useful for a niche place of high-density cities, where anthropogenic heat are intense while airflow is often stagnant inside urban canyons.


# Healthy <sup>HD</sup> Cities

1. Dean Webster

- The Dean's joint paper entitled "Improving mental health through the regeneration of deprived neighbourhoods: a prospective controlled quasi-experimental study" has been published. The Lancet, vol 388, Special Issue, S110, November 2016.

  http://dx.doi.org/10.1016/S0140-6736(16)32346-7
  http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(16)32346-7/fulltext

*Abstract: Policy makers often target deprived neighbourhoods for regeneration with the expectation that population health will improve, since housing and neighbourhoods of low quality, as well as the social and economic determinants of poor health, are concentrated in the most deprived areas. Our aim was to examine the effects of Communities First, a Welsh Assembly Government community-led programme of neighbourhood regeneration targeted at the 100 most deprived electoral wards in Wales on mental health.*