Chinese Culture Research Lecture Series + IAPS Public Lecture (2021-2022 Autumn Semester)

Title: Urban flood and water issues in Chinese cities – Sponge City program: initiatives, progress, challenges and opportunities

Speakers: Prof Faith Chan, Xiaohui Lu, Xinbing Gu, Lei Li, Yuyao Xu and Yunfei Qi

Date: 2 Dec 2021 (Thursday)
Time: 1830-2000 (Beijing/Hong Kong time)/1030-1200 (GMT: London, Dublin, Edinburgh)
Venue: TBC at UNNC and online (via MS Teams) – link will circulate to research networks worldwide

Abstract

'Sponge City' is the term used to describe the Chinese government's approach to urban surface water management. The concept was conceived in 2014 in response to an increasing incidence of urban surface flooding in many Chinese cities. While ambitious and far-reaching in its aim (of reducing national flood risk, increasing water supply and improving water quality), the initiative must be implemented by individual sub-provincial or municipal-level government entities. Thus, while the concept is similar to Blue-Green Cities (BGCs); sustainable drainage systems (SuDS) in the UK (or low-impact development (LID) in the USA), it is developing with different regional characteristics, and during continuing rapid urbanization. Indeed, the increasing use of national rather than international examples of best practice reflects a growing body of knowledge that has evolved since the start of the Sponge City initiative. However, there are some misunderstandings of the function and application of the SCP practices and measures, especially after the Zhengzhou flood in July 2021. In this seminar, Faith and his research team will provide the latest updates of the urban flood conditions and background of Chinese cities. The latest response and recovery processes will be introduced such as using the case of Typhoon In-Fa from the Ningbo municipal government and the success of improving flood resilience. Whilst, interpretation and development of the latest SCP guidelines will be presented that using the case of Ningbo, and illustrate the rapid urbanisation and reflected from the affluent and rapidly expanding city on this case, for example the development and progress of the SCP, also the function of addressing urban water pollutions. Though climate, environmental and socio-economic factors can all be seen to influence the way that the National guidelines are implemented (governance), project financing, integration and assessment are found to be increasing future influence.

Keywords: Sponge City, Climate Change, Intensive rainstorm, urban floods, flood resilience

Speakers: Prof Faith Chan and his PhD students (see the bio here)

Prof Faith Chan

Prof Faith, Ka Shun Chan is an associate professor at School of Geographical Sciences, and he holds a visiting professorship at SUSTech University, Shenzhen. He is a co-lead of the IAPS Environmental Security Research Priority Group at IAPS. He specialised in sustainable flood risk management, climate adaptations and urban resilience on Asian coastal megacities. He is currently funded by the Chinese National Research Council (NSFC) as principal investigator on the microplastics and its impacts on urban rivers, he is also involved in two international research projects as a researcher in the Blue-Green Cities Consortium (funded by ESPRC and British Academy from the UK research council) and co-investigating in the flood risk and commercial properties (funded by RICS) project. He is also a principal investigator on three municipal-funded projects to investigate the surface water quality, typhoon-enhanced flood risk, and the development of a "*Sponge City*" pilot study in Ningbo. He has published more than 60 publications in top tier international peer-reviewed journals such as *Journal of Hydrology, Journal of Cleaner Production, Land Use Policy, Journal of Flood Risk Management, Nature Ecology and Evolution, Progress in Planning, Applied Geography, Nature Hazards,* etc., book chapters and magazines. He is the Associate Editor of *ASCE Natural Hazards Review Journal*.

Ms Xiaohui Lu

Xiaohui Lu is currently a PhD student of Joint Doctoral Training Partnership Programme at University of Nottingham Ningbo China and Institute of Urban Environment, Chinese Academy of Sciences. She is supervised by Prof. Hing Kai Chan (1st supervisor, NUBS), Prof. Faith Ka Shun Chan (2nd supervisor, SoGS), and Prof. Weiqiang Chen (IUE supervisor, IUE, CAS). She completed her postgraduate study at Beijing Information Science & Technology University in 2020, majored in Management Science and Engineering. Her research foci and interests are extreme precipitation and road transport disruption, including urban flood simulation, road inundation analysis, road exposure analysis, traffic delay computing, roads and urban planning and development etc.

Mr Xinbing Gu

Xinbing Gu is currently a PhD student of Joint Doctoral Training Partnership Programme at University of Nottingham Ningbo China and Zhejiang University of Finance & Economics. He is supervised by Prof. Hing Kai Chan, Dr. Dimple Thadani, Prof. Faith Chan, Prof. Yi Peng. He completed his postgraduate study at Zhejiang University of Finance & Economics in 2020, majored in Urban Governance. His research foci and interests are urban floods and organizational resilience, including urban flood mitigation and management, floods resilience, floods insurance, firm resilience, firm disaster management etc.

Ms Lei Li

Miss Lei Li is currently a PhD student at School of Geographical Science, University of Nottingham Ningbo China. She is supervised by Prof. Faith Ka Shun Chan, Prof. Ali Cheshmehzangi, Dr Christopher D Ives and Dr Dimple Thadani. She completed her postgraduate study at Imperial College London in 2018, at the Center for Environmental Policy, specialized in Water Management. Her research foci include Sponge City, Green Infrastructure and Nature-based Solutions in terms of policy, multiple stakeholders' arrangement and perspectives, and the social media role. She is especially interested in the public perceptions and participation within Sponge City programme. She has been involved and contributed to the Ningbo municipal-funded project as a team-member with her 1st supervisor (FKS Chan) in 'typhoon-enhanced flood risk, and the development of a "Sponge City" pilot study in Ningbo', and British Academy Project 'Developing new Blue-Green futures: multifunctional infrastructure to address water challenges', part of the British Academy Programme on Tackling the UK's International Challenges, and currently on the Institute of Asia Pacific Studies (IAPS) funded project on the 'Influence of social media in Sponge City Program'.

Mr Yuyao Xu

Yuyao Xu is a PhD student at School of Geographical Sciences, and working with Prof Faith Chan on the research about microplastic pollution in urban freshwater environments. Currently, he is focusing on the microplastic abundance situation in urban rivers and waterbodies of urban parks.

Mr Yunfei Qi

Mr Yunfei is a Phd student at UNNC, Geographical Science. He currently works for GUIZHOU WATER & POWER SURVEY-DESIGN INSTITUTE CO., LTD as a senior engineer and economist, certificated consultant, constructor, cost engineer and project manager. He always focuses on worldwide water engineering in his working career. Now, he is studying at Sponge City related areas.

The initial arrangement as here (90mins):

1. Introduction (Faith) – 10 mins
2. Recent typhoons and urban flood impact in Ningbo and coastal cities (Xinbing Gu and Xiaohui Lu) – 15 mins
3. Flood responses and recovery processes: cases and examples in NGB, GZ, etc. (Faith Chan, Xinbing Gu and Xiaohui Lu) – 10 mins
4. Solution – Sponge City Program (SCP): initiative, progress and outcomes (Lei Li) – 15 mins
5. SCP and urban water/stormwater management issues (Yuyao Xu and Faith Chan) – 15 mins
6. Discussion – current challenges and opportunities (Faith, Yunfei Qi and the team) – 15 mins
7. Q and A (Faith and the team) – 10 mins

Media interviews and information regarding to the talk (see the link and information)

The Christian Science Monitor Daily (by Ann Taylor) on 29 July 2021, "To curb urban flooding: China is building sponge cities. Do they work?" (link)
Forbes (by Laurie winkless) on 27 July 2021, "Could Sponge Cities help us prepare for our flooded future? (link)
New York Times (by Steven Lee Myers, Keith Bradsher and Chris Buckley) on 26 July 2021, "As China Boomed, It Didn't Take Climate Change Into Account. Now It Must". (link)
Canadian Broadcast Co-operation (CBC) Radio 1, interviewed by Robyn Bresnahan, "The current show"
France 24 on 23 July 2021, "China warned of future disasters as Zhengzhou floods toll passes 50" (link)
MSN news (by David Stanway, Reuters) on 23 July 2021, "Zhengzhou floods serve China's urban planners deadly warning" (link)
The Wires China (by Eyck Freymann) on 18 July 2021, "The Sponge Revolution" (link)

Selected latest publications (up to 2018) related to this seminar:

1) Xu, Y., **Chan F**., Johnson, M., Stanton, T., He, J., Jia, T., Wang, J., Wang, Z., Yao, Y., Xu, J. (2021) Microplastic pollution in Chinese urban rivers: The influence of urban factors. *Resources, Conservation and Recycling*: 105686.
2) **Chan, F.** et al. (2021). "Urban flood risks and emerging challenges in a Chinese delta: The case of the Pearl River Delta." *Environmental Science & Policy* 122: 101-115.
3) Qi, Y., **Chan, F.**, O'donnell, E., Thorne, C., Feng, M., Sang, Y., et al. (2021). "Exploring the development of the Sponge City Program (SCP): the case of Gui'an New District, Southwest China." *Frontiers in Water*, 3, 41.
4) Xie, P., Wu, L., Sang, Y. F., **Chan, F.**, Chen, J., Wu, Z., & Li, Y. (2021). "Correlation-aided method for identification and gradation of periodicities in hydrologic time series." *Geoscience Letters*, 8(1), 1-16.
5) Xu, Y., **Chan, F**., Stanton, T., Johnson, M., Kay, P., He, J., Wang, J., Kong, C., Wang, Z., Liu, D., Xu, Y. (2021). "Synthesis of dominant plastic microfibre prevalence and pollution control feasibility in Chinese freshwater environments." *Science of The Total Environment*: 146863.
6) Li, L.., Cheshmehzangi A., **Chan, F.**, Ives, D.C. (2021). "Mapping the Research Landscape of Nature-Based Solutions in Urbanism." *Sustainability* 13(7): 3876.

7) O'Donnell, E. C., Netusil, N., **Chan, F.**, Dolman, N. and Gosling, S. (2021). "International Perceptions of Urban Blue-Green Infrastructure: A Comparison across Four Cities." *Water* 13(4): 544.

8) Qi, Y.; **Chan, F.**; Thorne, C.; O'Donnell, E.; Quagliolo, C.; Comino, E.; Pezzoli, A.; Li, L.; Griffiths, J.; Sang, Y.; Feng, M. (2020) Addressing Challenges of Urban Water Management in Chinese Sponge Cities via Nature-Based Solutions. *Water*, 12, 2788.

9) Alex M. Lechner, Rachel L. Gomes, Lucelia Rodrigues, Matthew J. Ashfold, Sivathass Bannir Selvam, Ee Phin Wong, Christopher M. Raymond, Alexandra Zieritz, Kong Wah Sing, Peter Moug, Lawal Billa, Saut Sagala, Ali Cheshmehzangi, Karen Lourdes, Badrul Azhar, Ruzana Sanusi, Christopher D. Ives, Yu-Ting Tang, David Tan, **Chan F.**, Tapan Kumar Nath, Nur Aliya Binti Sabarudin, Sarah Metcalfe, Natalie M. Gulsrud, Mark Scheursch, Ahimsa Campos-Arceiz, Mark G. Macklin, Chris Gibbins; Challenges and considerations of applying nature-based solutions in low- and middle-income countries in Southeast and East Asia. (2020) *Blue-Green Systems* bgs2020014. doi: https://doi.org/10.2166/bgs.2020.014

10) Xu, Y-Y., **Chan, F**., He, J., Johnson, M., Gibbins, C., Kay, P., Stanton, T., Xu, Y-Y., Li, G., Feng, M-L., Paramor, O., Yu, X-B. & Zhu, Y-G. (2020) A critical review of microplastic pollution in urban freshwater environments and legislative progress in China: Recommendations and insights, *Critical Reviews in Environmental Science and Technology*, DOI: 10.1080/10643389.2020.1801308

11) Li, L., Alexandra M.C., Cheshmehzangi A., **Chan F.** (2020) Identifying enablers and barriers to the implementation of the Green Infrastructure for urban flood management: A comparative analysis of the UK and China, *Urban Forestry & Urban Greening*, 54, 126770. https://doi.org/10.1016/j.ufug.2020.126770

12) Lo, Y., Liu S., Cheung, L.T.O., **Chan, F.** (2020) Contested Transformations: Sustainable Economic Development and Capacity for Adapting to Climate Change. *Annals of the American Association of Geographers*, 110 (1): 223-241. https://doi.org/10.1080/24694452.2019.1625748

13) O'Donnell E., Thorne C.R., Yeakley J.A., **Chan F.** (2020) Sustainable Flood Risk and Stormwater Management in Blue-Green Cities; an Interdisciplinary Case Study in Portland, Oregon. *Journal of the American Water Resources Association* (http://doi.org/10.1111/1752-1688.12854)

14) Griffiths J, **Chan F**, M, Zhu FF and Higgitt D, (2020) Interpretation and application of Sponge City guidelines in China. *Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences* (http://doi.org/10.1098/rsta.2019.0222)

15) Meng M., Dabrowski M., Tai Y., Stead D., **Chan, F.** (2019) Collaborative spatial planning in the face of flood risk in delta cities: A policy framing perspective. *Environmental Science and Policy,* 96, 95-104. https://doi.org/10.1016/j.envsci.2019.03.006.

16) **Chan F.**, Joon C.C., Ziegler A., Dabrowski M. and Varis O. (2018) Towards resilient flood risk management for Asian coastal cities: lessons learned from Hong Kong and Singapore. *Journal of Cleaner Production*, 187, 576-589. https://doi.org/10.1016/j.jclepro.2018.03.217

17) **Chan F.**, Griffiths G., Higgitt D., Shuyang X., Fangfang Z., Yu-Ting T., Yuyao X. and Thorne C. (2018) "Sponge City" in China – a breakthrough of planning and flood risk management in the urban context. *Land Use Policy*, 76, 772-228. https://doi.org/10.1016/j.landusepol.2018.03.005

18) Griffiths, J., Zhu F.-F. **Chan F.** and Higgitt D. Modelling the impact of sea-level rise on urban flood probability in SE China. *Geoscience Frontiers* (In Press - available online since 29 March 2018) https://doi.org/10.1016/j.gsf.2018.02.012

19) Tang Y.T., **Chan F.**, O'Donnell E., Griffiths J., Lau L., Higgitt D. and Thorne C. (2018) Aligning Ancient and Modern Approaches to Sustainable Urban Water Management in China: Ningbo as a 'Blue-Green City' in the 'Sponge City' Campaign. *Journal of Flood Risk Management*. https://doi.org/10.1111/jfr3.12451

20) Everett, G., Lamond, J., Mozillo, A., Matsler M. and **Chan, F.** (2018) Delivering Green Streets: An exploration of changing perceptions and behaviours over time around bioswales in Portland, Oregon. *Journal of Flood Risk Management*. 11, 973-985. DOI: 10.1111/jfr3.12225.

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