

# Qian ZHANG

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## Research Interest: 1) Industrial Ecology; 2) Environmental and Natural Resources Management

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GHG emission accounting and footprint analysis,  
Sustainable cities and infrastructure in life-cycle thinking,  
Transboundary air pollution and environmental justice,  
Integrated urban water management and water-energy-climate nexus,  
Value-added-oriented resource efficiency for a circular economy,  
Synergies and trade-offs between Sustainable Development Goals (SDGs).

## Education

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| <b>OCT 2012 –<br/>SEP 2015</b> | Department of Urban Engineering,<br><b>The University of Tokyo, Japan</b><br><i>Dissertation: Assessment of GHG emissions of water and wastewater utilities in urbanizing China</i>                        | <b>Ph.D. in Urban Engineering</b><br>Supervisor: Prof. Yuichi Moriguchi |
| <b>SEP 2009 –<br/>AUG 2012</b> | College of Environmental Sciences and<br>Engineering, <b>Peking University, China</b><br><i>Thesis: Trend analysis of ground-level ozone and its precursor concentrations in Beijing in the summertime</i> | <b>MSc in Environmental Science</b><br>Supervisor: Prof. Min Shao       |
| <b>SEP 2005 –<br/>AUG 2009</b> | School of Environmental Sciences,<br><b>Peking University, China</b>                                                                                                                                       | <b>BSc in Environmental Science</b><br>Thesis advisor: Prof. Min Shao   |
| <b>SEP 2007 –<br/>AUG 2009</b> | China Centre for Economic Research,<br><b>Peking University, China</b>                                                                                                                                     | <b>Minor in Economics</b>                                               |

## Work and Training Experience

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### **APR 2018 – JUL 2020, Postdoctoral Fellow at the University of Victoria**

- ❖ Research on ‘Infrastructure for a Low-carbon Planet’ led by Prof. Christopher Kennedy to understand the transition pathway of infrastructure systems towards deep decarbonization.

### **OCT 2015 – MAR 2018, Project Researcher at The University of Tokyo**

- ❖ Created value-added based indicators to evaluate Japan’s resource efficiency at the sectoral level by combining input-output analysis, material flow analysis, structural pathway analysis, and decomposition approaches.
- ❖ Identified hot-spot characteristics of sulphur dioxide (SO<sub>2</sub>) emissions embodied in supply chains by updating the environmentally extended multi-regional input-output analysis with the source-receptor relationship model.

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**JAN 2011 - AUG 2012, Research Intern/Consultant (Part-time) at China Office, the World Resources Institute (WRI)**

- ❖ Jointly made a *GHG emission calculation tool (excel-based) for Chinese cities*, and localized WRI's corporate GHG accounting guidelines into Chinese version under the supervision of Dr. Wee Kean Fong (Deputy Country Director for WRI China).
- ❖ Conducted preliminary research for a *GHG emission calculation tool for Chinese power plants*.

**SEP 2007 - AUG 2008, Research Assistant at Peking University**

- ❖ Enrolled in Undergraduate Research & Training Program under the supervision of Prof. Shu Tao and Dr. Jun Cao. The study theme: Bioaccessibility of polycyclic aromatic hydrocarbons (PAHs) in the digestion via in vitro studies.

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**Teaching Experience, Research Supervision, and School Services**

**Teaching Experience**

**MAY 2020 – AUG 2020, Sessional Lecturer at the University of Victoria**

- ❖ Develop and teach an elective undergraduate course with on-line teaching skills: CIVE 480D (*Methods, Tools, and Data for Industrial Ecology*).

**SEP 2018 – APR 2020, Co-Instructor at the University of Victoria**

- ❖ Co-taught (20%) in two graduate courses with active learning skills: CIVE 510 (*Industrial Metabolism & Global Environmental Challenge*) and CIVE 513 (*Sustainable Cities*).

**JUL 2014, Teaching Assistant at The University of Tokyo**

- ❖ Engaged in the preparation of a summer course *Sustainable Urban Management* and field trips.

**SEP 2010 - FEB 2011, Teaching Assistant at Peking University**

- ❖ Marked the assignments, and managed the internet platform for a core course (*Environmental Sciences*).

**School Services**

**JUL 2019 – JAN 2020, Event Planning Assistant at the University of Victoria**

- ❖ Assisted the coordinator in organizing the first research day for graduate students in the Department of Civil Engineering (29 JAN 2020)

**APR 2019, Table Facilitator at the University of Victoria**

- ❖ Ensured that our faculty members worked together to deliver clear outputs for a collaborative research proposal at the end of the Workshop on Advancing Green Civil Engineering (8-9 APR 2019).

**Skills**

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Language: Chinese (native), English (CEFR C1), and Japanese (JLPT N1)

Microsoft Word/Excel/PowerPoint, ArcGIS, SPSS, MATLAB, Python

## Professional Memberships and Services

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Member, the International Society of Industrial Ecology, 2015 - present

Member, the International Input-Output Association, 2016 - present

Member, the Institute of Life Cycle Assessment, Japan, 2012 - 2015

Co-founder, Chinese Association of Science and Technology at the University of Tokyo, 2015 - 2018

Editorial Board Member, *Journal of Cleaner Production*, 2019 - present

Awards Coordinator for the *Journal of Industrial Ecology* Best Paper Prizes committee, 2020 - present

Ad-hoc Reviewer for Journals:

*J. Clean. Prod.* (81 assignments), *Resour Conserv Recy.* (18), *Environ. Sci. Technol.* (2), *Ecol. Model.* (1), *EIA Review* (1), *J. Ind. Ecol.* (3), *Sci. Total Environ.* (7), *Waste Manag.* (3), *J. Mater. Cycles Waste.* (3), *Appl. Energy* (4), *J. Urban Manag.* (2), *BioResources* (1), *Renew. Sust. Energ. Rev.* (2), *Urban Clim.* (1).

## Awards, Grants, and Fellowships

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Japanese Government Ph.D. Scholarship, MEXT of Japan (JPY 5,328,000, 2012-2015)

First-class Scholarship for Excellent Master's Students, Peking University (CNY 15,000, 2009)

Chancellor's Grant for Undergraduate Research, Peking University (CNY 4,000, 2007-2008)

Merit Student, Peking University (2007)

## Publications (Peer-reviewed, underlined as the first author or corresponding author)

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### Industrial Ecology (Ph.D. and postdoctoral period)

- 1) Zhang, S., Yang, F.\*, Ma, Z., Liu, C., Tan, X., & **Zhang, Q.** (2020). Assessment of carbon emission abatement costs of global renewable power generation (in Chinese). *Journal of Global Energy Interconnection*, 3(4), 328-338.
- 2) **Zhang, Q.\***, Smith, K., & Zhao, X. (2020). Greenhouse gas emissions associated with urban water infrastructure: Evidence from China. *WIREs Water*. Submitted.
- 3) **Zhang, Q.\***, & Kennedy, C. (2020). Potential savings from the global railway infrastructure towards deep decarbonization. *In review*.
- 4) **Zhang, Q.\***, Takagi, S., Nakanishi, S., Nakatani, J., & Moriguchi, Y. (2019). A raw material-oriented indicator of sectoral resource efficiency for Sustainable Development Goals. *In review*.
- 5) **Zhang, Q.\***, Kennedy, C., Wang, T., Wei, W., Li, J., & Shi, L. (2020). Transforming the coal and steel nexus for China's eco-civilization: Interplay between rail and energy infrastructure. *Journal of Industrial Ecology*, doi.org/10.1111/jiec.13040.
- 6) Gao, X.\*, Nakatani, J., **Zhang, Q.**, Huang, B., Wang, T., & Moriguchi, Y. (2020). Dynamic material flow and stock analysis of residential buildings by integrating rural-urban land transition: A case of Shanghai. *Journal of Cleaner Production*, 253, 119941.
- 7) Li, L., Liu, D., **Zhang, Q.**, Song, K.\*, Zhou, X., Tang, Z., & Zhou, X. (2019). Occurrence and ecological risk assessment of selected antibiotics in the freshwater lakes along the middle and lower reaches of Yangtze River Basin. *Journal of Environmental Management*, 249, 109396.
- 8) Zhang, C.\*, He, G., **Zhang, Q.\***, Liang, S., Zipper, S., Guo, R., Zhao, X., Zhong, L., & Wang, J. (2020). The evolution of virtual water flows in China's electricity transmission network and its driving forces. *Journal of Cleaner Production*, 242, 118336.

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- 9) **Zhang, Q.\***, Liu, S., Wang, T., Dai, X., Baninla, Y., Nakatani, J., & Moriguchi, Y. (2019). Urbanization impacts on Greenhouse Gas (GHG) emissions of the water infrastructure in China: Trade-offs among Sustainable Development Goals (SDGs). *Journal of Cleaner Production*, 232, 474-486.
  - 10) Yu, L., Moriguchi, Y.\* , Nakatani, J., **Zhang, Q.**, Li, F., He, W.\* , & Li, G. (2019). Environmental impact assessment on the recycling of waste LCD panels. *ACS Sustainable Chemistry & Engineering*, 7(6), 6360–6368.
  - 11) Baninla, Y., Lu, Y.\* , **Zhang, Q.\***, Omotehinse, A., Zheng, X., Zhang, M., Yuan, J., Zhou, Y., Liang, R., & Khan, K. (2020). Material use and resource efficiency of African sub-regions. *Journal of Cleaner Production*, 247, 119092.
  - 12) Baninla, Y., Zhang, M., Lu, Y.\* , Liang, R., **Zhang, Q.**, Zhou, Y., & Khan, K. (2019). A transitional perspective of global and regional mineral material flows. *Resources, Conservation & Recycling*, 140, 91-101.
  - 13) **Zhang, Q.\***, Nakatani, J., Shan, Y., & Moriguchi, Y. (2019). Inter-regional spillover of China's sulfur dioxide (SO<sub>2</sub>) pollution across the supply chains. *Journal of Cleaner Production*, 207, 418-431.
  - 14) Wang, T., Shi, F.\* , **Zhang, Q.**, Qian, X., & Hashimoto, S. (2018). Exploring material stock efficiency of municipal water and sewage infrastructures in China. *Journal of Cleaner Production*, 181, 498-507.
  - 15) Chen, X., Niu, J.\* , Nakagami, K., **Zhang, Q.**, Qian, X., & Nakajima, J. (2018). Green sports supporting a low-carbon society: Inspiration from Japan. *International Journal of Global Warming*, 14(1), 61-80.
  - 16) **Zhang, Q.\***, Nakatani, J., Wang, T., Chai, C., & Moriguchi, Y. (2017). Hidden greenhouse gas emissions for water utilities in China's cities. *Journal of Cleaner Production*, 162, 665-677.
  - 17) **Zhang, Q.\***, Nakatani, J., & Moriguchi, Y. (2015). Compilation of an embodied CO<sub>2</sub> emission inventory for China using 135-sector Input-Output Tables. *Sustainability*, 7(7), 8223-8239.

#### Atmospheric Chemistry (Master's period)

- 18) Chen, W., Shao, M.\* , Wang, M., Lu, S., Liu, Y., Yuan, B., Yang, Y., Zeng, L., Chen, Z., Chang, C.-C., **Zhang, Q.**, & Hu, M. (2016). Variation of ambient carbonyl levels in urban Beijing between 2005 and 2012. *Atmospheric Environment*, 129, 105-113.
- 19) Wang, M., Shao, M.\* , Chen, W., Lu, S., Liu, Y., Yuan, B., **Zhang, Q.**, Zhang, Q., Chang, C.-C., Wang, B., Zeng, L., Hu, M., Yang, Y., & Li, Y. (2015). Trends of non-methane hydrocarbons (NMHC) emissions in Beijing during 2002–2013. *Atmospheric Chemistry and Physics*, 15(3), 1489-1502.
- 20) **Zhang, Q.**, Yuan, B., Shao, M.\* , Wang, X., Lu, S., Lu, K., Wang, M., Chen, L., Chang, C.-C., & Liu, S. C. (2014). Variations of ground-level O<sub>3</sub> and its precursors in Beijing in summertime between 2005 and 2011. *Atmospheric Chemistry and Physics*, 14(12), 6089-6101.
- 21) Wang, M., Zeng, L.\* , Lu, S., Shao, M.\* , Liu, X., Yu, X., Yuan, B., **Zhang, Q.**, Hu, M., & Zhang, Z. (2014). Development and validation of a cryogen-free automatic gas chromatograph system (GC-MS/FID) for online measurements of volatile organic compounds. *Analytical Methods*, 6(23), 9424-9434.
- 22) Yuan, B., Shao, M.\* , deGouw, J., Parrish, D. D., Lu, S., Wang, M., Zeng, L., **Zhang, Q.**, Song, Y., Zhang, J., & Hu, M. (2012). Volatile organic compounds (VOCs) in urban air: How chemistry

affects the interpretation of positive matrix factorization (PMF) analysis. *Journal of Geophysical Research: Atmospheres*, 117(D24).

- 23) Zhang, Q.**, Shao, M.\*, Li, Y., Lu, S., Yuan, B., & Chen, W. (2012). Increase of ambient formaldehyde in Beijing and its implication for VOC reactivity. *Chinese Chemical Letters*, 23(9), 1059-1062.

#### Selected Conference Presentations (Peer-reviewed, underlined as the presenter)

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- 1) Zhang, Q.**, *et al.* The coal and steel nexus in China's evolving infrastructure sectors. **Oral** presentation at *the 10th Biennial Conference of the International Society for Industrial Ecology: Industrial ecology for Eco-civilization*, Beijing, China, 7-11 JUL 2019.
- 2) Zhang, Q.**, & Moriguchi, Y. Sustainable Development Goals (SDGs) Call for New Indicator of Resource Efficiency for Japan. **Oral** presentation at *the 13th International Conference on EcoBalance: Nexus of ideas: Innovation by linking through life cycle thinking*, Tokyo, Japan, 9-12 OCT 2018.
- 3) Zhang, Q.**, & Moriguchi, Y. New Resource Efficiency Indicator for Better Corporate Engagement in Japan. **Oral** presentation at *the 2018 International Conference on Resource Sustainability*, Beijing, China, 27-29 JUN 2018.
- 4) Zhang, Q.**, *et al.* Analysis of CO<sub>2</sub> emissions embodied in the urban water use in China. **Oral** presentation at *the 24th International Input-Output Conference*, Seoul, Republic of Korea, 4-8 JUL 2016.
- 5) Zhang, Q.**, *et al.* Integrated evaluation of GHG emissions of water utilities in China. **Oral** presentation at *the 6th IWA-ASPIRE Conference & Exhibition: Sustainable water environment and water use*, Beijing, China, 20-24 SEP 2015.

#### Invited Presentations in Workshops, Seminars, and Other Events

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- 1) Zhang, Q.**, A Glance of 20-year Governance for the Circular Economy in Japan. *Urban Metabolism in Policy and Practice Seminar*, Metabolism of Cities funded by the Urban Studies Foundation, Tsinghua University, Beijing, China, 6 JUL 2019.  
<Information available at <https://seminars.metabolismofcities.org/beijing>>
- 2) Zhang, Q.**, Water-Energy-Climate nexus: Experiences from China's urban water sector. *Sustainability Seminar Series in Civil Engineering (Fall 2018)*, Department of Civil Engineering, University of Victoria, Victoria, Canada, 19 SEP 2018.