

Qian ZHANG

Postdoctoral Fellow, Department of Civil Engineering, University of Victoria
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Research Experience and Interests: Industrial Ecology & Environmental Systems Analysis

GHG emission accounting and carbon footprint analysis,
Sustainable cities and infrastructure in life-cycle thinking,
Transboundary air pollution and demand-side management,
Integrated urban water management and water-energy-climate nexus,
Value-added based resource efficiency for a circular economy.

Education

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

Work and Teaching Experience

APR 2018 – present Postdoctoral Fellow at University of Victoria

- ❖ Research on ‘Infrastructure for a Low-carbon Planet’ led by Chair Prof. Christopher Kennedy to understand the transition pathway of infrastructure systems under a deep decarbonization future.
- ❖ Co-teaching in the graduate course CIVE 510 (Industrial Metabolism)

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. [**Environment Research and Technology Development Fund No. 3K163001, Japan**]
- ❖ Identified hot-spot characteristics of sulphur dioxide (SO₂) emissions embodied in supply chains by updating environmental extended multi-regional input-output analysis with source-receptor relationship model. [**Grant-in-Aid for Scientific Research (A) No. 15H01750, Japan**]

JUL 2014 Teaching Assistant at The University of Tokyo

- ❖ Assisted in the intensive lecture *Sustainable Urban Management* and the field trips.

JAN 2011 - AUG 2012 Research Intern/Consultant at China Office, the World Resources Institute

- ❖ Jointly made a *GHG emission calculation tool (excel-based) for Chinese cities*, and localized WRI's corporate GHG accounting guidelines into Chinese version.
- ❖ Conducted preliminary research for *GHG emission calculation tool for Chinese power plants*.

SEP 2010 - FEB 2011 Teaching Assistant at Peking University

- ❖ Participated in marking the assignments, and managing the internet platform for the compulsory lecture *Environmental Sciences*.

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. [Chancellor's Grant for Undergraduate Research, Peking University]

Skills

Language: Chinese (native), English (full working proficiency), and Japanese (limited working proficiency)

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

Professional Memberships and Services

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

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

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

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

Reviewer for journals:

Resources, Conservation & Recycling (Outstanding Reviewer); Environmental Science & Technology; Journal of Cleaner Production; Ecological Modelling; Environmental Impact Assessment Review.

Reviewer for conferences:

CitiesIPCC conference 2018; ISIE biennial conference 2017.

Awards, Grants, and Fellowships

2012 - 2015 Japanese Government (MEXT) Ph.D. Scholarship, Japan

2010 First Prize in the *Young Scientist Challenge Cup*, Peking University, China

2009 - 2010 First-class Scholarship for Excellent Master Graduates, Peking University, China

2007 Excellent Student Award, Peking University, China

2007 Chancellor's Grant for Undergraduate Research, Peking University, China

Publications (Peer-Reviewed)

Industrial Ecology (PhD and postdoctoral period)

- 1)** **Zhang, Q.**, Takagi, S., Nakanishi, S., Nakatani, J., & Moriguchi, Y. (2018). Sustainable Development Goals Call for a New Raw Material-oriented Indicator of Sectoral Resource Efficiency, *under review*.
- 2)** Baninla, Y., Zhang, M., Lu, Y., **Zhang, Q.**, Liang, R., Wang, H., Chen, C., Zhou, Y., Yuan, J., & Khan, K. (2018). Global availability of metals and regional disparity in sustainability, *submitted*.
- 3)** Baninla, Y., Zhang, M., Lu, Y., Meng, J., **Zhang, Q.**, Liang, R., Zhou, Y., Yuan, J., & Khan, K. (2018). Source identification and emission estimation of heavy rare earth elements in China, *under review*.
- 4)** 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.
- 5)** **Zhang, Q.**, Nakatani, J., Shan, Y., & Moriguchi, Y. (2019). Inter-Regional Spillover of China's sulfur dioxide (SO₂) Pollution across the Supply Chains. *Journal of Cleaner Production*, 207, 418-431.
- 6)** 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.
- 7)** 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.
- 8)** **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.
- 9)** **Zhang, Q.**, Nakatani, J., & Moriguchi, Y. (2015). Compilation of an embodied CO₂ emission inventory for China using 135-sector Input-Output Tables. *Sustainability*, 7(7), 8223-8239.

Atmospheric Chemistry (Master's period)

- 10)** 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.
- 11)** 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.
- 12)** **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 O₃ and its precursors in Beijing in summertime between 2005 and 2011. *Atmospheric Chemistry and Physics*, 14(12), 6089-6101.
- 13)** 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.

- 14) 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).
- 15) **Zhang, Q.**, Shao, M., Li, Y., Lu, S. H., Yuan, B., & Chen, W. T. (2012). Increase of ambient formaldehyde in Beijing and its implication for VOC reactivity. *Chinese Chemical Letters*, 23(9), 1059-1062.

Environmental Toxicology (Undergraduate period)

- 16) Lv, Y., Zhang, D., Sai, D., **Zhang, Q.**, Zhang, W., & Tao, S. (2009). In-vitro determination of bioaccessibility of hexachlorocyclohexane in soils in a model digestion system (in Chinese). *Asian Journal of Ecotoxicology*, 4(2), 197-202.
- 17) Zhang, D., Lv, Y., Sai, D., **Zhang, Q.**, Zhang, W., & Tao, S. (2009). Effect of sorption of the bioaccessibility of polycyclic aromatic hydrocarbons in soil measured by in-vitro test (in Chinese). *Environmental Chemistry*, 28(4), 524-529.
- 18) Zhou, D., Li, X., Yang, Y., Yue, D., Liu, Z., **Zhang, Q.**, Guan, T., Yang, Y., Wang, W., Cao, J., & Tao, S. (2008). Residue-level of HCHs in chicken (in Chinese). *Environmental Science*, 29(1), 207-211.

Other Publications

- 1) **Zhang, Q.**, Gao, X., & Liu, Z. (2018). China's bike-sharing: A new green-washing industry? *eLetter response to Acuto, M.* (2018). Global science for city policy. *Science*, 359(6372), 165-166. <http://science.sciencemag.org/content/359/6372/165/tab-e-letters>

Selected Conference Presentations (Peer-Reviewed)

- 1) **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.
- 2) **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.
- 3) **Zhang, Q.**, Nakatani, J., & Moriguchi, Y. Impacts of urban configuration on resource and energy efficiency of water infrastructure in China. Poster presentation at *the 9th Biennial Conference of the International Society for Industrial Ecology and the 25th annual conference of the International Symposium on Sustainable Systems and Technology (ISSST): Science in Support of Sustainable and Resilient Communities*, Chicago, USA, 25-29 JUN 2017.
- 4) **Zhang, Q.**, Nakatani, J., & Moriguchi, Y. Environmental impact assessment of China's sulfur dioxide pollution through the supply chains. Poster presentation at *the 12th International Conference on EcoBalance: Responsible value chains for sustainability*, Kyoto, Japan, 3-6 OCT 2016.
- 5) **Zhang, Q.**, Nakatani, J., & Moriguchi, Y. Analysis of CO₂ 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.

- 6) **Zhang, Q.**, Nakatani, J., & Moriguchi, Y. 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.
- 7) **Zhang, Q.**, Nakatani, J., & Moriguchi, Y. Low carbon development of urban water utilities in China. Poster presentation at *the 8th Biennial Conference of the International Society for Industrial Ecology: Taking stock of industrial ecology*, Guildford, UK, 7-10 JUL 2015.
- 8) **Zhang, Q.**, Nakatani, J., & Moriguchi, Y. Compilation of embodied CO₂ emission inventory using China's input-output tables: Implication for environmental public utilities. Poster presentation at *the 11th International Conference on EcoBalance: Creating benefit through life cycle thinking*, Tsukuba, Japan, 27-30 OCT 2014.

Invited Presentations in Workshops, Seminars, and Other Events

- 1) **Zhang, Q.**, Hidden Greenhouse Gas (GHG) emissions of water utilities in China's cities. *The 2nd International Young Scientist Forum on Frontiers in Environmental Science & Engineering*, College of Environmental Science and Engineering, Tongji University, Shanghai, China, 18-20 MAY 2017. Newsletter (in Chinese): <https://sese.tongji.edu.cn/02/8e/c3145a66190/page.htm>
- 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.
- 3) **Zhang, Q.**, Inter-Regional Spillover of China's sulfur dioxide (SO₂) Pollution across the Supply Chains. *The 7th East Lake International Forum for Outstanding Overseas Young Scholars in Environmental and Earth Science*, School of Environmental Science & Engineering, Huazhong University of Science and Technology, Wuhan, China, 25-27 DEC 2018.

References

- 1) Prof. Christopher Kennedy
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- 2) Prof. Yuichi Moriguchi
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- 3) Dr. Tao Wang
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