

YIXIN GUO

guoyixin@pku.edu.cn; +8618801336906

No.59 Road Chengfu, School of Physics, Peking University, Beijing, China, 100871

Room 504C, Department of Atmospheric and Oceanic Sciences

WORK EXPERIENCES

Postdoctoral Researcher at Peking University *Oct. 2022 - present*

Advisors: Lin Zhang

Postdoctoral Researcher jointed between Peking University and International Institute for Applied Systems Analysis (IIASA) *Oct. 2020 - Oct 2022*

Advisors: Lin Zhang, Wilfried Winiwarter and Petr Havlik

Postgraduate Research Associate at Princeton School of International and Public Affairs, Princeton University *Dec. 2019 - Aug. 2020*

Short-term consultant at the World Bank *July-Oct. 2017*

EDUCATION

M.A. and Ph.D. in Public Affairs and Environmental Studies at Princeton School of International and Public Affairs, Princeton University *2014 - 2019*

Advisor: Denise L. Mauzerall

Dissertation: Mitigating Environmental and Health Damages: Opportunities From Changes in Agricultural Production and Food Consumption Practices in China

B.S. in Atmospheric and Oceanic Sciences at School of Physics, Peking University *2010 - 2014*

Advisor: Junfeng Liu

Dissertation: Quantifying trans-Pacific transport of tropospheric ozone pollution using sensitivity, tagged-NO_y and fully-tagged methods

RESEARCH INTEREST

Interconnections between the Earth's nitrogen cycle and air quality, climate and ecosystems

Science and policy of sustainable food system strategies

PM_{2.5} and O₃ air quality and health

PUBLICATIONS

1. **Guo Y**, Chen, Y., Searchinger, T.D. *et al.* Air quality, nitrogen use efficiency and food security in China are improved by cost-effective agricultural nitrogen management. *Nature Food (IF 20.43)* 1, 648–658 (2020). <https://doi.org/10.1038/s43016-020-00162-z> (**ESI hot, highly cited and top paper**)

2. **Guo Y**, He P, Searchinger, T.D., *et al.* Environmental and human health trade-offs in potential Chinese dietary shifts, *One Earth (IF 14.944)* (2022), <https://doi.org/10.1016/j.oneear.2022.02.002>

3. **Guo Y**, Tan H, Zhang L, *et al.* Global Food loss and waste embodies unrecognized harms to global air quality and biodiversity hotspots, *Nature Food (IF 20.43)* (2023), <https://doi.org/10.1038/s43016-023-00810-0>

4. J Xu, M Lu, **Guo Y***, L Zhang*, *et al* Summertime urban ammonia emissions may be substantially underestimated in Beijing, China *Environmental Science and Technology (IF 11.357)*, (2023), <https://doi.org/10.1021/acs.est.3c05266>

5. **Guo Y**, Liu J, Mauzerall D L, *et al.* Long-lived Species Enhance Summertime Attribution of North America Ozone to Upwind Sources, *Environmental Science and Technology (IF 11.357)*, (2017)

6. Ma R, Zhang B, **Guo Y**, *et al*. Mitigation potential of global ammonia emissions and related health impacts in the trade network. *Nature Communications (IF 17.694)* 12, 6308 (2021). <https://doi.org/10.1038/s41467-021-25854-3>
7. Liu Z, Ying H, Chen M, Bai J, Xue Y, Yin Y, Batchelor W, Du M, **Guo Y**, *et al*. Optimization of China's maize and soy production can ensure feed sufficiency at lower nitrogen and carbon footprints, *Nature Food (IF 20.43)* 2, 426–433 (2021). <https://doi.org/10.1038/s43016-021-00300-1>
8. Chen Y, Zhang L, Henze D, Zhao Y, Lu X, Winiwarter W, **Guo Y**, *et al*, Inter-annual variation of reactive nitrogen emissions and their impacts on PM2.5 air pollution in China during 2005-2015, (2021), *Environmental Research Letters (IF 6.947)* <https://doi.org/10.1088/1748-9326/ac3695>
9. Liu L, Xu W, Lu X, Zhong B, **Guo Y** *et al*. Exploring global changes in agricultural ammonia emissions and their contribution to nitrogen deposition since 1980 *Proc. Natl. Acad. Sci. (IF 12.777)*, (2022), 119 (14) e2121998119, <https://doi.org/10.1073/pnas.2121998119>
10. Wen Xu, Yuanhong Zhao, Zhang Wen, Yunhua Chang, Yuepeng Pan, Yele Sun, Xin Ma, Zhipeng Sha, Ziyue Li, Jiahui Kang, Lei Liu, Aohan Tang, Kai Wang, Ying Zhang, **Yixin Guo**, *et al*. Increasing importance of ammonia emission abatement in PM2.5 pollution control, (2022), *Science Bulletin (IF 20.577)* DOI: 10.1016/j.scib.2022.07.021
11. Liu L, *et al*. Modeling global oceanic nitrogen deposition from food systems and its mitigation potential by reducing overuse of fertilizers *Proc. Natl. Acad. Sci. (IF 12.777)*, 120.17 (2023): e2221459120.
12. Liu Z., Rieder H., Schmidt C., Mayer M., **Guo Y.**, *et al*. Optimal reactive nitrogen control pathways identified for cost-effective PM2.5 mitigation in Europe (2023) *Nature Communications* <https://doi.org/10.1038/s41467-023-39900-9>

WORKING MANUSCRIPTS

1. **Guo Y**, Zhang L, Winiwarter W, Wang X, Pan D, and Gu B Nitrogen abatement to address PM2.5 challenge persisting under climate mitigation policies (2023) *under review at One Earth*
- 2 **Guo Y**, Zhang L, Chang J, *et al*. Unappreciated planetary health benefits of achievable nitrogen interventions (2023) *submitted to Nature*
3. **Guo Y**, Zhao H, Zhang L, Chang J, *et al*. Climate and air quality implications of future food trade (2023) *in preparation*
4. **Guo Y**, contributing author, the 1st International Nitrogen Assessment report (2023) *in preparation*

WORKING PROJECTS

1. **Effects of international food trade in redistributing global reactive nitrogen burdens**
Objective: Tracing effects of changes in consumption in one country on food production in its trade partners and thus associated environmental impacts including ammonia, air pollution and greenhouse gas emissions
Methods: A multi-year food-product-level ammonia emission inventory, international food trade data, network analysis, and the GEOS-Chem model
2. **Opportunities for co-controlling future land-based greenhouse gas emissions and air pollutants**
Objective: Assess effects of agricultural structural changes, control technologies and food consumption

changes in mitigating future global land-based greenhouse gas emissions and reactive nitrogen pollutants

Methods: Coupling IIASA's Global Biosphere Management Model (GLOBIOM) and the Greenhouse Gas and Air Pollution Interactions and Synergies model (GAINS)

ORAL PRESENTATIONS

- (Invited)** *Overlooked Opportunities of Nitrogen Abatement For Improving Near-term Global Air Quality, Human and Ecosystem Health* at the American Geophysical Union Annual Meeting (San Francisco) expected Dec 2023
- (Invited)** *Mitigating Reactive Nitrogen and Associated Environmental Damages Through Transforming Our Food Systems* at ReCLEAN seminar series (jointed between ETH, EPFL, PSI, WSL and EAWAG Zurich) (online) Oct 2023
- (Invited)** *Mitigating Reactive Nitrogen pollution: present and future perspectives* at the Earth, Oceanic and Atmospheric Sciences (EOAS) Thrust of HongKong University of Science and Technology (Guangzhou) Sep 2023
- (Invited)** *Mitigating Reactive Nitrogen Loss and Associated Environmental Damages: Opportunities from Changes in Food Production, Consumption and Supply Chains* at the 20th annual meeting of AOGS (Asia Oceania Geoscience Society) (Singapore) Aug 2023
- Food system strategies and their benefits for air quality, climate and ecosystems* at the 4th Biogeochemical Nitrogen Cycle Forum (Beijing) 2023
- Environmental and Health Co-benefits of Sustainable Food System Strategies* at American Geophysical Union Annual Meeting (San Francisco and online) 2022
- Mitigating Reactive Nitrogen Losses and Associated Environmental Damages in China* at the 8th Global Nitrogen Conference (Berlin and online) 2021
- (Invited)** *Implications of improving food production and consumption for ammonia emissions and air pollution* at the Center for Agricultural Resources Research in the Chinese Academy of Sciences, Shijiazhuang, China 2021
- (Invited)** *Ammonia Emissions and Air Quality Under Various Chinese Diets* at the 25th Annual Meeting For Atmospheric Pollution Management and Controls at Xi'an, China 2021
- (Invited)** *Effects of cost-effective agricultural nitrogen management on air quality and food security* at the College of Resources and Environmental Sciences of China Agriculture University (online) 2021
- (Invited)** *Ammonia Emission Mitigation Strategies and Consequent Environmental Effects in China* at the 2nd Sino-Korean Air Quality Forum (online) 2020
- (Invited)** *Air Quality, Nitrogen Use Efficiency And Food Security in China Are Improved by Cost-effective Agricultural Nitrogen Management* at China Agriculture University (online) 2020
- (Invited)** *Agricultural Production and Consumption Strategies in China: Benefits for Air Quality, Nitrogen Use Efficiency, Climate and Dietary Health* at Atmospheric and Oceanic Science Seminar series at Peking University, Beijing, China 2019
- Mitigating Reactive Nitrogen Loss and Associated Environmental Damages: Opportunities from Changes in Production and Consumption in China* at American Geophysical Union Annual Meeting, San Francisco, CA 2019
- Effectiveness of Agricultural Ammonia Control Strategies for Mitigating PM2.5 Pollution in China* at Ammonia Workshop hosted by the Environment and Climate Change Agency of the Canadian government, Ottawa, Canada 2018
- (Invited)** *Reducing Nitrogen Pollution from Crop Fertilizer Use and Manure Management* at Atmospheric Science Seminar of Cornell University, Ithaca, NY 2017
- Long-lived Species Enhance Summertime Attribution of North America Ozone to Upwind Sources* at American Geophysical Union Annual Meeting, San Francisco, CA 2016

POSTER PRESENTATIONS AND CONFERENCES

Poster entitled 'Environmental and Health Co-benefits of Sustainable Food System Strategies in China' for Asian Conference on Meteorology (online) 2022
"Developing roadmaps for sustainable nitrogen management", Paris, France (online and in-person) 2022
The 3rd young scholar forum on 'Biogeochemical cycle of nitrogen (International Nitrogen Initiative-China)', Shanghai, China 2021
American Geophysical Union Annual Meeting, San Francisco, CA 2019
Third Plenary Meeting of International Nitrogen Management System, Edinburgh, Scotland 2018
High-yield High-efficiency Agriculture Conference, Kunming, China 2017
American Geophysical Union Annual Meeting, San Francisco, CA 2016
Chinese Environmental Scholars Forum, Princeton, NJ 2016
Community Earth System Model Annual workshop, Breckenridge, CO 2016
Poster at Princeton E-affiliates Partnership second annual Retreat, Princeton, NJ 2015
Poster at American Geophysical Union Annual Meeting, San Francisco, CA 2014

PROFESSIONAL EXPERIENCES

Visiting student at Prof. Lin Zhang's group at Peking University, Beijing, China *summer 2018 and winter 2019*
Visiting student at Prof. Peter Hess's group at Cornell University, Ithaca NY *Nov 2017*
Visiting student at Prof. Fusuo Zhang's group at China Agricultural University, Beijing, China *summer 2017*
Volunteer for The Nature Conservancy Beijing office in support of the climate change mitigation and agriculture pollution management projects, Beijing, China *2013-2014*

TEACHING

Assistant instructor for *The Environment: Science and Policy (WWS/ENV350)* *Spring 2018 and Spring 2019*

SKILLS

Atmospheric Chemistry Transport Model: *WRF-Chem, GEOS-Chem and MOZART-4*
Earth System Model: *NCAR CESM (Community Earth System Model)*
Economic model: *IIASA GLOBIOM (Global Biosphere Management Model)*
Integrated assessment model: *IIASA GAINS (Greenhouse Gas - Air Pollution Interactions and Synergies) model*
Scenario and Policy Analysis, Qualitative Research Methods
Skilled at Linux, Fortran, NCL, Office, Python, C++, *Algorithms and Data Structure*, MATLAB, Gnuplot, GAMS

GRANTS, FELLOWSHIPS AND AWARDS

"Ammonia mitigation opportunities in international trade network" selected for the 2021 Top 10 Scientific Achievements in Biogeochemical Nitrogen Cycles by the Nitrogen Working Group of Soil Science Society of China 2023
IOP (Institute of Physics) Outstanding Reviewer Award 2023
Green Talent (25 outstanding young scientists selected globally), German Federal Ministry of Education and Research 2022
Chinese Postdoc Special Support Scientific Grant (rmb 180,000; 2022T150005), China Postdoctoral Science Foundation 2022
International Fellowship for Postdoc Researchers (rmb 600,000), China Postdoctoral Science Foundation 2021

PKU (Peking University)- IIASA (International Institute for Applied Systems Analysis) postdoctoral fellowship 2020-2022
Graduate School Dean's Completion Fellowship, Princeton University 2019-2020
Princeton Institute for International and Regional Studies Graduate Funding, Princeton University 2018
Princeton School of International and Public Affairs Graduate Fellowship, Princeton University 2014-2019
Award for excellent undergraduate research by Bases for Cultivation of Talents of Geophysical Sciences, Peking University 2013
Samsung Scholarship, for top 3% physics-major students, Peking University 2012-2013
Merit Student, Peking University 2012-2013
Meritorious winner for Mathematical Contest in Modeling (MCM) 2013
1st Prize of National Olympiad in Chemistry in Provinces, China Chemistry Federation 2009

REVIEW ACTIVITIES

Reviewer for *Nature Climate Change*, *Nature Food*, *Nature Sustainability*, *One Earth*, *PNAS*, *Environmental Research Letters*, and *Atmospheric Chemistry and Physics*
2022 IOP Trusted Reviewer Award
2023 IOP Outstanding Reviewer Award

REFERENCES

Denise L. Mauzerall (mauzeral@princeton.edu) (PhD advisor)
Princeton School of Public and International Affairs and Department of Civil and Environmental Engineering, Princeton University
Timothy D. Searchinger (tsearchi@princeton.edu) (PhD co-advisor)
Princeton School of Public and International Affairs, Princeton University
Lin Zhang (zhanglg@pku.edu.cn) (PhD co-advisor and postdoc advisor)
Department of Atmospheric and Oceanic Sciences at School of Physics, Peking University
Wilfried Winiwarter (winiwart@iiasa.ac.at) (postdoc advisor)
Energy, Climate, and Environment (ECE), International Institute for Applied Systems Analysis
Junfeng Liu (jfliu@pku.edu.cn) (undergraduate advisor)
College of Urban and Environmental Sciences, Peking University

COLLABORATIONS

Princeton University, Oxford University, Cornell University, Finnish Meteorological Institute, International Institute for Applied Systems Analysis (IIASA), Geophysical Fluid Dynamics Laboratory, China Agricultural University, Tsinghua University, Zhejiang University, Peking University, Netherlands Environmental Agency