Minghao Qiu

Department of Earth System Science, Stanford University

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updated: April, 2022

EMPLOYMENT

Postdoctoral Scholar, Department of Earth System Science, Stanford University, Oct, 2021 - present
Advisor: Marshall Burke

EDUCATION

Massachusetts Institute of Technology, Cambridge, MA Sep 2016 - Sep 2021
Ph.D., Institute for Data, Systems, and Society (Focus: Environmental Science and Policy)
Thesis committee: Noelle E. Selin (advisor), Valerie J. Karplus, Corwin M. Zigler, Colette L. Heald
Thesis title: Impacts of Energy and Environmental Policies on Air Quality: Bridging Observational Data, Statistical, and Atmospheric Models
Selected PhD courses: Econometric; Statistical machine learning; Environmental modeling; Atmospheric chemistry; Microeconomics; Probability; Optimization.

Peking University, Beijing, China Sep 2012 - Jul 2016
B.S., Environmental Sciences, and B.A., Economics

RESEARCH EXPERIENCE

Stanford University, Stanford, CA Oct 2021 - present

- Evaluate effects of drought and wildfire on energy systems, air quality, and human health.
- Evaluate impacts of climate change on human health through deteriorated air quality.

Massachusetts Institute of Technology, Cambridge, MA Sep 2016 - Sep 2021

- Evaluate the ability of statistical models to correct for meteorological variability when estimating causal impacts of policy on air quality and human health; design a new machine learning approach that reduced estimation bias by 60% compared to widely-used regression methods.
- Estimate the effects of wind power on air quality, health, and environmental justice in the US with causal inference, GEOS-Chem and adjoint model; perform cost-benefit analyses of wind power at the state level.
- Examine the causal effects of China's energy efficiency and SO_2 policies on air quality and health at the firm-level.

International Institute for Applied Systems Analysis, Austria Jun 2019 - Sep 2019
Researcher, Young Scientists Summer Program (advised by Dr. Jens Borken-Kleefeld)

- Develop the first statistical method to estimate average emission factors of diesel vehicles with instantaneous measurements from remote sensing.

University of California, Berkeley, Berkeley, CA Jun 2015 - Oct 2015
Visiting Student Researcher, Atmospheric Chemistry Group (advised by Prof. Ronald Cohen)

Peking University, Beijing, China Jan 2015 - Jul 2016
Research Assistant, College of Urban and Environmental Sciences (advised by Prof. Junfeng Liu)

PUBLICATIONS

Under review, submitted, in preparation

Minghao Qiu, Cory Zigler, Noelle Selin. Statistical and machine learning methods for evaluating emissions reduction policies under changing meteorological conditions. *under review,* ***Atmospheric Chemistry and Physics*** [Preprint]

Minghao Qiu, Marshall Burke. Impacts of drought on energy systems and air quality in the Western US. *(in preparation)*

Peer Reviewed

1. **Minghao Qiu**, Cory Zigler, Noelle Selin. Impacts of wind power on air quality, premature mortality and environmental justice in the US. *accepted with minor revision,* ***Science Advances***, 2022

2. **Minghao Qiu**, Jens Borken-Kleefeld. Using snapshot measurements to identify high-emitting vehicles. ***Environmental Research Letters***, 2022 [Link]

3. **Minghao Qiu**, Yangqin Weng, Jing Cao, Noelle Selin, Valerie Karplus (2020). Improving evaluation of energy policies with multiple goals: Comparing *ex ante* and *ex post* approaches ***Environmental Science & Technology***, 2020 [Link]

4. Haozhe Yang, Wei Tao, Ying Liu, **Minghao Qiu**, Junfeng Liu, Kejun Jiang, Kan Yi, Yao Xiao, Shu Tao. The contribution of the Beijing, Tianjin and Hebei region's iron and steel industry to local air pollution in winter. ***Environmental Pollution***, 2018 [Link]

5. Kai Wei, **Minghao Qiu**, Rongfei Zhang, Liantong Zhou, Ting Zhang, Maosheng Yao, & Chunxiong Luo. Single Living yEast PM Toxicity Sensor (SLEPTor) System. ***Journal of Aerosol Science***, 2017 [Link]

CONFERENCE AND SEMINAR PRESENTATIONS

1. Challenges and opportunity in managing air pollution under a changing climate. *Peking University*, invited speaker, 2022
2. Impacts of energy and environmental policy on air quality: empirical data, statistical models, and atmospheric models. *Tsinghua University*, invited speaker, 2022
3. Statistical and machine learning methods for evaluating emissions reduction policies under changing meteorological conditions. *American Geophysical Union Fall Meeting*, invited speaker, 2021
4. Assessing impacts of energy and environmental policies on air quality in the real world. *Brandeis University*, invited speaker, 2021
5. Impacts of energy and environmental policies on air quality in the real world. *MIT Joint Program on the Science and Policy of Global Change*, invited speaker, 2021
6. Statistical and machine learning methods for evaluating emissions reduction policies under changing meteorological conditions. *American Geophysical Union Fall Meeting*, 2020
7. Evaluating quantitative techniques to assess policy impacts on air quality in changing meteorological conditions. *1st GEOS-Chem Europe Meeting*, 2020
8. Effectiveness of renewable energy policy for air pollution reductions: evidence from wind power in the US. *American Meteorological Society Annual Meeting*, Boston, 2020

9. Effectiveness of US state level climate policies: Evidence from plant level data in power sector. *Harvard/MIT ACE Center Science Advisory Committee Meeting*, Boston, 2018
10. Air Quality Co-benefits of Energy Policy: Evidence from industrial firms in China. *American Geophysical Union Fall Meeting*, New Orleans, Poster presentation, 2017

GRANTS AND AWARDS

Honorary mention, Early Career Scientist Poster Prize, IGAC 2021
Outstanding Student Presentation Awards (OSPA), American Geophysical Union Fall Meeting 2021
MIT Martin Family Society of Fellows for Sustainability ($50,000) 2020
Young Scientists Summer Program at IIASA (€3,000) 2019
MISTI Global Research Summer Fund ($3,100) 2019
National Merit Scholarship, Ministry of Education, China 2014 - 2015

TEACHING AND MENTORING

Course contributor, MIT 6.419x *Data Analysis: Statistical Modeling and Computation in Applications* 2021
Lecturer, Public lecture on *Tools to reach climate targets*, Science in the News Network 2021
Lecturer, Public course on *Climate Change Policy 101.* MIT Joint Program on the Science and Policy of Global Change. 2017

Mentoring: summer research (1 undergrad), graduate school application assistance program (5 undergrads)

SERVICE AND PROFESSIONAL DEVELOPMENT

Session chair and organizer: American Geophysical Union Fall Meeting, 2021
Journal and conference referee: *ACS Environmental Au, Environmental Research Letters, Environmental Research Communications, Science of the Total Environment, NeurIPS*

MIT Social and Engineering Systems Doctoral Seminar, Coordinator 2019 - 2020
MIT Energy for Human Development, Co-President 2017 - 2019

PROFESSIONAL EXPERIENCE

World Resource Institute, Research Analyst, Beijing, China January 2016 - July 2016
Analyzed China's decarbonization strategy under Paris Agreement for energy supply, building, industry and transportation sectors; Drafted research report "China's CO_2 Emissions Pathways and Reduction Strategies under Paris Agreement".

TECHNICAL EXPERTISE

Atmospheric modeling: GEOS-Chem, Community Earth System Model (CESM)
Statistical causal inference, **Machine learning**
Coding and software: R, Python, Matlab, STATA, ArcGIS

REFERENCES

Noelle Selin
Institute for Data, Systems and Society and Department of Earth, Atmospheric and Planetary Sciences

Massachusetts Institute of Technology
selin@mit.edu

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Department of Earth System Science and Center on Food Security and the Environment
Stanford University
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Corwin Zigler
Department of Statistics and Data Sciences
The University of Texas at Austin
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Valerie Karplus
Department of Engineering and Public Policy
Carnegie Mellon University
vkarplus@andrew.cmu.edu

Jens Borken-Kleefeld
International Institute for Applied Systems Analysis (IIASA)
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