

# Minghao Qiu

Department of Earth System Science, Stanford University

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## EMPLOYMENT

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

## EDUCATION

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**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

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**Stanford University**, Stanford, CA Oct 2021 - present

- Evaluate effects of drought on energy systems, air quality, and human health.
- Climatic causes and human consequences of wildfire PM<sub>2.5</sub> pollution.

**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<sub>2</sub> 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)*

## PUBLICATIONS

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### *Under review, submitted, in preparation*

**Minghao Qiu**, Cory Zigler, Noelle Selin. Impacts of wind power on air quality, premature mortality and environmental justice in the US. (*under re-review after revision, **Science Advances***)

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

### *Peer Reviewed*

1. Marissa Childs, Jessica Li, Jeff Wen, Anne Driscoll, Sherrie Wang, Carlos Gould, **Minghao Qiu**, Jen Burney & Marshall Burke. Daily local-level estimates of ambient wildfire smoke PM<sub>2.5</sub> for the contiguous US. (*accepted, **Environmental Science and Technology***)
2. **Minghao Qiu**, Cory Zigler, Noelle Selin. Statistical and machine learning methods for evaluating emissions reduction policies under changing meteorological conditions. *Atmospheric Chemistry and Physics*, 2022 [\[Link\]](#)
3. **Minghao Qiu**, Jens Borken-Kleefeld. Using snapshot measurements to identify high-emitting vehicles. *Environmental Research Letters*, 2022 [\[Link\]](#)
4. **Minghao Qiu**, Yangqin Weng, Jing Cao, Noelle Selin, Valerie Karplus. Improving evaluation of energy policies with multiple goals: Comparing *ex ante* and *ex post* approaches *Environmental Science and Technology*, 2020 [\[Link\]](#)
5. 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 [\[Link\]](#)
6. Kai Wei, **Minghao Qiu**, Rongfei Zhang, Liantong Zhou, Ting Zhang, Maosheng Yao, and Chunxiong Luo. Single Living yEast PM Toxicity Sensor (SLEPTor) System. *Journal of Aerosol Science*, 2017 [\[Link\]](#)

## CONFERENCE AND SEMINAR PRESENTATIONS

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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

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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

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<b>Course contributor</b> , MIT 6.419x <i>Data Analysis: Statistical Modeling and Computation in Applications</i>	2021
<b>Lecturer</b> , Public lecture on <i>Tools to reach climate targets</i> , Science in the News Network	2021
<b>Lecturer</b> , Public course on <i>Climate Change Policy 101</i> . 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

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<b>Session chair and organizer:</b> American Geophysical Union Fall Meeting,	2021
<b>Journal and conference referee:</b> <i>ACS Environmental Au</i> , <i>Environmental Research Letters</i> , <i>Environmental Research Communications</i> , <i>Science of the Total Environment</i> , <i>NeurIPS</i>	
MIT Social and Engineering Systems Doctoral Seminar, Coordinator	2019 - 2020
MIT Energy for Human Development, Co-President	2017 - 2019

## PROFESSIONAL EXPERIENCE

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<b>World Resource Institute</b> , 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 <sub>2</sub> Emissions Pathways and Reduction Strategies under Paris Agreement".	

## TECHNICAL EXPERTISE

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

## REFERENCES

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**Noelle Selin**

Institute for Data, Systems and Society and Department of Earth, Atmospheric and Planetary Sciences  
Massachusetts Institute of Technology  
selin@mit.edu

**Marshall Burke**

Department of Earth System Science and Center on Food Security and the Environment  
Stanford University  
mburke@stanford.edu

**Corwin Zigler**

Department of Statistics and Data Sciences  
The University of Texas at Austin  
cory.zigler@austin.utexas.edu

**Valerie Karplus**

Department of Engineering and Public Policy  
Carnegie Mellon University  
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**Jens Borken-Kleefeld**

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