

Lyssa Freese

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Education

Ph.D. — Massachusetts Institute of Technology Department of Earth, Atmospheric, and Planetary Sciences. Atmospheric Science. May, 2023.

- Title: Energy Policy Impacts on Air Quality, Climate Change, and Equity at the National and Global Scale
- Advisor: Noelle Selin

B.S. — Georgetown University Edmund A. Walsh School of Foreign Service.

Science, Technology, and International Affairs: Health and the Environment. May, 2016.

Research and Work Experience

Carnegie Institution for Science at Stanford. Stanford, CA.

Department of Global Ecology Postdoctoral Fellow. Advised by Ken Caldeira. *August, 2023-Present.*

MIT Department of Earth, Atmospheric, and Planetary Sciences. Cambridge, MA.

Research Assistant. *Fall 2018-Summer 2023.*

China Environment Forum at the Wilson Center. Washington, D.C.

Research Assistant. *Fall 2017- Fall 2018.*

Rock Environment and Energy Institute. Beijing, China.

Research Assistant. *Fall 2016- Summer 2017.*

Academic Publications

In Prep

Freese, L. M., Eastham, S., Han Springer, C., Selin, N. Ensembles of Early Coal Retirement Trajectories In Southeast Asia— Air Quality, Health, and Climate Impacts through a Reduced Form Black Carbon Model, *in prep for Environmental Research Letters* (manuscript available upon request).

Submitted and In Review

Freese, L. M., Davis, S., Virgüez, E., Caldeira, K. Country-to-Country Imposition of Climate Damages, *submitted to Nature* (manuscript available upon request).

Freese, L. M., Fiore, A.M., Selin, N. E. Spatially Resolved Temperature Response Functions to CO₂ Emissions, *in revision for Geophysical Research Letters* (preprint:

[10.22541/essoar.168986213.37265300/v1](https://doi.org/10.22541/essoar.168986213.37265300/v1), revised manuscript available upon request).

Duffy, M., Barnes, L., **Freese, L.M.,** Freilich, M., Lalk, E., Ranganathan, M. Shivamoggi, R., Wilcots, J., Wirz, C. An empirical analysis of how geoscientists from marginalized groups decide to accept or decline a faculty job offer, *submitted to Earth's Future* (preprint: [10.22541/essoar.170612426.63684810/v1](https://doi.org/10.22541/essoar.170612426.63684810/v1)).

Published

Freese, L. M., Chossiere, G., Eastham, S., Jenn, A., Selin, N. Eliminating Nuclear and Coal Power Generation Redistributes U.S. Air Quality and Climate Related Mortality Risk, 2023, *Nature Energy*.

<https://doi.org/10.1038/s41560-023-01241-8> (openly available read-only version <https://rdcu.be/c9yPn>).

Garima Raheja, Leatra Harper, Ana Hoffman, Yuri Gorby, **Freese, L. M.**, Brendan O’Leary, Melissa Goodwin, Daniel M. Westervelt. Community-Based Participatory Research for Low-Cost Air Pollution Monitoring in the Wake of Unconventional Oil and Gas Development in the Ohio River Valley – Empowering Impacted Residents through Community Science, 2022, *Environmental Research Letters*. <https://doi.org/10.1088/1748-9326/ac6ad6>.

Freese, L. M., Cronin, T.W. Antarctic Radiative and Temperature Responses to a Doubling of CO₂, 2021, *Geophysical Research Letters*. <https://doi.org/10.1029/2021GL093676>.

Ranganathan, M., Lalk, E., **Freese, L. M.**, Freilich, M.A., Wilcots, J., Duffy, M.L., Shivamoggi, R., Trends in the representation of women amongst geoscience faculty from 1999-2020: the long road towards gender parity, 2021, *AGU Advances*. <https://doi.org/10.1029/2021AV000436>.

Reports, White Papers, and News Articles

Virguéz, E., Leon Gasca, L., **Freese, L.**, [The Climate Sciences Need Representation from the Global South](#). 2023, One Earth.

Freilich, M., Wilka, C., Shivamoggi, R., **Freese, L.**, Heiderich, J., Drake, H. F., Cantine, M. 2019. [“Young Climate Scientists Speak Out”](#). Special Climate Crisis Issue of DigBoston.

Goodman, S and **Freese, L.** 2018. [“China’s Ready to Cash in on a Melting Arctic”](#). Foreign Policy.

Freese, L. 2018. [“Why Citizen Science Faces an Uphill Climb in China”](#). Sixth Tone.

Freese, L. 2018. [“How Citizen Science is Helping Save China’s Environment”](#). Sixth Tone.

JiaQiao, Lin and **Freese, L.** 2017. “China’s Coal-based Thermal Power Sector: Compliance of Environmental Standards”. Written for consultation with Centre for Science and Environment, India.

Freese, L. 2017. “The ‘Just Transition’ is not just a simple transition: the complexities of China’s coal phase-out”. Published in Rock Environment and Energy Institute’s Annual Energy Review 2016 and on their website.

Freese, L. 2016. “Polluting the Internet: ENGO Social Media Strategy and Capacity in China”. Senior Honors Thesis at Georgetown University. Advised by Joanna Lewis.

Grants, Fellowships, and Honors

Peter B. Wagner Memorial Award for Women in Atmospheric Sciences. Second Place for paper, Antarctic Radiative and Temperature Responses to a Doubling of CO₂. 2022.

[Martin Fellowship for Sustainability](#). PhD Fellowship. 2022-2023.

Department of State Air Quality Fellow. Beijing Office. 2021-2022.

Jack C. Tang (1949) Fellowship. PhD Fellowship. 2020.

NIEHS Training Grant in Environmental Toxicology. PhD Training Grant. 2019-2023.

AMS Summer Policy Colloquium NSF Fellowship. Summer Policy Colloquium run by AMS and funded by NSF. Summer 2019.

MIT Presidential Fellowship. Year-long PhD Student Fellowship. 2018-2019.

Sixth Tone Environmental Research Fellowship. Summer Fellowship.
“Environmental Protection in the Countryside”. 2018.

Georgetown University Environment Initiative. Summer Fellowship.
“Polluting the Internet: ENGO Social Media Strategy and Capacity in China”. 2015.

Teaching

Seminar on Racism, Colonialism, and Extraction in Geosciences. Co-creator and Instructor. *Spring 2021 and 2022.*

Kaufman Teaching Certificate Program. *Spring, 2022.*

People and the Planet: Environmental Governance and Science. Teaching Assistant. *Fall 2021.*

Mentorship

Undergraduate Research Advisor: Gabby Cazerres, *Fall 2019-Spring 2020*; Yuka Perera, *Summer 2020.*

Graduate Residential Advisor: Mentor for 90 undergraduate students.

Invited Talks

Colorado University, Boulder. Environmental Sciences. *Upcoming, Spring, 2024.*

Carnegie Mellon University. Civil and Environmental Engineering. *Spring, 2024.*

University of Texas, Austin. Water Climate and Energy Seminar. *Fall, 2022.*

Conference Presentations

Freese, L.M. Innovation Session: Use of Earth Observations to Advance the Role of Equity and Environmental Justice in Open Science. AGU. *Invited Talk.* 2023.

Freese, L.M., Fiore, A.M., Selin, N. Emulating Spatial Patterns of Surface Temperature Responses to CO₂ Emissions. AGU. *Poster.* 2023.

Freese, L. M., Eastham, S., Han Springer, C., Selin, N. Ensembles of Early Coal Retirement Trajectories In Southeast Asia— Air Quality, Health, and Climate Impacts through a Reduced Form Black Carbon Model. International Global Atmospheric Chemistry Conference (IGAC). *Poster.* 2022.

Freese, L., Cronin, T. Antarctic Radiative and Temperature Responses to a Doubling of CO₂. Princeton Center for Theoretical Science: From Spectroscopy to Climate. *Talk.* 2022.

Freese, L., Chossiere, G., Eastham, S., Jenn, A., Selin, N.E. Nuclear and Coal Power Generation Phaseouts Redistribute U.S. Air Quality and Climate Related Mortality Risk. Macro Energy Systems Workshop. *Lightning Talk.* 2022.

Freese, L., Eastham, S., Han Springer, C., Selin, N.E. Black Carbon Climate and Health Impacts of Coal Power Plant Lifetimes, Locations and Funders through the creation of a Reduced Form Model. International GEOS-Chem Conference (IGC10). *Talk.* 2022.

Freese, L., Eastham, S., Han Springer, C., Selin, N.E. Black Carbon Climate and Health Impacts of Coal Power Plant Lifetimes, Locations and Funders through the creation of a Reduced Form Model. American Geophysical Union (AGU) Annual Conference. *Poster.* 2021.

Freese, L., Chossiere, G., Eastham, S., Jenn, A., Selin, N.E. Nuclear and Coal Power Generation Phaseouts Redistribute U.S. Air Quality and Climate Related Mortality Risk. American Geophysical Union (AGU) Annual Conference. *Lightning Talk.* 2020.

Academic Service

Peer Reviewer. Nature, Environmental Research Letters, GeoHealth, Geophysical Research Letters.

AGU Session Chair and Organizer. Environmental Justice/Equity and Global Change. 2021.

Net Zero Emissions Energy Systems: Geophysical Constraints, Consequences, and Opportunities. 2023.

Program in Atmospheres, Oceans and Climate (PAOC) Colloquium Series. Planning Committee Member. 2019-2023.

MIT Atmospheric Chemistry Colloquium. Co-founder and organizer. 2019-2021.

Graduate Climate Conference. Executive Co-Chair. 2020.

Taskforce 2023. MIT EAPS Department task force focused on the Department's Organization, Cohesion, Experience, and Diversity. 2019-2020.

Justice, Equity, Diversity, and Inclusion

AGU Thriving Earth Exchange. Community Scientist. *Current.*

Carnegie Department of Global Ecology DEI Group. Member. *Current.*

Towards Inclusion, Diversity, and Equity Student Group. President. 2022-2023.

EAPS Application Mentorship Program. Co-Chair. 2020-2022.

MIT EAPS Diversity, Equity, and Inclusion Committee. Graduate Student Representative. 2020-2021.