Lyssa Freese

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Education

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

Stanford University and Carnegie Institution for Science. Stanford, CA.
Department of Global Ecology Postdoctoral Fellow. Advised by Ken Caldeira. *Upcoming (Summer 2023-).*

MIT Department of Earth, Atmospheric, and Planetary Sciences. Cambridge, MA.
Research Assistant. *Fall 2019-Present.*

China Environment Forum at the Wilson Center. Washington, D.C.
Research Assistant. *Fall 2017- Fall 2018.*

Environmental Protection Network (EPN). Washington, D.C.
Intern. *Fall 2017- Fall 2018.*

Green Camel Bell. Lanzhou, Gansu, China.
Research Assistant and Educator. *Summer 2017.*

Rock Environment and Energy Institute. Beijing, China.
Research Assistant. *September 2016- April 2017.*

Academic Publications

In Prep

Freese, L. M., Selin, N. Spatially Resolved Temperature Response Functions to CO_2 Emissions, *in prep for GRL*.

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 Earth's Future Special Collection on "Climate Change, Global Air Quality, and Society"*.

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 CO_2, 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

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 CO_2. *2022*.

Martin Fellowship for Sustainability. PhD Fellowship. *Current.*

Department of State Air Quality Fellow. Beijing Office. *Current*

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

NIEHS Training Grant in Environmental Toxicology. PhD Training Grant. *2019-Present.*

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 Cazeres, *Fall 2019-Spring 2020*; Yuka Perera, *Summer 2020.*
Research Mentor: Christina Chen, *MIT Technology and Policy Program Master's Program.*
Graduate Residential Advisor: Mentor for 90 undergraduate students.

Invited Talks and Workshops

NCAR Climate and Global Dynamics Laboratory Seminar. Spring, 2023.
UT Austin Water Climate and Energy Seminar. Fall, 2022.

Conference Presentations

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 CO_2. 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

Program in Atmospheres, Oceans and Climate (PAOC) Colloquium Series. Planning Committee Member. *Current.*
MIT Atmospheric Chemistry Colloquium. Co-founder and organizer. *2019-2021.*
Graduate Climate Conference. Executive Co-Chair. *2020.*
Taskforce 2023. MIT EAPS Department taskforce focused on the Department's Organization, Cohesion, Experience and Diversity. *2019-2020.*
PAOC Retreat. Planning Committee Chair. *2019.*

Justice, Equity, Diversity, and Inclusion

Towards Inclusion, Diversity, and Equity Student Group. President. *Current.*
AGU Thriving Earth Exchange. Community Scientist. *Current.*
EAPS Application Mentorship Program. Co-Chair. *2020-2022.*
Diversity, Equity, and Inclusion Committee. Graduate Student Representative. *2020-2021.*

Skills, Languages, and Relevant Coursework

Languages: Mandarin Chinese.

Computational models: GEOS-Chem, HySplit, ClimLab, Energy Dispatch Models.

Relevant Coursework (in order of expertise): Atmospheric Composition in a Changing Earth System; Environmental Modeling and Data Analysis; Science, Technology and Public Policy; Atmospheric Chemistry and Physics; Climate Diagnostics and Variability; Climate Science; Atmospheric Dynamics; Radiation and Convection; Geophysical Fluid Dynamics; Science Policy Bootcamp.

References

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Massachusetts Institute of Technology
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Tim Cronin
Massachusetts Institute of Technology
twcronin@mit.edu