Jonathan M. Moch, Ph.D.

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Jonathan's work has centered on the interactions between climate change and air pollution as well as the policy and public health implications of climate issues. He is currently a Postdoctoral Research Fellow with appointments in Harvard's Paulson School of Engineering and Applied Sciences, Chan School of Public Health, and Kennedy School of Government. Previously, Jonathan was the ChinaFAQs Project Specialist in the Climate and Energy Program at the World Resources Institute (WRI) in Washington, D.C., where he worked in collaboration with WRI's international network of experts to distill important scientific research and analyses about China's energy and climate change policies and actions into materials designed to educate U.S. policy makers and opinion leaders.

Experience

JOHN F. KENNEDY SCHOOL OF GOVERNMENT, HARVARD UNIVERSITY February 2021 - Present
Belfer Center for Science and International Affairs Cambridge, MA
Postdoctoral Research Fellow: Science, Technology, and Public Policy Program and Environment and Natural Resources Program
Conduct and assist with research on deep decarbonization in the United States

- Investigating the potential of various decarbonization technologies to help reach climate goals
- Identifying policy and other barriers to deployment and scalability of decarbonization technologies

JOHN A. PAULSON SCHOOL OF ENGINEERING AND APPLIED SCIENCES June 2020 - Present
and the T.H. CHAN SCHOOL OF PUBLIC HEALTH, HARVARD UNIVERSITY Cambridge, MA
Postdoctoral Research Fellow: Atmospheric Chemistry Modeling Group and Center for Climate, Health, and the Global Environment (C-CHANGE)
Conduct and assist with research on implications of climate change and atmospheric chemistry for public health and policy. Participate as a Fellow in the Program on Science, Technology, and Society (STS).

- Use coupled chemistry-climate models to examine the feedbacks between aerosols and climate
- Examine the importance of reductions in volatile organic compounds for air quality and public health
- Investigate the public health and air quality risks of solar geoengineering

DEPARTMENT OF EARTH AND PLANETARY SCIENCES, HARVARD UNIVERSITY August 2014 - May 2020
Graduate Research Fellow: Atmospheric Chemistry Modeling Group Cambridge, MA
Conducted and assisted with research on interactions between climate change and atmospheric chemistry

- Examined formation mechanisms behind sulfur aerosols and implications for air pollution control
- Investigated climatic and chemical mechanisms behind extreme air pollution events in China
- Developed first connection between the GEOS-Chem atmospheric chemistry model and the radiation scheme in a full Earth System Model, NASA's GEOS-ESM, enabling simulation of two-way feedbacks between climate and atmospheric chemistry.

INSTITUTE OF ATMOSPHERIC PHYSICS, CHINESE ACADEMY OF SCIENCES Summer 2016
Harvard Global Institute Visiting Graduate Research Fellow Beijing, China
Collaborated with Chinese researchers on interactions between climate change and atmospheric chemistry

- Examined the effects of future reductions in Chinese aerosols on regional climate
- Compiled and analyzed data on Chinese air pollution and climate

WORLD RESOURCES INSTITUTE (WRI), CHINAFAQs PROJECT March 2013 - June 2014
ChinaFAQs Project Specialist Washington, DC
Worked with global expert network to provide objective, fact-based information on China's energy and climate policies and the implications of such policies and actions to U.S. policy makers and the media

- Analyzed scientific and policy data to create issue briefs, blogs and fact sheets
- Helped plan, participated in and presented data at meetings with policy makers
- Liaised between WRI offices in Washington and Beijing; assisted with development and coordination of cross-country projects to promote understanding of climate and energy policies

DEPARTMENT OF GEOSCIENCES, PRINCETON UNIVERSITY June 2012 - March 2013
Research Associate Princeton, NJ

- Refined models for methane emissions from Arctic tundra that were developed as part of Senior Thesis. Findings published in Oh et al. (2016)

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION (NOAA) Summer 2011
Geophysical Fluid Dynamics Laboratory Princeton, NJ
Research Associate, Princeton Environmental Institute/Grand Challenges Intern

- Performed climate modeling research using then unpublished GFDL Earth System Models; characterized and quantified the carbon cycle-climate feedbacks and examined the model's uncertainties. Refined the understanding of and predictions about the behavior of the atmosphere, the oceans and the climate
- Work assisted with GFDL's submission to the IPCC's 5th Assessment Report

Education

HARVARD UNIVERSITY
Ph.D., Earth and Planetary Sciences. Secondary Field in Science, Technology, and Society May 2020
S.M., Environmental Science and Engineering November 2016
Research Advisors: Loretta Mickley, Ph.D.; Daniel Jacob, Ph.D.; Sheila Jasanoff, J.D., Ph.D.

- Dissertation: Investigating the Chemical and Climatic Mechanisms Driving Extreme Air Pollution Episodes
- National Science Foundation Graduate Research Fellowship, 2014 - 2019
- Switzer Environmental Fellowship, Robert and Patricia Switzer Foundation, 2017 - 2018
- Outstanding Student Presentation Award, American Geophysical Union Fall Meeting, 2017
- Stonington Graduate Fellowship of Environmental Science and Engineering, 2014 - 2015

PRINCETON UNIVERSITY June 2012
A.B., *magna cum laude,* Geosciences with primary Certificate (co-major) in Public and International Affairs
Additional Certificates (minors) in Environmental Studies and in Chinese Language and Culture
Research Advisors: David Medvigy, Ph.D.; Tullis Onstott, Ph.D.; Michael Oppenheimer, Ph.D.

- Edward Sampson, Class of 1914, Prize in Environmental Geosciences for distinguished work for Senior Thesis, "Permafrost and Global Climate Change: Novel Models and Policy Implications"
- Elected to Society of Sigma Xi (International Honor Society for Science and Technology)

Relevant Competencies

- Working level fluency in business and science Chinese - oral and written
- Working level fluency with computer languages including Fortran, Matlab, Python, and R

Leadership and Other Activities

- Harvard Science Policy Group: Co-President (2018 - 2020). Vice-President (2017 - 2018). Faculty Chat Coordinator (2015 - 2017)
- Atmospheric Chemistry Journal Club: Co-organizer (2016 - 2018)
- World Resources Institute ChinaFAQs: Network Expert (2014 - 2018)
- Princeton Varsity Fencing Team: 4-Year Varsity Athlete, Foil. Ivy League Champions (2010, 2012). NCAA Team 2nd place finish (2012). Personal undefeated season (2009 - 2010)
- Princeton College Democrats Environmental Caucus: Co-Founder (2009). Organized campus events and outreach to Senators and Congressmen regarding the Waxman-Markey Climate Legislation
- Obama Campaign: Dorm Captain and Campaign Worker (Fall 2008). Organized and conducted voter registration drive for students

Teaching

- Co-instructor, Harvard Kennedy School Science, Technology and Society Graduate Level Seminar: Beyond "Don't be Evil": Embedding your research in social contexts (2021)
- Teaching Fellow, Harvard Kennedy School: The Energy-Climate Challenge (2020)
- Teaching Fellow, Harvard Undergraduate Course: Energy and Climate - Visions for the Future (2017)
- Teaching Fellow, Harvard Undergraduate Seminar: China's Energy Economy - Perspectives from the Past, Challenges for the Future (2015)
- Princeton Peer Advisor (2010 - 2012). Guided underclassmen with course selection and academic advice
- Princeton Peer Tutor (2010 - 2012). Helped students with Geosciences courses

Select Publications and Presentations

- Dovrou, E., K.H. Bates, **J.M. Moch**, L.J. Mickley, D.J. Jacob, F.N. Feutsch, (in review). Catalytic Role of Formaldehyde in Particulate Matter Formation. Science.
- Zhai, S., D.J. Jacob, X. Wang, Z. Liu, T. Wen, V. Shah, K. Li, **J.M. Moch**, K. Bates, et al., (in press). Controlling particulate nitrate pollution in China. Nature Geosciences.
- Shah, V., D.J. Jacob, **J.M. Moch**, X. Wang, S. Zhai, (2020). Global modeling of cloud water acidity, precipitation acidity, and acid inputs to ecosystems. Atmospheric Chemistry and Physics.
- **Moch, J.M.**, E. Dovrou, L.J. Mickley, F.N. Keutsch, Z. Liu, Y. Wang, T. Dombek, M. Kuwata, S.H. Budisulistiorini, L. Yang, S. Decesari, M. Paglione, B. Alexander, J. Shao, J.W. Munger, and D.J. Jacob, (2020). Global importance of hydroxymethanesulfonate in ambient particulate matter: Implications for air quality. Journal of Geophysical Research – Atmospheres.
- Luo, G, F. Yu, **J.M. Moch**, (2020). Further improvement of wet process treatments in GEOS-Chem v12.6.0: Impact on global distributions of aerosol precursors and aerosols. Geoscientific Model Development.
- **Moch, J.M.**, (2019). Environmental Implications and Policy Challenges for Bringing Long-Haul Electric Trucks into China: The Case of the Tesla Semi. Environment and Natural Resources Program. Cambridge, MA. Belfer Center for Science and International Affairs.
- **Moch, J.M.**, E. Dovrou, L.J. Mickley, F.N. Keutsch, Y. Cheng, D.J. Jacob, J. Jiang, M. Li, J.W. Munger, X. Qiao, Q. Zhang, (2018). Contribution of hydroxymethane sulfonate to ambient particulate matter: A potential explanation for high particulate sulfur during severe winter haze in Beijing. Geophysical Research Letters.
- Leung, D.M., A.P.K. Tai, L.J. Mickley, **J.M. Moch**, A. van Donkelaar, L. Shen, R.V. Martin (2018). Synoptic meteorological modes of variability for fine particulate matter ($PM_{2.5}$) air quality in major metropolitan regions of China. Atmospheric Chemistry and Physics.
- **Moch, J.M.**, (2016). Clean Air, Cool Climate: Solving these problems together. ChinaFAQs. Washington DC: World Resources Institute.
- Li, K., H. Liao, J. Zhu, **J.M. Moch**, (2016). Implications of RCP emissions on future $PM_{2.5}$ air quality and direct radiative forcing over China. Journal of Geophysical Research: Atmospheres.
- Oh, Y., B.T. Stackhouse, M.C.Y. Lau, X. Xu, A.T. Trugman, **J.M. Moch**, T.C. Onstott, C.J. Jørgensen, L. D'Imperio, B. Elberling, C.A. Emmerton, V.L. St.Louis, D. Medvigy, (2016). A scalable model for methane consumption in arctic mineral soils. Geophysical Research Letters.
- **Moch, J.M.** and S. Forbes, (2013). Recent Progress Shows China's Leadership on Carbon Capture and Storage. ChinaFAQs. Washington DC: World Resources Institute.
- **Moch, J.M.**, (2013). 4 Promising Themes Emerge in U.S.-China Agreements at Strategic and Economic Dialogue. ChinaFAQs. Washington DC: World Resources Institute.
- **Moch, J.M.**, (2013). U.S.-China Collaboration: Can They "Inspire the World"? ChinaFAQs. Washington DC: World Resources Institute.
- **Moch, J.M.**, B.T. Stackhouse, M.C.Y. Lau, D. Medvigy, and T.C. Onstott, (2012). Modeling CH4 emissions from Arctic tundra: Processes behind emissions pulses and the potential for a negative feedback. Poster presentation at AGU 2012 Fall Meeting, December 3-7, San Francisco, California.
- Lau, M.C.Y., B.T. Stackhouse, **J.M. Moch**, K. Chourey, R.L. Hettich, T. Vishnivetskaya, S. Pfiffner, A. Layton, N. Mykytczuk, L. Whyte and T.C. Onstott, (2012). Identifying active CH4-oxidizers in thawed Arctic permafrost by proteomics. Poster presentation at AGU 2012 Fall Meeting, December 3-7, San Francisco, California.
- **Moch, J.M.**, (2012). Permafrost and Global Climate Change: Novel Models and Policy Implications. Undergraduate Senior Thesis. Princeton University, Department of Geosciences.