

# Jonathan M. Moch, Ph.D.

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Jonathan Moch is a Postdoctoral Fellow with dual appointments to Harvard's Atmospheric Chemistry Modeling Group and the Center for Climate, Health, and the Global Environment. His work has centered on the interactions between climate change and air pollution as well as the policy and public health implications of climate issues. 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 network of internationally renowned 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.

## Education

### **HARVARD UNIVERSITY**

Ph.D., Earth and Planetary Sciences May 2020

Secondary Field in Science, Technology, and Society at the Harvard Kennedy School of Government

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)

## Experience

### **HARVARD UNIVERSITY, JOHN A. PAULSON SCHOOL OF ENGINEERING AND APPLIED SCIENCES AND T.H. CHAN SCHOOL OF PUBLIC HEALTH**

June 2020 - Present  
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 interactions between climate change and atmospheric chemistry and implications for public health and policy. Also participate as a Fellow in the Harvard Program on Science, Technology, and Society

- 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

### **HARVARD UNIVERSITY, DEPARTMENT OF EARTH AND PLANETARY SCIENCES**

August 2014 - May 2020  
Cambridge, MA

*Graduate Research Fellow: Atmospheric Chemistry Modeling Group*

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

### **CHINESE ACADEMY OF SCIENCES, INSTITUTE OF ATMOSPHERIC PHYSICS**

Summer 2016  
Beijing, China

*Harvard Global Institute Visiting Graduate Research Fellow*

Collaborated with Chinese researchers on interactions between climate change and atmospheric chemistry

Research Advisor: Hong Liao, Ph.D.

- 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 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

- Created content including issue briefs, blogs and fact sheets
- Identified and analyzed scientific and policy data derived from multiple sources
- Helped plan and participated in meetings with policy makers and presented data
- 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

**PRINCETON UNIVERSITY, DEPARTMENT OF GEOSCIENCES**

June 2012 - March 2013

*Research Associate*

Princeton, NJ

Refined models for methane emissions from Arctic tundra that were developed as part of Senior Thesis.

- Work served as the basis for Oh et al., 2016, A scalable model for methane consumption in arctic mineral soils, *Geophysical Research Letters*

**NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION (NOAA)**

Summer 2011

**GEOPHYSICAL FLUID DYNAMICS LABORATORY**

Princeton, NJ

*Research Associate, Princeton Environmental Institute/Grand Challenges Intern*

Research Advisors: Jorge Sarmiento, Ph.D.; Thomas Frölicher, Ph.D.; Keith Rodgers, Ph.D

- Performed climate modeling research using then unpublished GFDL Earth System Models; characterized and quantified the carbon cycle-climate feedbacks of the model and examined the model's uncertainties in order to refine 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 5<sup>th</sup> Assessment Report

**Relevant Competencies and Coursework**

- Working level fluency in business and science Chinese – oral and written
- Working level fluency with computer languages including Fortran, Matlab, Python, and R
- *Geosciences and Environmental Studies*: Physics of Climate • Environmental Modeling • Atmospheric Chemistry • Climate Dynamics • Planetary Radiation and Climate • Environmental Geochemistry • Atmospheric Science • Physical Oceanography • Sea Level Change • Organic Chemistry • Global Air Pollution • Environmental Decision Making
- *Public Policy and International Affairs*: Expertise, Trust and Democracy • Disease Ecology, Economics, and Policy • Ethics and Public Policy • Social Policy Making • International Relations • Game Theory • Democracy • Environmental Economics and Policy • Science, Power and Politics • Environmental Law and Policy • Environmental Leadership • Energy Policy

**Activities and Leadership**

- 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)
- ChinaFAQs Network Expert for World Resources Institute (2014 - 2018)
- Princeton Varsity Fencing Team: 4-Year Varsity Athlete, Foil. Ivy League Champions (2010, 2012). NCAA Team 2<sup>nd</sup> 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**

- Teaching Fellow for Harvard Kennedy School: The Energy-Climate Challenge (Fall 2020)
- Teaching Fellow for Harvard Undergraduate General Education: Energy and Climate - Visions for the Future (Spring 2017)
- Teaching Fellow for Harvard Undergraduate Seminar: China's Energy Economy - Perspectives from the Past, Challenges for the Future (Fall 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 review). 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<sub>2.5</sub>) 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<sub>2.5</sub> 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 CH<sub>4</sub> 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 CH<sub>4</sub>-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.