Catherine (Casey) Ivanovich

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EDUCATION

Columbia University, New York, NY
Ph.D. in Earth and Environmental Sciences *Expected Spring 2024*
Advisors: Dr. Radley Horton and Dr. Adam Sobel
Draft Dissertation Title: *Understanding the Development of Extreme Humid Heat*
M.Phil. *2022*
M.A. *2021*

Princeton University, Princeton, NJ
B.A. in Geosciences, *summa cum laude* *June 2017*
Advisor: Dr. Satish Myneni
Senior Thesis Title: *Uncovering the Sources of Elevated Arsenic in Classic Maya Human Remains – Implications from Antiquity to Modernity*

RESEARCH EXPERIENCE

Graduate Research Assistant, Columbia University *August 2019- Present*
Advisors: Radley Horton and Adam Sobel
Analyze the physical mechanisms generating extreme humid heat. Consider the influence of factors including intraseasonal oscillations, monsoon variability, and the individual drivers of anomalous heat and humidity contributing to extremes around the globe. Work with historical data (station and reanalysis) to explore relationships in the present climate, as well as generate humid heat projections under a variety of future climate scenarios using downscaled climate model data.

High Meadows Climate Science Fellow, Environmental Defense Fund *August 2017-August 2019*
Supervisor: Dr. Ilissa Ocko
Evaluated the roles of global food consumption and international shipping and aviation in future warming by running and analyzing the results of a reduced complexity climate model (MAGICC). Communicated climate science to lay audiences through blog posts and graphics.

Research Intern, Princeton University *June 2017-August 2017*
Advisor: Dr. Gabriel Vecchi
Investigated the relationship between the Madden-Julian Oscillation (MJO) and humidity, with implications for intraseasonal variations in transmission strength for the influenza virus. Utilized observational data to generate MJO composites highlighting the relationship between seasonality, MJO phase, and the following variables: 2-meter air temperature, relative humidity, specific humidity, precipitation rate, and pressure.

Undergraduate Researcher, Princeton University *February 2016-June 2017*
Advisor: Dr. Satish Myneni. Second Reader: Dr. Bryan Just
Designed the first methodology to estimate the rate of arsenic incorporation in bone. Related elevated arsenic concentrations identified in Classic Maya ceramic vessels and osteological remains to potential exposure intensities and pathways. Identified a potential link between fatal levels of arsenic ingestion to contaminated surface waters during the Maya reign, and provided a new lens through which to assess mass arsenic poisonings throughout historical and contemporary contexts.

Undergraduate Researcher, Princeton University *September 2015-January 2016*
Advisor: Dr. Tullis Onstott. Second Reader: Dr. Michael Oppenheimer
Junior Paper: *Estimating the CH_4 Uptake Flux in the Arctic Region*
Developed a process to estimate monthly and annual methane uptake fluxes for the Arctic region based on the presence of carbon-poor, Arctic mineral cryosols.

PUBLICATIONS

Published

Ivanovich, C., Sun, T., Gordon, D., and I. Ocko. "Future warming from Global Food Consumption." *Nature Climate Change*, https://doi.org/10.1038/s41558-023-01605-8.

- News coverage including AP News, The Guardian, Vox's The Verge, and Wired

Ivanovich, C., Anderson, W., Horton, R., Raymond, C., and Sobel, A, 2022. Influence of the Madden-Julian Oscillation on Extreme Wet Bulb Temperature, *Journal of Climate*, 35(13), 4309-4329.

Speizer, S., Raymond, C., **Ivanovich, C.,** and Horton, R. M., 2022. Concentrated and intensifying humid heat extremes in the IPCC AR6 regions, *Geophysical Research Letters*, 49(5), pp. 1-10.

Raymond, C., Matthews, T., Horton, R. M., Fischer, E. M., Fueglistaler, S., **Ivanovich, C.,** Suarez-Gutierrez, L., and Zhang, Y., 2021. On the Controlling Factors for Globally Extreme Humid Heat, *Geophysical Research Letters,* 48(23), 1-11.

Ivanovich, C., Ocko, I., Piris-Cabezas, P., and Petsonk, A., 2019. "Climate benefits of proposed carbon dioxide mitigation strategies for international shipping and aviation." *Atmospheric Chemistry and Physics,* 19(23), 14949-14965.

In Review

Ivanovich, C., Horton, R. M., Sobel, A. H., & Singh, D. (in review). Extreme Humid Heat Variability during the South Asian Summer Monsoon. In review at *Geophysical Research Letters.*

Ivanovich, C., Sobel, A. H., Horton, R. M., & Raymond, C. (in review). Stickiness: A New Variable to Characterize the Temperature and Humidity Contributions toward Humid Heat. In review at *Journal of the Atmospheric Sciences.*

Johnson, S., **Ivanovich, C.,** Horton, R. M., Ting, M., Kornhuber, K., & Lesk, C. (in review). On the Relationship between Humid Heat and Extreme Precipitation. In review at *Geophysical Research Letters.*

In Preparation

Wilson, A., Bressler, D., **Ivanovich, C.,** Tuholske, C., Raymond, C., Horton, R., Sobel, A., Kinney, P., Cavazos, T., & Shrader, J. (in review). Heat disproportionately kills young people: Evidence from population-level wet-bulb temperature exposure in Mexico. Intended submission to *PNAS.*

Tuholske, C., **Ivanovich, C**., Horton, R., Shukla, S., Brooks, N., Andam, K., Williams, E., and Funk, C. (in preparation). Evidence of Rapidly Increasing Dangerous Humid-Heat Risk in Africa's Great Green Wall. Intended submission to *Geophysical Research Letters.*

SCIENCE COMMUNICATION

Blog Posts

GeoGraphics, Blog Founder *June 2020-Present*
Publication of original Earth science infographics to Instagram page @geographics_infographics

Climate411, Contributor *October 2017-May 19*

- **Ivanovich, C.** "What role do emissions from international shipping and aviation play in the global climate, and what do those sectors need to do to help keep warming below 1.5 degrees Celsius?" May 6, 2019. Link.
- **Ivanovich, C.** and I. Ocko. "Six takeaways from the new climate report." October 8, 2018. Link.
- **Ivanovich, C.** "Cherry blossoms: Predicting peak bloom in a warming world with weirder weather." April 9, 2018. Link.
- **Ivanovich, C.** "The Winter Olympics on hostile terrain – How climate change is harming winter sports." March 6, 2018. Link.
- **Ivanovich, C.** "A look back at 2017: The year in weather disasters – and the connection to climate change." January 3, 2018. Link.

- **Ivanovich, C.** and I. Ocko. "Everything you need to know about climate tipping points." November 1, 2017. Link.
- **Ivanovich, C.** "A real Halloween horror story: The five scariest aspects of climate change." October 30, 2017. Link.

Radio and Podcasts

Green Street Radio, Guest Speaker
Episode titled "Smoke, Heat and Humidity with Mary Prunicki and Casey Ivanovich." November 22, 2021.

Speaking Engagements

Morry Stein Management Conference *November 2023*
Invited speaker to present on the effects of climate change on extreme weather and implications for the future of children's summer camp.

Soccer in a Warming World Workshop *November 2022*
Presented on the causes of extreme humid heat with implications for professional and amateur soccer leagues around the globe. Participated in overall half-day workshop presented by the Columbia University Climate School and World Cup winning member of the US Women's National Team, Samantha Mewis.

New York Federal Reserve Bank Extreme Heat and Air Quality Virtual Roundtable *August 2021*
Provided expertise during stakeholder roundtable session on the impact of extreme heat on low- and moderate-income communities and communities of color.

Ridgewood Public Library Sustainability Series, Ridgewood, NJ *November 2020*
Guest Speaker. "Climate Change 101: Understanding Earth's Past, Present, and Future."

TEACHING EXPERIENCE

Columbia University, New York, NY *Spring 2022-Spring 2023*
Guest Lecturer. Climate Thermodynamics and Energy Transfer.
Guest Lecturer. Climate Impacts in New York City.
Teaching Assistant. Science for Sustainable Development.
Teaching Assistant. Earth's Environmental Systems: The Climate System.

Science Honors Program, **Columbia University,** New York, NY *Fall 2021-Spring 2022*
Co-Lead Teacher. Understanding Earth's Climate System and Climate Change.

Private tutor, grades 6-12 for mathematics and science courses. *Fall 2010-Spring 2021*

HONORS & AWARDS

AGU Outstanding Student Presentation Award (OSPA), for presentation titled "Future Warming from Global Food Consumption." March 2024.

ThinkSwiss Travel Grant, for use at the Swiss Climate Summer School, Office of Science, Technology and Higher Education (OSTHE) at the Swiss Embassy, Washington, D.C., 2022.

National Science Foundation Graduate Research Fellowship Program Honorable Mention, National Science Foundation, 2021.

1st Place Oral Presentation/Student Paper Award, AMS Ninth Symposium on the Madden-Julian Oscillation and Sub-Seasonal Monsoon Variability, American Meteorological Society, 2021**.**

Dean's Fellowship, Columbia University, 2019.

American Meteorological Society Graduate Fellowship. American Meteorological Society, 2019 *(Declined).*

Edward Sampson Prize in Environmental Geosciences, for Senior Thesis, Princeton University, 2017.

Summa Cum Laude, highest honors for both overall coursework and research within concentration, Princeton University Department of Geosciences, 2019.

Election to Membership in the Society of Sigma Xi. Princeton University, 2017.

Elmeryl Davies Memorial Scholarship. New Jersey Licensed Site Remediation Professionals Association (LSRPA), 2016-2017.

Henrietta S. Treen Scholarship. Center for Scholarship Administration, 2016-2017.

RESEARCH PRESENTATIONS

Invited Presentations

Megalopolitan Coastal Transformation Hub (MACH) Seminar Series. "Extreme Humid Heat Variability during the South Asian Summer Monsoon." February 2023.

NASA JPL Center for Climate Sciences (CCS) Friday Seminar Series. "Extreme Humid Heat Variability during the South Asian Summer Monsoon." January 2023.

NASA GISS Climate Impacts Group Seminar Series. "Future Warming from Global Food Consumption." May 2022.

Conference Presentations

Ivanovich, C., Sobel. A., Horton., R., and Raymond, C., January 2024: "Stickiness: A New Variable to Characterize the Temperature and Humidity Contributions toward Extreme Humid Heat." *American Meteorological Society Annual Meeting* (oral).

Ivanovich, C., Sun, T., Gordon, D., and Ocko, I., December 2023: "Future Warming from Global Food Consumption." *American Geophysical Union Fall Meeting* (oral).

Ivanovich, C., Sobel. A., Horton., R., and Raymond, C., April 2023: "Stickiness: A New Variable to Characterize the Temperature and Humidity Contributions toward Extreme Humid Heat." *European Geophysical Union Annual Meeting* (virtual, oral).

Ivanovich, C., Singh, D., Horton, R., and Sobel, H., January 2023: "Extreme Humid Heat Variability during the South Asian Summer Monsoon." *American Meteorological Society Annual Meeting* (virtual, oral).

Ivanovich, C., Singh, D., Horton, R., and Sobel, H., December 2022: "Extreme Humid Heat Variability during the South Asian Summer Monsoon." *American Geophysical Union Fall Meeting* (oral).

Ivanovich, C., Singh, D., Horton, R., and Sobel, H., September 2022: "Extreme Humid Heat Variability during the South Asian Summer Monsoon." *DAMOCLES Compound Events Final Conference* (oral).

Ivanovich, C., Anderson, W., Horton, R., Raymond, C., and Sobel, H., January 2021: "Influence of the Madden-Julian Oscillation on Extreme Wet Bulb Temperature." *American Meteorological Society Annual Meeting* (virtual, oral).

Ivanovich, C., Horton, R., and Sobel, H., December 2021: "Extreme Humid Heat during South Asian Summer Monsoon Breaks." *American Geophysical Union Fall Meeting* (oral).

Ivanovich, C., Anderson, W., Horton, R., Raymond, C., and Sobel, H., December 2020: "Influence of the Madden-Julian Oscillation on Extreme Wet Bulb Temperature." *American Geophysical Union Fall Meeting* (virtual, poster).

Ivanovich, C., Ocko, I., and Gordon, D., January 2020: "Surpassing 2 °C from Diet Alone: Insights into Future Warming via an Improved Greenhouse Gas Emissions Inventory." *American Meteorological Society Annual Meeting*, Boston, MA (poster).

Ivanovich, C. and I. Ocko, December 2018: "Global Food Consumption: Insights into Future Warming via an Improved Greenhouse Gas Emissions Inventory." *American Geophysical Union Fall Meeting*, Washington, D.C. (poster).

Ivanovich, C., May 2017: "Uncovering the Sources of Elevated Arsenic Levels in Classic Maya Human Remains." *Princeton Research Day*, Princeton, NJ (poster).

Ivanovich, C., May 2017: "Uncovering the Sources of Elevated Arsenic Levels in Classic Maya Human Remains." *Princeton Environmental Institute Discovery Day*, Princeton, NJ (poster).

Ivanovich, C., May 2017: "Uncovering the Sources of Elevated Arsenic Levels in Classic Maya Human Remains." *American Chemical Society National Meeting*, San Francisco, CA (poster).

MENTORSHIP & LEADERSHIP

Research Project Supervisor *June 2021-Present*
Columbia University, New York, New York

- Simone Speizer, summer research assistantship, co-advised with Radley Horton and Colin Raymond (2021)
- Sophie Johnson, Lamont research assistantship, co-advised with Radley Horton, Mingfang Ting, and Kai Kornhuber (2022-Present)
- Diana Milk-Batista, Lamont research assistantship, co-advised with Radley Horton and Mingfang Ting (Summer 2023)

Research Mentor, Columbia Summer Undergrad. Research Experiences in Mathematical Modeling *June 2023-August 2023*
Columbia University, New York, New York

- Supervised two groups of undergraduates on research projects exploring the use of Natural Language Processing (NLP) for modelling the relationship between public sentiment and stock price volatility
- Served as a panelist for students discussing the experience of applying to and navigating graduate school
- Coordinated visit to the Lamont-Doherty Earth Observatory for a day of presentations and lab tours

Board Member, Women in Science at Columbia (WISC) *December 2019-August 2023*
Columbia University, New York, New York.

- Co-founded the WISC Undergraduate Mentoring Program facilitating social and research project based mentoring for Columbia undergraduate students.
- Secured $3900 in funding for programming costs through Student Initiative Grants (Columbia University).
- Matched over 600 undergraduate students with graduate mentors in their field of study.

Ocean and Climate Physics Division Seminar Coordinator, Lamont-Doherty Earth Observatory *August 2022-July 2023*
Columbia University, New York, New York

- Organized 32 weekly seminars featuring both internal and external visiting scholars to present their research
- Attended by members of the Columbia University, NASA GISS, and International Research Institute communities

Skype a Scientist Volunteer *March 2020-July 2022*

- Two remote Q&A discussions with 8th grade classrooms at Power Middle School in Farmington, Michigan.
- One remote Q&A discussion with 5th grade classroom at Elmhurst Elementary School in Greenville, North Carolina.
- One remote Q&A discussion with 12th grade classroom at Marymount School of New York in New York, New York.

Lamont Summer Mentorship Program Volunteer *June 2020-August 2022*
Columbia University, New York, New York

"Girls' Science Day" Volunteer *November 2019*
Columbia University, New York, New York.

WORKSHOPS ATTENDED

"**NASA Summer School on Satellite Observations and Climate Models**," August 2023, *JPL Center for Climate Sciences* and the *Keck Institute for Space Studies,* Pasadena, California.

"**Extreme Weather and Climate: From Atmospheric Processes to Impacts on Ecosystems and Society**," August 2022, *20th Swiss Climate Summer School,* Grindelwald, Switzerland.

"**Communicating Science: Research Matters**," November 2019, *Columbia University,* New York, New York.

"**Workshop in Correlated Extreme Events**," May 2019, *Columbia University,* New York, New York.

"**23rd Summer Course in Climate Time Series Analysis**," August 2018, *Climate Risk Analysis*, Heckenbeck, Germany.

"**Science Talk 2018**," March 2018, *Science Talk*, Portland, Oregon.

SKILLS

Computers: Matlab (experienced), Python (experienced), Fortran (beginner), ArcGIS (beginner); Microsoft Office.

PROFESSIONAL ORGANIZATIONS AND ACTIVITIES

Memberships include: American Geophysical Union, American Meteorological Society, Climate Access, Earth Science Women's Network, and Sharing Science.

Reviewer for peer-reviewed journals including: *Journal of Climate, NPJ Climate and Atmospheric Science,* and *International Journal of Climatology*