

Ryan D. Harp, Ph.D.

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RESEARCH VISION

I apply my physical climate science background and quantitative toolbox to investigate the environmental and societal impacts of our changing climate. I also focus on interactions between climate and human health with an emphasis on applicable results, creative interdisciplinary work, and science communication.

EDUCATION

Ph.D., M.S. – Atmospheric and Oceanic Sciences (ATOC) 2020, 2018
University of Colorado Boulder (CU) | Boulder, CO
Graduate Certificate in Science and Technology Policy

B.S. – Atmospheric and Oceanic Sciences (AOS), Psychology 2012
University of Wisconsin – Madison (UW) | Madison, WI

RESEARCH EXPERIENCE

Research Physical Scientist – NOAA PSL | Boulder, CO 2024 to present
Joint Sponsors: NOAA PSL and National Integrated Drought Information System (NIDIS)

Climate and Health Postdoctoral Researcher – UCAR CPAESS | Boulder, CO 2022 to 2024
Joint Sponsors: NOAA and CDC

Ubben Postdoctoral Research Fellow – Northwestern University | Evanston, IL 2020 to 2022
Mentor: Dr. Daniel E. Horton

Graduate Research Assistant – CU ATOC | Boulder, CO 2016 to 2020
Advisor: Dr. Kristopher B. Karnauskas

Research Assistant – National Center for Atmospheric Research | Boulder, CO 2016
Principal Investigators: Dr. Brian O’Neill, Ms. Emily Laidlaw

Undergraduate Research Assistant – UW AOS | Madison, WI 2011 to 2012
Advisor: Dr. Grant Petty

Undergraduate Research Assistant – UW AOS | Madison, WI 2011
Advisor: Dr. Ankur Desai

Undergraduate Research Assistant – UW Chemistry | Madison, WI 2008 to 2009
Advisors: Dr. Melissa Galloway, Dr. Frank Keutsch

REFEREED PUBLICATIONS

12. Lotfata, A., Abusaa, S., Johansson, M. A., Holcomb, K. M., **Harp, R. D.**, and Barker, C. (*in prep*): Modeling the occurrence of Aedes mosquitoes in the United States through an open forecasting challenge.
11. **Harp, R. D.**, Benjamin, S., Green, B., Holcomb, K., and Johansson, M. (*in prep*): Climatic Influences on Seasonal Onset Timing and Annual Burden of West Nile Virus.
10. **Harp, R. D.**, Blanco, D. T.*, Sharma, A., Wuebbles, D. J., and Horton, D. E. (*preprint, in revision*): Recent changes in Great Lake hydrologic variability: an artifact of chance or a robust change? *Authorea*. <https://doi.org/10.22541/essoar.167569641.12291906/v1>
9. **Harp, R. D.**, Holcomb, K., Johansson, M., and others. (*in review*): Evaluation of the 2022 West Nile Virus Forecasting Challenge, United States.
8. **Harp, R. D.**, Taguela Ndetatsin, T., Akinsanola, A. A., and Horton, D. (*in review*): Evaluation of historical precipitation interannual variability in CMIP6 over the United States.
7. Graffy P., Sunderraj A., Visa M., Barrett B., Rao S., Camilleri S., **Harp R. D.**, Li C., Brenneman A., Allen N., Kho A., and Horton D. E. (2024): A Comprehensive Review of the Clinical Determinants of Heat-Related Adverse Events. *GeoHealth*.
6. **Harp, R. D.**, and Horton, D. E. (2023): Observed Changes in Interannual Precipitation Variability in the United States. *Geophysical Research Letters*. <https://doi.org/10.1029/2023GL104533>
5. **Harp, R. D.**, & Horton, D. E. (2022): Observed Changes in Daily Precipitation Intensity in the United States. *Geophysical Research Letters*. <https://doi.org/10.1029/2022GL099955>
4. **Harp, R. D.**, Colborn, J. M., Candrinho, B., Colborn, K. L., Zhang, L., and Karnauskas, K. B. (2021): Interannual Climate Variability and Malaria in Mozambique. *GeoHealth*. <https://doi.org/10.1029/2020GH000322>
3. **Harp, R. D.**, and Karnauskas, K. B. (2020): Global Warming to Increase Violent Crime in the United States. *Environmental Research Letters*. <https://doi.org/10.1088/1748-9326/ab6b37>
2. Laidlaw, E., O'Neill, B., and **Harp, R. D.** (2019): The Use of the Community Earth System Model in Human Dimensions Climate Research and Applications. *WIREs Climate Change*. <https://doi.org/10.1002/wcc.582>
1. **Harp, R. D.**, and Karnauskas, K. B. (2018). The Influence of Interannual Climate Variability on Regional Violent Crime Rates in the United States. *GeoHealth*. <https://doi.org/10.1029/2018GH000152>

* – denotes undergraduate advisee

SIGNIFICANT AWARDS

NSF EAGER (\$300,000 – unlisted co-PI*) <i>Bridging Seasonal Physical Climate/Weather Prediction with Disease Forecasts</i>	2024
Buffett Institute for Global Affairs Defusing Disasters – (\$300,000 – co-PI)	2022
Ubben Postdoctoral Research Fellowship (~\$75,000/year)	2020
CIRES Graduate Student Research Award (\$70,000)	2019

Earth Lab Graduate Research Associate (\$34,000)	2019
Carol B. Lynch Graduate Fellowship for Outstanding Interdisciplinary Research (\$2,000)	2018
University of Colorado Graduate School Summer Fellowship (\$6,000)	2018
NSF-Funded Participant in AMS Summer Policy Colloquium (~\$11,000)	2017

* – fully contributing co-PI not listed due to postdoctoral status

INVITED PRESENTATIONS

Colorado School of Public Health Climate Change and Health Guest Lecture <i>Climate Change and Infectious Disease, the Case of West Nile Virus</i>	2024
UCAR Community Programs All-Hands Meeting <i>Toward a Climate-Informed Nationwide West Nile Virus Forecast</i>	2024
UCAR President's Council Meeting <i>Toward a Climate-Informed Nationwide West Nile Virus Forecast</i>	2024
CPAESS Discovery Seminar <i>Toward a Climate-Informed Nationwide West Nile Virus Forecast</i>	2024
2nd Symposium of Colorado Consortium on Climate Change and Health <i>Building Toward a Climate-Informed West Nile Virus Forecast</i>	2024
AGU-AMS Climate and Health Showcase <i>Climatic Influences on Seasonal Onset Timing and Annual Burden of West Nile Virus</i>	2024
CSTE-CDC Vector-Borne Disease Forecasting Workshop <i>Preliminary Results from Recent CDC West Nile Virus Forecasting Projects</i>	2024
Council of State and Territorial Epidemiologists Infectious Disease Meeting <i>Analysis of the 2022 CDC West Nile Virus Forecasting Challenge</i>	2023
Models of Infectious Disease Agent Study – Infectious Disease Group Meeting <i>Lessons Learned from the CDC West Nile Virus Forecasting Project</i>	2023
NOAA Global Systems Laboratory – Global Modeling Group Meeting <i>Observed Changes in U.S. Precipitation: Daily Intensity and Interannual Variability</i>	2023
European Centre for Disease Control – COVID-19 Modeling Group Meeting <i>Lessons Learned from the CDC West Nile Virus Forecasting Project</i>	2023
Northwestern University Earth and Planetary Sciences Earth Connects Series <i>Two Aspects of Climate: Trends in Precipitation Variability and Weather-Driven Mobility</i>	2021
Northwestern University Global Health Leadership Course <i>Links Between Climate and Human Health</i>	2020
University of Tennessee Anthropology Visiting Lecture Series <i>Links Between Climate and Human Health</i>	2020
NCAR – Integrated Assessment Modeling Group Seminar <i>The Influence of Interannual Climate Variability on Regional Violent Crime Rates in the United States</i>	2018

CONFERENCE AND SEMINAR PRESENTATIONS

- Johansson, M.A., **Harp, R. D.**, Holcomb, K. M. (upcoming, 2025). *Environmental drivers of West Nile virus*. American Mosquito Control Association Annual Meeting.
- Harp, R. D.**, Holcomb, K. M., Benjamin, S. G.*, Green, B. W., Jones, H., and Johansson, M. A. (upcoming, 2024). *A Regionally Determined Climate-Informed West Nile Virus Forecast*. American Geophysical Union Annual Meeting.
- Detmar, A., Madewell, Z. J., Thayer, M., **Harp, R. D.**, Munayco, C., Adams, L. E., Paz-Bailey, G., Johansson, M. A. (upcoming, 2024) *El Niño Southern Oscillation and Climatological Impacts on Dengue in Mexico, Peru, Brazil, The Dominican Republic and Puerto Rico*. American Society of Tropical Medicine and Hygiene Annual Meeting.
- Benjamin, S., **Harp, R. D.**, Green, B., Holcomb, K., Johansson, M. (2024). *Building Toward a Weather-S2S-Climate-Informed West Nile Virus Forecast*. NOAA's Subseasonal and Seasonal Applications Workshop.
- Graffy, P., Sunderraj, A., Visa, M., Barrett, B., Rao, S., Camilleri, S., **Harp, R. D.**, Li, C., Brenneman, A., Allen, N., Kho, A., and Horton, D. E. (2024). *Heat Exposure and Cardiovascular Vulnerability in the Context of Climate Change: A Scoping Review and Meta-Analysis*. Epidemiology and Prevention | Lifestyle and Cardiometabolic Health American Heart Association Scientific Sessions.
- Benjamin, S. G., **Harp, R. D.***, Holcomb, K. M., Green, B. W., Jones, H., Johansson, M. A., Nett, R. J., Beard, C. B., and Trtanj, J. (2024). *Toward a Future NOAA-CDC West Nile Virus National Prediction Capability: Weather/Climatic Influences on Seasonal Onset Timing and Annual Burden of WNV*. American Meteorological Society Annual Meeting.
- Hans, A., Sharma, A., Carter, T., Budhathoki, M., Zhang, X., **Harp, R. D.**, Veiga, C. (2024). *Understanding the Relationship between Crime and Temperature in the Chicago Region*. American Meteorological Society Annual Meeting.
- Harp, R. D.**, Benjamin, S. G., Green, B. W., Holcomb, K. M., Jones, H., and Johansson M. A. (2023). *Climatic Influences on Seasonal Onset Timing and Annual Burden of West Nile Virus*. American Geophysical Union Fall Meeting.
- Harp, R. D.**, Holcomb, K. M., Barker, C. M., Benjamin, S. G., Jones, H., Staples, J. E., Nett, R., Johansson, M. A. (2023). *Preliminary Evaluation of the 2022 West Nile Virus Forecasting Challenge*. Annual Society of Vector Ecology Meeting.
- Harp, R. D.**, and Horton, D. E., (2022). *Observed Changes in Daily and Interannual Precipitation Variability in the United States*. American Geophysical Union Fall Meeting.
- Harp, R. D.**, and Horton, D. E., (2022). *Observed Changes in Precipitation Seasonality and Timing*. American Meteorological Society Annual Meeting.
- Harp, R. D.**, and Horton, D. E., (2021). *Quantifying Observed Changes in Global Precipitation Variability and Extremes*. American Geophysical Union Fall Meeting.
- Harp, R. D.**, and Horton, D. E., (2021). *Patterns in Human Mobility Responses to Weather and Climate*. American Geophysical Union Fall Meeting.
- Blanco, D., **Harp, R. D.**, and Horton, D. E. (2021). *Observing Changes in the Great Lakes Water Variability*. American Geophysical Union Fall Meeting.

- van der Lee, S., Davis, T. C., Tuccillo, M., **Harp, R. D.**, Larocca, L., Bausch, H., Montgomery, A., Nichols, F., Savatic, K., Puleo, P., Perkins, K., Bueno, N., Woods, S. E., and Drane, D. (2021). *NU-Geopaths 1.0 Increased Awareness of and Aided the Possible Diversification of the Sciences*. American Geophysical Union Fall Meeting.
- Harp, R. D.**, Colborn, J. M., Karnauskas, K. B., Candrinho, B., Colborn, K. L., Zhang, L., and Horton, D. E. (2021). *Toward Using Climate to Increase Lead-Time of a Malaria Early Warning System in Mozambique*. Planetary Health Annual Meeting.
- Harp, R. D.**, Colborn, J. M., Karnauskas, K. B., Candrinho, B., Colborn, K. L., Zhang, L., and Horton, D. E. (2020). *Toward Using Climate to Increase Lead-Time of a Malaria Early Warning System in Mozambique*. American Geophysical Union Fall Meeting.
- Harp, R. D.**, and Karnauskas, K. B. (2020). *Projections of Future Changes in United States Violent Crime Under Global Warming*. American Meteorological Society Annual Meeting
- Harp, R. D.**, and Karnauskas, K. B. (2019). *Projecting Future Temperature-Driven Changes in Crime*. Earth Lab/North Central Climate Adaptation Science Center Open House Poster Session.
- Harp, R. D.**, and Karnauskas, K. B. (2019). *Projecting Future Temperature-Driven Changes in Crime*. University of Colorado Boulder ATOC Colloquium.
- Harp, R. D.**, and Karnauskas, K. B. (2019). *Application of Seasonal Climate Forecasts to Predictions of Regional Crime Anomalies in the US*. American Meteorological Society Annual Meeting.
- Harp, R. D.**, and Karnauskas, K. B. (2018). *The Influence of Interannual Climate Variability on Regional Violent Crime Rates in the US*. Colorado State University Young Scientist Symposium.
- Harp, R. D.**, Ahlert, A., and Bateman, R. (2018). *How We Created Our Own SciComm Class*. National ComSciCon Poster Session.
- Harp, R. D.**, and Karnauskas, K. B. (2018). *Influence of Climate Variability on US Regional Assault Rates*. CIRES Rendezvous Poster Session.
- Harp, R. D.**, and Karnauskas, K. B. (2017). *Influence of Climate Variability on US Regional Assault Rates* University of Colorado Climate Change and Health Symposium Poster Session.
- Harp, R. D.**, and Karnauskas, K. B. (2017). *Influence of Climate Variability on US Regional Assault Rates*. American Geophysical Union Fall Meeting.
- Harp, R. D.**, and Karnauskas, K. B. (2017). *Implications of Changing Temperatures on US Crime Rates*. CIRES Rendezvous Poster Session.
- Harp, R. D.**, and Karnauskas, K. B. (2016). *Implications of Changing Temperatures on US Crime Rates*. ATOC Earth System and Space Science Student Poster Conference.

* – non-first author presenter

SCIENCE COMMUNICATION AND OUTREACH

Presenter on Climate and Health – Science for Seniors virtual	2021 to 2022
Weather and Climate Presenter – Skype a Scientist virtual	2019 to 2021
Science Careers Guest Speaker – Rocky Top Middle School Thornton, CO	2020
Science Outreach Programmer – Broomfield Public Library Broomfield, CO	2016 to 2020
Climate Science Writer – Science Buffs CU STEM Blog	2016 to 2020
3 Minute Thesis Finalist	2019

Selected Participant—National ComSciCon Boston, MA	2018
Volunteer – Colorado Weatherfest Fort Collins, CO	2017, 2018
Planning Committee Member—ComSciCon Rocky Mountain West Fort Collins, CO	2018
Selected Participant—ComSciCon Rocky Mountain West Boulder, CO	2017
American Geophysical Union Sharing Science Workshop Fort Collins, CO	2016

SCIENCE POLICY

Member – Committee on Environment and Sustainability Broomfield, CO	2021 to 2022
Selected member of official advisory committee for the city of Broomfield. Committee provided guidance for city council on greenhouse gas reduction and other sustainability efforts.	
American Meteorological Society Summer Policy Colloquium Washington, DC	2017
NSF-grant funded ten-day intensive science policy program.	
Climate Science Congressional Visit Day Washington, DC	2016
AMS-hosted science policy training and meetings with Colorado representatives in the United States Senate and House.	

TEACHING EXPERIENCE

Instructor – CU Boulder	2018
Co-organized the creation of a new graduate student-led ATOC 6020 seminar course on science communication with two ATOC graduate students. Created syllabus and course schedule, arranged guest speakers, distributed and graded student homework.	
Teaching Assistant – CU Boulder	2015 to 2018
Assisted professors with class preparations and grading of student exams and assignments. Produced and presented several mini-lectures on relevant material. Classes taught include one semester of ATOC 3600 – Principles of Climate, and four semesters of ATOC 1060 – Our Changing Environment.	
Private Tutor – UW Madison AOS 100	2011 to 2012
Greater University Tutorial Services Volunteer Tutor – UW Madison	2009

MENTORSHIP

Formal Student Mentees

Ajeeth Iyer, Emily Weingardt (UCLA, CU undergraduates)	2023 to 2024
<i>Co-advised Virtual Student Federal Service Internships with NOAA advisor.</i>	
Daniel Blanco (Lewis University undergraduate)	2021 to 2022
<i>Co-advised NSF-funded Northwestern CIERA summer REU with PI.</i>	

Aidan O'Neil (Northwestern University undergraduate)	2020 to 2022
<i>Co-advised student training with PI. Helped obtain \$5,000 in funding support through the Northwestern University Undergraduate Research Assistant Program (\$1,500) and Summer Undergraduate Research Grants (\$3,500).</i>	
Northwestern University Geopaths Leadership and Mentor Program	2021
Mentored high school junior for three-week intensive summer program designed to promote interest in the geosciences. Experience included guiding mentee on research project, managing a budget, and mentorship and leadership trainings.	
Northwestern Mentoring Up and Down Certificate	2021
New Student Mentor – ATOC	2016 to 2019

OTHER RECOGNITION AND HONORS

Best Abstract in Planetary Health Annual Meeting (non-monetary)	2021
3 Minute Thesis Finalist (non-monetary)	2020
ATOC Teaching Assistant Award (\$250)	2019
Outstanding Service to ATOC Award (\$100)	2019
ATOC University Fellowship Award (\$1,250)	2018
Outstanding Service to ATOC Award (\$250)	2018
Funded Participant in National ComSciCon (\$400)	2018
United Government of Graduate Students Travel Grant (\$300)	2017
ATOC University Fellowship Award (\$500)	2017
Selected Participant in ComSciCon—Rocky Mountain West (non-monetary)	2017
Outstanding Service to ATOC Award (\$250)	2017
Selected Participant in Climate Science Congressional Visit Day (non-monetary)	2016
ATOC University Fellowship Award (\$300)	2016

PROFESSIONAL SERVICE

Professional Committees

Member – U.S. CLIVAR Climate and Health Working Group	2023 to present
Contributing to group efforts to establish protocols for data management and sharing, improve the understanding of uncertainties in climate prediction and projection, and lay the groundwork for transdisciplinary collaboration at the nexus of climate and health.	
Co-chair/Member – AGU GeoHealth Early Career Researcher Committee	2020 to present
Coordinating volunteer efforts across ten committee members. Created and facilitated an AGU section-wide webinar series designed to amplify the science of early career researchers. Webinar attended by over 400 participants in the first year.	

Conferences

GeoHealth Travel Grant Judge	2024
Primary Session Convener – AMS Annual Meeting	2024
Primary Session Convener and Chair – AGU Fall Meeting	2021, 2023 to 2024

GeoHealth Section Judge – AGU Outstanding Student Presentation Award 2020 to 2023

Diversity, Equity, and Inclusion

Inclusion and Diversity Organizer – Northwestern GeoEquity 2020 to 2022

Worked to improve inclusion and diversity, and to build actively anti-racist structural changes, in the Northwestern University Department of Earth and Planetary Sciences and the geosciences as a whole.

Participant – Unlearning Racism in the Geosciences (URGE) Northwestern Pod 2021 to 2022

Participated in nationally coordinated biweekly discussion group aiming to increase group knowledge of the effects of racism on the geosciences and work to develop and share antiracist policies and strategies.

Manuscript Peer Reviewer 2020 to present

AGU Books; Geophysical Research Letters; GeoHealth; University of New South Wales Law Journal; Weather, Climate, and Society; Climatic Change; PLOS ONE

Departmental

Student Lead – ATOC Awards Committee 2017 to 2020

Member – ATOC Departmental Action Team 2017 to 2020

Student Lead – ATOC Social Committee 2015 to 2019

Member – ATOC Mentorship Committee 2017 to 2019

Member – ATOC Club 2017 to 2019

Graduate Student Council Member – CU ATOC 2018 to 2019

Member – ATOC Outreach Committee 2018 to 2019

Member – ATOC Academic Review and Planning Advisory Committee 2016 to 2017

Member – ATOC Technology Committee 2015 to 2016

PROFESSIONAL AFFILIATIONS

Member – Models of Infectious Disease Agent Study Network 2023 to Present

Member – American Meteorological Society 2010 to 2012, 2016 to Present

Member – American Geophysical Union 2016 to Present

Member – American Association for the Advancement of Science 2016 to Present

WORK EXPERIENCE

Assistant Department Manager – Menards | Baraboo, WI 2014 to 2015

Directly oversaw eight employees in daily operations and served as the primary department contact for customer orders, questions, and issue resolution. Promoted from part-time employee to assistant department manager in five months.

Professional Billing Technical Services – Epic Systems | Verona, WI 2012 to 2014

Performed issue resolution for three hospital systems using Caché, an M-based database language. Wrote and developed code routines to be added to the Epic software.

Data Collection and Customer Support – Weather Central | Madison, WI **2011 to 2012**

Gathered and documented meteorological data from around the United States.

Developed training materials outlining day-to-day operations and processes.

SELECTED PROFESSIONAL DEVELOPMENT

NASA ARSET Fundamentals of Machine Learning for Earth Science Workshop Virtual	2023
Epidemiology in Public Health Practice Certificate Coursera	2020
Climate Change and Health Symposium Denver, CO	2018
Colorado Climate and Social Sciences Retreat Boulder, CO	2017
NCAR/CDC Workshop on Weather, Climate, and Health Boulder, CO	2017
CU Boulder Climate and Health Workshop: Engaging Our Future Boulder, CO	2017