

CASCADE P. TUHOLSKE

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EDUCATION

Ph.D. , Geography, University of California, Santa Barbara	2020
M.A. , Geography, University of California Santa Barbara	2016
B.A. , International Affairs, The George Washington University	2010

APPOINTMENTS

Assistant Professor, Human-Environment Geography Department of Earth Sciences, Montana State University	2022 – Present
Earth Institute Postdoctoral Research Scientist CIESIN, Columbia Climate School, Columbia University	2020 – 2022
Graduate Research Assistant Earth Research Institute, University of California Santa Barbara	2017–2020
Graduate Student Researcher Climate Hazards Center, University of California Santa Barbara	2019–2020
Graduate Research Assistant National Center for Ecological Analysis and Synthesis, University of California Santa Barbara	2019
Graduate Research Associate Broom Center for Demography, University of California Santa Barbara	2014–2020

PEER-REVIEWED PUBLICATIONS

* equal authorship # undergrad mentee

16. Di Landro[#], M.A., **Tuholske, C.**, de Sherbinin, A., and Anderson W. (In Review). A review of empirical evidence linking climate change, food security, and migration. *Population and Environment*.
15. Berger, M., Canty, S. W., **Tuholske, C.**, & Halpern, B. S. (2022). Sources and discharge of nitrogen pollution from agriculture and wastewater in the Mesoamerican Reef region. *Ocean & Coastal Management*, 227, 106269.
14. Blekking, J., Giroux, S., Waldman, K., Battersby, J., **Tuholske, C.**, & Siame, G. (2022). The Impacts of Climate Change and Urbanization on Food Distribution in sub-Saharan Africa. *Current Opinion in Environmental Sustainability*, 55, 101169.
13. **Tuholske, C.***, Halpern, B. S.*, Blasco, G., Villasenor, J. C., Frazier, M., & Caylor, K. (2021). Mapping global inputs and impacts from of human sewage in coastal ecosystems. *PLOS ONE*, 16(11), e0258898.
12. Zaitchk, B. & **Tuholske, C.** (2021). Earth Observations of Extreme Heat Events: leveraging current capabilities to enhance heat research and action. *Environmental Research Letters*, 16 (11).
11. **Tuholske, C.**, Caylor, K., Funk, C., Verdin, A., Sweeney, S., Grace, K., ... & Evans, T. (2021). Global urban population exposure to extreme heat. *Proceedings of the National Academy of Sciences*, 118(41).

10. **Tuholske, C.**, Gaughan, A. E., Sorichetta, A., de Sherbinin, A., Bucherie, A., Hultquist, C., ... & Yetman, G. (2021). Implications for Tracking SDG Indicator Metrics with Gridded Population Data. *Sustainability*, 13(13), 7329.
9. Verdin, A., Chris Funk, C., Peterson, P., Landsfeld, M., **Tuholske, C.**, & Grace, K. (2020). Development and validation of the CHIRTS-daily quasi-global high-resolution daily temperature data set. *Scientific Data*, 7, 303.
8. Zimmer, A., Guido, Z., **Tuholske, C.**, Pakalniskis, A., Lopus, S., Caylor, K., & Evans, T. (2020). Variability of Urban Population Growth Trajectories in Southern Africa. *Landscape Ecology*, 1-16.
7. Blekking, J., Waldman, K., **Tuholske, C.**, Evans, T. (2020). The Role of Employment in Urban Food Security in Sub-Saharan Africa. *Applied Geography*, 114, 102131.
6. **Tuholske, C.**, Andam, K., Blekking, J., Evans, T., & Caylor K. (2020). Comparing Measures of Urban Food Security in Accra, Ghana. *Food Security*, 1-15.
5. **Tuholske, C.**, Caylor, K., Evans, T., & Avery, R. (2019). Variability in urban population distributions Across Africa. *Environmental Research Letters*, 14(8).
4. Brissett, D. I., **Tuholske, C.**, Allen, I. E., Larios, N. S., Mendoza, D. J., Murillo, A. G., & Bloch, E. M. (2018). Zika Virus: Knowledge Assessment of Residents and Health-Care Providers in Roatán, Honduras, following an Outbreak. *The American journal of tropical medicine and hygiene*, 99(1), 211-215.
3. **Tuholske, C.**, Tane, Z., López-Carr, D., Roberts, D., & Cassels, S. (2017). Thirty Years of Land Use/Cover Change in the Caribbean: Assessing the Relationship between urbanization and Mangrove Loss in Roatán, Honduras. *Applied Geography*, 88C, 84-93.
2. Blekking, J., **Tuholske, C.**, & Evans, T. (2017). Adaptive Governance and Market Heterogeneity: An Institutional Analysis of Urban Food Systems in Sub-Saharan Africa. *Sustainability*, 9(12).
1. Brooks, T., Roy-Burman Bloch, A., **Tuholske, C.**, Busch, M., Bakkour, S., Stone, M., Linnen, J. M., Gao, K., Coleman, J., & Bloch, E. (2017). Real-Time Evolution of Zika Virus Disease Outbreak, Roatán, Honduras. *Emerging Infectious Disease-CDC*, 23(8).

OTHER PUBLICATIONS

*Book Chapter †NGO/Government Report ^Conference proceeding ~Media author/contributor

- 2021~ **Tuholske, C.**, Funk, C., Grace, K. “Dangerous urban heat exposure has tripled since the 1980s, with the poor most at risk”. *The Conversation*. Oct. 4.
- 2021~ National Public Radio & Columbia Journalism Investigations. “Heat Is Killing Workers In The U.S. — And There Are No Federal Rules To Protect Them.” Aug. 17.
- 2021~ **Tuholske, C.** “Watching My Dad Die Changed My Life.” *Outside Magazine*. May 20.
- 2018† **Tuholske, C.**, Andam, K., Blekking J., Evans, T., & Caylor, K. Comparative Estimates of Urban Food Security: Evidence from Accra, Ghana. Washington, DC: International Food Policy Research Institute.

2018* Ervin D., **Tuholske, C.**, and D. López-Carr. “Global Hunger.” in *Food and Place: A Critical Exploration*, edited by Pascale Joassart-Marcelli and Fernando Bosco. Washington, DC: Rowman and Littlefield.

2017† Food and Agriculture Organization of the United Nations. 2017 The State of Food and Agriculture leveraging Food Systems for Inclusive Rural Transformation. Rome: FAO.

2015^ **Tuholske, C.**, López-Carr, D., & Roberts, D. Anthropogenic impacts on Roatán, Honduras: 30 Years of land-cover and land-use change. In *Plurimondi. An International Forum for Research and Debate on Human Settlement*, 8(16), 179-190.

RESEARCH GRANTS

Step-2 In Review	PI, NASA ROSES A.2 Land-Cover/Land-Use Change Program. “Modulation of Climate Risks by Intensification of Urban and Agricultural Land Uses in the Arabian Peninsula” (NNH22ZDA001N-LCLUC).	\$704,103
2022 - 2023	Co-I, NASA ROSES A.49 Earth Science Applications: Equity and Environmental Justice, “Pairing earth observations and socioeconomic data to enable student-led hazard monitoring for environmental justice in New York” (NNH21ZDA001N-EEJ)	\$150,000
2022 - 2023	Co-PI, GEO-Microsoft Planetary Computer Programme Group on Earth Observation. “Development of Cloud Computing and Machine Learning Tools to Identify Combined Heat and Flood Exposure Worldwide”	\$60,000
2022 - 2025	Co-I, NASA ROSES Early Career A.2 Land-Cover/Land-Use Change “A Remote Sensing Analysis of Heat Stress, LCLUC, and Women’s Health in sub-Saharan Africa” (NNH21ZDA001N-LCLUC)	\$404,947

HONORS, AWARDS, AND FELLOWSHIPS

2021	Investigative Reporters and Editors (IRE) Award – Audio Large
2020	Earth Institute Postdoctoral Fellowship, Columbia University
2020	National Science Foundation SBE Postdoctoral Fellowship (declined)
2020	UCSB Department of Geography Excellence in Research Award
2019	UCSB President’s Dissertation Year Fellowship
2019	UCSB Faculty Senate Graduate Travel Fellowship
2019	Earth Research Institute Graduate Student Conference Travel Fellowship
2019	Jack & Laura Dangermond Geography Travel Scholarship
2018	UCSB Dept. of Geography Graduate Summer Research Funding
2018	Earth Research Institute Graduate Student Conference Travel Fellowship
2018	Jack & Laura Dangermond Geography Travel Scholarship
2017	Earth Research Institute Graduate Fellowship
2017	Graduate Student Research and Travel Grant, Broom Center for Demography
2016	U.S. Borlaug Fellows in Global Food Security
2016	Graduate Student Research and Travel Grant, Broom Center for Demography
2016	Jack & Laura Dangermond Geography Travel Scholarship
2015	Jack & Laura Dangermond Geography Travel Scholarship
2015	Graduate Student Research and Travel Grant, Broom Center for Demography
2011	Fulbright Scholar - English Teaching Assistant, Sliven, Bulgaria

TEACHING EXPERIENCE

- Instructor of Record**, Dept. of Earth Sciences, Montana State University
Human Geography (GPHY-121) Fall 2022
- Co-Instructor**, Dept. of Earth & Environmental Sciences, Columbia University
Threats to Urban Food Security: Climate, Cost, & COVID (graduate reading seminar) Spring 2021
- Instructor of Record**, Dept. of Geography, University of California, Santa Barbara
Geography of Surfing (GEOG 20) Winter 2018, Summer 2019
- Teaching Assistant**, Dept. of Geography, University of California, Santa Barbara
Geography of Surfing (GEOG 20) Winter 2015, 2016, 2017
Coastal Pollution (GEOG 132) Fall 2017, 2018
Population Geography (GEOG 141A) Spring 2016, 2017
Urban Geography (GEOG 108) Fall 2016
People, Place & the Environment (GEOG 05) Fall 2014, Spring 2015, Fall 2015
- Professor de Inglés**, Centro de Estudios Superiores de la Industria Farmacéutica, Madrid
Graduate-level Professional English classes 2013–2014
- Fulbright Scholar – English Teaching Assistant**, U.S. Fulbright Program, Sliven Bulgaria
High school English classes 2011–2012

WEBINARS, TALKS, AND POSTERS

* Invited

- 2022* **Tuholske, C.** Developing New Global High-Resolution Extreme Humid Heat for Human Health Applications. American Geophysical Union GeoHealth Early Career Quarterly Webinar. Everywhere, 16 Sep.
- 2022* **Tuholske, C.** Satellite Remote Sensing for Measuring Urban Heat Islands and Constructing Heat Vulnerability Indices – Part 4. NASA Applied Remote Sensing Training Program. Everywhere, 11 Aug.
- 2022* **Tuholske, C.** Understanding Gridded Population Datasets to Measure Demographic Processes and Hazard Exposure Worldwide. Humanitarian Responses to Forced Migration and Displacement; New Insights from Quantitative and Qualitative Geographic Data, National Academy of Sciences, Everywhere 5 June.
- 2022 **Tuholske, C.,** Latka, C., Baylis, K., Blekking, J., Green, R., Kim, M., ... & Funk, C. Extreme heat impacts on food security in Africa. European Geophysical Union General Assembly. Vienna, Austria, 23 May.
- 2022* Hultquist, C. and **Tuholske, C.** “Using Geospatial Data to Evaluate Climate Hazards and Inform Environmental Justice”. ASPRS, Everywhere, 22 April.
- 2022 **Tuholske, C.,** Latka, C., Baylis, K., Blekking, J., Green, R., Kim, M., ... & Funk, C. Rethinking Food Security in sub-Saharan Africa in the Age of Urbanization. The American Association of Geographers Annual Meeting. Everywhere, 25 Feb.
- 2022* **Tuholske, C.** Linking Climate Change, Urbanization, and Food Security in Africa. Montana State University, 27 Jan.

- 2022* **Tuholske, C.** Linking Climate Change, Urbanization, and Food Security in Africa. Georgetown University, 21 Jan.
- 2022* Kemper, T & **Tuholske, C.** Applications of the EO Toolkit to Measure and Analyze Sustainable Development Goals. NASA Applied Remote Sensing Training Program. Everywhere, 3 Nov.
- 2021* Hultquist, C. and **Tuholske, C.** “Using Geospatial Data to Evaluate Climate Hazards and Inform Environmental Justice”. NASA Socioeconomic Data and Applications Center (SEDAC), Everywhere, 8 Dec.
- 2021* **Tuholske, C.** Urban Extreme Heat Exposure. 2021 GEO Week. Everywhere, 24 Nov.
- 2021* **Tuholske, C.** Gridded population data to support SDG indicator needs. Using the EO Toolkit for Sustainable Cities and Human Settlements to Support Equitable Development and Climate Resilience side event for 2021 AmeriGEO Week. Everywhere, 24 Nov.
- 2021* **Tuholske, C.** Urban Food Security in the Age Climate Change - Are we flying blind?. Climate Hazards Center, University of California, Santa Barbara, 4 Nov.
- 2021* **Tuholske, C.,** Halpern, B. S., Blasco, G., Villasenor, J. C., Frazier, M., & Caylor, K. Mapping global inputs and impacts from of human sewage in coastal ecosystems. National Center for Ecological Analysis and Synthesis, Santa Barbara, CA, 3 Nov.
- 2021* **Tuholske, C.** Code Red: Vulnerability to Extreme Heat, Floods, and Displacement. New York Climate Week 2021. Everywhere, 22 Sep.
- 2021 **Tuholske, C.** Urban Extreme Heat Exposure Trajectories in AmeriGEO Countries. 2021 AmeriGEO Week. Everywhere, 24 Aug.
- 2021* **Tuholske, C.,** Caylor, K., Funk, C., Verdin, A., Sweeney, S., Grace, K., Peterson, P., & Evans, T. Too Hot to Handle: A Global Analysis of Urban Extreme Heat Exposure Trajectories. Talk given at At What Point Managed Retreat? Resilience, Relocation and Climate Justice. Everywhere, 24 June.
- 2020* **Tuholske, C.,** Gaughan, A. E., de Sherbinin, A. M., Stevens, F. R., Sorichetta, A., Yetman, G., Huyck, C., & Chen, R. S. A Comparison of Gridded Population Data Products in Disaster Response. eLightning talk given at 2020 American Geophysical Association Fall Meeting. Everywhere, 11 Dec.
- 2020 **Tuholske, C.,** Caylor, K., Funk, C., Verdin, A., Sweeney, S., Grace, K., Peterson, P., & Evans, T. Global Urban Population Exposure to Extreme Heat. 2020 American Geophysical Association Fall Meeting. Everywhere, 11 Dec.
- 2020* **Tuholske, C.** Global Urban Population Exposure to Extreme Heat. International Research Institute for Climate and Society, Columbia University, 29 Sep.
- 2019 **Tuholske, C.,** Funk, C., Caylor, K., Evans, T., and Sweeney, S. A Fine-Resolution, Global Comparison of Urban Exposure to Extreme Temperatures. 2019 American Geophysical Association Fall Meeting. San Francisco, CA. 9-13 Dec.

- 2019 **Tuholske, C.**, and K. Caylor. Inventorying population pressures across Sub-Saharan Africa. The Global Land Programme Open Science Meeting 2019. Bern, Switzerland, 24 -26 April.
- 2019* **Tuholske, C.** Linking Food Security, Urbanization, and Climate Change in Sub-Saharan Africa. Stanford Center for Food Security and the Environment. Palo Alto, CA, 28 Jan.
- 2018 **Tuholske, C.**, and K. Caylor. Fusing Remote Sensing and Demography to Assess which Sub-Saharan African Cities Are Growing the Fastest. 2018 American Geophysical Association Fall Meeting. Washington, DC. 10-14 Dec.
- 2018 **Tuholske, C.**, Andam K., Blekking J., Evans. T, and Caylor K. Towards linking climate change and urban food security: Evidence from Accra, Ghana. 2018 Graduate Climate Conference. Pack Forest, WA. 2-4 Dec.
- 2018 **Tuholske, C.**, Andam K., Blekking J., Evans. T, and Caylor K. Urban Food Security and Nutritional Challenges in West Africa: Evidence from Accra, Ghana. 2018 UC Global Health Day, UC San Diego, CA. 22 April.
- 2018 **Tuholske, C.** Andam, K., Blekking, J., Evans, T., and Caylor, K. Towards Assessing Urban Food Security and Nutrition in West Africa. 2018 American Association of Geographers Annual Meeting, New Orleans, LA. 9-13 April.
- 2016 **Tuholske, C.** The Effects of Tourism on Land Cover and Land Use Change in Roatán, Honduras. 2016 American Association of Geographers Annual Meeting Annual Meeting, San Francisco, CA. 28 March – 2 April.
- 2015 **Tuholske, C.**, and T. Brooks. Bridging Epidemiology and Remote Sensing: A Case Study of Dengue Fever and Land Use and Land Cover Change in Roatán, Honduras. American Geophysical Association Fall Meeting, AGU, San Francisco, CA. 3-7 Dec.
- 2015 **Tuholske, C.** Reconciling Space and Place to Reveal the Determinate of Health: Integrated Research in Roatán, Honduras. SPATIAL 2015 Spatial Information on Human Health. The University of California, Santa Barbara. Santa Barbara, CA. 9-11 Dec.
- 2015 **Tuholske, C.**, López-Carr, D., Roberts, D. Anthropomorphic impacts on Roatán, Honduras: 30 Years of Land-Cover and Land-Use Change. The XIX European Colloquium in Theoretical and Quantitative Geography (ECTQG2015). Technical University of Bari, Italy, 3-7 Sep.
- 2015 Ervin, D., Lopez-Carr, D., Hodges, C, Miller, K, and **Tuholske, C.** The Geographic Advantage in Coupled Migration-Health Research. University of California, Los Angeles Blum Center on Poverty and Health in Latin America Workshop on Migration and Health, Los Angeles, CA, 6 March.
- 2014 **Tuholske C.**, López-Carr, D., Elwell, T., Ervin, D, Miller, K.M. Human Health and Human-Environment Dynamics. Roatán Inter-Professional Program Symposium. Global Health Sciences, University of California, San Francisco, CA. November 17.

SERVICE & DIVERSITY, EQUITY and INCLUSION ADVANCEMENT

- Co-chair**, GEO Health Community of Practice Small Working Group 2020 – Present
- NASA-led working group to support use of earth observations to understand, predict, and reduce health risks from heat across time scales.
- Member**, Steering Committee for EO Toolkit for Sustainable Cities and Communities 2020 – 2022
- Working group to assist the UN-Habitat's Global Urban Observatory (GUO) specialized statistics Toolkit development to track UN Sustainable Development Goal 11.
- Contributor**, Columbia Journalism Investigations and National Public Radio 2021
- Developed climate dataset for a multi-part invest investigation on occupational heat-related fatalities in the United States; stories ran nationally, and in California and Texas
- Mentor**, Graduate Scholar Program, University of California, Santa Barbara 2019 – 2020
- Mentored 3 first-year PhD students from historically under-represented groups in academia.
- Participant**, Lamont Pod, Unlearning Racism in Geosciences (URGE) 2021
- Eight-week course work designed to promote antiracism in geo sciences that includes developing deliverables to present to decisionmakers your academic institution.
- Session Convener**, AGU Fall Meeting 2021, 2022
- Ad-hoc Reviewer**, National Science Foundation HEGS Program 2021, 2022
- Peer-Reviewer** *African Geographic Review* (1), *Earth's Future* (1), *Environmental Research Letters* (1), *Food Security* (1), *GeoJournal* (1), *Global Environmental Change* (1), *Global Food Security* (1), *Journal of Coastal Conservation* (1), *Journal of Urban Health* (1), *Population and Environment* (1), *Science Advances* (1), *Scientific Data* (2)

SELECTED PRESS COVERAGE

- 2022 **New Scientist** “Most days could be dangerously hot for 5 billion people by 2100”
- 2022 **NBCNow** Live broadcast interview for segment on 2022 heatwaves
- 2022 **NY1** Broadcast interview for segment on 2022 heatwaves in New York City
- 2022 **CBC News** Broadcast interview for segment on 2022 Indian heatwaves
- 2022 **New Scientist** “Most days could be dangerously hot for 5 billion people by 2100”
- 2022 **Bozeman Chronical** “How Montanans are coping with climate anxiety”
- 2022 **Forbes** “30% Of Americans Cite Climate Change as a Motivator To Move In 2022”
- 2022 **CBC News** “Scientists warn future temperatures will test humans' ability to survive”
- 2022 **The Washington Post** “Climate change is worsening heat wave in India and Pakistan”
- 2022 **Bloomberg CityLab** “Africa’s First Heat Officer Faces a Daunting Task”
- 2022 **New York Magazine** “The Future of Reforestation Could be in the Sky”
- 2021 **The Associated Press** “AP analysis: Exposure to extreme heat has tripled since 1983”
- 2021 **Scientific American** “Half of the World’s Coastal Sewage Pollution Flows from Few Dozen Places”
- 2021 **The Daily Beast** “Poop From Meat Eaters Is Killing Coral Reefs”
- 2021 **The Washington Post** “Exposure to extreme urban heat has tripled worldwide since the 1980s, study finds”
- 2021 **Scientific American** “Risk of Dangerous Heat Exposure Is Growing Quickly in Cities”
- 2021 **NBC News** “Extreme heat in cities a growing problem as climate warms, study finds”
- 2021 **National Geographic** “Weather disaster-related deaths are down—warming could undo that trend”
- 2021 **Axios** “Study: Urban extreme heat exposure has increased by 200% since the 1980s”

- 2021 **Science Magazine** “Extreme heat is broiling people in developing cities”
 2021 **Times of India** “Heat exposure: 4 India cities in worst 10 list”
 2021 **The Guardian** “Nearly 25% of world population exposed to deadly city heat”
 2021 **The Washington Post** “Wet-bulb temperature is important, climate experts say. So what is it?”
 2016 **Pacific Standard Magazine** “What Happens When a Tiny Island Becomes a Tourist Destination?”
 2016 **NASA Earth Observatory** “How Tourism Changed the Face of Roatán”

FIELD EXPERIENCE

- 2017 Urban food security surveys, Accra, Ghana
 2017 Climatological sensor installation and urban food security surveys, Zambia
 2015 Land cover & epidemiological research, Roatán, Honduras
 2011 – 2012 Piloted study on student perceptions of the European Union, Sliven, Bulgaria
 2009 Community-based disease surveillance program assessment, northern Ghana

RELEVANT EMPLOYMENT EXPERIENCE

- Intern**, The Food and Agriculture Organization of the United Nations, Rome 2016
 - Penned sections on urbanization for FAO’s 2017 State of Food and Agriculture Report
 - Researched rural-urban food security issues for the United Nation’s Committee on Food Security policy negotiations

- Director of Organizing**, Montana Abolition Coalition, The ACLU of Montana, Missoula MT 2012 – 2013
 - Designed and implemented grassroots efforts in targeted legislative districts to abolish the death penalty during the 2013 Montana Legislature

PROFESSIONAL AFFILIATIONS

- The American Geophysical Union, member 2015 – Present
 The American Association of Geographers, member 2016 – Present
 The Global Land Programme, member 2019 – Present
 European Geophysical Union, member 2022 – Present