

Hannah Kathleen Friedrich

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Education

Ph.D., Geography, School of Geography, Development and Environment, University of Arizona, August 2021 - May 2026 (Expected)

M.S., Geography, Oregon State University, 2019 (current academic level)

B.A., Geography (Honors) and Cartography & Geographic Information Systems, University of Wisconsin-Madison, 2015

Research Experience

Visiting Fellow, Cornell University, Department of Natural Resources and the Environment
August 2023 – present / Ithaca, NY

Future Investigators in NASA Earth and Space Science and Technology (FINESST) Fellowship
September 2022 – present / Tucson, AZ

Graduate Research Assistant, University of Arizona
August 2021 – August 2022 / Tucson, AZ

Graduate and Faculty Research Assistant, Oregon State University
January 2018 – June 2021 / Corvallis, OR

Professional Work Experience

Geospatial Analyst (Short-term Contract), The World Bank
November 2020 – August 2021 / Remote

Geospatial Analyst, Conservation Biology Institute
January 2020 – May 2021 / Corvallis, OR

Mapping Analyst, Cruise Automation
February– August 2017 / San Francisco, CA

Earth Science Contractor, Science Systems and Applications Inc., NASA DEVELOP
September - November 2016 / Ames Research Center, Mountain View, CA

GIS Analyst, Fehr & Peers
January - July 2016 / Oakland, CA

Research Publications

Flores, A. B., Sullivan, J. A., Yu, Y., & Friedrich, H. K. (2024). Health Disparities in the Aftermath of Flood Events: A Review of Physical and Mental Health Outcomes with Methodological Considerations in the USA. *Current Environmental Health Reports*, 11(2), 238–254. <https://doi.org/10.1007/s40572-024-00446-7>

Friedrich, H. K., Tellman, B., Sullivan, J. A., Saunders, A., Zuniga-Teran, A. A., Bakkensen, L. A., Cawley, M., Dolk, M., Emberson, R. A., Forrest, S. A., Gupta, N., Gyawali, N., Hall, C. A., Kettner, A. J., Lozano, J. L. S., & Bola, G. B. (2024). Earth Observation to Address Inequities in Post-Flood Recovery. *Earth's Future*, 12(2). <https://doi.org/10.1029/2023ef003606>

- Bennett, M. M., Gleason, C. J., Tellman, B., Alvarez Leon, L. F., **Friedrich**, H. K., Oviemhada, U., & Mathews, A. J. (2024). Bringing satellites down to Earth: Six steps to more ethical remote sensing. *Global Environmental Change Advances*, 2. <https://doi.org/10.1016/j.gecadv.2023.100003>
- Walker, S., Alix-Garcia, J., Bartlett, A., Van Den Hoek, J., **Friedrich**, H. K., Murillo-Sandoval, P. J., & Isoto, R. (2023). Overlapping land rights and deforestation in Uganda: 20 years of evidence. *Global Environmental Change*, 82. <https://doi.org/10.1016/j.gloenvcha.2023.102701>
- Van Den Hoek, J., **Friedrich**, H. K., Ballasiotes, A., Peters, L. E., & Wrathall, D. (2021). Development after Displacement: Evaluating the Utility of OpenStreetMap Data for Monitoring Sustainable Development Goal Progress in Refugee Settlements. *ISPRS International Journal of Geo-Information*, 10(3), 153. <https://doi.org/10.3390/ijgi10030153>
- Van Den Hoek, J., & **Friedrich**, H. K. (2021). Satellite-Based Human Settlement Datasets Inadequately Detect Refugee Settlements: A Critical Assessment at Thirty Refugee Settlements in Uganda. *Remote Sensing*, 13(18), 3574. <https://doi.org/10.3390/rs13183574>
- Friedrich**, H. K., & Van Den Hoek, J. (2020). Breaking ground: Automated disturbance detection with Landsat time series captures rapid refugee settlement establishment and growth in North Uganda. *Computers, Environment and Urban Systems*, 82, 101499. <https://doi.org/10.1016/j.compenvurbsys.2020.101499>

Book Chapters

- Van Den Hoek, J., & Friedrich, H. K. (2024). Humanitarian Applications. In J. A. Cardille, M. A. Crowley, D. Saah, & N. E. Clinton (Eds.), *Cloud-Based Remote Sensing with Google Earth Engine: Fundamentals and Applications* (pp. 805-832). Springer International Publishing. https://doi.org/10.1007/978-3-031-26588-4_38

Public Scholarship

- Sullivan, J. A., **Friedrich**, H.K., Tellman, B., Saunders, A. and Belury, L. (2024), Five key needs for addressing flood injustice, *Eos*, 105, <https://doi.org/10.1029/2024EO240068>.
- Friedrich, H. K. (2023). *Mapping tarps and stories to spotlight inequitable disaster recovery*. Climate Assessment for the Southwest. <https://climas.arizona.edu/blog/mapping-tarps-and-stories-spotlight-inequitable-disaster-recovery>

Awards

- Barbara Petchenik 2015 Undergraduate Award in Cartographic Design (\$250)
- Oregon State University Arthur Parenzin 2019 Fellowship Award (\$500)
- Women in Data Science Tucson 2022 Top Speaker Award (\$100)
- University of Arizona Carson Scholar 2022-2023 (\$5,000)
- University of Arizona 2023 Research Data Challenge (\$1,000)
- Natural Hazards Engineering Research Infrastructure Graduate Student Council Travel Award (\$800)
- North American Alliance of Hazards and Disaster Research Institutes Rising Star Award (\$500)

Grants and Fellowships

- University of Wisconsin-Madison Senior Honors Thesis 2016 Research Grant (\$3,000)
- University of Arizona GPSC 2022 Research and Project Grant Spring 2022, Fall 2023 (\$3,000)
- University of Arizona GPSC 2022 Travel Grant (\$1,500)
- University of Arizona SBSRI 2022 Pre-doctoral Research Grant (\$500)
- Arizona Institute for Resilience International Programs Working Group (\$15,000), *Co-PI*
- Future Investigators in NASA Earth and Space Science and Technology Grant (\$150,000)
- Climate Assessment for the Southwest (CLIMAS) Environment & Society Fellowship (\$4,750)
- University of Arizona GPSC 2023 Professional Opportunities Development (\$1,500), *co-lead*
- Cornell Center for Social Sciences Research Grant (\$12,000), *Co-PI*

Grants and Fellowships (cont.)

EDF – Cornell Atkinson Center for Sustainability Impact Grant (\$180,000), *contributor*

Conference Participation

Conference Presentations

American Association of Geographers (AAG) Annual Meeting 2019, 2020
American Geophysical Union (AGU) Annual Fall Meeting 2019, 2021, 2022
Humanitarian OpenStreetMap Team (HOT) Summit 2019, Heidelberg, Germany
State of the Map 2019, Heidelberg, Germany
Frontiers in Hydrology Meeting 2022, San Juan, PR
Natural Hazards Workshop Researchers Meeting 2022, Virtual
Global Flood Partnership Annual Meeting 2022, Leeds, UK
Society for Applied Anthropology Annual Meeting 2023, Cincinnati, OH
Association for Humanist Sociology Annual Meeting 2023, New Orleans, LA

Conference Organization

Side Meeting on “Flood Recovery and Adaptation from Space” at the Global Flood Partnership Annual Meeting 2022, Leeds, UK
Flood Justice Symposium 2023, Tucson, AZ

Conference Panel Organization

At What Point Managed Retreat? 2023 Conference, New York City, NY

Other Engagement Activities

Organizer of the Water Justice Knowledge Exchange Speaker Series (Fall 2023 – present) in partnership with Humanitarian Assistance Technical Support hosted at the University of Arizona

Student speaker at FEMA Resilient Nation Partnership Network, Next Generation of Resilience: Voices of the Future April 2023 Student Showcase

Invited Research Talks

- 2023 *Resilient recovery is community-defined.* University of Arizona Institute of Resilience Perspectives on Resilience.
Blue tarps and blue pixels: tracking post-hurricane recovery from space. Arizona State University, Equitable Places Lab Group.
- 2022 *Satellite image detection of blue roofs to map coastal storm damage and recovery.* Center for Climate Adaptation Science and Solutions Climate Resilience and Adaptation Lightning Talks.
Disaster recovery. Arizona Institute of Resilience International Programs Event Series
Satellite imagery detection of blue roofs to track disaster recovery. University of North Carolina, Miyuki Hino Lab Group.
- 2021 *Satellite image analysis for anticipatory research and planning at flood-prone informal settlement.* Symposium on Resilience Research for Global Development Challenges.

Invited Guest Lectures

- 2023 *The covered: mapping and recording experiences of disparities in hurricane recovery and insurance.* University of California – Santa Barbara, Environmental Studies 130A.
Remote sensing to track disasters and recovery. 1) York University, Disaster & Emergency Management Program. 2) Hull University, Flood Risk Management.
- 2022 *Satellite image detection of blue roofs to track disaster recovery.* Cornell University, Global Development 3140.

Teaching Assistance Experience

Graduate Teaching Assistant, Oregon State University

eGEOG 560: GIScience I: Introduction to Geographic Information Science (2017)

eGEOG 561: GIScience II: Analysis and Applications (2018)

eGEOG 203: People-Environment Geography (2018)

GEOG 481/581: Remote Sensing II: Digital Image Processing (2019)

Curriculum and Workshop Design

NASA Applied Remote Sensing Training Program (ARSET): Humanitarian Applications Using NASA Earth Observations (2-parts; [link](#))

Labs for Fall 2022 GEOG 330: Introduction to Remote Sensing course at the University of Arizona

Coordinated activities for student shadowing of environmental justice leaders in southwest Louisiana for PHIL 255: Environmental Ethics at McNeese State University in spring 2024

Professional Affiliations

Student Member: American Association of Geographers, American Geophysical Union

Technical Skills

Programming: Python, Google Earth Engine, JavaScript (beginner)

GIS Software: QGIS, ArcGIS

Statistical Software: R, Stata