ANNIKA HJELMSTAD

Postdoctoral Scholar, UC Irvine

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EDUCATION

2025 **Ph.D. Civil and Environmental Engineering** — **University of California, Irvine**
Hydrology and Water Resources
Dissertation: Toward Impact-Based Attribution of Human-Induced Climate Extremes

2020 **M.S. Civil, Environmental, and Sustainable Engineering** — **Arizona State University**
Hydrosystems Engineering
Master's thesis: Propagation of Radar Rainfall Uncertainties into Urban Flood Predictions: An Application in Phoenix, AZ

2018 **B.S.E. Civil Engineering (Environmental Engineering)** — **Arizona State University**
Minor: Mathematics
Honors thesis: Effect of Drought Policies on Los Angeles Water Demand

TECHNICAL SKILLS

- **Programming languages**: Python (including numpy, scipy, pandas, xarray, geopandas, numba), R, MATLAB
- **Technologies and Programs**: ArcGIS, QGIS, GDAL, Google Earth Engine, zsh, bash, git, make, snakemake, Docker, Singularity, Linux, LaTeX, high-performance computing
- **Models**: CMIP6 climate models, MAGICC, GSSHA, HEC-HMS

RESEARCH EXPERIENCE

2026 - present **Postdoctoral Scholar (current role)** — **University of California Irvine**
- Developing recommendations for drought resistant infrastructure for California Senate Bill 745.
- Leading research on future projections of urban compound flooding hazards and impacts.
- Leading and collaborating on proposal development in the Center for Hydrometeorology and Remote Sensing

2020 - 2025 **Graduate Research Assistant** — **University of California Irvine**
- Quantified the impact of human emissions on heatwave-induced health and infrastructure impacts.
- Developed temporally-downscaled estimates of coastal water levels under different emissions scenarios. (Project repo: https://github.com/UCI-CHRS/Hourly-CMIP6-Sea-Level)
- Simulated Hurricane Sandy flooding and flood impacts in New York under different emissions scenarios.
- Received funding from multiple fellowships, see "Awards & Fellowships."
- Collaborations with Los Alamos National Laboratory and USACE ERDC Coastal and Hydraulics Laboratory

2019 - 2020 **Graduate Research Assistant** — **Arizona State University**
- Developed a precipitation error model for the assessment of error propagation through a rainfall-runoff model of an urban catchment to support flash flood warning operations.
- Collaboration with the National Weather Service

2018-2019 **Undergraduate Research Assistant** — **Arizona State University**
- Developed a statistical model of drivers of water demand in Los Angeles that included climatic, socioeconomic, and political factors.
- Laboratory work performing column tests for removal of arsenic and PFAS; sorption modeling in MATLAB.

TEACHING & SCIENCE COMMUNICATION EXPERIENCE

2025 **Google Earth Engine for Water Resources Workshop** — **University of Dar es Salaam**
- Developed and taught a 2-hour workshop on Google Earth Engine for hydrology and water resource applications in Dar es Salaam, Tanzania.
- Course materials: uci-chrs.github.io/GEE-Training-2025/

2021 - 2025 **Co-created and co-lead seminar "Social Justice in Civil & Environmental Engineering"** — **University of California Irvine**
- Fall 2021, Spring 2023, 2024, 2025 quarters
- Coordinated presentations from experts on social and environmental justice in civil and environmental engineering contexts for graduate and undergraduate students

2025 **Graduate Teaching Assistant** — **University of California, Irvine**
- Graded homework and exams.
- Led active learning activities.
- Courses: EngrCEE 81B: Civil Engineering Practicum II; ENGRCEE 173: Watershed Modeling

2019 **Graduate Teaching Assistant** **Arizona State University**

- Assisted students during recitations, held office hours, gave lectures, and ran labs.
- Courses: CEE 341: Fluid Mechanics for Civil Engineers; CEE 321: Structural Analysis and Design; CEE 212: Engineering Mechanics II: Dynamics; CEE 441: Water Resources Engineering

2016 - 2018 **Undergraduate Teaching Assistant** **Arizona State University**

- Ran labs and provided assistance to students during recitation.
- Courses: CEE 212: Engineering Mechanics II: Dynamics; CEE 213: Introduction to Deformable Solids; FSE 100: Introduction to Engineering

LEADERSHIP & SERVICE

2025 **Early career convener, AGU Fall Meeting 2025** **American Geophysical Union**

- Session: Assessing Adaptation Strategies for Hydrological Extremes: Data and Modeling Tools for Planning, Trade-offs, and Implementation

2023-2025 **Leadership in graduate student organizations** **University of California Irvine**

- President, Civil & Env. Engineering Graduate Association (CEEGA)
- President and founding member of Reframing Civil & Env. Engineering at UCI (CEER), a student-led coalition focused on equity in engineering.

2021 - 2024 **Student representative, Dept. of Civil & Env. Engineering committees** **University of California Irvine**

- Graduate Affairs Committee
- Diversity, Equity, and Inclusion Committee

AWARDS & FELLOWSHIPS

2024 **Awarded O-RISE Fellowship** **U.S. Army Corps of Engineers ERDC-CHL**

2022, 2023 **EPA Environmental Justice Video Challenge for Students Phases I & II, 1st place** **US EPA**
Phase I: Unearthing Lead: The Power of Historical Maps
Phase II: Civic Bioremediation: Building a Network of Soil Practitioners

2022 **Awarded UCI-Engineering LANL Fellowship** **University of California Irvine**

2021, 2023 **Awarded Ridge to Reef and UCI Graduate Division fellowship** **University of California Irvine**

2020 **Awarded Provost PhD Fellowship** **University of California Irvine**

2018 **Leadership and Service Award** **Arizona State University**
Civil, Environmental, and Sustainable Engineering

PUBLICATIONS

1. **Hjelmstad, A.**, Tavakoly, A., Byrd, A., Sisco, A., Memarsadeghi, N., Roland, V., AghaKouchak, A. Compound Flood Impact Attribution Under Different Tidal Scenarios: An Application in New York City. Under review (2026).
2. **Hjelmstad, A.**, Tavakoly, A., Byrd, A., Sisco, A., Memarsadeghi, N., Roland, V., AghaKouchak, A. Historical and Future Hourly coastal water levels for the United States: Toward impact-based risk and attribution analysis. Under review (2026).
3. AghaKouchak, A., **Hjelmstad, A.**, Lucy, J., Duku, J., Sadhasivam, N., Werth, S., Babagiray, S., de Oliveira, D. Y., Boschee, A., Sadegh, M., Vahedifard, F., Abatzoglou, J. T., Turco, M., Ortiz, M. S., Shirzaei, M., Azimi, P., Ferguson, L., and Allen, J. G. (2025). Building urban fire resilience to enhance national security. *Nature Cities*, 1–3.
4. Rubio, J. M., Kaylan, B., Diaz, A., Flores, P., Cheav, M., Bañuelas, D. C., Green, A., **Hjelmstad, A.**, Jong-Levinger, A., Schütz, T., Carrasquillo, M., LeBrón, A. M. W., and Wu, J. (2025). From the Ground Up: Community-Based Participatory Research Reclaiming the Science of Lead. *Environmental Justice*.
5. Briese, E., Niimi, K., **Hjelmstad, A.**, and Westerhoff, P. (2024). Surface Complexation and Packed Bed Mass Transport Models Enable Adsorbent Design for Arsenate and Vanadate Removal. *ACS ES&T Engineering*, 4(10), 2563–2572.
6. AghaKouchak, A., Huning, L. S., Sadegh, M., Qin, Y., Markonis, Y., Vahedifard, F., Love, C. A., Mishra, A., Mehran, A., Obringer, R., **Hjelmstad, A.**, Pallickara, S., Jiwa, S., Hanel, M., Zhao, Y., Pendergrass, A. G., Arabi, M., Davis, S. J., Ward, P. J., … Kreibich, H. (2023). Toward impact-based monitoring of drought and its cascading hazards. *Nature Reviews Earth and Environment*, 4(8), 582–595.

7. **Hjelmstad, A.**, Shrestha, A., Garcia, M., and Mascaro, G. (2021). Propagation of radar rainfall uncertainties into urban pluvial flood modeling during the North American monsoon. *Hydrological Sciences Journal*, 66(15), 2232–2248.

8. Zeng, C., Atkinson, A., Sharma, N., Ashani, H., **Hjelmstad, A.**, Venkatesh, K., and Westerhoff, P. (2020). Removing per- and polyfluoroalkyl substances from groundwaters using activated carbon and ion exchange resin packed columns. *AWWA Water Science*, 2(1), e1172.

9. **Hjelmstad, A.**, Garcia, M., & Larson, K. (2019). Effect of Drought Policies on Los Angeles Water Demand. World Environmental and Water Resources Congress 2019: Watershed Management, Irrigation and Drainage, and Water Resources Planning and Management, 239–250.

SELECT PRESENTATIONS

For a complete list of publications and conference presentations, see Google Scholar

1. **Hjelmstad, A.**, Tavakoly, A. A., Byrd, A., Memarsadeghi, N., Roland, V., Sisco, A. W., and AghaKouchak, A. Temporally Downscaled Compound Coastal Flooding Scenarios for an Urban Watershed in New York (2025). AGU Fall Meeting 2025 [Oral, H33G-09].

2. **Hjelmstad, A.**, Love, C. A., de Oliveira, D. Y., Najib, D., Feldman, D. L., Mirchi, A., Sobhani, N., Placht, D., and AghaKouchak, A. (2024). Learning Resilience - Lessons for Managing Transboundary Water Resource Vulnerabilities: A Workshop Summary (2024). AGU Fall Meeting 2024 [Oral, H31G-04].

3. **Hjelmstad, A.**, and AghaKouchak, A. (2023, June 11). Attribution of Sea-Level Rise-Induced Roadway Flooding to Anthropogenic Emissions [Oral presentation and poster]. *CUAHSI Biennial Colloquium*, Tahoe City, California.

4. **Hjelmstad, A.**, and AghaKouchak, A. (2022, December). Impact-Based Attribution of Heatwaves [Oral Presentation]. *AGU Fall Meeting 2022*, Session GC56A, Chicago, Illinois.

5. **Hjelmstad, A.**, Shrestha, A., Garcia, M., Hopper, L., Iniguez, P., and Mascaro, G. (2021). Propagation of Radar Rainfall Uncertainty into Urban Flood Predictions during the North American Monsoon [Lightning talk]. *AMS 101st Annual Meeting*, Virtual.