

## Jessica A. Eisma

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### Research Interests

Applying novel remote and meteorological sensing techniques to answer hydrologic questions in arid, semi-arid, and/or urban regions and exploring socio-hydrologic issues related to climate change and water stress

### Education

August 2020	Ph.D. in Civil Engineering Lyles School of Civil Engineering, <b>Purdue University</b> , West Lafayette, IN <i>Dissertation title:</i> "From impacts to implementation: A survey of sand dams in sub-Saharan Africa"
May 2020	Certificate in Teaching and Learning in Engineering School of Engineering Education, <b>Purdue University</b> , West Lafayette, IN
May 2015	M.S. in Civil Engineering. Lyles School of Civil Engineering, <b>Purdue University</b> , West Lafayette, IN <i>Thesis title:</i> "Downward model development of the soil moisture accounting loss method in HEC-HMS: Revelations concerning the soil profile"
Dec. 2012	B.S. Civil Engineering. Honors College, <b>Michigan State University</b> , East Lansing, MI

### Appointments

2020 – Present	Department of Civil Engineering, <b>University of Texas at Arlington</b> , Arlington, TX <i>Assistant Professor of Water Resources Engineering</i>
2020 – 2020	Faculty of Civil Engineering and Geosciences, <b>Delft University of Technology</b> , the Netherlands <i>Visiting Researcher</i> ; Supervisors: Professors Nick van de Giesen and Gerrit Schoups
2013 – 2019	Lyles School of Civil Engineering, <b>Purdue University</b> , West Lafayette, IN <i>Graduate Research Assistant</i> ; Advisor: Professor Venkatesh Merwade

### Funded Projects

"SAI: Enhancing flood resilience in coastal urban communities through infrastructural citizenship and green stormwater infrastructure" funded by NSF (**\$135,000 (UTA portion)/Co-PI**: 2024-2026)

"CyberTraining: Pilot: Justice in Data: An intensive, mentored online bootcamp developing FAIR data competencies in undergraduate researchers in the water and energy sectors" funded by NSF (**\$298,830/PI**: 2023-2024)

"Identification of cost-effective green stormwater infrastructure to mitigate flooding in Houston's vulnerable communities and improve Galveston Bay fisheries" funded by Texas Sea Grant (**\$300,000 (\$450,00 with cost-share)/PI**: 2022-2024)

"Identification of Cost-Effective, Climate-Informed Green Infrastructure Adaptations to Reduce Flood Risk in Houston's Vulnerable Communities" funded by NOAA (**\$299,466/PI**: 2021-2024)

"Campus as a living lab: Discovering the comfort of wheelchair users in the pedestrian network by experiential learning with high school students" funded by CTEDD (\$65,080/Co-PI: 2021-2022)

## Publications

Rafter, B., Ambrose, P., Springfield, S., **Eisma, J.A.**, Bozeman III, J.F. (202X). "Addressing adverse outcomes of green stormwater infrastructure in Houston, Texas: Integrating systemic equity into policy analysis." *J. Policy Anal. Manag.*, in preparation.

Phillips, B., Seo, D.J., **Eisma, J.A.**, League, C., and Lyons, E. (202X). "A Framework for Early Warning System Evaluation: A Forecast-to-Response Analysis of an Urban Flash Flood Event in Fort Worth, Texas." *Weather Forecast.*, in preparation.

Filho, W.L., **Eisma, J.A.**, Amiraslani, F., Baidoo, A.A., Limones, N., Brearley, F.Q. (202X). "The Silent Witness: How soil dynamics are influenced by climate change." *Anthropocene*, submitted.

**Eisma, J.A.**, Schoups, G., Davids, J., and van de Giesen, N. (202X). "A Bayesian model for quantifying errors in citizen science data: Application to rainfall observations from Nepal." *Hydrol. Earth Syst. Sci.*, accepted.

Castelli, G., Piemontese, L., Quinn, R., Aerts, J., Elsner, P., Ertsen, M., Hussey, S., Filho, W.L., Limones, N., Mpofo, B., Neufeld, D.G., Ngugi, K., Ngwenya, N., Parker, A., Ryan, C., de Trinchiera, J., Villani, L., **Eisma, J.A.**, and Bresci, E. (2022). "Sand dams for sustainable water management: Challenges and future opportunities." *Sci. Total Environ.*, 838(2):156126. doi:10.1016/j.scitotenv.2022.156126

**Eisma, J.A.**, Saksena, S., and Merwade, V. (2021). "Assessing the impact of land cover, soil, and climate on the storage potential of dryland sand dams." *Front. Water*, 3:671455. doi:10.3389/frwa.2021.671455

Ritchie, H., **Eisma, J.A.**, and Parker, A. (2021). "Sand dams as a potential solution to rural water security in drylands: Existing research and future opportunities." *Front. Water*, 3:651954. doi:10.3389/frwa.2021.651954

**Eisma, J.A.** and Merwade, V. (2021). "A data-driven approach to assessing the impact of water harvesting structures on regional water storage in east Africa." *J. Hydroinform.*, 23(2):352-367. doi:10.2166/hydro.2021.115

**Eisma, J.A.** and Merwade, V. (2020). "Investigating the environmental response to water harvesting structures: A field study in Tanzania." *Hydrol. Earth Syst. Sci.*, 24:1891-1906. doi:10.5194/hess-24-1891-2020

**Eisma, J.A.** and Merwade, V. (2019). Environmental Response Data for Tanzanian Sand Dams. Purdue University Research Repository, doi:10.4231/GYSC-1X41

**Eisma (Holberg), J.A.** (2014). "Tutorial on using HEC-GeoHMS to develop Soil Moisture Accounting method inputs for HEC-HMS." Available: [http://web.ics.purdue.edu/~vmerwade/education/hechms\\_sma.pdf](http://web.ics.purdue.edu/~vmerwade/education/hechms_sma.pdf).

## Conference Proceedings

Darafshani, M.S., Seersma, J., & **Eisma, J.A.** (2023). Design and placement of green stormwater infrastructures and associated runoff peak and volume reduction assessment. In *Proceedings of the ASCE Low Impact Development Conference 2023*, submitted.

Narzis, A. and **Eisma, J.A.** (2023). "Developing Green Stormwater Infrastructure Strategies to Reduce Flood Runoff and Improve Water Quality for the Vulnerable Coastal Communities of Houston." *Proceedings of the ASCE EWRI Congress 2023*.

McCullough, S., **Eisma, J.A.**, Park, J.Y., Salazar, M., Rose, S.F. (2022). "Inequity by inequity: Community driven investigation of wheelchair user discomfort by infrastructure failures." *BuildSys '22: Proceedings of the 9th ACM International Conference on Systems for Energy-Efficient Buildings, Cities, and Transportation*. doi:10.1145/3563357.3564081

Broberg, M.R., Bose, B., Pineda-Mendez, R.A., Gehr, R.E., Jange, C.G., McDermott, J.E., Loui, M.C., **Eisma, J.A.** (2022). "Lessons learned: Preparing graduate students and postdoctoral researchers for tenure track careers through mentoring circles." *American Society of Engineering Education (ASCE) 2022 National Conference Proceedings*.

## **Presentations**

### **National and International Conferences**

Darafshani, M.S., Seersma, J., and **Eisma, J.A. (presenter)**. (2023, Aug.). "Design and placement of green stormwater infrastructures and associated runoff peak and volume reduction assessment." Presented at the ASCE International Low Impact Development Conference in Oklahoma City, OK.

**Eisma, J.A.**, Rafter, B., Ambrose, P., Springfield, S., Bozeman III, J. (2022, Dec.). "A Systemic Equity Assessment of Houston's Incentive Program for Green Stormwater Infrastructure." Presented at the AGU Fall Meeting 2022 in Chicago, IL.

Darafshani, M.S. and **Eisma, J.A.** (2022, Dec.). "Green Infrastructure Potential in Mitigation of Climate Change-Induced Flood Risk Increase." Presented at the AGU Fall Meeting 2022 in Chicago, IL.

Ahmad, J. and **Eisma, J.A.** (2022, Dec.). "Exploring the Role of Urbanization and Wind on the Distribution of Extreme Rainfall by Utilizing High Spatiotemporal Radar Rainfall Product: A Dallas Fort-Worth Case Study." Presented at the AGU Fall Meeting 2022 in Chicago, IL.

Darafshani, M.S. and **Eisma, J.A.** (2022, June). "Green stormwater infrastructures design and evaluation for flood risk reduction in Houston's vulnerable communities." Presented at the Frontiers in Hydrology Meeting in San Juan, Puerto Rico.

Ahmad, J. and **Eisma, J.A.** (2022, June). "Investigating the impact of urbanization on the spatial variability of extreme rainfall in the Dallas-Fort Worth area using Multi-Radar Multi-Sensor (MRMS) rainfall." Presented at the Frontiers in Hydrology Meeting in San Juan, Puerto Rico.

Philips, B., League, C., **Eisma, J.A.**, Seo, D.J., Muttiah, R., Lyons, E., and Chandrasekar, V. (2022, Jan.). "Integrated Warning Systems Research for Urban Flash Floods." Presented at the American Meteorological Society 102<sup>nd</sup> Annual Meeting in Houston, TX.

Philips, B., **Eisma, J.A. (presenter)**, Chandrasekar, V., Seo, D.J., Lyons, E., League, C., and Muttiah, R. (2022, Jan.). "Enhancing the Detection Subsystem to Improve the Integrated Early Warning System for a Pluvial Flash Flood Event in Fort Worth, Texas." Presented at the American Meteorological Society 102<sup>nd</sup> Annual Meeting in Houston, TX.

**Eisma, J.A.**, Saksena, S., and Merwade, V. (2021, Mar.). "Developing site-selection guidelines for water harvesting structures in sub-Saharan Africa." Poster presentation at the Early Career Women in Water Conference (virtual).

**Eisma, J.A.**, Schoups, G., Davids, J.C., and van de Giesen, N. (2020, Dec.). "Bayesian quantification of errors in citizen science data: Application to Nepal rainfall observations." Presented at American Geophysical Union Fall Meeting (virtual).

**Eisma, J.A.** and Merwade, V. (2019, Dec.). "Model-based guidelines for siting new water-harvesting structures in sub-Saharan Africa." Presented at American Geophysical Union Fall Meeting in San Francisco, CA.

**Eisma, J.A.** and Merwade, V. (2018, Apr.). "The impact of small-scale dams on water storage in Kenya." Presented at AWRA Spring Specialty Conference: GIS & Water Resources X in Orlando, FL.

**Eisma, J.A.**, Merwade, V., Njau, K. (2017, Dec.). "Impact of sand dams on water availability in rural communities." Presented at Third International Conference on Global Food Security in Cape Town, South Africa.

**Eisma (Holberg), J.A.**, and Merwade, V. (2015, May). "Downward model development: soil profile impacts on streamflow." Poster presented at ASCE EWRI Annual Conference in Austin, TX.

### **Invited Presentations**

**Eisma, J.A.** (2023, Mar.). "all the while I was quite happy." Presented for the Purdue University CEGSAC Emerging Leaders Lecture.

**Eisma, J.A.**, and Quinn, R. (2022, Oct.). "Engineering water storage systems: the Sand Dams water harvesting." Presented at FAO Masterclass - the potential of sand rivers for improved water harvesting in arid areas (virtual).

**Eisma, J.A.** (2021, May). "Assessing and improving sand dam performance." Presented at Channeling the future research on sand dams: An international workshop, University of Florence (virtual).

**Eisma, J.A.**, Merwade, V. (2020, Mar.). "On a mission to verify: Remotely sensed datasets and field studies to test claims about the impacts of sand dams." Webinar presented for Water-WISER EPSRC Centre, Cranfield University, Loughborough University, and University of Leeds, UK.

### **Local Meetings**

Asakura, K., **Eisma, J.A.**, Williams, K., Boyer, D. (2023, Apr.) "Kashmere Gardens: Empowering people for climate adaptation." Oral presentation at the 2023 Texas American Society of Landscape Architects Conference, Fort Worth, TX.

**Eisma, J.A.**, Merwade, V. (2019, Mar.). "The impact of water harvesting structures on the local environment: Field study in Tanzania." Poster presented at Women in Engineering Program 50<sup>th</sup> Anniversary Celebration, Purdue University, West Lafayette, IN.

### **Teaching Experience**

#### Lead Instructor, Basic Fluid Mechanics (CE 3305)

University of Texas at Arlington, Taught 1 section of the course. Preparation and delivery of all course content, homework, quizzes, and exams (total: 4 Semesters).

#### Lead Instructor, Water Resources Engineering (CE 3342)

University of Texas at Arlington, Taught 1 section of the course. Preparation and delivery of all course content, homework, quizzes, and exams (total: 1 Semester).

### **Awards and Accomplishments**

**Purdue Civil Engineering Graduate Student Advisory Council Emerging Leaders Award** (Mar. 2023), Purdue School of Civil Engineering award presented to an outstanding graduate alumni

**Estus H. And Vashti L. Magoon Award for Excellence in Teaching** (Mar. 2020), Purdue College of Engineering award presented to an outstanding graduate teaching assistant

**NSF Graduate Research Opportunities Worldwide (GROW) Award** (June 2019), An NSF award that provides opportunities for U.S. graduate students to engage in international research collaborations

**Fulbright U.S. Student Grant** (Apr. 2016), U.S. Department of State award that provides opportunities for students to perform advanced research worldwide

**U.S. Borlaug Graduate Student Grant for Global Food Security** (Dec. 2015), USAID grant that supports exceptional graduate students performing a portion of their research in a developing country and in collaboration with a mentor from a National Agricultural Research System unit

**NSF Graduate Research Fellowship Program (GRFP)** (Apr. 2015), An NSF award that recognizes and supports outstanding graduate students in STEM disciplines who are pursuing research-based master's and doctoral degrees at United States institutions

**Congressional Medal of Merit** (May 2008), United States Congress' award for young Americans who have shown great community involvement in public service, fitness, development, and exploration

### **Professional Service**

- Reviewer for *Journal of Hydrology*, *Hydrological Processes*, *Frontiers in Water*, *Agricultural and Forest Meteorology*
- NASA ROSES proposal review panel
- NSF proposal review panel and ad hoc reviewer
- AGU Fall Meeting Session Convener

### **Professional Affiliations**

- ASCE Environmental and Water Resources Institute
- American Geophysical Union
- American Water Resources Association
- International Water Association
- American Meteorological Society