



AGU

HYDROLOGY

AGU HYDROLOGY
SECTION NEWSLETTER

Members of AGU's Hydrology Section are concerned with the cycling of continental water at all scales, and with physical, chemical and biological processes driven by that cycling.

APRIL 2026

Mapping Unprecedented Western U.S. Snow Drought

Noah Molotch & Emma Tyrrell
(University of Colorado, Boulder)

The Western U.S. is currently undergoing an intense snow drought that extends from the Pacific Northwest to the Desert Southwest. As a result, spring and summer water supplies for agricultural, municipal, industrial, and hydropower demands are significantly threatened. Using a snow water equivalent (SWE) data fusion approach that combines ground-based, airborne, and satellite measurements, retrospective physically based and statistical models, the University of Colorado's Mountain Hydrology Group provides real-time estimates of SWE across the Western U.S. to over 500 water management entities within the region (example for March 22, 2026 shown in **Figure 1**) ([Yang et al., 2022](#)); data generation is supported by the U.S. Bureau of Reclamation and California Department of Water Resources.

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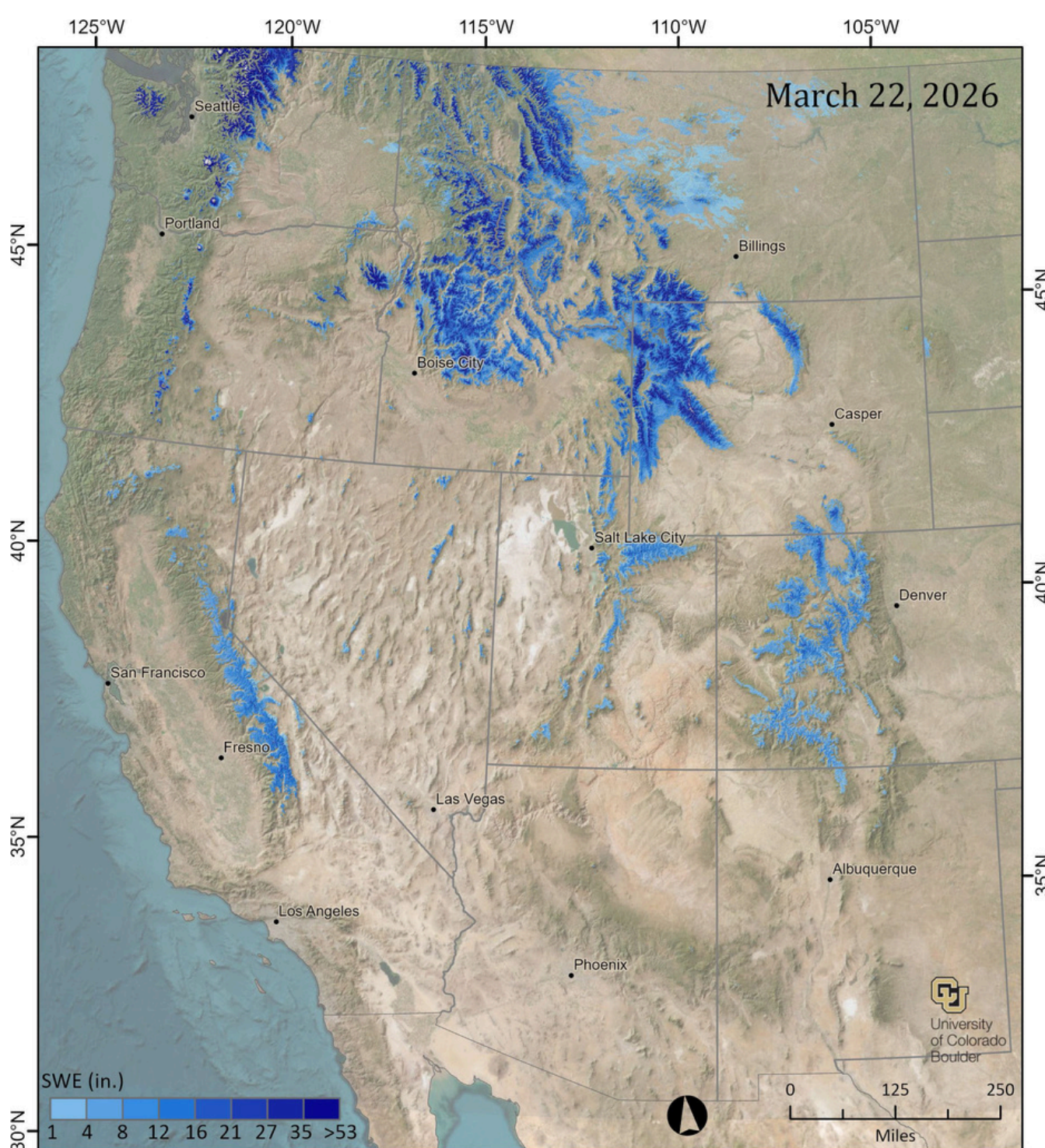
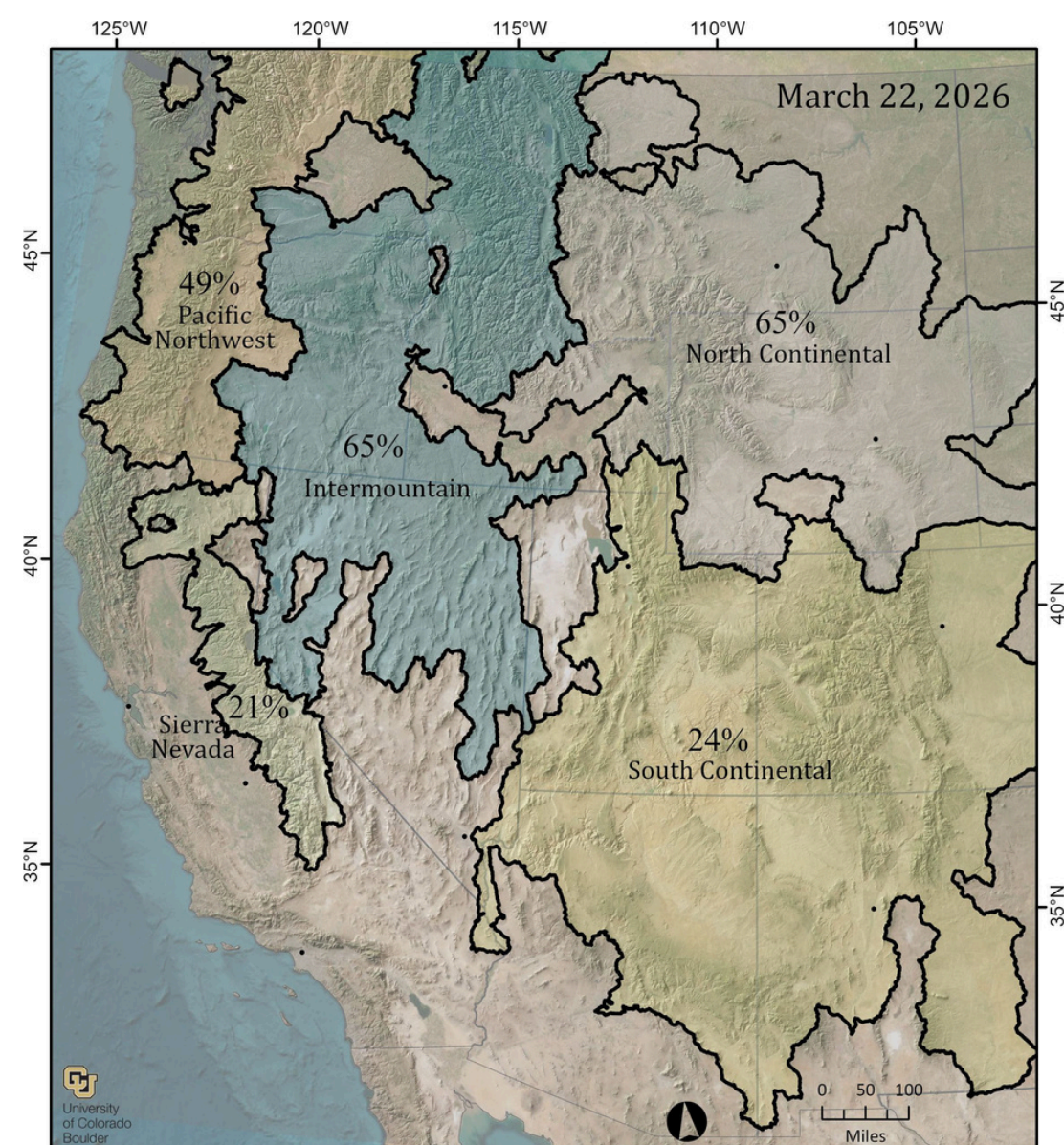


Figure 1. Estimated SWE and % of Average SWE across the Western U.S. SWE amounts for March 22, 2026 across the entire Western region of the United States (**top**) and percent of long-term average (2001-2025) by five regions (**right**). Region boundaries are delineated based on Snowpack regimes of the Western United States ([Trujillo and Molotch, 2014](#)). Data and SWE reports can be found at <https://www.colorado.edu/instaar/research/labs-groups/mountain-hydrology-group/western-us-swe-reports>.

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Mapping Unprecedented Western U.S. Snow Drought

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The SWE-fusion system reveals distinct patterns of snow-water storage anomalies across the region in which both the Pacific Northwest and Northern Rockies exhibit a stark north-south gradient with areas near the Canadian border greater than 100% of the 2001–2025 historical mean (**Figure 2**), while the large majority of watersheds in both regions are well below average (**Figure 2**). Snow-water deficits are even more significant in the Southern Rockies at 24% of the historical mean SWE, with Colorado between 16% and 30% of the long-term average SWE and most sub-basins of the Lower Colorado River basin in the single digits. The Sierra Nevada range is similarly dry at only 21% of long-term average SWE, with the Sacramento River Basin at only 10%. The snow water deficits across the region have a myriad of implications depending on antecedent conditions, reservoir storage, and access to sustainable sources of groundwater. For example, the current snow drought in the Colorado River Basin is particularly concerning given the multi-year drought, record low reservoir storage values in Lake Powell and Lake Mead, and general over-allocated nature of the basin.

A common characteristic of snow drought is earlier snowmelt. Notably, the region is currently undergoing a record-setting heat wave which is further advancing snowmelt timing by several weeks. This relatively early snowmelt reduces the partitioning of snowmelt to streamflow, leading to overall reductions in runoff efficiency ([Barnhart et al., 2016](#)). Notwithstanding these water-supply related concerns, the earlier and reduced snowmelt may also increase vegetation water stress across the region, potentially increasing wildfire risk in the weeks and months ahead ([Westerling, 2016](#)).

Water management across the Western U.S. is increasingly relying upon spatial snowpack information to augment point-based data from the U.S. Natural Resource Conservation Service SNOTEL program. Accurate characterization of snow drought impacts on water supply requires that point-based measurements are statistically consistent with Full Natural Flow (FNF). Snow droughts represent a prime example of established non-stationarities in climate ([Milly et al., 2008](#)) and hydrologic conditions which can cause anomalous relationships between point-based SWE measurements and FNF. In this respect, both warm and dry-warm snow droughts create anomalous patterns in SWE associated with proportional increases in rainfall and reductions in snowfall, increased mid-winter snowmelt, and increased losses to snow sublimation. New approaches for measuring SWE from aircraft (e.g. [Painter et al., 2016](#)), satellite (e.g. [Tsang et al., 2022](#)), and ground-based platforms, and data fusion approaches such as those highlighted here, are transforming water management by providing insights into the physical mechanisms that govern runoff response to anomalous hydrologic conditions such as snow droughts.

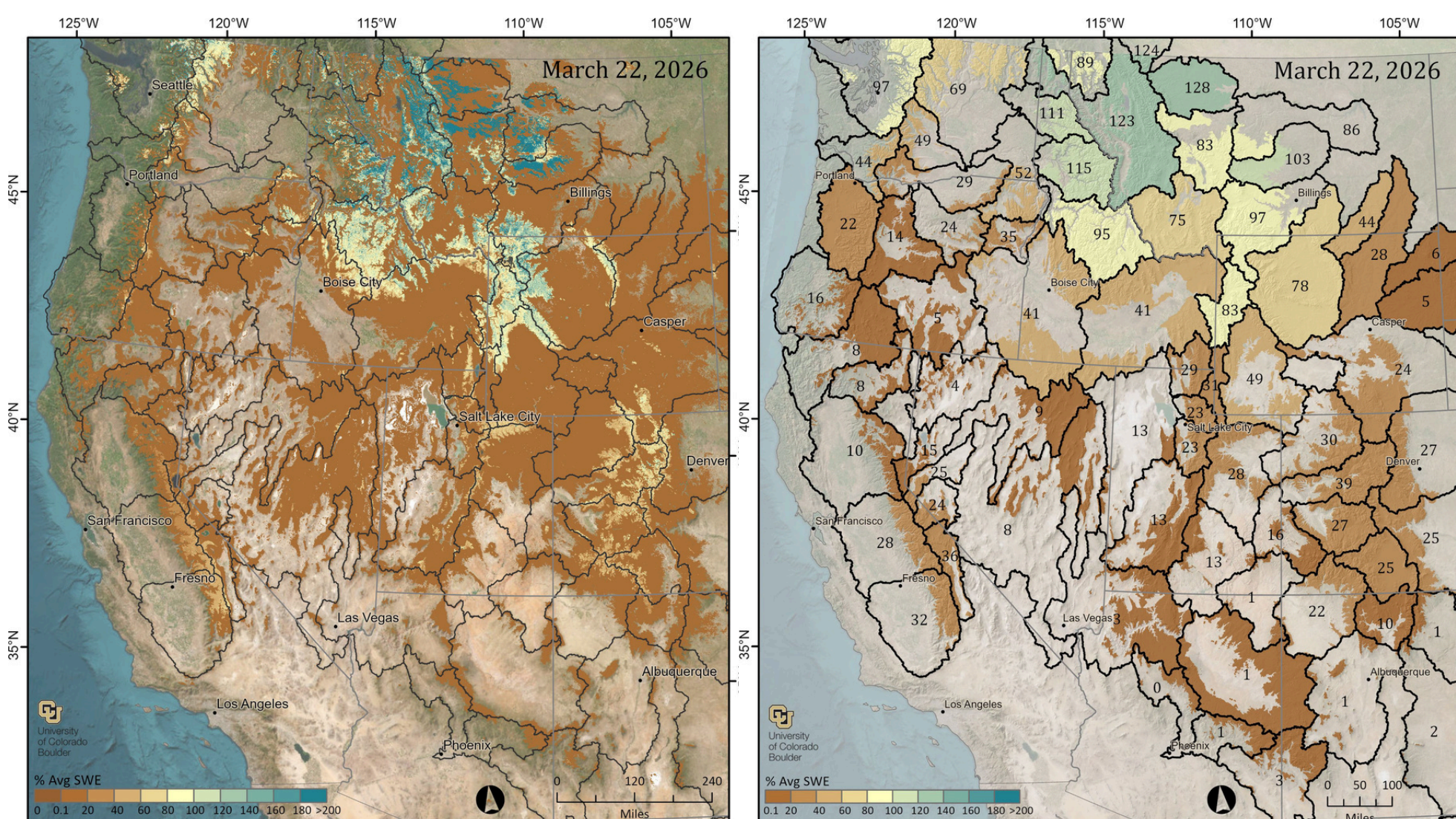


Figure 2. Estimated % of Average SWE across the Western U.S. Percent of long-term average (2001–2025) from the spatial SWE calculated for each pixel (**left**) and by HUC-6 basin (**right**); integer within each watershed represents the percent of average SWE for the report date (March 22, 2026).

Noah Molotch, Professor of Geography & Fellow; Institute of Arctic & Alpine Research, University of Colorado, Boulder
Emma Tyrrell, PhD Student, Geography; Institute of Arctic & Alpine Research, University of Colorado, Boulder
Reports / data available at: colorado.edu/instaar/research/labs-groups/mountain-hydrology-group/western-us-swe-reports

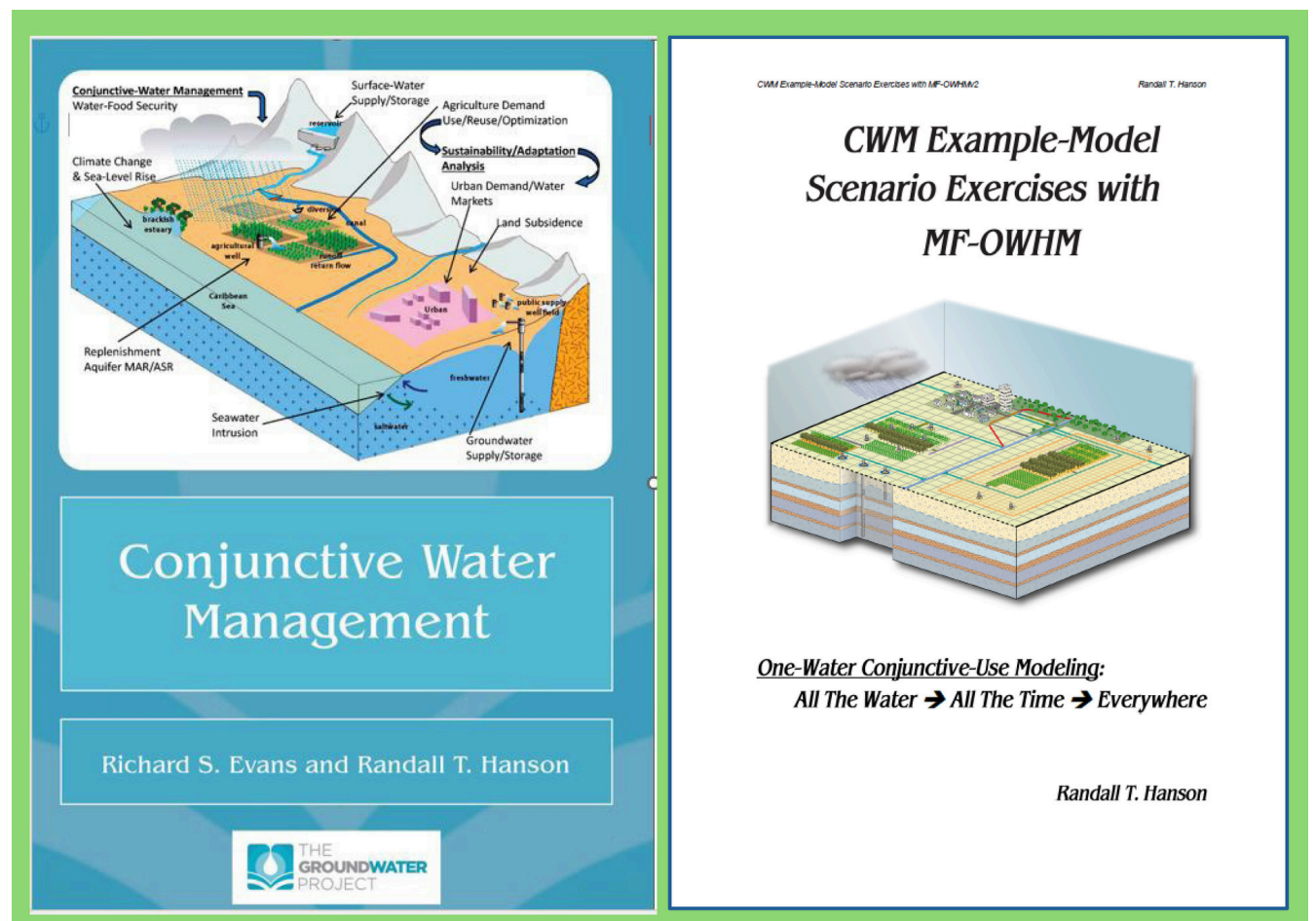


Announcements

New Books on Conjunctive Water Management

Two new open-access books on Conjunctive Water Management by Randall Hanson and Richard S. Evans have been released through John Cherry's Groundwater Project. The books highlight the use of MODFLOW-OWHM, an integrated hydrologic modeling framework developed by the USGS to analyze water sustainability under changing land use, climate conditions, and water demand.

The volumes include modeling exercises using MF-OWHM2 and examples from USGS studies demonstrating how water supply, demand, land use, and climate variability can be analyzed within a unified framework for water management.



Since their release, the books have already received over 2,200 downloads, reflecting strong global interest in conjunctive water management approaches. A Spanish translation is planned, and training workshops on One-Water modeling are expected in 2026 in California and Mexico.

Access the books: <https://gw-project.org/books/conjunctive-water-management/>

Watch the release interview: <https://youtu.be/GDjFp4-yEXo>

These books and all of the other publications within John Cherry's Groundwater Projects are free and they are all completed as volunteer contributions.

AGU Days of Action April Congressional Visits Day event application

As part of its ongoing Days of Action programming, AGU is excited to support a special Congressional Visits Day (CVD) event on 21-22 April 2026, bringing scientists directly to Capitol Hill to advocate for the value of science. Federal policy decisions have a direct impact on science funding, research priorities, and the role of science in society-and scientists have a critical role to play in those conversations. One of the most effective ways to influence science policy is through in-person meetings with Members of Congress and their staff.

[Apply to join by March 15th!](#)



Announcements

New! AGU Circles – Member-Only Peer Cohorts

AGU Circles is a new, members-only online space designed for small groups of scientists to connect globally around shared research interests, career paths, and professional challenges.

Participants meet regularly in small cohorts built for candid exchange and collaboration—not lectures—so you can share real challenges, gain new perspectives, and move your career forward.

Open to graduate students, postdocs, early- and mid-career scientists, and anyone seeking a trusted peer space.

The next cycle runs March–May. **Space is limited—register early.**

Browse or propose a Circle: <https://www.agu.org/advancement/mentoring>

Call for Contributions – Only a few spots left!

We are seeking contributions for our 2026 issues of the AGU Hydrology Section Newsletter. Nominate yourself or a colleague to be featured in one of our regular columns by emailing agu.hydro.news@gmail.com.

Column opportunities include:

- **Science to Solutions** – Hydrologic research connecting science to policy, practice, and community outcomes.
- **Hydrology Horizons** – Emerging tools, datasets, methods, or technologies shaping the future of hydrology.
- **Early Career Spotlight** – Profiles of early career hydrologists highlighting research, career paths, and reflections.
- **Student Spotlight** – Short features showcasing undergraduate or graduate students' research, fieldwork, or academic journeys in hydrology.
- **Other** – Have a piece that doesn't quite fit? Let's find a space for it or create one

Most 2026 slots are taken, so be sure to reach out soon to grab a spot!

Sarah Fletcher

Hydrologic Sciences Early Career Award



Stanford University

I am honored to receive the AGU Hydrologic Sciences Early Career Award and grateful to my nominator, Dara Entekhabi, and letter writers.

[My lab](#) advances water resource systems analysis to design infrastructure and policy solutions that support climate resilience. We build a fundamental understanding of the hydrological and social processes that enable water security, while partnering with planners and communities for real-world impact. We are motivated by urgent questions: How can we ensure reliable water supply as the climate changes? How do we make sure our solutions serve the communities who face the greatest risks and have the fewest resources?



[Fletcher Lab](#) at Stanford University.

Like so many of us at AGU, I find myself increasingly alarmed by the climate crisis and its devastating impacts on communities. Every day on my way to work, I am struck by what an enormous privilege it is to work on problems of my choosing alongside incredibly talented students. As a scientist and professor, and now as a new mother, I feel both the responsibility and urgency to be part of the solution.

This drives how I approach research. I look for problems in the real world where there is potential for practical solutions or policy advances, but where knowledge gaps create barriers. For me, a home-run research question helps local planners while offering general insights that can be translated and scaled beyond a single case study. Because real problems do not follow disciplinary silos, this approach has led me to interdisciplinary collaborations spanning data science, climate science, technology assessment, economics, community-based research, and law.

Students often ask me how to pursue interdisciplinary research careers. My advice: don't go it alone. Find a community of peers in your area and invest in mentoring each other. Every one of my projects has been made better by close friends and collaborators who lift me up when I lose my way. There is no time for competition in the face of the challenges we're tackling. Build networks of support, follow problems where they lead you, and bring your full self to work. Our shared humanity makes our science stronger.

“Our shared humanity makes our science stronger.”

Marco Marani

University of Padova

I am honored to have been selected as a 2025 AGU Fellow. I am a bit hesitant to acknowledge that my first AGU Fall Meeting was back in 1994, but I am very willing to say that AGU has served as my happy scientific home ever since. Much of what I know about research and academic life has come from interacting with outstanding scientists at AGU meetings. I am sincerely grateful to my nominators and to everyone who evaluated my candidacy with such generosity. I am even more astonished to have been selected by both the Hydrology Section and the Earth and Planetary Surface Processes Section

I have always engaged in the topics that at any given time seemed most exciting to me, and coastal eco-geomorphology, basin-scale hydro-morphological processes, and hydrometeorology have remained a source of new questions and research adventures since that first AGU meeting. Many of these research efforts inevitably lead to rather unexciting results. But I have found that if we have the perseverance to keep asking questions out of sheer curiosity, the few results that “work” make the energy spent and the frustrations endured totally worthwhile.

Working on different topics, often at disciplinary interfaces, is risky—you may end up not being fully accepted by one community or another. This did not happen to me, and interacting with colleagues from multiple fields has made my scientific life far more interesting and varied. The difficult path is often the right one, and today I still enjoy working on all these fronts. But on this occasion in particular, I would like to note how we, earth scientists in a broad sense, can and must contribute to advances in science and technology that support adaptation to climate change. Hydrology has historically advanced our understanding of the water cycle, guided by the societal needs of infrastructure planning and design. This has been the case for thousands of years, at least since humans measured the maximum Nile River water levels at Nilometers.

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Some current and former members of the team working on hydrologic extremes at the University of Padova and beyond, at the AGU Honors Dinner: Maria Francesca Caruso, Santa Andria, me, Enrico Zorzetto (New Mexico Tech), Pietro Devò.

“If we have the perseverance to keep asking questions out of sheer curiosity, the few results that ‘work’ make the energy spent and the frustrations endured totally worthwhile.”

Marco Marani

University of Padova

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Now is the time for hydrologists, in line with this tradition, to play a central role in climate-proofing our societies. We should take the new and exciting opportunities we have to go beyond simple Clausius–Clapeyron scaling and develop approaches to climate-resilient adaptation measures that account for projected changes in hydrologic extremes. An example close to my own work is the use of Convection-Permitting Models (CPMs), which are now able to produce realistic extreme hydrological events ([Dallan et al., 2023](#)), along with new non-asymptotic statistical techniques that estimate rare extremes with controlled uncertainty—extremes that traditional Extreme Value Theory cannot reliably estimate based on the short simulations we can obtain from CPMs ([Andria et al., 2025](#); [Devò et al., 2025](#); Akbari et al., 2026).

We are living in a difficult time, in which climate change does not receive the attention it deserves, but it is also a scientifically stimulating time. An interdisciplinary science connecting climate science, hydrology, sediment transport, and engineering applications can truly make a difference. It is particularly encouraging that, as always, the new generations are taking up these challenges.

At the beginning of my career, I was not very interested in developing new educational opportunities. Today I see this as one of the most important contributions we can make to solving major global problems: preparing new generations of scientists and professionals who can tackle these challenges with new approaches, wherever they are needed. This is one achievement that now gives me the greatest satisfaction and pride: having created, together with colleagues and

collaborators, a new Water and Geological Risk Engineering Master’s Program that connects engineering, geology, agronomic and forest sciences, and climate science (check it out [here](#)). In this program, young professionals from all continents—particularly from economically disadvantaged countries—can train and make a difference.

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“An interdisciplinary science connecting climate science, hydrology, sediment transport, and engineering applications can truly make a difference.”

Individual Decisions, Collective Consequences: An Interdisciplinary Approach to On-Site Wastewater Treatment



Kyra Selina Hagge, East Carolina University

Imagine you are moving to a new house, and you have narrowed down your search to two properties. Both are in the same neighborhood and school district, and have the same number of bedrooms and bathrooms. Neither house is connected to a central sewer system, which means you are responsible for your own wastewater treatment. The only difference between the two houses is the type of wastewater treatment system installed and the price. House 1 operates a traditional septic system, while House 2 treats its wastewater through an alternative system. Which home would you like to own?



Private systems, shared water - Photo by [Gene Gallin](#) on [Unsplash](#)

What you just read is an abbreviated question used in my research. In my study area, eastern North Carolina, more than 60% of homes rely on onsite wastewater treatment systems (OWTS) ([NCNERR, 2001](#)). Many use traditional septic systems, a mature technology invented in the 1960s and largely unaltered since. This technology is also vulnerable to changing environmental conditions, such as sea level rise. Failing septic systems contaminate groundwater and surface water with bacteria and pathogens, creating health risks for the entire community. The large number of decentralized septic users in the region presents a social dilemma—individual short-term interest (saving money) at odds with long-term collective benefit (clean water) ([Van Lange et al., 2013](#)).

I want to understand how individual homeowner decisions and attitudes about their OWTS affect community-level outcomes and environmental loading. While engineering metrics like efficiency are key for OWTS design, they fail to account for the complexity of end-users. My research addresses this gap by deciphering the environmental and human drivers of nutrient loading and developing policy recommendations. My model integrates three components: an environmental system that models nutrient transport, fate, and risk; an economic model examining willingness to pay and the utility homeowners derive from switching to more efficient OWTS; and a cooperative model exploring how homeowners' mental models and social capital influence decisions about community technologies. Collaborating with natural and social scientists, septic professionals, and community members allows me to develop policies that drive meaningful change.

“The large number of decentralized septic users in the region presents a social dilemma—individual short-term interest (saving money) at odds with long-term collective benefit (clean water)”

Read more about this work in our recent publication: [Hagge et al. \(2026\)](#).

I am looking to apply my interdisciplinary expertise to advise policy, support communities, and reduce humanity's environmental impact. I am excited to discuss job opportunities beginning August 2026—please reach out on [LinkedIn](#) or via email kyra.hagge@pm.me.

Bridging AI Research and Rural Access: WaterNet's Journey from Algorithm to Impact



Cameron Kruse (Fika); Zia Mehrabi, Matthew Pierson, and Katie Fankhauser (Better Planet Laboratory)

The origins of WaterNet began with a deceptively simple question: How do we find every place where walking paths cross waterways? For Fika, this wasn't an academic exercise—it was about reaching the billion rural people who cannot safely access markets, schools, and healthcare because of gaps in transport networks. When we tried to answer this question, we found a more critical data gap: the location of waterways around the world.

This challenge exemplifies how AI research and on-the-ground impact work can strengthen each other. Our nonprofit field teams in Rwanda, Uganda, Ethiopia, and beyond reported that up to 60% of validated bridge requests were located at waterways that didn't appear in any existing maps, including specialized applications such as OpenStreetMap or TDX Hydro. Meanwhile, our partners at Better Planet Lab already had the technical capacity to tackle this as a machine learning problem. The result is WaterNet: a deep learning model that has mapped 124 million kilometers of new waterways worldwide, tripling the coverage of existing datasets

Where Research Meets Reality

One of the greatest lessons from the WaterNet project was the mutually beneficial relationship between nonprofit operations and AI research. Our field data on actual bridge locations provided ground truth for model validation, showing that WaterNet captures over 95% of reported community needs. Conversely, the model's global predictions now inform where we deploy resources most effectively. We've integrated WaterNet outputs into our Fika Impact Map, which predicts infrastructure needs and their potential impact on rural communities.

The technical approach for the WaterNet model combines satellite imagery from Sentinel-2 with terrain data, using a novel UNet architecture to detect waterways at 20-meter resolution. Post-processing includes automated vectorization, thinning algorithms, and Strahler stream order assignment, generating a usable dataset in just 9 days of runtime on a single GPU workstation. Full technical details are available in our papers on the [model architecture](#) and [dataset creation](#).

Open Data for Collective Progress

Following the principle that operational progress depends on shared tools, we've made WaterNet freely available. Anyone can [explore the data interactively](#) or [download it for analysis](#). We believe that transparency builds trust, and that solving global infrastructure challenges requires community collaboration.

As AI/ML tools mature in hydrology, we're learning that the most transformative applications emerge when research is grounded in real-world needs and when impact organizations embrace technical innovation. For us, every waterway mapped is a potential bridge built, and every bridge built is a community connected.



WaterNet is a machine learning algorithm and dataset of global waterways. It is developed with the intent to provide information about barriers that prevent rural communities from accessing essential infrastructure.

Omid Zandi

PhD student, University of Arizona

My journey into hydrology and atmospheric sciences began with construction projects, steel, and concrete. As a child, I was fascinated by large construction projects and civil engineering. That curiosity led me to pursue a bachelor's degree in civil engineering in Iran, where I was born and raised. I imagined myself building bridges, roads, and buildings, and spending much of my career on construction sites.

After spending a few years in civil engineering, I decided to pursue a master's degree in water resources management at the University of Tehran in 2018. Growing up in a mostly arid country shaped how I viewed hydrology-related engineering problems. Unlike my undergraduate studies, which covered a wide range of topics, graduate work was more research-focused. It involved identifying uncertainties, solving problems, and thinking critically. I also grew increasingly interested in programming, which had initially intimidated me as an undergraduate student!

I began developing a precipitation dataset for an orographically complex region in northern Iran. There, the Alborz Mountains rise sharply along the Caspian Sea, creating intense and highly variable orographic precipitation patterns. As someone who loves hiking and spending time in the mountains, I became increasingly curious about how landscapes shape rainfall. My work focused primarily on geostatistical methods to spatially interpolate gauge-based observations and on merging large-scale precipitation products with ground data to calibrate them using machine learning (ML) methods.

After completing my master's degree, I felt a desire to experience life beyond my home country. Living abroad, I believed, would not only expand my academic training but also challenge me personally and culturally. I came to the United States to pursue a Ph.D. in Hydrology and Atmospheric Sciences at the University of Arizona (UofA) in 2022. Studying in the U.S. has been one of the most educational experiences of my life, not only academically, but socially. You meet people from across the world, exchange ideas across cultures, and build friendships that broaden your worldview.



Omid Zandi among the autumn aspens in Flagstaff, Arizona (October 2025).

“My journey into hydrology and atmospheric sciences began with construction projects, steel, and concrete.”

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Omid Zandi

PhD student, University of Arizona

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One of the most meaningful changes in my personality over the past three years has been becoming more sociable. During my master's years, I spent long hours in the library, focused almost entirely on my work. During my Ph.D., however, I intentionally chose to become more active in my community. I joined a student association and became involved with the AGU Precipitation Technical Committee. Through these experiences, I realized that science is not only about equations and coding, but also about collaboration, leadership, and meaningful human connections. In a world increasingly shaped by artificial intelligence, many technical tasks may become automated, but genuine person-to-person relationships will remain essential.

This perspective has motivated me to grow not only as a researcher but also as a community builder. Outside of research, I enjoy inviting friends and colleagues over and sharing the wonderful flavors of Iranian cuisine, which has become one of my favorite ways to connect with people and build friendships.

Today, my research sits at the intersection of hydrology, remote sensing, and ML. I focus on remote sensing of precipitation, applying traditional ML and modern deep learning (DL) methods to improve satellite-based retrievals, particularly from infrared observations on polar-orbiting satellites, with a focus on high-latitude regions.

One of the most valuable experiences I have gained during this work has been operating in high-performance computing (HPC) environments. Training DL models for satellite retrieval is computationally expensive, and I have had the opportunity to execute multi-node, multi-GPU experiments on the UofA HPC system. Working at that scale has strengthened not only my technical capabilities but also my appreciation for the computational infrastructure that enables modern Earth system science, which is often not available in developing countries. At this stage of my career, I believe one of the key challenges in Earth sciences is bridging physical understanding with data-driven methods. While ML has shown great promise, its true potential lies in developing physically informed models that respect conservation laws while leveraging the flexibility of modern AI. Looking ahead, I hope to advance actionable AI in hydrology, particularly for real-time meteorological and hydrological forecasting that supports real-world decision-making.

For more details about my work, connect with me on [LinkedIn](#) and [GitHub](#).

“I realized that science is not only about equations and coding, but also about collaboration, leadership, and meaningful human connections.”

“While ML has shown great promise, its true potential lies in developing physically informed models that respect conservation laws while leveraging the flexibility of modern AI.”

Fraser King

University of Wisconsin-Madison



Growing up in the lake-effect snow belt in small-town Ontario, Canada, I was constantly reminded (by the daily shovelling of the driveway) of how an improved understanding of snowfall could directly help the daily lives of the people around me. Coupled with the fact that my hometown was known as the “home of the radar” because of a nearby WWII radar training facility, this naturally led me down a future research path focused on the remote sensing of precipitation.

Following my education at the University of Waterloo, where I specialized in machine learning-based precipitation retrievals, I spent time at the University of Michigan–Ann Arbor studying the microphysical properties of snowfall and mixed-phase precipitation using nonlinear, unsupervised learning techniques. This work helped us better understand the underlying structure of these observations and the evolutionary pathways particles take as conditions change, particularly during extreme events. Because uncertainties in subgrid-scale parameterizations remain a major source of model error, our work also aimed to improve how these processes are represented. I then worked at the NASA Goddard Space Flight Center on machine learning-based microwave land surface emissivity retrievals using spaceborne measurements from the GPM satellite, with the goal of improving our understanding of global atmospheric moisture content.

Since then, I’ve been building out my own research group at the University of Wisconsin-Madison (<https://kinglab.org>), focusing on applied machine learning for precipitation and convection, remote sensing observations of extreme events, data visualization, and model interpretability. As AI-based models become increasingly ubiquitous in our field, trust in these models becomes paramount. Our focus is therefore not only on building useful operational models, but on building models that we can better understand, explain, and trust in their predictions.

We are also interested in exploring how foundation models can be used to enhance our understanding of extreme precipitation events, and improve on how mixed phase precipitation is represented at global scales relative to traditional numerical weather prediction models.

“An improved understanding of snowfall could directly help the daily lives of the people around me.”



Me in the Galápagos, a region where the local ecosystem and biodiversity are closely tied to surrounding precipitation patterns, including the strong influence of ENSO.

“As AI-based models become increasingly ubiquitous in our field, trust in these models becomes paramount.”

Groundwater

Bo Guo (Chair; University of Arizona),

Tianyuan Zheng (Deputy Chair; Ocean University of China)

Here are a few highlights of activities and updates from our Groundwater Technical Committee (GWTC).

1. 2026 Student Contest — Picture Your Groundwater Science

The AGU Groundwater Technical Committee (GWTC) invites student submissions for a competition highlighting the visual and creative dimensions of groundwater research.

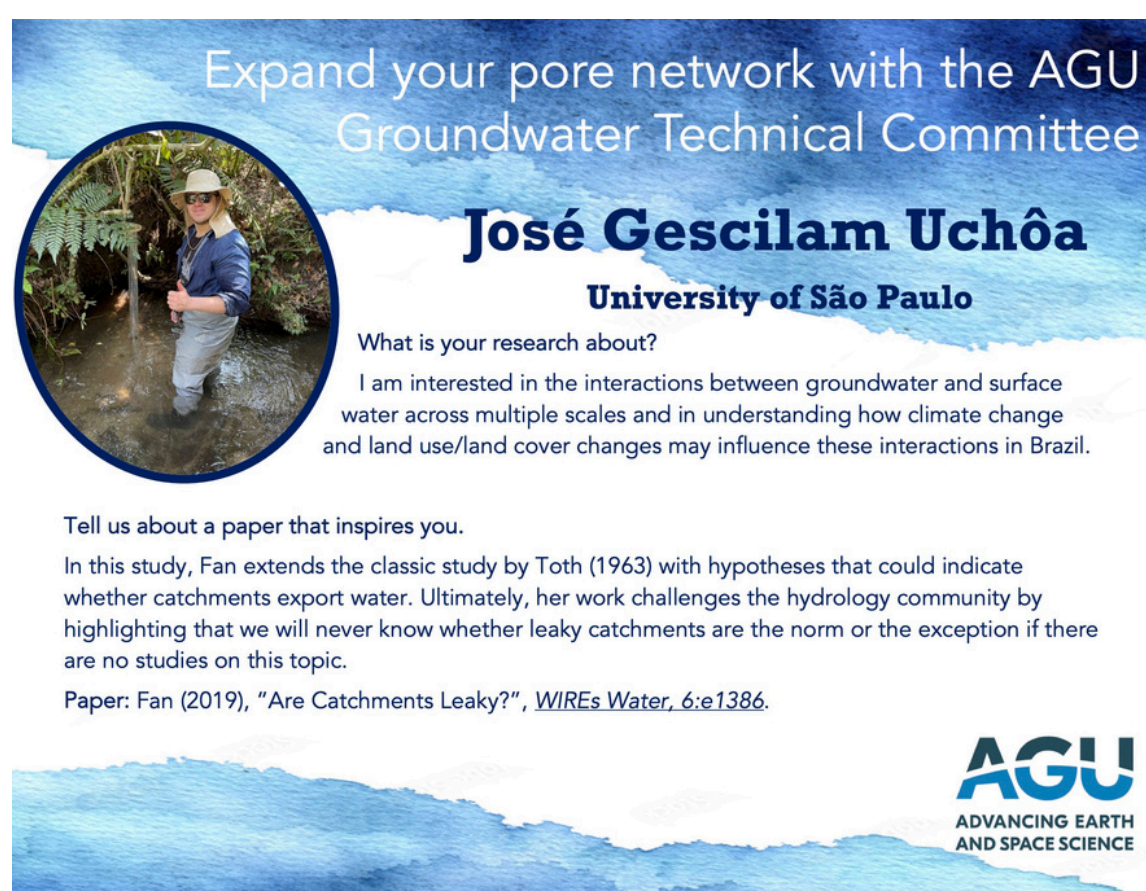
Students are encouraged to submit photographs or short videos that capture their groundwater research, including fieldwork, laboratory experiments, modeling visualizations, or community engagement. The goal is to promote clear and engaging science communication while strengthening connections within the groundwater community.

The top three winners will receive an electronic certificate and monetary prizes (\$300, \$200, \$100). Students at all career stages are encouraged to participate. Submit [here](#) by May 31, 2026.

2. “Pore Network” Initiative

We continue to expand our “Pore Network,” led by GWTC member Kevin Roche (Boise State University), by providing groundwater researchers with a platform to introduce themselves. In each “Pore Network” submission, interviewees provide a brief overview of their research and share one paper that inspires them. In the past few months, we have featured:

- José Gescilam Uchôa (University of São Paulo)
- Seonkyoo (Sean) Yoon (University of Florida)



Expand your pore network with the AGU Groundwater Technical Committee

José Gescilam Uchôa
University of São Paulo

What is your research about?
I am interested in the interactions between groundwater and surface water across multiple scales and in understanding how climate change and land use/land cover changes may influence these interactions in Brazil.

Tell us about a paper that inspires you.
In this study, Fan extends the classic study by Toth (1963) with hypotheses that could indicate whether catchments export water. Ultimately, her work challenges the hydrology community by highlighting that we will never know whether leaky catchments are the norm or the exception if there are no studies on this topic.
Paper: Fan (2019), “Are Catchments Leaky?”, *WIREs Water*, 6:e1386.

AGU
ADVANCING EARTH
AND SPACE SCIENCE



Expand your pore network with the AGU Groundwater Technical Committee

Seonkyoo (Sean) Yoon
University of Florida

What is your research about?
My research explores the interactions between water flow, solute transport, geochemical reactions, and microbial processes to understand how these coupled processes in hydrogeologic systems influence the environment, shape ecosystems, and affect water resources.

Tell us about a paper that inspires you.
What excites me about this paper is its brilliant solution: introducing a unified parameter for matrix diffusion and using it to formulate an equivalent solute-release function. This allows complex, real-world effects to be accurately modeled within simpler single-fracture frameworks.
Paper: Wu et al. (2025), “Quantifying matrix diffusion effect on solute transport in subsurface fractured media”, *HESS*, 29, 5283-5298.

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ADVANCING EARTH
AND SPACE SCIENCE

Two recent featured “Pore Network” participants by our GWTC.

Be sure to follow us on X ([@AGU_GWHydro](#)), and on LinkedIn ([AGU Groundwater Hydrology](#)) for new “Pore Network” features. If you’re interested in submitting your own entry as a groundwater researcher, please fill out this submission form ([link](#)).

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Groundwater

Bo Guo (Chair; University of Arizona),

Tianyuan Zheng (Deputy Chair; Ocean University of China)

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3. Highlights of GWTC Members

- We welcomed two new committee members in the past year: Behzad Ghanbarian (The University of Texas at Arlington) and Reza Soltanian (University of Cincinnati). See the full list of GWTC members [here](#).
- Ilenia Battiato (Stanford University) won the [InterPore Award for Porous Media Research](#).
- Tianyuan Zheng (Ocean University of China) started serving as Co-Editor-in-Chief of the *Journal of Contaminant Hydrology*.
- Bo Guo (University of Arizona) started serving as Associate Editor of *Advances in Water Resources*.

4. Upcoming Conferences

- The 2026 edition of the Computational Methods in Water Resources (CMWR) Conference will be held June 28 – July 2, 2026, in Bologna, Italy. Visit the conference [website](#) to see more details.
- The 18th annual meeting of [InterPore](#) will take place May 19–22, 2026 in Nantes, France.
- The Geological Society of America (GSA) 2026 Meeting will be held October 11–14 in in Denver, Colorado.

Growing Hydrology's Future: AIH Pathways for the Next Generation



John Ramirez-Avila, Director of Academic Affairs (AIH),
Associate Professor & Co-Graduate Coordinator (Mississippi State University)

About the American Institute of Hydrology (AIH)

The American Institute of Hydrology (AIH) is an organization dedicated to certifying hydrologists in surface water, groundwater, and water quality. Founded in 1981, AIH strengthens hydrology as both a science and a profession by establishing certification standards, promoting ethical practice, and supporting education and training across the discipline.

A Commitment to the Next Generation of Hydrologists

AIH views the development of new hydrologists and related water-resources professionals as central to its mission. This commitment is reflected in programs that emphasize mentoring, applied learning, and early professional engagement.

AIH's work with the next generation includes:

- The AIH HEARS Mentorship Program
- The AIH DEI Scholarship
- Hands-on workshops and training activities across Latin America
- Waiving student membership fees

AIH HEARS: Supporting Student Training and Research in Hydrology

The Hydrology Education and Research Mentorship for Students (AIH-HEARS) Program supports student development through structured mentoring in hydrology, research development, data analysis, and technical writing, while introducing professional expectations and career pathways.

In 2025, AIH launched its first international AIH-HEARS pilot in Colombia, where students conducted a regional study involving rainfall analysis, precipitation data gaps, and watershed planning applications, guided by local advisors and an AIH mentor in the United States. Participants also benefited from a waived AIH student membership, which supported engagement with professional resources and structured mentorship.

In 2026, HEARS includes students from four countries and six universities, advancing their studies in watershed processes, stormwater runoff, sediment dynamics, hydrologic data analysis, and water-quality modeling, consistent with their academic training:

- United States - 5 mentees (3 universities)
- Colombia - 4 mentees (1 university)
- Argentina - 2 mentees (1 university)
- Ecuador - 1 mentee (1 university)

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AIH DEI Scholarship

The AIH Diversity, Equity, and Inclusivity (DEI) Scholarship expands access for students who have historically been underrepresented in hydrology. Since 2025, the program has awarded two scholarships each academic year. Awards include a one-year AIH membership and access to mentoring that supports professional preparation, early engagement with the hydrology community, and awareness of certification pathways.

AIH Workshops and Applied Training

AIH continues to deliver hands-on hydrology and stormwater workshops across Latin America, with applied training in hydrologic modeling, water-quality assessment, and watershed analysis. Developed using instructional frameworks from Mississippi State University, workshops implemented in Colombia, Ecuador, and Brazil reached full capacity and engaged more than 160 students and professionals. Participants completed rainfall-runoff analyses, hydrograph development, and stormwater control design and evaluation, strengthening their ability to link watershed behavior to engineering and management decisions.

Building on these results, AIH is expanding applied training in 2026 through a collaborative Stormwater Management program with the Universidad del Magdalena and Mississippi State University. Both early- and late-stage students complete a capstone design project, with scope and evaluation aligned with their academic level. Early-stage students apply course-based hydrologic methods, while late-stage students address additional design constraints, documentation, and technical justification. Projects integrate watershed characterization, rainfall-runoff estimation, hydrograph analysis, and stormwater-control design within a local planning context.

Waiving Student Membership Fees

Beginning in 2025, AIH initiated a policy to waive student membership fees for eligible full-time undergraduate and graduate students in hydrology-related programs. This effort reduces financial barriers and supports engagement with professional resources and standards, as well as awareness of AIH certification pathways. Continued participation aligns with demonstrated motivation to engage in professional development and progress toward certification.

Looking Ahead

Through mentoring, applied training, scholarships, and reduced barriers to participation, AIH supports student engagement with hydrology as a profession. These efforts reflect ongoing opportunities for students, educators, and professionals to engage with AIH's educational and certification programs.



Participants in the 2024-2025 AIH Latin America Hydrology Workshops.

Community Resources



Unlock powerful resources to help you grow in your career

Take full advantage of tools and opportunities designed specifically to support your professional growth—don't miss out!

- [Learn and Develop | AGU](#): Grow your skills and career with learning tailored for Earth and space scientists
- Resource Guides:
 - [Careers in Geosciences Resource Guide](#)
 - [Graduate School Resource Guide](#)
- [AGU Weekly](#) eNewsletter: delivered to your inbox every Thursday!



Impacted AGU Member Support Community

AGU has set up [a community](#) on AGU Connect for members impacted by job and funding losses. Participants can use this forum to share information and resources with one another. If you have any questions, please contact AGU's Section Support Team (agu-SectionHelp@agu.org).



Interviews with Interesting Hydrologists

The AGU Hydrology Section offers a [video series featuring interviews with eminent hydrologists](#) reflecting on key achievements in the field during the 20th century. These videos highlight the progression of hydrological science and offer valuable insights for scientists and educators alike.

Community Links

AGU Hydrology Section

Website: connect.agu.org/hydrology

BlueSky: [@hydrology-agu.bsky.social](https://bsky.app/profile/@hydrology-agu.bsky.social)

X: [@Hydrology_AGU](https://twitter.com/Hydrology_AGU)

Technical Committee Links

Catchment Hydrology

Website: hydrocatch.weebly.com

BlueSky: [@agucatchhydro](https://bsky.app/profile/@agucatchhydro)

LinkedIn: [AGU Catchment Hydrology](https://www.linkedin.com/company/agu-catchment-hydrology)

X: [@AGUCatchHydro](https://twitter.com/AGUCatchHydro)

Distributed Sensing

Website: connect.agu.org/hydrology/about/tc-committees/sensing

BlueSky: [@agu-sensing.bsky.social](https://bsky.app/profile/@agu-sensing.bsky.social)

Ecohydrology

Website: connect.agu.org/hydrology/about/tc-committees/ecohydrologymain

X: [@AGUecohydro](https://twitter.com/AGUecohydro)

Groundwater

Website: connect.agu.org/hydrology/about/tc-committees/groundwater

X: [@AGU_GWHydro](https://twitter.com/AGU_GWHydro)

LinkedIn: [AGU Groundwater Hydrology](https://www.linkedin.com/company/agu-groundwater-hydrology)

Hydrologic Uncertainty

Website: connect.agu.org/hydrology/about/tc-committees/hydro-uncertainty

X: [@AGU_HU](https://twitter.com/AGU_HU)

Hydrology Section Student Subcommittee (H3S)

Website: agu-h3s.org

X: [@AGU_H3S](https://twitter.com/AGU_H3S)

LinkedIn: [American Geophysical Union Hydrology Section Student Subcommittee \(H3S\)](https://www.linkedin.com/company/american-geophysical-union-hydrology-section-student-subcommittee-h3s)

Hydrogeophysics

Website: connect.agu.org/hydrology/about/tc-committees/hydrogeophysics

X: [@AGUhydrogeophy](https://twitter.com/AGUhydrogeophy)

Instagram: [@aguhydrogeophysics](https://www.instagram.com/aguhydrogeophysics)

Justice, Equity, Diversity, and Inclusion (JEDI)

Website: connect.agu.org/hydrology/about/tc-committees/hydrojedi

Precipitation

Website: connect.agu.org/hydrology/about/tc-committees/pretech

Facebook: [AGU Precipitation](https://www.facebook.com/AGUPrecipitation)

BlueSky: [@aguprecip.bsky.social](https://bsky.app/profile/@aguprecip.bsky.social)

Instagram: [@AGU_precipitation](https://www.instagram.com/AGU_precipitation)

LinkedIn: [AGU Precipitation](https://www.linkedin.com/company/AGU-Precipitation)

Remote Sensing

Website: connect.agu.org/hydrology/about/tc-committees/remote-sensing

LinkedIn: [AGU Hydrology Section's Remote Sensing Technical Committee group](https://www.linkedin.com/company/AGU-Hydrology-Section's-Remote-Sensing-Technical-Committee-group)

Soil Processes and Critical Zone

Website: connect.agu.org/biogeosciences/tc-committees/soils-spcztc

Unsaturated Zone

Website: connect.agu.org/hydrology/about/tc-committees/unsat

X: [@UnsatHydro](https://twitter.com/UnsatHydro)

Water and Society

Website: connect.agu.org/hydrology/about/tc-committees/water-and-society

X: [@AGU_WS](https://twitter.com/AGU_WS)

Google: groups.google.com/agu-water-and-society

Water Quality

Website: aguwaterquality.org/

X: [@AGU_WQ](https://twitter.com/AGU_WQ)

