

Water-monitoring technology earns ASU expert recognition from UN

By Julie Kurth, ASU News
June 22, 2026

By Lori Baker

Arizona State University global water expert [Jay Famiglietti](#) has received one of the world's most prestigious honors in water science: the [Prince Sultan Bin Abdulaziz International Prize for Water](#), to be presented during a ceremony at the United Nations Office in Vienna.

Famiglietti and his team of current and former graduate students and researchers — including ASU research scientists Hrishi Chandanpurkar and Karem Abdelmohsen — were awarded the creativity prize, the most significant of the five awards presented worldwide this cycle.

The award recognizes Famiglietti's pioneering work that transformed NASA satellite data into a powerful tool for tracking groundwater depletion and freshwater loss across the planet. His research helped turn observations from NASA's GRACE and GRACE-FO satellite missions into practical information used by scientists, policymakers and water managers to monitor drought, aquifer depletion and the impacts of climate change.

Awarded every two years, the prize recognizes groundbreaking contributions to solving global water challenges. Famiglietti's work has fundamentally changed how the world measures and understands its most critical freshwater resources.

Famiglietti is a Global Futures professor in the [School of Sustainability](#) and is involved with the [ASU Water Institute](#) at the [Julie Ann Wrigley Global Futures Laboratory](#). His multidisciplinary background spans geology, hydrology and civil engineering.

"I have been fortunate to work with some of the brightest and most creative students and postdocs throughout my career," he said. "This award is a testament to their hard work. Importantly, this prize shines a global spotlight on the importance of groundwater to water supplies, worldwide. We

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will use the attention to raise the profile of water resources in U.N. climate dialogues.”

Monitoring groundwater from space

Unlike traditional satellites that function like space-based cameras or thermometers, GRACE functions more like “a scale in the sky.” It consists of two satellites orbiting approximately 250 miles above Earth and about 125 miles apart. As the satellite duo flies over regions gaining or losing water mass, gravity pulls them slightly closer or farther apart. By measuring these tiny positional changes, scientists can map total water storage changes across the globe. One complete gravity field map takes about a month to assemble.

To isolate groundwater specifically, scientists must subtract out other water components — snow, surface water and soil moisture — using other satellite data, ground observations and models. Corrections also must be made for non-water mass changes like mantle convection and earthquakes.

Revealing a striking global picture

Findings from studying over two decades of satellite observations reveal that the Earth’s continents have experienced unprecedented freshwater loss since 2002, driven by climate change, unsustainable groundwater use and extreme droughts. Studies pinpoint major U.S. groundwater depletion hot spots in California’s Central Valley and the Ogallala Aquifer underlying 174,000 square miles in the central United States, spanning Colorado, Kansas, Nebraska, New Mexico, Oklahoma, South Dakota, Texas and Wyoming. Across the globe, studies identify groundwater depletion hot spots in northwestern India and Bangladesh, the Middle East and North China Plain.

Famiglietti served as the principal investigator for [a 2025 study](#) published in Science Advances that reveals drying areas on land are expanding at a rate roughly twice the size of California every year. And the rate at which dry areas are getting drier now outpaces the rate at which wet areas are getting wetter, reversing long-standing hydrological patterns.

Shaping public policy

GRACE data has been influential in shaping public policy, most notably in California. Fueled by a science communications campaign, it empowered the governor's office to sign the Sustainable Groundwater Management Act into law. GRACE data has also been incorporated into the U.S. National Drought Monitor for about a decade.

While the federal government has reduced funding for earth science research, Famiglietti said funding from the State of Arizona has allowed him to continue his work. He currently serves as director of science for the ASU-led Arizona Water Innovation Initiative, which has been funded by the Arizona Governor’s Office of Resiliency.

“The state project funding has allowed our team to clearly demonstrate the power of GRACE data for monitoring groundwater storage changes in critically depleted regions of the state and across the Colorado River basin,” he said.

A glimpse into the future

Famiglietti sees the holy grail of his research as integrating GRACE with other satellites (for example, radar and GPS) into data-assimilating digital twins — living models continuously corrected by real-world observations. He draws a parallel to autonomous vehicles, which do something similar by ingesting multiple data streams simultaneously for real-time decision-making. But he notes that water science receives a tiny fraction of the research investment.

“We do ourselves a disservice by not highlighting the value of water, and water data, to society,” he said. “If people understood that water is at the root of nearly everything they do, every product they buy, and all the food that they eat, then they would be far more willing to support significantly expanded funding for water research.”

This story originally appeared on [ASU News](#).

Main image



Jay Famiglietti's (center) research helped turn observations from NASA's GRACE and GRACE-FO satellite missions into practical information used by scientists, policymakers and water managers to monitor drought, aquifer depletion and the impacts of climate change. ASU photo