MISSOURI WATER CENTER

OCTOBER 2026 NEWSLETTER

Welcome

This month, we're celebrating the impact of Missouri Water Center research, innovation, and collaboration. Across Missouri and around the world, our faculty, students, and alumni are tackling important challenges through work that advances scientific discovery, protects natural resources, and strengthens communities.



In our newsletter, you'll find stories that highlight cutting-edge research, meaningful partnerships, and real-world solutions, from improving water quality and understanding environmental contaminants to supporting conservation efforts on a global scale. Together, these accomplishments reflect Mizzou's commitment to creating knowledge that makes a difference, while preparing the next generation of scientists and leaders to address tomorrow's challenges.

We're also excited to share opportunities to connect, collaborate, and engage with colleagues across the region through upcoming events and programs.

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In this issue

Discover how **Dr. Xiangqun Zeng's research group** is creating innovative technologies to help protect water resources and public health.

Learn how **Dr. Shokhrukh Jalilov and FAPRI-MU** are developing new ways to understand the financial impact of Missouri River flooding on agriculture.

Follow along with **Dr. Alba Argerich and Dr. Binbin Wang's** field day investigating how macrophyte beds may be helping clean water contaminants in Hinkson Creek.

Explore student and faculty research highlights, including **Govinda Khanal's big win at the CAFNR Research Symposium.**

And more!

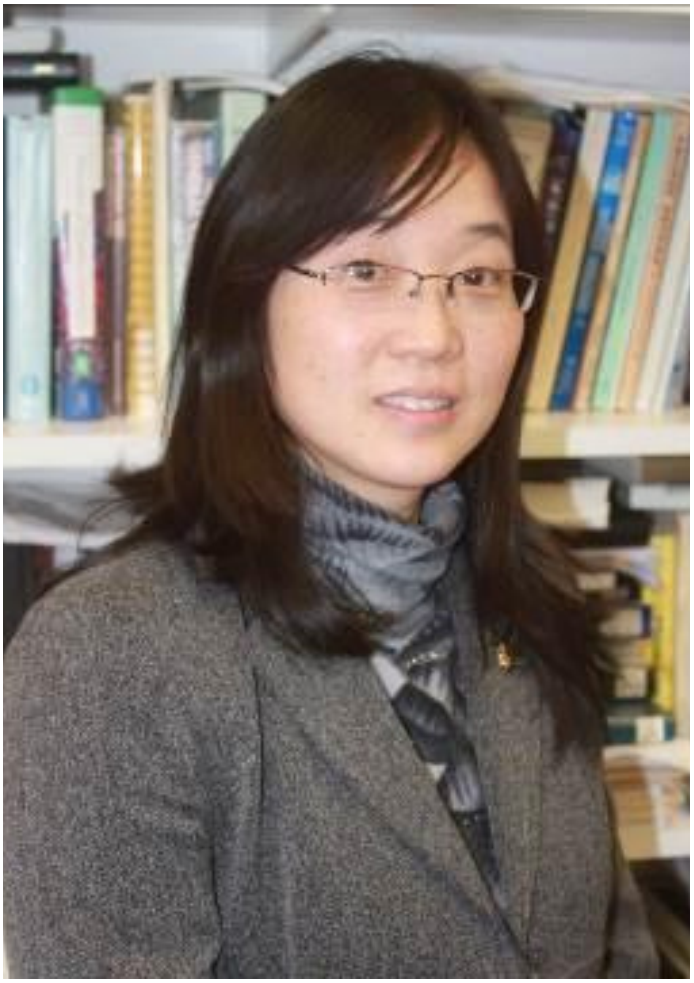


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News & Research

What if water pollution could be detected instantly using affordable, portable technology?



Dr. Xiangqun Zeng, an MWC affiliated faculty member and professor of chemistry at MU, is developing innovative technologies to help protect water resources and public health. Her and her group's research focuses on understanding how chemical reactions occur at electrode surfaces and applying that knowledge to create advanced sensors for water pollutant monitoring.

Zeng's research group designs next-generation chemical and biosensors, microelectrode devices and electroanalytical tools that can detect pollutants quickly and accurately.

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The team's goal is to develop sensitive, selective, low-cost and portable sensors capable of monitoring water quality in real time. These technologies can help identify harmful contaminants, such as heavy metals and other emerging pollutants. **MWC Scientist Pan Ni** also assists the group by providing trainings for those working on this project.

Recently, the group developed a low-cost electrochemical sensor for detecting heavy metals in wastewater, demonstrating the potential of these technologies for practical water quality assessment.

"By integrating fundamental interfacial science with innovative sensor engineering, our research aims to advance accessible and reliable water pollution monitoring technologies that support environmental sustainability, public health and water resource protection," said Zeng

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How much do Missouri River floods cost farmers? Researchers at FAPRI-MU are working to find out.



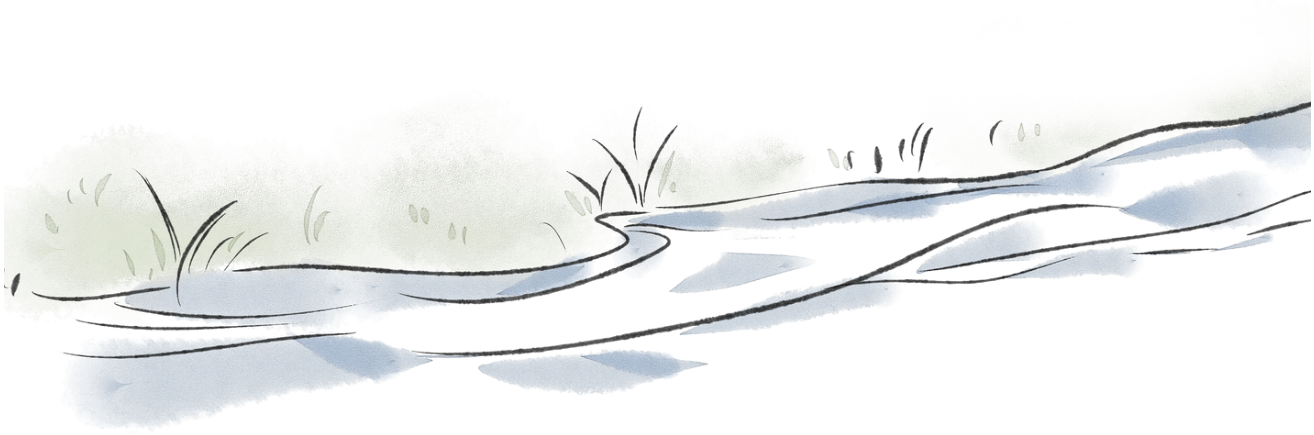
Researchers at the Food and Agricultural Policy Research Institute (FAPRI-MU) are developing new ways to understand the financial impact of Missouri River flooding on agriculture.

According to **Dr. Shokhrukh Jalilov**, MWC affiliated faculty member and assistant research professor in applied social sciences, the team has created and published two methods for estimating flood-related crop losses.

One calculates total crop damages and the value of flood protection measures, while the other examines how the timing of a flood during planting or the growing season affects potential losses.

Using these methods in Chariton and Holt counties, FAPRI researchers found that flood risks varies significantly along the Missouri River. Their analysis showed that expected annual crop losses are several times higher in downstream Chariton county than in Holt county.

The work is already making an impact beyond the university. The U.S. Army Corps of Engineers has incorporated FAPRI-MU data and research into a major flood-risk management study, helping improve estimates of agricultural damages and support future planning efforts.



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Can aquatic plants help clean up our waterways? That's the question researchers are investigating at Hinkson Creek.



Dr. Alba Argerich, associate professor in the School of Natural Resources and MWC core research faculty member, is studying how aquatic plants help improve water quality in Hinkson Creek.

To better understand how these underwater plant beds, known as macrophyte beds, filter pollutants from water, Argerich and her team spent weeks preparing for a recent field study.

With support from Sarah Smith, manager of the MU Aquatic Ecology Lab, and several student researchers, the team installed monitoring wells throughout the stream, including both control sites and wells within the macrophyte beds.

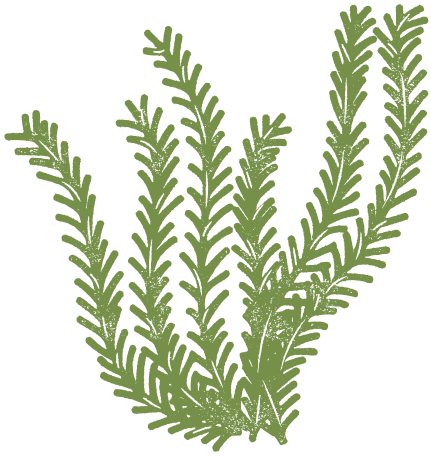
Researchers also deployed sensors along the creek to track water conditions such as oxygen levels, temperature and electrical conductivity. In addition, a drone from **Dr. Binbin Wang**'s lab was used to capture aerial footage of stream activity.

To trace how the water moves through the stream, Argerich introduced a specially prepared solution containing salt, nitrates and dye. The purple-colored solution made it possible to visualize water flow and track how materials moved through the study area.

"We have been doing a lot of water quality sampling in the macrophyte wells, but we have never done this type of injection here before," Argerich said.

The goal of this approach is to compare water conditions in plant-filled areas, control wells and surface water to determine whether aquatic plants and microorganisms are removing nutrients and other compounds from the stream.

The recent field effort served as a test run, helping the research team evaluate the method and ensure they can collect reliable samples for future studies.



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Decades of lake data at risk as funding dries up



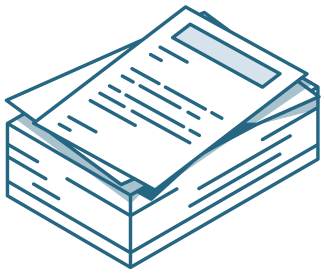
For decades, **the Statewide Lake Assessment Program** and **the Lakes of Missouri Volunteer Program** have defined and monitored the water quality of more than 65 lakes across Missouri. Together, these lake monitoring programs have collected more than 50 years of lake water data that helps scientists understand things like algal blooms and farm runoff. For more than half a decade, this data has ensured lakes are safe for people to recreate, use for industrial means and, in some cases, source for drinking water. The loss of one of Missouri's primary water monitoring programs will leave a critical gap in scientists' understanding of the health of the region's lakes — a gap that will have far-reaching effects on the people who live on, recreate and rely on Missouri's lakes for their living.

Read the full story

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MWC Moments



Latest research highlights!

Understanding Baseline Drift in Laser-Induced Graphene Electrodes and Its Impact on Heavy Metal Detection by Anodic Stripping Voltammetry: Comparison with Glassy Carbon Electrode

Dr. Xiangqun Zeng and **MWC Co-Director Dr. Baolin Deng** recently published a study in the *Journal of Electroanalytical Chemistry* that advances the development of low-cost, portable electrochemical sensors for monitoring toxic heavy metals in water and wastewater.

By integrating bismuth-modified low cost and scalable Laser induced graphene electrodes (LIG) with anodic stripping voltammetry and a simple baseline correction strategy, the research team demonstrated sensitive detection of Pb^{2+}, Cd^{2+}, Cu^{2+}, and Zn^{2+} at low parts-per-billion concentrations, with accurate lead detection demonstrated in a real-world water sample.

This work establishes a fundamental understanding and practical strategy for improving the reliability of inexpensive, miniaturized electrochemical sensors, paving the way for accessible, on-site water pollution monitoring and improved protection of environmental and public health.

Read the study

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Hydrophobic deep eutectic solvents for the efficient removal of priority polyfluoroalkyl substances from water

Dr. Gary Baker, MWC core research faculty member, recently published a study in *Environmental Science: Advances* that provides molecular-level design principles for developing improved task specific solvents.

Baker and other researchers evaluated four hydrophobic deep eutectic solvent formulations for the liquid–liquid extraction of perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS) from deionized and saline water, with quaternary ammonium- and phosphonium-based HDESs substantially outperforming naturally derived HDES formulations. The best-performing solvents achieved extraction efficiencies of up to 99.95% for PFOA and 99.98% for PFOS in saline water, demonstrating exceptional performance even under high-salinity conditions.

This work suggests that HDES-based extraction could offer a promising approach for concentrating PFAS from freshwater, saline water and industrial wastewater into smaller volumes for subsequent treatment or destruction, although solvent regeneration, capacity, and scalability remain to be established.

Read the study

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Three recent publications from FAPRI-MU

FAPRI-MU's agricultural flood risk team published three peer-reviewed articles in 2026 that together give decision-makers better tools for valuing the agricultural benefits of flood protection.

In **"Rapid Assessment of Flood-Induced Agricultural Losses to Support Infrastructure and Policy Decisions"** (Journal of Flood Risk Management), Maltsbarger, Tsay, Gedikoglu, and **Jalilov** present a practical method for estimating total crop losses from flooding, including prevented planting, yield reduction, and harvest losses, and for quantifying the losses that mitigation avoids, using Chariton County, Missouri, as a case study.

Read the study

In **"The Cost of Bad Timing: How Phenology and Frequency Determine Agricultural Flood Risk"** (Water Resources Management), **Jalilov**, Maltsbarger, and Gedikoglu show that when a flood happens matters as much as how big it is: a moderate flood that arrives while crops are in the ground can cause greater losses than a larger flood early or late in the season.

Read the study

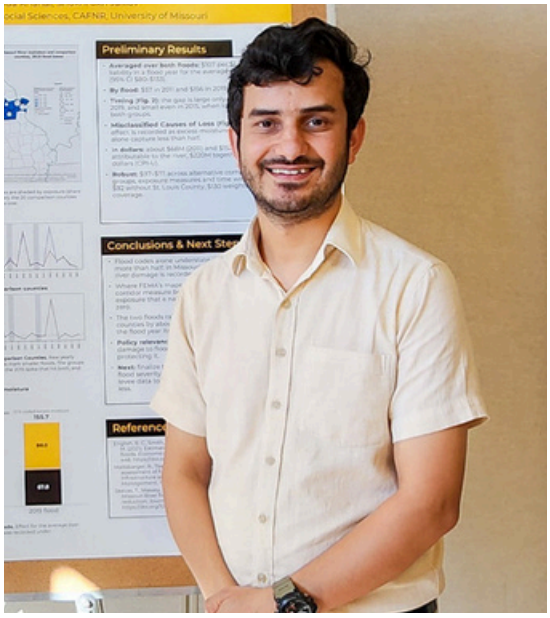
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A third article, **"Valuing the Hidden Benefits of Reservoir Storage: A Stochastic Assessment of Flood Damage Reduction in an Irrigation-Dominated System"** (Water), by Jalilov and Maltsbarger, applies the approach to Navajo Dam on the San Juan River in New Mexico, demonstrating that the methods transfer beyond Missouri. The team's work has also reached practice: the U.S. Army Corps of Engineers' draft Holt County flood risk management study (September 2026) drew on FAPRI input to estimate agricultural flood damages.

Read the study

Govinda Khanal's win at CAFNR Research Symposium



Congratulations to Govinda Khanal, a master's student who won second place in the graduate poster competition at this year's CAFNR Research Symposium!



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His poster, **“Rethinking How Crop Losses from Missouri River Floods Are Estimated,”** examines how the choice of valuation method changes estimates of crop losses from flooding, a question that directly affects how the benefits of levees and other flood protection are calculated in federal planning.

Dr. Shokhrukh Jalilov, Assistant Research Professor and MWC affiliated faculty member, served as advisor for this research.

Using 24 years of crop insurance records, Govinda found that a large share of flood is not recorded as "flood" but as "excess moisture," so counting only flood claims may significantly understate the true cost of flooding.

“Counting both together gives a fuller, low-cost measure of flood damage that can help inform decisions on flood protection and agricultural flood-risk management mechanisms,” he explained.

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In addition to receiving a certificate and poster award, Govinda was selected to present during the symposium's lightning talk session, recognizing both the quality of his research and his ability to communicate it effectively.

A second-semester master's student in Agricultural and Applied Sciences at the University of Missouri, Govinda hopes to build a career in water resources agricultural risk research, using data and economic analysis to help farmers, communities, and public agencies better prepare for and recover from floods and other water-related challenges.

Congratulations Govinda!

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Events

Collaborative science for water security and innovation

Nov. 3| 3:30 - 4:30 p.m. | Ag 2-6

Watch Missouri Water Center's Co-Directors Dr. Kate Nelson and Dr. Baolin Deng guest speak in the Johnny Morris Institute's seminar series.

The two will discuss their involvement and insights about groundbreaking research happening within the Center.

CUAHSI Water Science Exchange

Nov. 12-14| Preliminary agenda is available here.
University of Missouri - Columbia

This is a two-and-a-half-day gathering where water science researchers will come together for skill-building workshops, field trips and science poster and presentation opportunities.

Stay up to date with this event's information, visit this **link.**

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Thanks for reading this edition of our newsletter

For more information about the Center, visit our website at water.missouri.edu.

Baolin Deng, Co-Director
Kate Nelson, Co-Director
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The Missouri Water Center newsletter is published with funds provided by the U.S. Geological Survey, Department of the Interior, as authorized by the Water Resources Act of 1964.

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