

Marquette University: Receives \$3.8 million grant from Department of Defense for new “In Defense of Water” program

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MILWAUKEE — Marquette University has received a two-year, \$3.8 million grant from the U.S. Department of Defense for an interdisciplinary program, “Novel Technologies to Mitigate Water Contamination for Resilient Infrastructure,” to develop novel, sustainable technologies to protect the environment and to provide clean drinking water.

The project, which the researchers refer to as “In Defense of Water,” expands the water technology development researchers at Marquette have been doing for decades to help provide clean drinking water and protect the environment. It pairs the U.S. Army Engineer Research and Development Center (ERDC) with faculty from the Opus College of Engineering, Klingler College of Arts and Sciences and Marquette Law School.

“This award demonstrates the breadth and depth of water group expertise at Marquette,” said Dr. Jeanne Hossenlopp, vice president for research and innovation. “It serves as a reminder that our faculty does significant environmental-related research on a major scale. I hope and expect it will grow into a prosperous long-term partnership between Marquette and ERDC that will have great benefits in defending the water resources we all share.”

These projects aim to improve water security and efficiency at military and civilian installations to improve readiness and reduce operational impacts due to water shortages and employ innovative water management technologies. Furthermore,

the work addresses clean-up related to PFAS — “forever chemicals” — at current and former military installations, including many in Wisconsin.

“Wisconsin has a deep commitment to protecting the environment and providing clean drinking water so I’m extremely proud to support this collaboration between Marquette and Army Corps’ Engineer Research and Development Center,” said Sen. Tammy Baldwin who, alongside Rep. Gwen Moore, supported Marquette’s grant proposal. “This federal funding from the Biden Administration will advance made-in-Wisconsin research and produce results as we work together to take on dangerous PFAS contaminants and provide safe and clean drinking water to people across our state.”

“Access to clean drinking water is not only important to our military, it’s also essential to keeping our Milwaukee communities—especially our children—healthy and safe,” said Rep. Moore. “That’s why I’ll keep fighting to bring back funding to help keep Milwaukee universities like Marquette at the forefront of efforts to find innovative solutions to our world’s most pressing challenges in the 21st century.”

“In the Defense of Water” is composed of four areas that target water reuse; improved disinfection of persistent surface-associated pathogens; electrochemical removal of PFAS; and water data fusion and analytics to mitigate soil and water contamination:

- **Area 1: “Contaminant mitigation in decentralized potable water reuse systems”**
- **Lead, Co-Principal Investigator:** [Dr. Brooke Mayer](#), associate professor of civil, construction and environmental engineering.
 - This project will advance research and development of a mobile wastewater recovery system consisting of solids removal, disinfection with ozone, nutrient recovery and membrane processes. To return wastewater to drinkable standards, the multidisciplinary team will target advances in the ability of mobile systems to mitigate viruses, antibiotic-resistant bacteria and chemicals.
- **Area 2: “Investigating the effects of disinfection on the persistence of surface-associated pathogens”**
- **Lead, Co-Principal Investigator:** [Dr. Krassi Hristova](#), associate professor of

biological sciences and director of the Marquette Global Water Center

- This team will address timely environmental health issues heightened by two coinciding trends: the dramatic and apparently lasting increase in the use of disinfectants in buildings during the COVID-19 pandemic, and the rapid rise of illness-causing pathogens that are resistant to antiseptics or antibiotics. In particular, the team will investigate the microbial ecology of biofilms that form on everything water touches in buildings including pipes, sinks and shower curtains.

- **Area 3: “Electroremediation of PFAS”**

- **Lead, Co-Principal Investigator:** [Dr. Chris Marshall](#), *assistant professor of biological sciences*

- Widely used in food packaging, firefighting foam and other products, PFAS chemicals are toxic and accumulating in the environment, with inadequate remediation strategies available to address the threat they pose to human health. This team will advance research and development of an innovative two-step system involving electrochemical removal of PFAS and subsequent bioelectrochemical degradation and destruction.

- **Area 4: “Water data fusion and analytics for resilient infrastructure to mitigate soil and water contamination”**

- **Lead, Co-Principal Investigator:** [Dr. Anthony Parolari](#), *assistant professor of civil, construction and environmental engineering*

- This team will look at several external factors by developing a data- and policy-driven approach to mitigate water quality degradation, as well as data-driven optimization of green stormwater infrastructure performance. They will also identify policy roadblocks by evaluating and comparing legal, policy, and governance strategies that impact pollutant transport.

[Dr. Daniel Zitomer](#), chair and professor of civil, construction and environmental engineering, serves as the project’s principal investigator, while contributing to Area 1. Other faculty involved are [Dr. Patrick McNamara](#), associate professor, and [Dr. Walter McDonald](#), assistant professor, both of civil, construction and environmental engineering; and [David Strifling](#), director of the Water Law Policy Initiative and

adjunct professor of law.

The ERDC is an integral component of the Office of the Assistant Secretary of Defense for Research and Engineering and helps solve the nation's most challenging problems in civil and military engineering, geospatial sciences, water resources, and environmental sciences for the Army, Department of Defense, civilian agencies, and the nation's public good. The ERDC strives to be the world's premier public engineering and environmental sciences research and development organization.