

RESEARCH LEADERS

UNIVERSITY  
of GUELPH



**ED MCBEAN**

Canada Research Chair in Water Supply Security

# KEEPING WATER SAFE AND CLEAN

Risk analysis and waste-water filtration  
help communities prepare for the future



# Preserving and protecting our greatest natural resource

Water may just be the “oil” of our future. Fresh clean water may appear to be in abundance but, like oil, it is actually becoming scarcer for many reasons – increasing population, climate change and pollution, to name a few. In fact, water may be even more valuable than oil; after all, we absolutely need it to survive. That’s why researchers say that, although Canada has one of the largest freshwater supplies in the world, we need to work toward better preservation and protection of this invaluable resource, and offer our expertise to the world.

Engineering professor Ed McBean, Canada Research Chair in Water Supply Security, is leading research that assesses the vulnerability of water systems nationally and internationally, as well as finding solutions to emerging water safety and supply problems.

“As we move closer to a time when water isn’t in vast abundance, we’ll need to improve the ways in which we manage water systems to avoid wasting, overusing or contaminating supplies,” says McBean. “I’m focusing on detecting and managing risks in the most practical and economically viable ways possible.”

McBean is developing a monitoring system for what’s called Ontario’s “linear infrastructure” – that is, the sewage and clean water pipes that run beneath cities. Although they’re out of sight, they are not insignificant – the infrastructure’s value exceeds \$76 billion in Ontario alone. By collecting and modelling data from GIS records and commercial inspections, he’s able to determine the pipes that are likely to develop leaks based on pipe material, age, length and diameter, as well as surrounding soil conditions.

## Water may be the “oil” of our future

McBean says that this system will be able to help inspectors determine which sewage pipes need to be repaired before they leak and contaminate clean water. It will also help municipalities and provinces avoid costly and often imprecise underground inspections.

McBean is also part of the Southern Ontario Water Consortium (SOWC), a collaboration among the University of Guelph and seven other universities that helps private firms commercialize waste-water technology. Through more efficient and effective treatment, these technologies will make waste water a resource rather than a byproduct. From Guelph, this collaboration is based out of the SOWC Wastewater Treatment Facility.

McBean is extensively involved with First Nations water systems, with efforts to identify vulnerabilities resulting in drinking water advisories and to teach First Nations youth about safe drinking water.



*Ed McBean (left) and water resources engineer Emily Nickerson with their water-filtering clay pot.*

His work doesn’t end there. McBean is part of several international initiatives to provide affordable water filtering systems to developing countries. In Cambodia, his research team is introducing and improving a novel and affordable clay pot composed of rice husk, iron and silver nitrate. The pot’s surface acts as a filter, blocking 99.9 per cent of water-borne pathogens and destroying other harmful organisms.

Bangladesh has a different problem. There, groundwater naturally contains high levels of arsenic, which has devastating health consequences. To help mitigate this problem, McBean and his team are improving existing water filter systems. They’ve been able to eliminate 90 per cent of arsenic from drinking water.

He and his research group are now applying those technologies in China under the auspices of the United Nations Development Program.

“The goal of my research is to increase the safety of water supplies by improving those technologies that already exist and developing new ones,” says McBean. “This will benefit us now and in the future.”

Collaborators include Elliot Corston-Pine, Rachael Marshall, Emma Thompson, Yvonne Post and Cam Farrow.

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*This profile was written by Samantha Beattie and Joanne Pearce, Students Promoting Awareness of Research Knowledge (SPARK)*

The Canada Research Chairs program aims to boost the country’s capacity as a global research leader by supporting outstanding and emerging scholars and scientists. The program, administered by the federal government, invests approximately \$265 million per year in universities across Canada to attract and retain some of the world’s most accomplished and promising minds. Chairholders aim to achieve research excellence in engineering and the natural sciences, health sciences, humanities and social sciences. The program has established almost 30 research chairs at the University of Guelph.

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