



Georgia Institute of Technology

Water

Georgia Tech Research Institute Water Filtration System Testing and Training Center

SCHOOL

The Georgia Institute of Technology is one of the nation's top research universities, distinguished by its commitment to improving the human condition through advanced science and technology. Georgia Tech's campus occupies 400 acres in the heart of the city of Atlanta, Georgia, where 20,000 undergraduate and graduate students receive a focused, technologically based education.

Accredited by the Southern Association of Colleges and Schools (SACS)*, as a 4 year college, the Institute offers many nationally recognized, top-ranked programs. Undergraduate and graduate degrees are offered in the Colleges of Architecture, Computing, Engineering, Management, Sciences, and the Ivan Allen College of Liberal Arts. Georgia Tech is consistently ranked in *U.S. News & World Report's* top ten public universities in the United States.

GTRI is the applied research arm of Georgia Tech. GTRI's highly capable engineers and scientists are recognized worldwide for achieving the right mix of expertise and creative thinking to solve tough issues with practical solutions. They go beyond ideas to deliver solutions that work today. Customers experience greater flexibility and lower risk when teaming with GTRI to solve complex technical problems.

ABSTRACT

The Georgia Tech Research Institute (GTRI) has developed a water filtration systems Testing and Training Center designed to support international recovery and development efforts. Currently, seven systems are being operated and tested by students, research engineers, and scientists. The project is a collaboration between the GE Foundation, Assist International, the Emory Center for Global Safe Water and GTRI.

GOALS AND OUTCOMES

Goals

Systems evaluation goals include extended testing of at minimum 6 commercially available water filtration systems that are designed to provide safe drinking water in accordance with World Health Organization (WHO) Guidelines for Drinking-Water Quality. The anticipated outcome of the testing is a decision support tool capable of ranking the tested systems based on end-users project specific requirements. Additionally, a high level of communication is maintained with the filter manufacturers intended to provide feedback that can be used to improve products, advance the industry, and improve access to safe drinking water.

Through the rigorous incorporation of training into the systems testing process, a minimum of 5 students from an array of degree programs and at least one local high school student are expected to undergo field training, operate, maintain, and test the systems. Goals of the field training include providing hands on experience to students considering working in relief and/or development fields. Students who undergo the

training are expected to develop a fundamental knowledge of water filtration systems, practical hands-on technical skills, and to network with industry suppliers and end-users.

Accomplishments and Outcomes

Currently 7 water filtration systems are being operated and tested at the Georgia Tech Research Institute pond. Physical and chemical testing is routinely conducted by students. This fall a high school intern will join the team. Highlights from the water quality test include consistent reductions in turbidity (water clarity) and 100 percent coliform removal across all community scale systems as required by the WHO guidelines.

At the systems level, a robust evaluation method has been developed and implemented to quantify the intangibles that are often responsible for the success or failure of these projects. Rubrics are utilized at each step in the process including, procurement, installation, commissioning, operation, maintenance, winterization, and de-commissioning. Each rubric is customized for the process step and quantifies items such as “Technical Expertise Required”, “Tools Required” and, “Ease of Procedure”. The results of each rubric are being compiled as they are completed into an interactive decision support tool.

Challenges and Responses

Sourcing, installation instructions, and product revisions have resulted in significant challenges for several of the systems. In an emergency such as a flood aftermath, the consequences of slow system delivery can be significant. Going into field with the expectation of installing a system in a couple days then having over a month of delays can be demoralizing and frustrating to the team. However, the systematic documentation of the challenges in the rubrics has facilitated continued learning from each system. Once a problem such as poor installations instructions is quantified in the installation rubric, students appear more open to evaluating the systems operating performance with a clean slate, and ultimately we have learned from operating every system in the study.

Campus Climate Action: Your School’s Carbon Footprint

Although the short term effect on greenhouse gases on campus is minimal, the implication of the savings is large. Water is vital for life. Safe water is a critical world issue.

Commentary and Reflection

Side by side system testing in a “Consumer Reports” fashion provides a tremendous research and learning opportunity. Often the design intent and tradeoffs become apparent when operated next to other systems. For example, one system we tested has significantly lower part count and complexity but requires daily maintenance while another has automated controls that minimize maintenance activity but increase the risk of component failure. The market is fortunate for the array of technologies available, as each may be appropriate for different applications. We have the fortunate role of helping identify the right system for the job.

ENGAGEMENT AND SUPPORT

Leaders and Supporters

- GE Foundation
- Assist International
- Kevin Caravati, GTRI
- Joseph Goodman GTRI
- Molly Nelson GT undergraduate
- Laura Kovalchick GT/GTRI

- Andrew Foote GT Undergraduate

Funding and Resources

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National Wildlife Federation's Campus Ecology Program

Georgia Tech students won the 2010 NWF National Chill Out Video competition.

CONTACT INFORMATION

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Campus Sustainability History

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