

The ICTAS Water Group

An ICTAS Focus Area

Need for Research

Water is critical to life. With anticipated changes in weather patterns coupled with aging infrastructure and overuse of water resources, a time will come when water is valued as much as petroleum.

Virginia Tech (VT) has unique capabilities in the water and watersheds areas. The Occoquan Watershed Monitoring Laboratory (OWML) is a major environmental engineering field facility of the VT Civil & Environmental Engineering Department, and is located in the National Capital Region (NCR) in the City of Manassas. Investigators have conducted water quality research on this major drinking water source for the northern Virginia area since 1972. The Occoquan water supply system is the largest indirect potable reuse (of wastewater) system in the U.S.

Research in water and watershed sciences at VT has a long history and considerable expertise across five colleges and fifteen departments. Research ranges from detailed disciplinary studies to broad interdisciplinary projects. VT water research has been centered on basic science and engineering, but also has been extended to interdisciplinary studies and knowledge of watershed management and water and land policy.

Strategic Approach

In the area of infrastructure major initiatives are underway. The most important of these is providing information for the citizens of Washington DC regarding the presence of lead in the water distribution system, along with solutions to solve this problem. More and more cities are recognizing the problem of contamination and taste and odors associated with the distribution of water and Virginia tech is positioned to be the leading research team in this area.

The interdisciplinary WATER group within ICTAS will focus on water issues with the goal of insuring that we have adequate water supplies to all citizens. This will be carried out by focusing on three core areas.

- Providing safe and reliable infrastructure for the collection and conveyance of wastewater and stormwater and by providing safe and reliable water distribution systems within urban areas.
- Managing and protecting urban watersheds by control of runoff, protecting drinking water sources and managing urban contamination
- Providing the technological know how necessary for the effective treatment of wastewater and to provide reliable drinking water.

Mission

The mission of the ICTAS WATER GROUP is to conduct state of the art research that will insure high quality water resources and safe drinking water for the future. This will be accomplished through research supported by federal, state, and local



Secchi depth measurements in a reservoir

governments, along with private organizations to conduct high quality research that can be applied to the solution of complex water quantity and quality problems.

Vision

The ICTAS WATER GROUP intends to become the premier water quality research group in the country. As water resources become more at risk due to population growth, increased urbanization and the discharge of new and exotic contaminants, the ICTAS WATER GROUP will be sought as the organization to conduct research needed to solve these problems.



Algal bloom in a water supply reservoir



“Providing Water For the Future”

Key Personnel

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The use of a global positioning system in hydrographic surveys



Phosphorus removal using iron salts



Backwashing of a filter at a water treatment plant



Wastewater clarification unit for reclaimed water production

Providing safe and reliable infrastructure

Researchers are currently focused on understanding and preventing the deterioration of water lines and to understanding the causes for pipe deterioration that contribute lead and copper into the water lines. They are also working to prevent corrosion of sewers and pumping systems to reduce or eliminate environmental contamination that results from leaking infrastructure. There is also research underway to understand the impact of water transmission on taste and odor in water and to understand the causes and prevention of microbial growth in urban piping systems.

Managing and protecting urban watersheds

The focus of this area of research is to engage a multidisciplinary team of water quality and land use experts to develop a major integrated research thrust that focuses on the link between urban land use and water quality in urbanized and urbanizing watersheds. This thrust will build on existing research groups and focus on urban watersheds in the Northern Virginia area where drinking water shortages can be expected and the use of reclaimed wastewater is expected to grow.

Providing effective treatment of wastewater and reliable drinking water

The challenge of providing for the public health through effective management of wastewater and drinking water is becoming more difficult because of increasing populations, shrinking water supplies and new and emerging contaminants such as endocrine disrupting chemicals and pharmaceuticals. Solutions to the challenge will require innovative research to identify processes and approaches to water purification that are responsive to the existing links between wastewater and drinking water.

Experts from around the campus from a range of disciplines will focus on these problems. This may require the development of new materials to protect pipes, the use of membrane systems for purifying wastewater that is suitable for reuse, developing GIS tools for understanding the impact of urbanization on water quality, improving best management practices to improve the quality of runoff, and understanding how forests provide water quality protection in urban environments.