Arizona Water Quality Center

The University of Arizona at Tucson (lead institution) and Arizona State University at Tempe

Water Quality is a critical factor affecting human health and welfare. Any advance in our ability to preserve or enhance the quality of our water supplies is likely to come through state-of-the-art research.

A National Science Foundation Industry/University Cooperative Research Center since 1999

Center Mission and Rationale

The Arizona Water Quality Center consists of a prestigious group of research scientists within The University of Arizona (UA) and Arizona State University (ASU). Being a multi-university Center enhances the ability of both universities to achieve national status in the field. This interdisciplinary group of microbiologists, chemists, physicists, hydrologists, and engineers work together to resolve water quality problems. Funding for the Center is supplied by the National Science Foundation (NSF) and a variety of companies and agencies that are interested in specific water quality issues. This dynamic industry-university relationship makes the Arizona Water Quality Center unique. The combination of university expertise and corporate and government funding leads to scientific discoveries that can enhance water quality for the community at large.

The overall goals of the Center are:

- To improve the flow of scientific research knowledge between and among the two Arizona universities, industry, and the public
- To develop industry support for the Center
- To help train new scientists with a broad industrial perspective
- Ultimately to achieve self-sufficiency by fostering long-term federal, state, and local government partners.

Research Program

The objective of the two research sites is to investigate physical, chemical, and microbial processes that affect the quality of surface and subsurface waters, including potable supplies. Areas of interest within the Center at The University of Arizona include:

- Nucleic acid-based detection systems for pathogens and contaminants
- Microbial and chemical risk assessment
- Modeling fate and transport of chemicals and microbes
- Ecosystem restoration
- Vadose zone chemistry and microbiology
- Land application of biosolids
- Taste and odor of potable water.

Areas of interest within the Center at Arizona State University include:

- Molecular tracking of microorganisms in the environment
- Taste and odor of potable water
- Biofilm formation and pathogen intrusion in distribution systems
- Disinfection by-products formation and control
- Modeling the fate and transport of contaminants in the environment
- Characterization of Natural/Dissolved Organic Matter (NOM/DOM) in water
- Ground water recharge (surface application and aquifer storage and recovery).

Research will focus on the following six areas:

- Water security
- Fate and remediation of commercial/industrial contamination
- Agrochemical products and salinity that affect water quality
- Waste reuse
- Mining
- Potable water quality.

Applying the universities' research expertise and resources, the Center uses funding from the private sector to sponsor basic research into applied problems that are of interest to industry, government agencies, and the public.

Examples of Center projects at the two research sites include:

The University of Arizona

- Evaluation of disinfection by-products resulting from chlorination of groundwater
- Molecular methodology development for emerging pathogens in surface water
- Evaluation of heterotrophic plate count populations in drinking water
- Remediation technologies to enhance groundwater quality
- Mine tailing stabilization to protect surface waters

Arizona State University

- Detection and identification of *Cryptosporidium* in source water
- Occurrence of endocrine disruptors in raw and finished drinking waters
- Optimization of coagulation processes using atomic force microscopy
- Managing salinity accumulation in Arizona
- Development of algae-resistant cement-based canal surfacing materials.

Facilities and Special Programs

Examples of the major units involved in the Center at the two research sites include: *Soil, Water and Environmental Science; Hydrology and Water Resources; Agricultural and Biosystems Engineering; Watershed Management; Microbiology and Immunology; Plant Pathology; Civil and Environmental Engineering; Chemical Engineering; and Biology*. These units complement each other not only in terms of Center focal areas, but also in terms of a blend of science and engineering. The Center contributes substantially to the training and development of both graduate and undergraduate students. Students are exposed to the research and development activities of the Center. In addition, they can interact with companies from the private sector, and governmental and non-governmental agencies. This integration of the university with industry and government provides students with the opportunity to apply their skills to real-world problems. In addition, it prepares them for future job opportunities since there are opportunities for internships with industrial partners.

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