The Water Sustainability Initiative (WSI) is the first of five active faculty groups formed as part of the UI Cluster Hire Initiative. Nine WSI faculty affiliates from across the academic spectrum are working to understand and address issues related to a subject that affects us all: water sustainability.
WSI Mission Statement

The University of Iowa established the Water Sustainability Initiative (WSI) to advance research, education, and outreach activities regarding the stewardship and responsible management of our water resources. Working together, WSI faculty members will identify key challenges on a local, regional, and global scale regarding the availability, quality, reuse, AND health impacts of water resources and their relationship to a changing climate.

WSI is an interdisciplinary team of researchers and educators that encompasses the Colleges of Liberal Arts and Sciences, Public Health, Engineering, the Graduate College, the Public Policy Center, and the Iowa Flood Center. New faculty positions have been added to expand the University of Iowa’s existing research strengths in engineering, natural and social sciences, public health, and the humanities. The University of Iowa is committed to creating a sustainable campus through its support of the WSI, the UI Office of Sustainability, and the undergraduate Certificate in Sustainability.

The initiative also hopes to transform education for university students by providing additional graduate and undergraduate opportunities for interdisciplinary training and research, and by integrating sustainability concepts and behavioral change strategies to existing coursework. There is also a profound opportunity for the WSI to help inform upper-level high school students, community college students, and professional trades-personnel in the areas of sustainability literacy, applied mathematics, and information sourcing as it applies to future career paths. As the WSI continues to develop research and education programs oriented toward greater water sustainability, the team facilitates engagement with the university community, Iowa citizens, and the world.

Working together as an interdisciplinary team, WSI affiliates are committed to developing sound strategies and technological solutions to meet the challenges facing society’s growing need for sustainable water resources and to educate future generations of sustainable water citizens.
WSI Faculty Affiliates

The University of Iowa’s Water Sustainability Initiative (WSI) began in 2009, when the university announced it would create a cluster of new faculty positions to advance research, education, and outreach on water sustainability issues.

Water issues present the perfect combination of complexity and global scale for a multidisciplinary group effort. The WSI faculty members span the disciplines, from engineering and economics to public health and communications.

In 2013, the WSI faculty members who were not already faculty affiliates of IIHR—Hydroscience & Engineering (IIHR) joined the institute, while retaining primary appointments in their home departments. The WSI/IIHR partnership is already proving to be productive, given IIHR’s worldwide leadership in fluids-related research and education and the interdisciplinary expertise of the WSI members.
WSI faculty make up an interdisciplinary team that represents four colleges (liberal arts and sciences, engineering, the graduate college, and public health).

WSI faculty members collaborate on a variety of research projects. With a good understanding of each member’s research interests, they can look for synergies and opportunities that make sense to pursue together.

A better understanding of the broad context of water-related research, made possible by interdisciplinary collaborations, enables WSI affiliates to more completely address complicated water problems.

WSI faculty members currently hold more than 30 active grants, from agencies such as NSF, USDA, NIH/NIEHS, USHHS, the Nuclear Regulatory Committee, and more.
WSI Faculty Members

David Cwiertny *
Associate Professor
Department of Civil and Environmental Engineering
Assistant Research Engineer, IIHR
Pollutant fate and transport; Water treatment

Kajsa Dalrymple
Assistant Professor
Department of Journalism and Mass Communication
Assistant Research Scientist, IIHR
Intersections between science, strategic communication, and public policy

Tori Z. Forbes
Assistant Professor
Department of Chemistry
Assistant Research Scientist, IIHR
Fundamental actinide chemistry; Development of metal organic nanotubes

Craig Just
Assistant Professor
Department of Civil and Environmental Engineering
Assistant Research Engineer, IIHR
Freshwater mussels; Valdose zone; Wastewater nutrient removal processes

Hans-Joachim Lehmler *
Associate Professor
Department of Occupational and Environmental Health
Assistant Research Scientist, IIHR
Environmental, chemical, and analytical toxicology; Environmental contaminants

Ananya Sen Gupta
Assistant Professor
Department of Electrical and Computer Engineering
Assistant Research Engineer, IIHR
Environmental signal processing focused on anthropogenic impact on aquatic environments

* Indicates that the faculty member has been granted tenure
Aaron Strong
Assistant Professor
Department of Urban and Regional Planning
Assistant Research Scientist, IIHR
Environmental economics

Eric Tate
Assistant Professor
Department of Geographical and Sustainable Sciences
Assistant Research Engineer, IIHR
Social vulnerability/resilience indicators; Uncertainty and sensitivity in geospatial models

Adam Ward
Assistant Professor
Department of Earth and Environmental Sciences
Assistant Research Engineer, IIHR
Catchment science; Ecological implications of solute transport and fate
Water Sustainability Initiative

Major Research Funding

The WSI vision is to enable collaborative research in water sustainability that cannot be otherwise pursued. The group accomplishes this, in part, by identifying and pursuing funding for key water-related challenges.

The following list represents examples of recent and/or currently funded projects. Note that WSI faculty are achieving success at many levels, together and in collaboration with other faculty at the University of Iowa and other institutions.

Major Grants

- **Reversible Photohydration in Diene and Triene Steroids**—NSF, $395K (PI: D. Cwiertny)
- **Reaction of Carbon Nanotubes with Free Chlorine and Monochloramine Disinfectants**—NSF, $300K (PI: R. Valentine; Co-PI: D. Cwiertny and T. Mattes)
- **Development of Metal Organic Nanotubes with Unique Water Transport and Storage Properties**—NSF Career Award, $509K (PI: T. Forbes)
- **Faculty Development in Radiochemistry at the University of Iowa**—Nuclear Regulatory Commission, $450K (PI: T. Forbes)
Monsoon Harvests: Assessing the Impact of Distributed Storage Tanks on the Vulnerability of Subsistence-Level Agriculture in Tamil Nadu, India—NSF, $250K (PI: E. Tate; Co-PI: C. Just)

Critical Zone Observatory for Intensively Managed Landscapes (IML-CZO)—NSF through University of Illinois at Urbana-Champaign, $770K (UI PI: A. Bettis; SP: M. Muste, D. Schnoebelen, and A. Ward)

Iowa Nutrient Research Center—State of Iowa, $500K (UI PI: L. Weber; Co-PI: D. Schnoebelen and A. Ward)

Water-Quality Implications of Unique Transformation Processes of Synthetic Steroids—USDA through the University of Nevada-Reno, $226K (UI PI: D. Cwiertny; Co-PI: A. Ward)

RAPID: Using a Drought-Enhanced Nitrate Pulse to Understand Stream N Retention and Processing—NSF through University of Nebraska-Lincoln, $57K (UI PI: A. Ward)

MRI: Acquisition of Instrumentation (LC-MS/MS) for the Trace Analysis of Anthropogenic Organic Compounds and Their Metabolites in Various Complex Matrices—NSF, $238K (PI: G. Zhai; Co-PI: J. Schnoor, K. Hornbuckle, H-J. Lehmler, and L. Robertson)

Collaborative Research: Measuring Social Vulnerability—Reducing Uncertainty and Validating Indicators—NSF, $160K (PI: E. Tate)

Abbreviations
PI: Principal Investigator
Co-PI: Co-Principal Investigator
Co-I: Co-Investigator
SP: Senior Personnel
Educational Initiatives

Around the world, more and more people are recognizing the essential role of education in achieving sustainable development. At the University of Iowa, WSI faculty affiliates are creating coursework in a variety of disciplines that opens students’ minds to the complex, multidisciplinary issues and questions surrounding sustainability.

Certificate in Sustainability

WSI affiliates played a crucial role in the development of the Certificate in Sustainability, which draws from different disciplines to give students the knowledge and skills to contribute to developing sustainable systems. Students who earn the certificate will enhance their preparation for vocations such as researcher, corporate officer, technology specialist, farmer, government official, and grassroots advocate.

Water Sustainability Courses

Field Methods in Hydrologic Science
This course emphasizes hands-on experience with field equipment for students, including weekly laboratory experiences and multiple field trips during the semester. Students earn certification as a hydrologic technician from the American Institute of Hydrology. (GEOS:4680), Professor A. Ward

Topics in Mass Communication: Risk Communication
People justify risky behaviors in their lives because of basic perceptions of risk. Whether they are journalists, scientists, engineers, or are interested in public policy, students in this course learn to communicate the risks of our society to the general public. (JCM:3832), Professor K. Dalrymple
Introduction to Sustainability
Students learn about the skills and habits of a sustainable citizen. Subject areas include topics related to society, the economy, and the environment, as well as intersecting themes such as informed consumerism and eco-economics. (ENGR:4013), Professor C. Just

Water Resources
This course introduces students to the science and policy issues affecting water resources management in the United States. The course focuses on how the intersection of people, climate, technology, and geography affects the quality, availability, and demand for freshwater resources. (GEOG:2930), Professor E. Tate

Hazards and Society
Disasters are inflicting an ever-increasing toll on the health and wealth of nations and communities. This course explores the impact and societal responses to natural and technological hazards. (GEOG:3760), Professor E. Tate

Other WSI Courses

Environmental Toxicology
Students in this course explore the sources, routes of absorption, and effects of environmental toxicants affecting humans; and the pathophysiology of toxicant actions, including those of air and water pollutants, metals, pesticides, solvents, food toxicants, and chemicals. (OEH:5810) Professor H-J. Lehmler

Environmental and Natural Resource Economics
Students in this course learn about achieving allocative efficiency and cost-effectiveness when setting environmental policy. (ECON:3330) Professor A. Strong
Selected Publications

Every year WSI faculty members’ research results are published in dozens of peer-reviewed articles in journals representing their respective fields. This list represents just a few recent examples


**Recent Awards**

- David Cwiertny received the 2014 University of Iowa Early Career Scholar of the Year Award
- Tori Forbes received the 2014 University of Iowa Distinguished Mentor Award
- Adam Ward received the 2013 University of Iowa Distinguished Mentor Award
Current Collaborations

- Iowa Flood Center
- Iowa Department of Natural Resources
- UI Public Policy Center
- Office of Sustainability at the University of Iowa
- State Hygienic Laboratory
- Center for Global & Regional Environmental Research
- Engineers for a Sustainable World
- Take Back the Tap

WSI Steering Committee

Jerry Schnoor, Professor  
Department of Civil & Environmental Engineering  
Research Engineer, IIHR—Hydroscience & Engineering  
Water-quality modeling and dispersion processes

David Bennett, Professor  
Department of Geography  
The intersection of technology, policy, and science

Charles Connerly, Professor and Director  
Department of Urban and Regional Planning  
Segregation and growth management

Peter Damiano, Director  
Public Policy Center  
Professor  
Department of Preventive and Community Dentistry  
Access to care; Quality, cost, and outcomes of care

Tom Rice, Associate Provost for Faculty  
Professor  
Department of Political Science  
American politics, political behavior, and culture and politics

Sara Mitchell, Professor  
Department of Political Science  
International relations

Peter Thorne, Professor  
Department of Occupational and Environmental Health  
Air pollution, asthma, and environmental health and medicine

Lea Vandervelde, Professor  
College of Law  
Employment law, property law, legal history, and constitutional law

Larry Weber, Professor  
Department of Civil & Environmental Engineering  
Director  
IIHR—Hydroscience & Engineering  
Fish passage facilities, physical modeling, river hydraulics, hydropower, and computational hydraulics