

# SPECIALTY AREA: HYDROLOGY & HYDRODYNAMICS



## OVERVIEW

### RESEARCH TOPICS

- Surface Water
- Climate and Water Resources
- Infrastructure & Smart Cities
- Water Resources Management
- Water-Food-Energy Security
- Infrastructure Resilience
- Environmental Fluid Mechanics
- Coastal Oceanography
- Remote Sensing
- Sediment Transport
- Rip Current Dynamics

### DEGREE PROGRAMS

- Master's Program:
  - Coursework-only
  - professional track
- Ph.D. Program

UW CEE Hydrology & Hydrodynamics researchers address pressing societal issues related to water by investigating the supply and quality of the world's freshwater, predicting flood and sedimentation risks and managing water resources in developing nations by building innovative tools. This research area encompasses two related areas of study: hydrology and hydrodynamics.

**Hydrology:** The hydrology area focuses on monitoring, modeling and predicting water resources both above and below the Earth's surface. Researchers work to improve the understanding and prediction of water resources driven by snow and glacial melt runoff, streamflow variability, flood risks, water quality, erosion and sediment transport, and ecosystem response. The hydrology area also examines water resource challenges driven by global change such as droughts, groundwater contamination, water and human health relations.

**Hydrodynamics:** The hydrodynamics area examines the behavior of fluids in the environment. Researchers explore the behavior of fluids in natural flows that are influenced by a variety of factors, such as turbulence, the Earth's rotation and density stratification, when density differences causes water to separate into distinct layers. Research projects explore the fluid dynamics of rivers, estuaries and the coastal ocean, investigating topics such as sediment transport and fish passage.

## Best Graduate Schools

UW CEE received the following rankings from *U.S. News & World Report* for 2018:

**#12** best graduate school in environmental engineering

**#16** best graduate school in civil engineering



## FACULTY

### Hydrology:

Faisal Hossain  
Erkan Istanbuluoglu  
Jessica Lundquist  
Rebecca Neumann  
Bart Nijssen  
David Shean

### Hydrodynamics:

Alexander Horner-  
Devine  
Andrew Jessup  
Nirnimesh Kumar  
James Thomson

## CAREERS

Advanced degrees in the hydrology and hydrodynamics area prepares engineers for careers in a variety of areas including water resources engineering, coastal engineering, environmental restoration and management, risk management and design of hydraulic systems.

## RESEARCH FUNDING

Research is funded by federal and state agencies such as the National Science Foundation, NASA and Environmental Protection Agency.

## STUDENT RESEARCH



### Better Forecasting Water Supply

Accurately forecasting the amount of water stored as snow is critical, as meltwater is essential for agriculture and municipal use during summer and dry periods. With the goal of better estimating snowmelt via satellite observations, a team of researchers including Ph.D. student William Currier visited Yosemite National Park, Calif. The researchers dug trenches in the snow in order to measure the temperature change from the snow surface to the ground. They compared their observations with data gathered from satellites to evaluate the accuracy.



### Exploring Sediment Transport in Coastal Seas

Understanding how sediment is transported to the ocean is increasingly important, due to the potentially negative impact on water quality and marine life habitat. To better understand how freshwater from rivers interacts with the ocean environment and influences the transport of coastal sediment, researchers from the Environmental Fluid Mechanics Group, including Ph.D. student Raul Flores Audibert, traveled to the Netherlands. Along the Dutch Coast, the researchers deployed instruments to gather data they will use to investigate flow dynamics.



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