



Research

Improving the Efficiency of Wastewater Recycling Systems

Associate Professor Yi-Hsueh Chuang from our university's Graduate Institute of Environmental Engineering is dedicated to optimizing advanced oxidation processes (AOPs) in wastewater recycling systems. Professor Chuang's research focuses on different photocatalytic oxidants as part of AOPs, conducting in-depth investigations into the chemical mechanisms and reaction pathways involved. The research results are used to establish mathematical models applied to the design of treatment units and optimization of operating conditions. This research offers a solution for addressing future water shortages by advancing domestic wastewater treatment into alternative potable water sources. The project has been recognized with the 2022 "Ta-You Wu Memorial Award" by the National Science and Technology Council.

Mitigating Land Subsidence in Yunlin County

Professor Chein-Way Huang from the Department of Civil Engineering at our university focuses on the issue of land subsidence in Yunlin County, particularly its impact on the safety of Taiwan's High-Speed Rail. Using gravity measurement techniques, Professor Huang's team has established seven gravity observation points in the southern part of the Zhuoshui River alluvial fan—five in the subsidence area and two above unconsolidated aquifers—to estimate groundwater storage changes through residual gravity variations. The findings indicate that subsidence caused by excessive groundwater extraction can be mitigated by developing unconsolidated aquifers with recharge potential. The study recommends integrating gravity measurements with electrical resistivity imaging (ERI) to develop artificial recharge lakes, thus effectively alleviating subsidence and promoting sustainable water resource management. These findings have been published in the international journal *Engineering Geology*.

Social Impact

Enhancing National Water Resource Management and Disaster Response Capabilities

In response to the increasingly extreme rainfall patterns and higher frequency of events caused by climate change, the Disaster Prevention and Water Environment Research Center at our university has assisted the Seventh River Management Office of the Water Resources Agency in developing a 24/7 disaster prevention and response mechanism. This initiative aims to create a technological disaster monitoring and early warning environment for the region and develop an intelligent disaster prevention decision-making system. The system reduces the response time from days or hours to mere minutes or seconds, significantly improving the county government's ability to make quick disaster prevention and response decisions.

Hosting the "Sustainable Use of Groundwater Resources During the Century Drought" Seminar

To promote the sustainable management of groundwater resources, our university co-hosted the 15th Groundwater Resources and Water Quality Protection Symposium and the Annual Meeting of the Taiwan Association of Groundwater Resources and Hydrogeology. This year's seminar theme was "Sustainable Use of Groundwater Resources During the Century Drought." The seminar focused on topics such as groundwater resource planning, water quality protection, hydrogeological characteristics, adaptation strategies to extreme climate, groundwater quality protection, fostering knowledge exchange, and developing innovative technologies for groundwater resource and water quality protection in Taiwan.



Education & Cultivation

Reading Group on "Watershed Reform" in Western Taiwan

Our university's International Center for Cultural Studies is hosting a reading group on "Watershed Reform" in Western Taiwan. Through three field study projects, the group will focus on issues related to Taiwan's urban development and hydrological changes. The first session, "Taoyuan Aerotropolis," will lead participants through the changing reality of Taoyuan's ponds and rural labor communities. The second session in Hsinchu, titled "Touqian River," will take participants from the upstream Shouping Creek and along the various water intake and output points of the Touqian River, observing how water flows through different sections. The third session in Taipei will explore the religious practices of temples dedicated to Yinpong and Yinpua on Shezi Island, discussing the interwoven relationship between humans and water on an ontological level.



06 CLEAN WATER AND SANITATION

Education & Cultivation

Student Team Creates Green Water Solutions

In response to the growing water shortage and rising environmental awareness, the Arete Honors Program's Electrical Engineering division students formed a student startup team called "Water Continuation." This team aims to provide innovative green water supply systems for high-tech, water-intensive industries by integrating water resource allocation strategies for campsites, agricultural land, and major industrial water users. They have also established a "Water Rights Fulfillment" system for water source transactions among supplying enterprises, aiming not only to alleviate Taiwan's current water scarcity but also to promote the sustainable value of ESG for corporations. In 2024, the team will collaborate with the university to install small underground water storage devices for field trials, contributing to the achievement of sustainable development goals.

photo / Hsinchu City as Museum (2024)
<https://hsinchucitymuseum.hccg.gov.tw/home/zh-tw/assets/757>

Stewardship

Enhancing Campus Flood Resilience

Surveillance cameras have been installed near the Tingpu Canal adjacent to the Boai Campus to strengthen flood response capabilities. During heavy or continuous rainfall, security personnel can closely monitor the canal's water level through surveillance footage, and administrators from the Office of General Affairs can use mobile apps to monitor water level changes in real-time. If there is a rapid rise or the water level reaches a warning threshold, relevant departments will be immediately notified to activate flood control mechanisms, enhancing the campus's flood resilience. The school has also planned several drainage improvement projects, with completed works including rerouting sewage discharge paths, improving drainage systems, and advancing stormwater sewer connections to comprehensively improve the campus's overall drainage system and further enhance flood resilience.

Response Measures for Tritium-Contaminated Water Discharge

In response to the release of tritium-contaminated water from Japan's Fukushima plant, which has raised concerns among the public about potential impacts on marine water quality and seafood safety, the university's Environmental Protection and Safety and Health Center held a seminar titled "Understanding the Characteristics of Tritium and Taiwan's Response to Japan's Tritium Water Discharge." The seminar covered the properties of tritium, provided an overview of Japan's discharge plan and IAEA's oversight operations, and discussed Taiwan's countermeasures. It also addressed public concerns regarding Japan's tritium discharge through a Q&A session.