2nd KU–NTU Joint Workshop on River Sediment Replenishment and Eco-Engineering Development (ReSEED): Bridging Rivers and Knowledge

Date & Time: Wednesday, the 29th of October 2025, 9:00-12:30 (Japan time)

Venue: **S-519D, Disaster Prevention Research Center (DPRI), Kyoto University, Gokasho, Uji City, Kyoto, Japan**

For online participants via zoom platform:

Topic: Sediment Replenishment Workshop

Time: Oct 29, 2025 09:00 AM Osaka, Sapporo, Tokyo

- Join Zoom Meeting
  https://kyoto-u-edu.zoom.us/j/98771256203
- Meeting ID: 987 7125 6203
- Passcode: 807843

Background

The Kyoto University–National Taiwan University (KU–NTU) collaboration on sediment replenishment and eco-hydrological monitoring aims to advance sustainable river management through shared scientific knowledge and field-based innovation. The partnership began with the implementation of sediment replenishment experiments in the Naka River in Tokushima, Japan, where field surveys and continuous monitoring were conducted to assess downstream sediment dynamics and ecological responses. Building on this foundation, the collaborative framework was extended to the Zengwen River below the Zengwen Dam in Taiwan, with the goal of transferring technical expertise and establishing a long-term observation and modeling network.

In the Zengwen River, real-time monitoring systems, including high-resolution cameras and water-level gauges, have been installed to track and evaluate the effectiveness of sediment replenishment operations. Using image-based hydrological techniques such as Large-Scale Particle Image Velocimetry (LSPIV) and Space-Time Image Velocimetry (STIV), the project team analyzes flow conditions and sediment movement during replenishment events. In parallel, advanced AI-based optical flow methods are being applied to improve the accuracy of flow velocity estimation and to predict sediment transport patterns and morphological evolution of the river channel.

These efforts aim to establish a comprehensive methodology for assessing the short- and long-term impacts of sediment replenishment on downstream reaches, thereby supporting eco-hydrological restoration and sustainable river management in both Japan and Taiwan. The collaboration represents a pioneering step toward developing an international network for data-driven, nature-based river restoration.

Objectives

- Share and discuss recent findings from sediment replenishment monitoring in the Naka and Zengwen rivers, focusing on sediment behavior, flow characteristics, and morphological evolution.
- Enhance collaborative research between Kyoto University and National Taiwan University through joint data analysis, comparative studies, and co-development of monitoring and modeling frameworks.
- Advance the application of AI and optical flow techniques for real-time flow and sediment monitoring to improve predictive capabilities.
    - Strengthen the scientific network for sediment management, eco-hydrological monitoring, and ecological restoration across Asia.
    - Identify future research directions and joint publication opportunities, ensuring the continuity and expansion of the KU–NTU collaboration.

Main Theme:

"Bridging Rivers and Knowledge: Integrating Sediment Replenishment, Image-Based Analysis, and Ecological Assessment for Sustainable River Restoration."

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Workshop Opening Session		
9:00 – 9:10	Opening Remarks and Workshop Overview	***Prof. Dr. Sameh Kantoush*** (DPRI, Kyoto University, Japan)
Section 1: Sediment Replenishment and River Restoration 9:10 –10:40 (1 hr 30 min)		
9:10 – 9:40 (30 min)	Self-Regulating Sediment Management System Combining River Widening, Seigyu, and Sediment Replenishment: Toward Sustainable Flood Control and River Environment Restoration	***Prof. Dr. Sameh Kantoush*** (DPRI, Kyoto University, Japan)
9:40 – 10:10 (30 min)	Using SRH-2D to Simulate Sediment Replenishment and Improvement Measures at the Nagayasuguchi Dam	***Prof. Dr. Gene You*** (National Taiwan University, Taiwan)
10:10 – 10:40 (30 min)	Types of gravel bars and pool–riffle beds required for ecosystem recovery through sediment supply in degraded river channels	***Associate Prof. Dr. Sohei Kobayashi*** (DPRI, Kyoto University, Japan)
10:40 – 10:50	***Coffee Break***	
Section 2: Image-Based Hydrology and AI-Enhanced Monitoring 10:50 – 12:20 (1 hr 30 min)		
10:50 – 11:20 (30 min)	Machine learning approaches for hydrological applications	***Associate Prof. Dr. Mohamed Saber*** (DPRI, Kyoto University, Japan)
11:20 – 11:50 (30 min)	Image-Based Detection and Motion Analysis of Urban Flood Drifters Using Deep Learning and Optical Flow Techniques	***Eng. Lu Cheng-Lin*** (DPRI, Kyoto University, Japan)
11:50 – 12:20 (30 min)	Real-Time Measurement of Flow Patterns using LSPIV, STIV and Deep Learning-Based Optical Flow Models	***Eng. Lee Meng-Han*** (DPRI, Kyoto University, Japan)
Workshop Closing Session		
12:20 – 12:30 (10 min)	Closing Remarks and the Way Forward	***Prof. Dr. Sameh Kantoush*** (DPRI, Kyoto University, Japan)