North Dakota Water Resources Research Institute (NDWRRI) Seminar Series

Cumulative impact dams and climate change on the hydrology of the Mekong River

Dr. Hien Le, Chuo University, Japan

Date and Time: Mon. 01/26/2026

3:30 - 4:30 PM (CST)

Via Zoom, Meeting ID: 995 0056 5246 Passcode: 920171

https://ndsu.zoom.us/s/99500565246

Abstract:

Accurate rainfall estimation at high spatial and temporal resolutions remains a challenge in data-scarce and topographically complex regions. This study introduces a novel deep learning framework that fuses radar and gauge rainfall using Convolutional Neural Networks (CNNs) with a radius of influence strategy—extracting radar grids around each gauge to learn spatial rainfall patterns without relying on dense station networks. Validated over the Huong River Basin in Vietnam, the model demonstrates strong generalization under hourly data, achieving a mean RMSE of 1.08 mm/h and NSE of 0.96 across 17 stations. Compared to the Quantile-Adaptive Gaussian (QAG) benchmark, the CNN model better captures localized extremes and spatial rainfall gradients. A continual learning extension (CNN_S4) maintains high accuracy with new data, demonstrating resilience against catastrophic forgetting. The framework remains effective in transboundary and gauge-sparse regions, offering a scalable and adaptive solution for real-time flood forecasting.

Speaker biography:

Dr. Hien Le is currently an Associate Professor at Chuo University, Tokyo, Japan, and a research collaborator with Thuyloi University, Vietnam. He received his PhD in Constructional Disaster Prevention and Environmental Engineering from Kyungpook National University, South Korea. His research focuses on hydrology, remote sensing, and artificial intelligence, with specific interests in radar/satellite rainfall correction, flood forecasting, and sediment analysis using Earth observation data. Dr. Le has published extensively in international peer-reviewed journals and has been actively involved in interdisciplinary research across Southeast Asia and Japan.