

North Dakota Water Resources Research Institute (NDWRRI) Seminar Series

“General Unit Hydrograph Model and Its Applications?”

Presenter: Dr. Junke Guo, University of Nebraska

Date: Monday, October 5, 2026

Time: 3:30–4:30 PM (CDT)

Room: AGHILL 110 (NDSU)

Zoom link: <https://ndsu.zoom.us/j/98591740209>



Abstract

This seminar introduces the *General Unit Hydrograph (GUH) model*, a modern, analytical watershed-response framework that unifies and extends nearly a century of unit-hydrograph (UH) theory. After outlining the historical evolution from empirical UH methods to systems-theoretic and digital approaches, the talk presents the GUH model's mathematical foundation, including its exponential rising and recessing behavior, closed-form S-hydrograph structure, and its interpretation as a parallel-reservoir linear system. Key features such as the instantaneous unit hydrograph, finite-duration response, and principles of proportionality and superposition are highlighted. Applications in both gauged and ungauged watersheds are demonstrated, including parameter estimation, rainfall–runoff prediction, and an analytical reformulation of Snyder's synthetic UH. The seminar emphasizes how the GUH model provides a rigorous, scalable, and physically interpretable tool for contemporary hydrologic analysis and watershed modeling.

Speaker biography

Prof. Junke Guo is an Associate Professor of Civil and Environmental Engineering at the University of Nebraska–Lincoln, specializing in hydrologic modeling, open-channel hydraulics, and sediment transport. His research advances physically based rainfall–runoff modeling, watershed response theory, and sediment dynamics in engineered and natural channels. He has published extensively and is recognized for developing clear, practice-ready analytical tools for water-resources engineering.

