

North Dakota Water Resources Research Institute (NDWRRI) Seminar Series

“On the turbulent viscosity parameter C_μ in the $k-\epsilon$ model”

Presenter: Dr. Mishra Harshit, University of Alaska-Fairbanks

Date: Monday, November 9, 2026

Time: 3:30–4:30 PM (CDT)

Room: AGHILL 110 (NDSU)

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



Abstract

Hydraulic engineers rely heavily on commercial CFD packages that incorporate turbulence models to obtain design parameters. However, these models require careful tuning of model constants, which are frequently left at their factory defaults. In this seminar, I will demonstrate how these default values fail to capture specific hydraulic flow features and argue that recalibration is necessary using high-resolution Direct Numerical Simulation (DNS) datasets. Focusing on the popular $k-\epsilon$ model, I will show that the standard value of C_μ overpredicts turbulent viscosity by 50%. I will conclude with practical, analytical guidelines for selecting and calibrating appropriate turbulence models.

Speaker biography

Harshit Mishra is an Assistant Professor in the Department of Civil, Geological, and Environmental Engineering at the University of Alaska Fairbanks. His research focuses on incompressible wall-bounded and free shear turbulent flows. Prior to his current academic position, he was a postdoctoral researcher at Texas A&M University. He earned his doctoral degree from Colorado State University, where he received the ASCE Freeman Fellowship and graduated as Outstanding Graduate Student for 2024. He completed his undergraduate and masters in India.

