April 11, 2024

Dr. Tiantian Yang

Assistant Professor
University of Oklahoma

Seminar Details

April 11, 2024
2:30pm – 4:00pm

UH Campus: Agrawal Engineering Research Building (AERB) 100
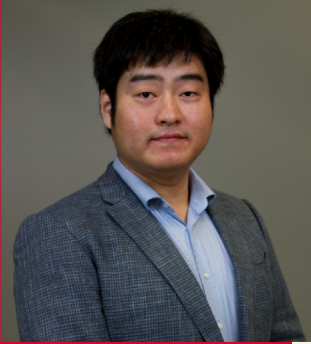
Online via Zoom
https://us02web.zoom.us/j/85778120523

Adaptive Reservoir System Operation: Challenges and Opportunities in Subseasonal-to-Seasonal Forecasts and Physical-Informed AI/ML Models

ABSTRACT

Reservoirs are fundamental, human-built, multi-functional water infrastructures that collect, store, and deliver fresh surface water for a multitude of uses, including flood and fire control, recreation, wildlife habitat, residential, industrial, and agricultural water supply, hydro-electric power generation, supply source during droughts, and more. It is also a critical human-built engineering environment that intervenes with the hydrological cycles and natural systems. Reservoir release decisions directly influence various aspects of socioeconomic functioning and our nation's water resources security. In recent years, more frequent and severe abrupt weather extremes, climate change, natural hazards, aging infrastructure, and increases in water demands due to population growth, have placed another great barrier preventing the effective, sustainable, and flexible operation of the existing reservoir systems. Therefore, new technologies and capabilities are essentially needed to improve the existing reservoir operation and management "status quo" of water infrastructures in our nation. In this talk, Dr. Tiantian Yang will introduce his past and current research on improving Subseasonal-to-seasonal precipitation forecasts in support of reservoir system modeling and hydrologic ensemble forecasting, inspired by novel ways of combined physical models and Artificial Intelligence and Machine learning (AI&ML) tools. The uses of AI&ML tools are further discussed in terms of their pros and cons in solving different types of weather/climate, hydrology, and water resources engineering problems. Outreach and education are followed, in which Dr. Yang will highlight some innovative teaching approaches, fun research/teaching activities, and various public outreach efforts, with the overarching goal of fostering the next generation of STEM workforce in the interdisciplinary fields of weather/climate, hydrology, and water resources engineering.

BIOGRAPHY

Dr. Tiantian Yang is a tenure-track assistant professor in the School of Civil Engineering and Environmental Science (CEES) at the University of Oklahoma, and associate director of the OU Hydrology & Water Security online master's degree program. Before joining the University of Oklahoma, Dr. Yang worked in the private sector from 2015-2018 at Deltares Netherlands. Dr.Yang's Ph.D. degree was in Civil Engineering from the Department of Civil and Environmental Engineering of the University of California Irvine (UC Irvine). Yang's master's degree was in Mechanical Engineering from the Department of Mechanical and Aerospace Engineering at UC Irvine. His bachelor's degree was also in Mechanical Engineering and Aerospace from Tsinghua University, China. Yang's work is mainly supported by the NSF EPSCoR Track 1 program, the US Army Corps of Engineers (USACE)'s Engineering With Nature (EWN) program, DOE Clean Energy Research Center Water-Energy Technology (CERC-WET), U.S. Bureau of Reclamation Snow forecasting program, and the NSF CAREER program.