VANDERBILT
School *of* Engineering

DEPARTMENT OF CIVIL & ENVIRONMENTAL ENGINEERING

Seminar

Tuesday,

Feb. 13, 2024

3:00 pm

FGH 298

"EARTH SYSTEM MODELING, DATA ASSIMILATION & MACHINE LEARNING FOR HYDROCLIMATIC HAZARDS PREDICTION & RISK AWARENESS"

DR. HAMID MORADKHANI

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ABSTRACT

Extreme events impose significant global-scale socio-economic vulnerability and risk that are likely to increase in the future under climate change and human development. In particular, floods and droughts are the most prevalent catastrophic natural hazards in the United States. Such events cause billions of dollars in damage annually and significant losses of life and resources. The massive impacts provoked by these extremes are clear motivation for improved understanding of the key drivers to characterize them, account for associated uncertainties and quantify the vulnerabilities and risks.

This presentation will provide an overview of hydrometeorological predictability and predictive uncertainty with strategies that leverage the integration of in-situ and remotely-sensed satellite with Earth system models to better monitor and predict extreme events while characterizing the hazards, vulnerability and risk for more effective disaster management. Additionally, I will discuss some of our experiences in understanding and modeling climate-water-sustainability and food-energy-water nexus by providing local and global examples.

BIOGRAPHY

Dr. Hamid Moradkhani is the Alton N. Scott Endowed Chair of hydrology in the Department of Civil, Construction and Environmental Engineering and the founding and current Director of the Center for Complex Hydrosystems Research at the University of Alabama. Previously, he was a professor of Civil and Environmental Engineering and director of Remote Sensing and Water Resources lab at Portland State University. His research emphasis is on Bayesian data assimilation, predictive science, machine learning, data analytics, remote sensing and high-performance computing in the context of Earth system science. In addition, his research advances our understanding of hydrologic science through modeling climate-water-human interactions and food-energy-water nexus. He is the Editor of AGU Water Resources Research and before that was the Editor of AGU Earth's Future and on the editorial board of several other journals. He is a Fellow of the American Society of Civil Engineers, Fellow of the Environmental and Water Resources Institute, and the Diplomat of water resources engineering and recipient of several awards, including the AMS Horton Lecturer Award, ASCE Arid Lands Hydraulic Engineering award, Outstanding Research and Innovation Award from the American Association of Water Resources Engineers, Faculty Research Excellence Award, and Branford P. Millar Award, for exceptional scholarship in research, instruction, university and public service.