MECHANICAL ENGINEERING COLLOQUIUM

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TIME: 5.15 PM

VENUE: FB-370

HYDROCLIMATIC EXTREMES UNDER CLIMATE CHANGE: ADVANCING PROCESS UNDERSTANDING AND PREDICTIONS

ABSTRACT

Global warming has resulted in an unequivocal increase in hydroclimatic extremes with devastating consequences. Together with an increase in exposure and vulnerability exacerbated by burgeoning inequalities, the impacts of extreme weather events have intensified, highlighting the urgent need for climate resilience through adaptation and mitigation measures.

Understanding the non-linear interactions between global mean temperature changes and spatiotemporal variabilities in extremes is key to building resilience. In this talk, I provide an overview of anthropogenic warming and its impacts on extreme weather events, with focus on floods, one of the major disasters that globally accounts for significant human mortalities and infrastructure damage. The talk dissects the cascading uncertainties in the translation of temperature extremes to rainfall extremes and then to riverine floods and summarizes the major drivers of floods and their projected changes. Finally, the talk provides a glimpse into the ongoing research focus at our lab at IIT Kanpur at the intersection of hydroclimatic extremes and climate change.

ABOUT THE SPEAKER

Dr. Nanditha J. S. joined as an Assistant Professor at the Kotak School of Sustainability at IIT Kanpur in 2025. Her research areas are hydrological modelling, statistical modelling of hydroclimatic extremes, land-atmospheric drivers of extremes, machine learning applications, and forecasts and predictions of extreme weather events. Previously, she worked as a postdoctoral research associate at Princeton University, NJ, US, and at the University of Iowa, IA, US. She completed her PhD in Civil Engineering from the Indian Institute of Technology Gandhinagar.