ICTS | INTERNATIONAL CENTRE for THEORETICAL SCIENCES

TATA INSTITUTE OF FUNDAMENTAL RESEARCH

ICTS Fluid Seminar (HYBRID)

Title : Understanding climate variability with statistical machine learning and artificial intelligence

Speaker : Bedartha Goswami (University of Tübingen, Germany)

Date : Tuesday, 29th August, 2023

Time : 11:00 AM (IST)

Abstract : Recent years have seen a boom in the application of statistical machine learning and artificial intelligence methods to tackle problems in meteorology and climate science. In this talk, I will present three projects ongoing in my group that use machine learning concepts to understand climate variability. I will show how we can use similarity-based networks of climate time series data to reveal new propagation pathways of extreme rainfall over South Asia that might potentially be useful for early warning systems of extreme monsoonal rain. Next, I will present how we can use principal component analysis in combination with Gaussian Mixture Models to categorize extreme phases of the El Niño Southern Oscillation (ENSO) and show how the Eastern Pacific El Niño is better modeled as two separate categories: a weaker 'canonical' form and an extreme El Niño, both of which show distinct idiosyncratic onset and development. Last, I will present how we can leverage deep learning to develop purely data-driven models for subseasonal-to-seasonal forecasting of the ENSO that are at par with state-of-the-art physics based weather prediction models. Finally, we will briefly talk about what these recent developments mean for understanding and modelling climate variability over the Indian subcontinent.

Venue : **Offline:** Madhava Lecture Hall (ICTS)

Online: Please click the below link to join the seminar.

https://icts-res-in.zoom.us/j/81211432021?pwd=enlGdll0RlNQYXNzVXptZkM2Q21nQT09
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International Centre for Theoretical Sciences - TIFR
Survey No. 151, Shivakote Village, Hesaraghatta Hobli, Bengaluru (North) - 560089
Tel: +91 80 4653 6000 Fax: +91 80 4653 6002
Email: academicoffice@icts.res.in **Website:** www.icts.res.in