PhD topics for Spring Semester (January to April, 2025). Interviews will be held in December 2024.

Name of the faculty	PhD topic	A brief description about the topic, and specific requirements, if any
Karthikeyan Lanka	Land-atmosphere interactions during dry extreme events [with Prof. Vishal Dixit, IDPCS]	Soil moisture has a significant role in influencing the feedback from the land surface. There is a growing literature that depicts its influence on the evolution of dry extreme events. This project deals with a thorough examination of soil moisture feedback using numerical weather model Weather Research and Forecasting (WRF) model simulations. Specifically, we would be interested to study the role of land using water and heat tracking schemes when extreme dry events and compound extremes get triggered. It is desirable for the candidates to have experience running the WRF model.
Karthikeyan Lanka	Sub-seasonal to seasonal agricultural drought prediction	Sub-seasonal to seasonal predictions are now the frontline research to ensure adequate time for planning and adaptation. There is limited effort that is made to carry out predictions at S2S scales (1-3 months ahead) in India. This work deals with developing models using machine learning or dynamical models to predict various aspects of droughts at S2S scales. Candidates with a good understanding of atmosphere processes and programming background are desirable for this project.
Avik Bhattacharya	Assessing Earth Surface Change Dynamics Using Dual-Polarization SAR Data	This work aims to enhance the utility of dual-polarization SAR descriptors by developing novel methods to extract critical land cover information from temporal SAR data. These new descriptors will be designed to assess dynamic changes on Earth's surface, such as flood mapping, post-disaster damage assessment, deforestation and afforestation mapping, and monitoring surface water changes. By building on existing dual-pol SAR techniques, the study will provide improved tools for detecting and analyzing land cover changes over time, offering valuable insights for environmental monitoring and disaster response. Requirements:Knowledge of SAR remote sensing is essential. 1. Knowledge of SAR polarimetry is highly desirable.2) Proficient in programming languages. 4)Basic knowledge of Linear Algebra.