आईआईटीएम की 54वीं 'प्रो. आर. अनंतकृष्णन' वार्ता
IITM's 'Prof. R. Ananthakrishnan' Colloquium (54th)

Late Prof. R. Ananthakrishnan (Ex-Director and Honorary Fellow of IITM, Pune) started his research carrier as a research scholar in the field of light scattering under the guidance of Nobel Laureate Prof. C.V. Raman and was awarded D.Sc. in 1937 from University of Madras. Then he joined IMD and occupied several positions up to DDG and then he worked as Director IITM during 1968-1971. He was awarded Padmashree by President of India in 1969 and Nobel Laureate Prof. C.V. Raman Centenary Medal in 1988. He was elected as an INSA Fellow in 1961 and was also member of many learned and professional societies like (Indian Academy of Sciences, Maharashtra Academy of Sciences). He was associated with many technical committees and working groups of WMO Geneva. He was editor of reputed national and international journals in Meteorology.

Prof. R. Ananthakrishnan was deeply associated in organizing and teaching M.Sc./M.Tech. Courses in Meteorology at University of Cochin and University of Pune. Under his able guidance 12 persons were awarded Ph.D.

Research contribution of Prof. R. Ananthakrishnan covers wide range topics *viz.* Light Scattering and Raman Effect, Solar Physics and Meteor Astronomy and Meteorology. In the field of Meteorology he covers: Aerology, Dynamics, Thermodynamics, Monsoon Circulation, Tracks of Storms and Depressions. Atmospheric pressure and oscillations, Indian Rainfall and features associated with onset of southwest monsoon and identification of errors in upper air data. To meet defense needs he organized the publications entitled 'Climatology of Himalayas, Tibet and adjoining areas'. There are 110 national/ international (research papers/technical contributions) papers to his credit and a book entitled 'An introduction to Meteorology'. This text book is found to be extremely useful to all the new comers in the field of meteorology. Prof. R. Ananthakrishnan pursued his research and guidance in atmospheric science even after his retirement as an Honorary Fellow of IITM till his last days.

Dr. Tani Satyanarayana

Title of the Talk: **"Innovative methodologies for assessing crop hail damage & executing cloud seeding operations to enhance hail mitigation strategies"**

Abstract: This study introduces innovative methodologies for evaluating crop damage and enhancing strategies for hail mitigation. The research employs a thorough analysis that incorporates data from radar, satellite, lightning, environmental conditions, and ground measurements. Specifically, during periods of increased hail damage claims, an initial investigation examines the correlation between radarderived products and crop hail damage in Styria, Austria. To quantify hail kinetic energy and integrated flux during events, 3D single-polarization C-band weather radar data and radiosonde freezing level data are utilized. Spatial distribution maps of total hail kinetic energy aid in identifying potential damage areas by capturing the swath and intensity of hail storms. Validation is carried out using hail events from the European Severe Weather Database (ESWD), crop damage reports from the Austrian Hail Insurance System, and crowd sourced data from the HeDi platform developed by TU Graz. Conducting a pilot study in Styria, Austria, specifically in the village of Hartensdorf, the assessment of crop hail damage is performed using drone technology. High-resolution drone imagery, processed with image processing tools, successfully captures and estimates the extent of damage in cropped areas, such as a pumpkin field. Beyond the research findings, the presentation delves into the historical context and recent advancements in the operational framework for hail prevention in Styria, Austria. The province has implemented extensive hail prevention operations supported by eight aircraft and two radars. Operational planning integrates various tools, including weather forecasts, radar data, aircraft tracking, data transmission, and a Tablet-PC display system on aircraft. The introduction of a novel pilot visual interface communication system enhances coordination efforts. Daily operational coordination planning encompasses aircraft and pilot allocation, mission commencement based on synoptic meteorological conditions, and ongoing assessment of weather forecasts and nowcast status. The Weather Information System (WIIS) software supports operational activities, and the HAILSYS software enables post-analysis of daily operations and radar-derived parameters over time, providing insights into changes attributed to cloud seeding. This comprehensive overview explores the sophistication of hail prevention operations, coordination protocols, recent advancements, and the nuanced challenges encountered.

Keywords: Hail signature, Radar-derived parameters, Hail mitigation operations, Hail risk

Date: **16th February 2024, 1100 hrs.**
Venue: Varahamihira Hall, IITM