# CMB BHARAT

PRESENTS

COSMOLOGY SEMINAR SERIES

# MACHINE LEARNING IN COSMOLOGY - WHITHER THE CMB?

**By**
**Prof. Benjamin D. Wandelt, Institut d'Astrophysique de Paris (IAP)**

**Abstract of the Talk:**
In our endeavor to unravel the universe's origins, composition, evolution, and destiny, we turn to the cosmos' vast data reservoir: the cosmic microwave background (CMB), galaxy surveys, supernovae, and space-time distortions from astrophysical events. This talk delves into novel methodologies for merging cosmological theory with these diverse data sets, with a special focus on potential for current and future CMB experiments. The advent of Artificial Intelligence and Machine Learning is revolutionizing our approach, enabling sophisticated, end-to-end Bayesian reasoning for previously intractable problems and opening new avenues for extracting insights from current and future CMB data. I will explore how these technological advancements are not only reshaping our analytical capabilities but also inspiring fresh cosmological perspectives. The discussion will cover the current state, emerging opportunities, and challenges in this field, aiming towards the ambitious goals of reconstructing the universe's initial conditions, comprehending cosmic structure formation, and probing dark matter and dark energy in a way that could redefine our understanding of the cosmos.

**About the Speaker:**
Prof. Wandelt (Ph.D. in astrophysics from Imperial College, London) held early career research fellowships at the Theoretical Astrophysics Centre (Niels Bohr Institute) in Copenhagen and at the Department of Physics at Princeton University. In 2001, he became assistant professor in the Departments of Physics and Astronomy at the University of Illinois at Urbana-Champaign, receiving tenure in 2006. In 2010 he was awarded the International Chair of Theoretical Cosmology at Sorbonne University and the Institut d'Astrophysique de Paris. In 2011 he was the founding co-director of the Institut Lagrange de Paris in cosmology, astro-particle, and theoretical physics and was named director in 2014. Professor Wandelt has held long-term visiting faculty positions at the Max Planck Institute for Astrophysics; Caltech; Princeton University; the Institute for Advanced Studies, Princeton; and NYU; and joined the Center for Computational Astrophysics at the Flatiron Institute in New York City in 2017.

**Date – March 13, 2024**
**Time – 3:30 pm IST**

**Registration: https://forms.gle/oyV3zrzRXWKyY1k66**

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