



భారతీయ సాంకేతిక విజ్ఞాన సంస్థ హైదరాబాద్  
भारतीय प्रौद्योगिकी संस्थान हैदराबाद  
Indian Institute of Technology Hyderabad

కంది, సంగారెడ్డి - 502 284, తెలంగాణ, భారత్  
ఫోన్: (040) 2301 6999 ఫ్యాక్స్: (040) 2301 6000

कंदी, संगारेड्डी - 502 284, తెలంగాణ, భారత్  
ఫోన్: (040) 2301 6999 ఫ్యాక్స్: (040) 2301 6000

Kandi, Sangareddy - 502 284, Telangana, India  
Phone: (040) 2301 6999 Fax: (040) 2301 6000

**Physics Seminar: Probing High-Dimensional Spaces with AI: From Theory Design to  
Parameter Inference in Particle Physics**

**Speaker:** Dr. Aishik Ghosh, Assistant Professor, School of Physics, Georgia Institute of Technology, USA

**Title:** Probing High-Dimensional Spaces with AI: From Theory Design to Parameter Inference in Particle Physics

**Abstract:** When confronted with high-dimensional problems, physicists have traditionally relied on intuition to break them down into manageable pieces. But do these simplifications compromise our physics reach? In this talk, we will question core assumptions underlying statistical methods at the foundation of experimental particle physics, such as the likelihood ratio test, as well as mathematical simplifications in theoretical particle physics, aided by some powerful machine learning (ML) tools. We will see that ML allows us to directly probe high-dimensional data at the LHC and achieve a level of precision once thought impossible. These algorithms also let us design theories using mathematical tools for which physicists are yet to build intuition.

**Speaker Bio:** Aishik Ghosh is an assistant professor in the School of Physics at Georgia Institute of Technology where his group develops AI methods for particle and astrophysics. He has worked on topics such as neutron star astrophysics, Higgs physics and fast simulation in the ATLAS experiment and neutrino theory design.