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## **(I) Entering a new, data-driven era for precision cosmology: opportunities and challenges for machine learning.**

*Tuesday 7 June 2022 13:15 (30 minutes)*

In the past decades, the standard model of cosmology, the inflationary lambda CDM model, has had remarkable success at predicting the observed structure of the universe over many scales of space and time. However, to this day, very little is known about the fundamental nature of its principal constituents: the inflationary field(s), dark matter, and dark energy. In the coming decade, new surveys and telescopes will provide an opportunity to probe these unknown components. These surveys will produce unprecedented volumes of data, the analysis of which can shed light on the equation of state of dark energy, the particle nature of dark matter, and the nature of the inflaton field. The analysis of this data using traditional methods, however, will be entirely impractical. In this talk, I will share recent advances in cosmological data analysis, specifically focusing on the development and the application of machine learning methods. I will show how these methods can allow us to overcome some of the most important computational challenges for the data analysis of the next generation of sky surveys and open a new window of discoveries for cosmology.

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