

## **Exploring the nature of dark energy with Machine Learning**

One of the most pressing mysteries in physics is the accelerating expansion of the Universe, usually attributed to a dark energy component. The standard model of cosmology, which contains only six free parameters describing the matter and dark energy content of the Universe is so far the best phenomenological fit to the data to percent level precision. Observations of future experiments will provide a vast amount of data for a broad span of redshifts with hundreds of thousands of supernovas type Ia along with millions of galaxies and quasars. Machine Learning (ML) techniques will play a big role in testing accurately the standard model of cosmology, but will also help in the search for new physics and tensions in the data by placing tighter constraints on cosmological parameters. I will present a unified ML analysis of all the currently available cosmological data in order to reconstruct several key background and perturbations variables in a model-independent manner in order to explore the nature of dark energy.