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Applications of deep learning in wide-field cosmological surveys - Francois Lanusse, McWilliams Center for Cosmology at Carnegie Mellon University

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The next generation of cosmological surveys such as the ones conducted by LSST, Euclid and SKA will bring unprecedented constraints on the nature of dark matter and dark energy. They also entail new challenges, in particular from the sheer volume of data they will produce. In this talk, I will mention some exciting applications of Deep Learning to address these challenges at different levels, from image processing to modelling galaxy physics. I will focus in particular on the problem of automated strong lens finding (see <https://goo.gl/TnnTLE>), a typical image classification problem, to illustrate how Deep Learning can have a profound impact on a science analysis pipeline, in this case by dramatically reducing (and maybe even eliminating) the need for human visual inspection. As a point of reference, it was estimated that previous methods would have required around one million volunteers participating in a citizen science initiative to classify the whole LSST survey in a matter of weeks.

Primary author: Dr LANUSSE, Francois

Presenter: Dr LANUSSE, Francois