

Machine Learning and Physics Seminar Series

Thursday, 28 November 2019 at 2.30pm
Dennis Sciama Lecture Theatre, Denys Wilkinson building

Analysis of Strong Gravitational Lensing Data with Machine Learning

Professor Laurence Levasseur
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Machine learning methods have seen a rapid expansion in applications to various fields of astrophysics in recent years. In this talk, I will discuss our results on using deep convolutional neural networks to estimate the parameters of strong gravitational lenses from telescope data. Estimating these parameters with traditional maximum-likelihood modelling methods is a time- and resource-consuming procedure, involving several data preparation steps and a difficult optimization process. I will discuss how, using deep convolutional networks, we are able to estimate these parameters and their uncertainties 10 million times faster than with traditional methods, with a similar accuracy. With the advent of large volumes of data from upcoming ground and space surveys and the remarkable speed offered by these networks, deep learning promises to become an indispensable tool for the analysis of large survey data.

Laurence Perreault Levasseur is an assistant professor at the University of Montréal and a member of the Montréal institute for learning algorithms (Mila), where she conducts research in the development and application of machine learning methods to cosmology. Prior to that, she was a Flatiron research fellow at the Center for Computational Astrophysics in the Flatiron Institute and a KIPAC postdoctoral fellow at Stanford University. Laurence completed her PhD degree at the University of Cambridge, where she worked on applications of open effective field theory methods to the formalism of inflation. She received her B.Sc. and M.Sc. degrees from McGill University.