

# EPIT 2022 Proposal

## Machine Learning

At the heart of "artificial intelligence", Machine Learning is a very active, interdisciplinary research field involving various concepts of theoretical computer science and mathematics. The 2022 EPIT on Machine Learning aims at presenting modern and promising aspects of Machine Learning to interested, but possibly non-specialist young researchers. This includes in particular deep neural networks, a particular class of algorithms that has obtained unexpected and spectacular empirical successes which still need to be understood from a theoretical point of view; this requires statistics, approximation theory, functional analysis, statistical physics, etc.

The 2022 EPIT will be composed of five 6-hours lectures given by international specialists. They present a great variety, from very theoretical aspects to applications and theoretical answer to social expectations: an general introduction to Statistical Learning Theory by Shipra Agrawal, a course on Optimization and (Deep) Learning by Francis Bach, a tutorial on Learning and Graph Theory by Pierre Vandergheynst, a lecture on Privacy in Machine Learning by Rachel Cummings, and a modern presentation of Machine Learning in Natural Language Processing by François Yvon.

This selection is also meant to build bridges with other topics and communities. Each participant will be invited to give a short presentation of her/his research. Each speaker will be encouraged to provide, in addition to her/his lectures, a selection of exercises that will be discussed collectively in the evening.