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Rene Carmona and **Mathieu Lauriere*** (lauriere@princeton.edu), 98 Charlon Street,
Princeton, NJ 08540. *Machine Learning Methods for Mean Field Control and Mean Field Games*.

In this talk, we propose several numerical methods for mean field control problems and mean field games, both in the ergodic setting and the finite time horizon setting. These methods are based on machine learning tools such as function approximation via neural networks and optimization relying on stochastic gradient descent. We investigate the numerical analysis of these methods and prove bounds on the approximation error. We then consider numerical test cases, including examples which are difficult to tackle with deterministic methods such as numerical schemes based on finite differences. If time permits, we will also discuss model-free methods for mean-field problems in a reinforcement learning framework. This is based on joint work with Rene Carmona (Princeton University). (Received September 16, 2019)