



ÉCOLE DE PHYSIQUE DES HOUCHES



Summer School on Statistical Physics and Machine Learning

Session CXIX

July 4 - 29, 2022

Organizers: Florent Krzakala & Lenka Zdeborová

Overview: The school is aimed primarily at the growing audience of theoretical physicists, applied mathematicians, computer scientists and colleagues from other computational fields interested in machine learning, neural networks, and high-dimensional data analysis. We shall cover basics and frontiers of high-dimensional statistics, machine learning, theory of computing and statistical learning, and the related mathematics and probability theory. We will put a special focus on methods of statistical physics and their results in the context of current questions and theories related to these problems. Open questions and directions will be discussed as well.

Website: <https://leshouches2022.github.io/>

Lectures and tutorials:

Yasaman Bahri (Google)
Boaz Barak (Harvard)
Giulio Biroli (ENS Paris)
Michael I. Jordan (Berkeley)
Yann LeCun (Facebook & NYU)
Marc Mézard (ENS Paris)
Remi Monasson (ENS Paris)
Andrea Montanari (Stanford)
Sara Solla (Northwestern Univ.)
Haim Sompolinsky (Harvard & Hebrew Univ.)
Nathan Srebro (TTI Chicago)
Nike Sun (MIT)

Example of topics covered:

Phase transition in machine learning
Computational complexity
Dynamics of learning in high-dimension
Message passing algorithms
Challenges in machine learning
Statistical physics of deep neural networks
High-dimensional statistics
Optimization and implicit regularisation
Replica and cavity methods
Probability theory and rigorous approaches
Statistical inference in high-dimension
Computational learning theory

Topical seminars will be given during the school by distinguished invited scientists

Poster presentations by participants

Registration: The online Application can be found on <https://www.houches-school-physics.com>. Applications must reach the School before March 1, 2022 in order to be considered by the Selection Committee. The full cost per participant includes housing and meals, and is specified on the School's Website. Further information can be found on the Website too. One can contact the Les Houches Physics School at:

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Location: Les Houches is a village located in Chamonix valley, in the French Alps. Established in 1951, the Physics School is situated at 1150 m above sea level in natural surroundings, with breathtaking views on the Mont-Blanc mountain range, conducive to reflection and discussion.

