INSTITUT D'ÉTUDES SCIENTIFIQUES DE CARGÈSE

Cargèse International School 2018

Statistical Physics and Machine Learning back together

August 21 - 31, 2018

Web site

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The past years brought a revolution to machine learning: algorithms are now able to deal with tasks and amounts of data that seemed to be impossible only a decade ago. The statistical physics community and the machine learning ones were once connected and indeed many concepts and algorithms of machine learning have roots in physics. This connection is currently enjoying an active revival.

This school brings together researchers from machine learning and statistical physics to train a new generation that will be able to take full advantage of the strong link between the two fields to make further scientific progress. The school will cover both theoretical aspect of machine learning and statistics, and their deep link with physics, as well as some direct application sof machine learning technics in physics, an activity that is currently witnessing a burst of activity.

The format will be ~10 of 3h introductory lectures, and about twice as many contributed invited talks.

Main topics will include
* Energy/loss landscapes in disordered systems * Machine learning and inference problems * Computational and statistical thresholds and trade-offs * Theory of artificial multilayer neural networks * Rigorous approaches to spin glasses and related models of statistical inference * Parallels between optimization algorithms and dynamics in physics * Vindicating the replica and cavity method rigorously * Message passing algorithms * Information processing in biological systems * Applications of machine learning in condensed matter physics

Eminent scientists in the field will animate the workshop.
The keynote lectures will be given by:
Gerard BenArous (Courant Institute), Giulio Biroli (CEA Saclay, France), Nicolas Brunel (Duke University), Yann LeCun (Courant Institute and Facebook), Michael Jordan (UC Berkeley, TBC), Stephane Mallat (ENS & College de France), Andrea Montanari (Stanford), Dmitry Panchenko (University of Toronto), Sundeep Rangan (New York University) Riccardo Zecchina (Universita' Bocconi, Milano)

Scientific Committee
Patricl Charbonneau (Duke University, USA), Giorgio Parisi (La Sapienza Rome, Italy) Gérard BenArous (Courant Institute, USA)

Organization Committee
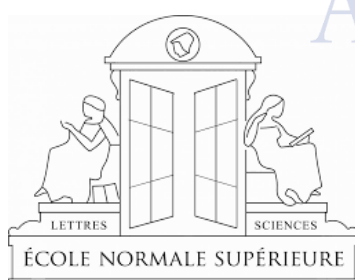Florent Krzakala (ENS Paris FR), Lenka Zdeborová (IPhT Saclay FR)

Application and registration
http://cargese.krzakala.org
Contact: Florent Krzakala and Lenka Zdeborová
Deadline Application: March 2018
Registration Fees: around 800 euros

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