

Department of Decision Sciences

Occasional Seminars

Monday, 16th November 2016

12:30 pm

Room 2-E4-SR03

Via Röntgen 1, 2nd floor

Riccardo Zecchina

Politecnico di Torino & Microsoft Research New
England

Optimization, Inference and learning: challenges in Data Sciences

Abstract:

The extraction of information from large amounts of data is one of the prominent cross disciplinary challenges in contemporary science. Disentangling direct from indirect correlations and learning from large scale data sets require the design of efficient optimization algorithms over very large scale networks of constraints. In such a setting, collective phenomena of the type studied in statistical physics, like phase transitions, often play a major role. This observation has lead in the last decade to a cross fertilization between statistical physics, information theory and computer science, with applications in a variety of fields. In particular a deeper geometrical understanding of random computational problems and novel probabilistic algorithms have emerged.

In this talk I will give a brief introductory overview of the main conceptual advances in these fields and discuss few state of the art examples of causal inference and machine learning tasks from complex data.

I will conclude by pointing out some major computational bottlenecks we will be facing in the near future (and how to hopefully solve them).