

**Ahmed El Alaoui:**  
**Optimization of mean-field spin glasses**

We consider the question of computing an approximate ground state configuration of an Ising (mixed) p-spin Hamiltonian  $H_N$  from a bounded number of gradient evaluations.

I will present an efficient algorithm which exploits the ultra-metric structure of the super-level sets of  $H_N$  in order to achieve an energy  $E_*$  characterized via an extended Parisi variational principle. Time permitting, I will discuss the following points:

- If  $H_N$  has no overlap gap, then  $E_*$  is the ground state energy.
- $E_*$  is the best energy achievable by a class of message passing algorithms.
- In the case of the 3-spin model, which is known to exhibit overlap gap, preliminary numerical evaluations suggest that  $E_*$  is strictly lower than the so-called “threshold” energy, which is thought to lower-bound Glauber-type dynamics.

This is joint work with Andrea Montanari and Mark Sellke.