The statistical price to pay for computational efficiency in sparse PCA

Professor Philippe Rigollet
Operations Research and Financial Engineering
Princeton University

Monday, May 5, 2014, 11:30 am
Room 3280 WID Building (3rd floor teaching lab)

**Anyone without WID access can use the special events elevator located behind Aldo’s café (WID 1st floor) to access room 3280 (3rd floor teaching lab). If anyone has difficulty finding the special events elevator, ask at the WID Welcome desk and they will be happy to help.**

Computational limitations of statistical problems have largely been ignored or simply overcome by ad hoc relaxations techniques. If optimal methods cannot be computed in reasonable time, what is the best possible statistical performance of a computationally efficient procedure? Building on average case reductions, we establish these fundamental limits in the context of sparse principal component analysis and quantify the statistical price to pay for computational efficiency. Our results can be interpreted as complexity theoretic lower bounds conditionally on the assumptions that some instances of the planted clique problem cannot be solved in randomized polynomial time. [Joint work with Quentin Berthet]