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Title: Challenges and opportunities in Bayesian statistical imaging

Abstract: During my PhD at Università Bocconi, of which Pietro was the Director, I became acquainted to both Bayesian Nonparametrics and spatial statistics. In this talk, I will discuss some recent work stemming from those seeds. More specifically, I will discuss typical goals and open challenges in the Bayesian analysis of high-dimensional imaging data. A remarkable feature of a fully Bayesian approaches is that they allow a flexible modeling of spatial and temporal correlations in the data. Based on some recent work, I will discuss the use of Bayesian nonparametrics methods in the analysis of task-related brain activity in single as well as multi-subject fMRI experiments. Computational aspects need to be taken into account due to the dimension of the data. Thus, in addition to Markov chain Monte Carlo sampling algorithms, I will describe suitable variational Bayes algorithms for conducting posterior inference, using both simulated data and data from actual fMRI experiments.