

Department of Decision Sciences

Statistics Seminar

## Bayesian sample size determination: an overview

**Fulvio De Santis**

Università La Sapienza, Roma

Thursday, 8<sup>th</sup> November 2012

12:30pm Room 3-E4-SR03 Via Röntgen 1 Milano

### Abstract

Determination of the number of units to include in a study is a crucial aspect of experimental design and “how large the sample size must be” is, probably, one the most frequent question any statistician is asked about. Nevertheless, quoting Lindley, “it is a question that is embarrassingly difficult to answer”. The literature on sample size determination (SSD) from a frequentist perspective is extremely large. The last 15-17 years have witnessed strong advances in addressing the SSD problem also from a Bayesian perspective. Efforts have focused on two primary issues. The first is the distinction between a formal decisional approach, which provides the sample size through the maximization of an expected utility, and a performance based approach, which chooses the sample size to control inference for a parameter of interest to a specified degree of error. The other issue is the elaboration of a variety of performance measures and their respective advantages and disadvantages. Regardless of the approach (decisional or non-decisional), a crucial point for implementation of SSD methods is the choice of the priors. The recent literature makes a sharp distinction between the “analysis prior” used to determine the posterior distribution of the parameter of interest, and the “design prior”, used in pre-posterior computations. In this seminar, we present several performance-based criteria and discuss several robustness issues. The presentation focuses primarily on the use of SSD criteria for the design of clinical trials.