UNIVERSITY OF BRESCIA
DEPARTMENT OF ECONOMICS AND MANAGEMENT

SHORT COURSE

BAYESIAN STATISTICS (an introduction to)

Prof. Luigi Spezia
Biomathematics & Statistics Scotland, Aberdeen, UK

Monday, February 5th, 2024,
10:30 AM-12:30 PM – 2:30 PM-4:30 PM
Informatics Laboratory, S.Chiara Building

Tuesday, February 6th, 2024,
10:30 AM-12:30 PM – 2:30 PM-4:30 PM
Room A5, S.Chiara Building

This short course will summarise the basic concepts of Bayesian statistics with a special focus on modelling. Central to the Bayesian philosophy is the recognition that not only the data possess a distribution, but also the unknown parameters by assumption. Hence, the data are described by the likelihood and the parameters by their prior distributions. The combination of these quantities gives rise to the posterior distribution which is the main function to perform the Bayesian inference. Prior distributions are subjective descriptions of the personal beliefs in the occurrence of events, based on the researchers' past experience and/or experts' opinion and intuition, whereas the posterior distribution is based on these prior distributions modified by conditioning on the new observed data. Some examples of Bayesian modelling will be presented over the course. In modern Bayesian inference and model choice, the posterior density is approximated by computer-intensive methods based on numerical integration, performed mainly by Markov chain Monte Carlo (MCMC) algorithms, which will be gently presented as well. Practical demonstrations of some MCMC examples will be shown via the software R (**attendees are invited to take their own devices and install the R packages "Boom" and "MASS"**).

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