

SEMINAR SERIES IN BIOSTATISTICS



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Zoom

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An Introduction to Monte Carlo Simulation Studies for Statisticians

Alessandro is a Post-Doctoral Researcher in Biostatistics at the Department of Medical Epidemiology and Biostatistics, Karolinska Institutet. He received his PhD from the University of Leicester, in the UK, with a thesis on multilevel models applied to the settings of electronic health records.

Monte Carlo simulation studies are computer experiments based on generating pseudo-random observations from a known truth. They provide an invaluable tool for statisticians, e.g. to compare statistical methods, to assess their robustness in a variety of settings, and for learning. They can help answer questions such as: is an estimator biased in a finite sample? What are the consequences of model misspecification? Do confidence intervals for a given parameter achieve the advertised/nominal level of coverage? How does a newly developed method compare to an established one? What is the power to detect a desired effect size under complex experimental settings and analysis methods? Throughout this seminar, I will introduce Monte Carlo simulation studies as a general tool and how to plan, run, analyse, and report them. We will follow a case study on confounding to illustrate a simulation study in practice, including code in R and Stata to reproduce the results.