BioISI - Biosystems & Integrative Sciences Institute

MAKING THE MOST OUT OF DATA IN FIGHTING COVID-19

Place of work: FCUL

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Abstract / MSc thesis project proposal

For the last twelve months, data on the pandemic have been all over the news, and the results of mathematical models became part of our everyday life. We have developed the first study of this type devoted to Portugal. The study is still undergoing peer-review [1], but it already received much attention from the media [2]. It is based on a transmission model robustly calibrated using several data sources, following a Bayesian approach used in our previous work [3]. Model fitting is achieved using Hamiltonian Monte Carlo method as implemented in Stan (www.mc-stan.org).

The goal of this thesis is to provide hands-on training in these powerful statistical methods, using the modeling of Covid-19 spread in Portugal as a case study. The skills the student will acquire will allow him/her to assess the impact of public health measures, and, more generally, to deal with decision making in a variety of complex settings. This project will be developed in collaboration with Professor Manuel Gomes who is one of the key advisors on the COVID-19 pandemic for the Ministry of Health and with researchers from the Utrecht University, The Netherlands.

Bibliography:

[1] Viana J, van Dorp CH, Nunes A, et al. Controlling the pandemic during the SARS-CoV-2 vaccination rollout: a modeling study, 24 March 2021, PREPRINT (Version 1) available at Research Square [https://doi.org/10.21203/rs.3.rs-358417/v1]

[2] https://www.rtp.pt/noticias/pais/portugal-pode-enfrentar-quarta-vaga-de-covid-19-ja-no-proximo-mes_v1310404

[3] Rozhnova G, van Dorp CH, Bruijning-Verhagen P, Bootsma MCJ, van de Wijgert JHHM, Bonten MJM, et al. Model-based evaluation of school- and non-school-related measures to control the COVID-19 pandemic. Nature Communications. 2021;12(1):1614.