PIPGES · WEBINARS

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The video call link will be available at:

https://tiny.one/sepulveda-n

Interinstitutional Graduate Program in Statistics (PIPGES) of Federal University of São Carlos with University of São Paulo promotes seminars groups (temporarily webinars, due to pandemic issues) of researches involving Probability, Statistics, Machine Learning etc. Our interest, among other things, is to stimulate the sharing of knowledge, as well as the connection between members of the program and researchers in other institutions.

Organizer

Michel H. Montoril, Department of Statistics,
Federal University of São Carlos.

THE THREE-SIGMA RULE TO DEFINE ANTIBODY POSITIVITY: IS IT A BEAUTY OR A BEAST?

The main objective of many epidemiological studies wanders around the estimation of the proportion of individuals currently or previously infected by a given microorganism. Given that an infection inevitably leads to an immune response, this estimation exercise often requires identifying individuals who reach a minimal level of microbe-specific antibodies in their serum. This threshold invariantly follows the three-sigma rule: mean plus three times the standard deviation from a hypothetical antibody-negative population. Notwithstanding not being linked to a specific parametric distribution, it has the most intuitive interpretation in the context of a normal distribution. I will then discuss the problems of estimation bias and apparent control of specificity arising from applying this rule to non-normal distributions for the seronegative population. I will use public data on antibody testing against the SARS-CoV2 to illustrate these problems. We should finally ask ourselves whether the three-sigma rule is a beautiful statistical concept or, instead, a little beast hidden in antibody data analysis.

SPEAKER

Nuno Sepúlveda · Warsaw University of Technology

BIO

Nuno Sepúlveda has BSc and MSc degrees in Applied Mathematics and Computation (Statistics) from the Technical University of Lisbon, Portugal. He developed mathematical theories of the adaptive immune system in his Ph.D. project in University of Oporto, Portugal. He was a member of the London School of Hygiene and Tropical Medicine between 2010 and 2019, where he investigated the genetics and epidemiology of malaria. He got interested in ME/CFS after collaborating with the CureME group in the statistical analysis of the United Kingdom ME/CFS biobank. He is the head of the Immune-Stats group, which has the research mission to find biomarkers of immunity and disease diagnosis of ME/CFS, Fibromyalgia, long-Covid, malaria, and other complex diseases. He currently lives in Warsaw with his wife Anna and his two-year-old son Artur.