Title: Qualification of in silico-augmented clinical trial approach to the efficacy assessment of new tuberculosis therapies in developing countries

Tutor: Prof Marco Viceconti - https://www.unibo.it/sitoweb/marco.viceconti/

Funding source: STriTuVaD project - https://cordis.europa.eu/project/rcn/212940_en.html

Research Project

In the framework of the STRITUVAD project partner University of Catania is developing a sophisticated simulation of the human immune system that can predict how a patient will respond to the disease activation of the Mycobacterium Tuberculosis bacterium already present in his/her body in term of bacterial spread, as a function of the patient general immune condition, and to the inoculation of specific therapies. The project goal is to refine this model so that it can:

1) predict with sufficient accuracy the change in bacterial load over time in individual patients treated with different therapies;
2) generate a cohort of “virtual patients” that well represent the inter-subject variability of all determinants that affect the disease progression and the response to therapy;
3) develop in collaboration with the University of Sheffield a Bayesian statistical model that combines observational results from a clinical trial to the in silico-predicted response on the virtual patients cohort into an in silico-augmented clinical trial aimed to shorted the duration and the number of physical patients enrolled;
4) validate the results of the in silico augmented trial to those of a full sized standard clinical trial, so to produce sufficient evidences to qualify the in silico method for studies of future drugs.

Under the guidance of Prof Marco Viceconti, one of the top experts of in silico trials worldwide, the post holder, a post-doctoral researcher with documented experience in modelling and simulation in biomedicine, will conduct the research activities described above in close collaboration with the model developers in Catania, the statistical modelling experts in Sheffield, and the clinical trialists in New Delhi.

The research contract (Assegnodi Ricerca), has an annual salary before taxes of € 26,174.00. While the initial contract is for 12 months, if successful the post holder contract will be extended until the end of the project, in July 2022.

The ideal candidate for this position holds a PhD in math, physics, or engineering, documented experience in modelling and simulation in biomedicine, excellent spoken and written English, and one or more of the following skills:

- Familiarity with the mathematical modelling of the immune system
- Familiarity with Bayesian statistics and Bayesian modelling
- Previous experience with biomedical regulatory science
- Previous experience with verification, validation, and uncertainty quantification of predictive models in biomedicine