UNIVERSITÀ DI TRENTO
Dipartimento di Matematica

# DOTTORATO

CYCLE 33th
ORAL DEFENCE OF THE PHD THESIS

## Monday 26 July 2021 – at 10:00 am

The event will take place online through the ZOOM platform.
To get the access codes please contact the secretary office


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# Modeling the transmission of viral diseases: understanding hidden processes to inform public health policies


**Abstract:**
The diffusion of viral diseases may critically depend on hidden processes, like human mobility, people's behavior, or underlying environmental conditions. The seminar focuses on the investigation of those variables that remain partially unobserved but that could strongly influence the spread of infectious diseases. First, an innovative method will be introduced to estimate the overall abundance of mosquitoes over time across all sites of interest in Europe and the Americas, on the basis of only freely available eco-climatic data. The model, calibrated against a large set of entomological data, is used to highlight which mosquito species could contribute to the disease transmission across different regions and identify the areas at higher risk of autochthonous transmission of dengue, chikungunya, and zika fever. A similar approach will be also discussed to investigate the potential burden of Usutu virus (USUV) in the northeast of Italy. The conducted analysis estimates the potential USUV prevalence expected among Culex pipiens mosquitoes and human blood donors. The second part of the seminar focuses on the study of the global pandemic of COVID-19. Results obtained with an epidemiological model based on novel age-specific contact data, collected across different geographical contexts of Ethiopia will be presented. The analysis aims at assessing how socio-demographic factors and observed mixing patterns can impact the burden of COVID-19 in the scenario of an unmitigated SARS-CoV-2 epidemic and under a school closure mandate. Finally, an epidemiological analysis of individual COVID-19 records collected during the first epidemic wave in the Lombardy region (Italy) will be presented. Leveraging an unbiased sample of infections, the performed analysis quantifies all the main parameters related to the natural and healthcare burden caused by the natural history of SARS-CoV-2. Estimates provided are essential for modeling activities aimed at investigating the disease spread or projecting the impact of alternative public measures on the disease and healthcare burden.


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**CONTATTI**
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