



UNIVERSITÀ
DI TRENTO

Dipartimento di
Matematica

DOTTORATO



CYCLE 38TH
SEMINARS THIRD YEAR

ADMISSION TO THE FINAL EXAMINATION - PHD PROGRAMME IN MATHEMATICS Seminar Room of Department of Mathematics

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

Tuesday 23rd September 2025

9:30 **Bizzotto Andrea**

Effect of PrEP in Chlamydia Trachomatis transmission dynamics in a northern region of Italy

Abstract: Sexually transmitted infections remain a significant public health challenge, with men who have sex with men (MSM) particularly affected. Chlamydia trachomatis is the most common bacterial STI, often asymptomatic yet capable of causing serious complications. The introduction of HIV pre-exposure prophylaxis (PrEP) has reshaped STI dynamics, with increasing CT incidence linked to behavioral changes, intensified screening, and possible reduced immunity from repeated treatments. We developed a stochastic chain binomial model calibrated with epidemiological and behavioral data from 532 MSM enrolled in a PrEP program in Northern Italy (2018-2024). The model incorporates temporary immunity and evaluates intervention strategies. Sensitivity analyses were performed to assess robustness.

Our results show that reducing testing frequency or restricting testing to symptomatic individuals leads to an increase in CT prevalence and incidence, both among PrEP users and the wider MSM population. Conversely, intensifying screening or introducing doxycycline post-exposure prophylaxis reduces CT circulation. Our findings highlight the crucial role of regular screening and preventive interventions in controlling CT transmission within MSM PrEP cohorts.

Supervisors: Andrea Pugliese - Giorgio Guzzetta (FBK) – Ilaria Dorigatti (Imperial College of London)

9:50 **Filosi Tobia**

Processes on Graphs with Euclidean edges: definitions, modelling, estimation and extensions

Abstract: In this presentation, we introduce graphs with Euclidean edges and covariance functions defined over them, with several related results and extensions. More specifically, we define and give some examples of such topological structures and we explore some extensions: time-evolving topology, multivariate homogeneous kernels, univariate simulation and in-progress research about estimation of completely monotonic functions, which play a pivotal role in the definition of covariance functions.

Supervisors: Claudio Agostinelli – Emilio Porcu (Khalifa University, Abu Dhabi, UAE)

CONTATTI

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14:00 Caldini Gianmarco

On smooth approximation of generalized surfaces

Abstract: The natural question of how much smoother integral currents are with respect to their initial definition goes back to the late 1950s and to the origin of the theory with the seminal article of Federer and Fleming. I will explain how closely one can approximate both integral and mod 2 currents representing a given homology class with smooth submanifolds.

Supervisors: Andrea Marchese – William Browder

Contact persons: Luigi Amedeo Bianchi – Willem Adriaan De Graaf

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