UNIVERSIDAD TECNICA
FEDERICO SANTA MARIA

DEPARTAMENTO
DE MATEMÁTICA

# Próximo Seminario DMAT

**Martes 29 de Octubre de 2019, 11:30 - 12:30**

**Sala de Seminarios**, DEPARTAMENTO DE MATEMÁTICA


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## Optimal control and its applications to infectious disease prevention


Infectious diseases constitute one of the leading causes of illness and death throughout the world. The diversity of infection agents (viruses, bacteria, microbes, etc.) combined with their ability to evolve and adapt to changing host populations, environments, practices, and technologies creates ongoing threats to human health and appeals for more sophisticated policies for disease prevention and control.

To be most effective, these policies must reflect the best scientific knowledge available and, therefore, policy development should extend beyond the public healthcare communities to engage mathematicians, among other scholars and practitioners.

In this context, optimal control theory constitutes an essential mathematical tool for design of new strategies for disease prevention and control in accordance with some qualitative criteria. Additionally, mathematical models formulated in terms of optimal control allow for feasible estimations of the costs associated to implementation of the underlying strategies as well as their quantitative benefits.

This presentation will be focused on applications of optimal control dealing with prevention of dengue fever, which is a vector-borne infection caused by the dengue virus (DENV) and transmitted by Aedes aegypti female mosquitoes. In the first part, I will present a general framework of the optimal control approach. In the second part, I will present an unconventional vector control technique based on the use of biological control agent (wMelPop Wolbachia) that targets to reduce the rate of transmission of the infectious agent (DENV) between Aedes aegypti mosquitoes and human hosts.