

ENAC-SIE, SIE/Master project, Fall	Start: 18/09/2018
30 ECTS credits (master project); 4 ECTS credits (semester project)	End: 21/12/2018 (approx)

Title	Transmission of mosquitoes-born diseases along mobility pathways
Supervisors	Doct. Damiano Pasetto, Doct. Emanuele Massaro, Prof. Andrea Rinaldo
Objective	The main objective of this project is to perform a sensitivity analysis of an agent-based model for the simulation of mosquito-borne diseases.
Abstract	Epidemiological modelling of mosquito-borne diseases is fundamental to provide objective information supporting disease surveillance with the goal of improving the global health and decrease the burden of communicable diseases. The agent-based model considered in this study attempts to realistically represent the behaviour of individuals' daily path in an urban setting. Because the exposure to the disease strongly increases for the commuters whose pathways have a large probability to cross vector-infested areas, the model considers the transmission of the disease at the 'home' and 'work' nodes, plus the transmission along the commuters' pathways. This semester project will explore the sensitivity of the model results to different pathways of the commuters and different spatial distributions of the vectors.
Task description	• Getting acquainted with mosquito-borne diseases and agent-based models. • Review of the state of the art of mosquito-borne diseases (only master project). • Improve the description of the transmission process along the pathways (only master project). • Comparison of the results with and without transmission in a synthetic scenario. • Sensitivity analysis of the model results to different commuters' pathways (only master project)
Required skills	• Strong programming skills (e.g. Matlab, R or Python) • Notions about ordinary differential equations • Attitude toward applied mathematics
Location	EPFL, Lausanne (CH)
Contacts	damiano.pasetto@epfl.ch ; manuele.massaro@epfl.ch