

## **Multiscale tales in epidemiology**

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### **Abstract:**

We shall concentrate on two problems: the first one is the dynamics of a SIR-SI model for arboviruses. In this case, we shall show how a natural dichotomy in time-scales appear and leads to a reduced model that fully approximates the original one. The second problem is the study of a stochastic SIS model for large, but finite populations. We shall obtain a PDE that contains all the relevant information of the model and, in the infinity population limit, recovers the classical SIS model. If time allows we may discuss further applications to ecological and evolutionary models.