

## **Biomathematics/Biomatemática**

### **Eco-evolutionary dynamics in co-colonization systems with multiple strains.**

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The high number and diversity of microbial strains circulating in host populations has inspired extensive research on the mechanisms that maintain biodiversity. While much of this work focuses on strain-specific parameters and cross-immunity interactions, the role of co-infection (co-colonization) and co-infection interactions between strains has received less attention. Diversity in such interaction coefficients enables strains to create dynamically their niches for growth and persistence, and 'engineer' their common environment. How such a network of interactions with others mediates collective coexistence remains puzzling analytically and computationally difficult to simulate. Furthermore, the gradients modulating stability-complexity regimes in such multi-player endemic systems remain poorly understood. In this talk, I will present results from recent work, where we analyze such an interacting system and the eco-evolutionary dynamics that emerge. Adopting slow-fast dynamic decomposition of the original coinfection model, we obtain a replicator equation, which enables to highlight the key coexistence principles and evolutionary trajectories of a system.