UCL Undergraduate Mathematics Colloquium

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Date: **21stth October** 2026, Time: **3-4pm**

Location: **B20, Jevons Lecture Theatre, Drayton House**

Biological networks in drug-microbiome interactions

Speaker: **Andreea Balmus** (UCL)

Abstract: The current machine learning models for predicting drug-microbiome interactions are limited in scope, as they can only estimate a xenobiotic's effect on a single bacterial species in vitro. As a result, they fail to capture the following complex interactions between multiple bacterial species, and so cannot predict how a xenobiotic (pharmaceutical drug) will ultimately change the composition of the human gut microbiome.

This talk will explore extending the current models by incorporating biological networks for inter-species microbial interactions. A Random Forest will first predict the direct effect of a xenobiotic on each bacterial species. These predictions will then serve as inputs to a Bayesian Network that encodes the ecological relationships between species, such as parasitism, mutualism, and commensalism. Given a starting gut microbiome composition and the chemical properties of the xenobiotic, can we predict the microbiome's final composition?

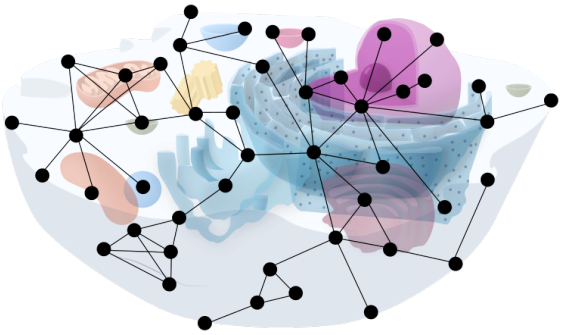


Diagram from: https://cbdm-01.zdv.uni-mainz.de/ galanisl/netbio/