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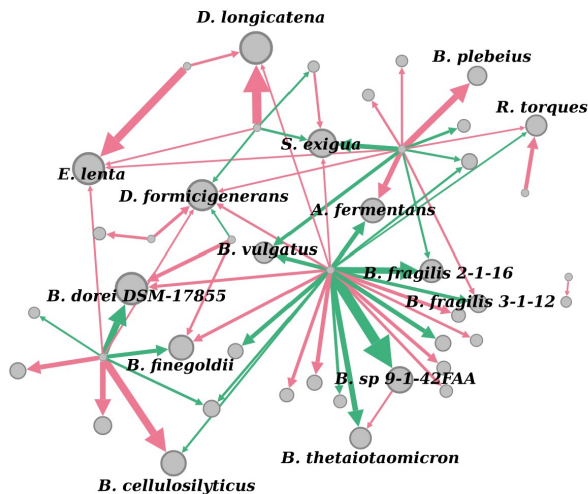
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How microbial ecosystems maintain their diversity? How many stable states do they have? How to efficiently control complex microbial ecosystems? How phages co-evolve with their microbial hosts? Dr. Maslov's research has practical applications in manipulating the human gut microbiome and analyzing big data generated by genomics and systems biology projects.



Interactions between species in synthetic human gut microbiome

Research Interests

- Microbial ecology, consumer resource models, phage-bacterial interactions and networks
- Machine Learning, Deep Neural Networks (DNNs), and Large Language Models (LLMs)
- Single-cell and spatial transcriptomics, RNA velocity

Current Projects

- Mechanistic models of competition for resources in complex microbial ecosystems including the human gut microbiome
- Phage-microbial ecosystems: evolution, population dynamics
- Use of LLMs and DNNs for annotations of microbial communities, proteins, protein-protein interactions and gene regulatory networks, and discovery of structurally disordered regions in protein sequences

Keywords

Microbiome, ecosystems, models, machine learning, genome, evolution, protein protein interactions, single-cell transcriptomics, RNA velocity

Interest Areas for Collaboration/Future Work

Ecology and evolution in human gut microbiome, microbial communities in oceans, lakes, soils. Looking for experimental collaborators to study synthetic communities in the lab using serial dilution experiments. We will provide both mechanistic models and machine learning analysis