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Department of Medicine
Channing Division of Network Medicine

Channing Microbiome Seminar

June 25th (Friday), 2021, 11AM (ET)

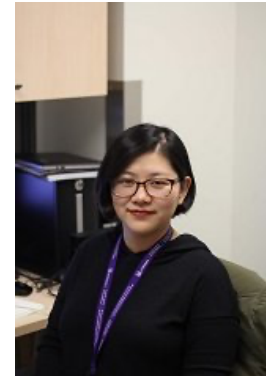
Zoom link: <https://us02web.zoom.us/j/579497999?pwd=cHNIWHMzWUJFUUVJTG1EeVJmY05aQT09>

Meeting ID: 579 497 999

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Revealing Protein-Level Functional Redundancy in the Human Gut Microbiome using Ultra-deep Metaproteomics

Abstract: As a key property of ecosystems, functional redundancy means that phylogenetically unrelated taxa can play similar roles in ecosystem functionality. The redundancy of potential functions of human microbiome has been quantified recently based on metagenomics data. Yet, the redundancy of expressed functions remains largely unexplored. Here, we quantify the protein-level functional redundancy in the human gut microbiome using metaproteomics and network approaches. In particular, using an ultra-deep metaproteomics approach, we reveal high protein-level functional redundancy and high nestedness in the proteomic content networks - bipartite graphs that connect taxa with their expressed functions. We further examine multiple metaproteomics datasets, and show that various environmental factors, including individuality, gut regions, xenobiotics, and disease significantly altered the protein-level functional redundancy. By projecting the bipartite proteomic content networks into unipartite weighted genus networks, functional hub genera across individual microbiomes were discovered, suggesting a universal principle of functional organization in microbiome assembly.

Bio: Dr. Leyuan Li received her PhD in Biomedical Engineering in 2016. She then worked as a postdoctoral fellow, and currently works as a research associate, both at Dr. Daniel Figey's Lab at the Department of Biochemistry, Microbiology and Immunology, Faculty of Medicine, University of Ottawa. Dr. Li's research project focuses on development and application of metaproteomics in gut microbiome studies, with an interest in high-throughput assays focusing on individual microbiomes and their functional ecology.

Hosted by Yang-Yu Liu