Data Science Seminar Spring 2022

Title: Modeling Disease Progression & The Role of Microbial Community Dynamic
Speaker: Nicholas Chia, Ph.D., Mayo Clinic

Abstract
Recent work on the role of the microbiome in cancer initiation and progression highlights the need to better assess and understand the key microbial-metabolite interactions. This presentation explores the merger of insight from microbial ecology, metabolic modeling, and cancer biology, with the ultimate goal of building our applicable knowledge towards microbial solutions for preventing initiation and slowing progression cancer. Motivated by past work, this talk presents modeling approach for understanding different aspects of the complex dynamics of microbial ecosystems and cancer evolution. These modeling approaches create an opportunity for application toward (1) rationale design of probiotic interventions, (2) time-longitudinal microbial community prediction, and (3) use of inverse reinforcement learning (IRL) as a generative model of cancer evolution.

Bio
Nicholas Chia is an Associate Professor at the Mayo Clinic in the Department of Surgery and Department of Pathology and Laboratory Medicine. He is Director of the Beyond DNA Multi-omics program and Co-Associate Director of the Microbiome Center for Individualized Medicine. His research focuses on uncovering collective mechanisms—that is, understanding the mechanisms that give rise to population dynamics. The collective mechanism can lead to functional changes in complex natural systems ranging from microbial community susceptibility to the emergence of cancer. Over his career, he has developed new bioinformatics tools for 16S rRNA analysis pipelines, identified new microbial genomes that impact cancer formation, and led the development of a pipeline for Automated Metabolic Model Reconstruction. His focus is developing models to better understand microbiome interactions with the host, environment, and within the microbial community. Recent work has explored the application of artificial intelligence and its interface with mechanistic modeling techniques for complex biological systems.
Time: 1:20-2:20 pm April 29, 2022
ZOOM link: https://baylor.zoom.us/my/seminartalk
Passcode: 019584
Location: Cashion 311