Multiscale analysis of trophic interactions in microbial communities

All life requires nutrients and energy; the processes of acquiring these resources drive biology from pathogenesis to planetary biogeochemical cycling. However, the organisms responsible for these processes are often uncultivable and too complex to directly observe and/or understand. Stoichiometric modeling, a systems biology approach, incorporates data from multiple sources, including metagenomes, to extract biologically meaningful principles, from resource requirements to community productivity as a function of population composition. The presented work expands both systems biology tools by improving the stoichiometric modeling algorithm and their application by identifying fundamental principles that govern nutrient and energy transfer through microbial communities.

Multiscale analysis of trophic interactions in microbial communities, Thesis Defense by Kristopher Hunt, PhD candidate, chemical and biological engineering, Montana State University, September 19, 2016