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Title: Exploring the biosynthetic potential of uncultured microbes

Abstract: Microbes universally live in communities, where the antagonistic and symbiotic interactions between different species shape the evolution of bioactive small molecules. Delineating the exact nature of such interactions may shed light on the functions, and hence potential therapeutic uses, of small molecules in the environment. However, most environmental microbes have never been cultured, making the study of their natural behavior and interactions challenging. One of the methods that can help shed light on the lives of uncultured microbes is culture-independent sequencing, of both DNA and RNA (metagenomics and metatranscriptomics, respectively). In this talk, I will outline how before we can use meta'omics to ask "who is doing what?" in microbial communities, we must first determine who each sequence belongs to, in a process called "binning". I will discuss a binning pipeline that my lab has developed, termed "Autometa", that is capable of deconvoluting highly complex metagenomes with over 1,000 microbial species present and associated with non-model hosts. I will also present examples of the applications of this pipeline in the study of small molecule biosynthesis in uncultured microbial symbionts of marine invertebrates (tunicates, bryozoa, sponges) and insects.