As microbiome research matures, it has become clear that a better understanding of the microbial communities inhabiting our world is key to a better understanding of our environment and of animal and human health. At the same time, we have become aware of the limitations current microbiome technologies have, and of the tremendous challenges posed by the analysis of the massive data sets generated in microbiome studies. In my talk I will describe some of the research taking place in my lab aimed at developing computational tools for microbiome analyses. I will specifically focus on challenges related to the structure of biological databases, and the resulting impact on the insights that can be derived from microbiome data.