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Microbiome Data Science: from the Earth Microbiome to the Global Virome

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Microbiome research is rapidly transitioning into Data Science. The unprecedented volume of microbiome data being generated pose significant challenges with respect to standards and management strategies, but also bear great new opportunities that can fuel discovery. Computational analysis of microbiome samples involving previously uncultured organisms, is currently advancing our understanding of the structure and function of entire microbial communities and expanding our knowledge of genetic and functional diversity of individual micro-organisms. I will describe some of our computational approaches and will emphasize the value of data processing integration in enabling the exploration of large metagenomic datasets and the discovery of novelty. I will discuss current approaches and success stories for the discovery of novel phylogenetic lineages as well as the exploration of the viral dark matter.