Cosmology is in the era of large observational surveys that generate detailed three-dimensional maps of the matter content in the Universe. These maps contain a plethora of information about the physics of the universe as a whole, such as its initial conditions, size, age, and contents, as well as the physics that describe how galaxies formed and evolved with time. However, extracting this physical understanding from the data is an enormous challenge because the observational data sets are massive and the relevant theoretical models are computationally expensive. I will describe these challenges and present my research group's recent and ongoing work to address them.