Polynomial representations of probability density functions and of designed experiments are at the core of Algebraic Statistics. Some ideas and techniques used in Algebraic Statistics will be exemplified by three applications. An example is given by a symbolic-numeric approach for the analysis of datasets, represented as sets of limited precision points. A second one refers to a novel statistical model class for the understanding of discrete processes and its causal interpretation. The third one considers independence in Gaussian models and structural meta-analysis.