The recovery of ancient DNA from human, animal, and plant remains has created new opportunities to use genetic data to enhance archaeological investigations. Ancient DNA research has advanced steadily over the past two decades in both its technical efficiencies and its applications. Archaeology is the discipline that has benefited the most from ancient DNA analysis. Through case studies, this talk will demonstrate that ancient DNA has become an integral part of archaeological research. New high throughput next generation sequencing technology has now made the analysis of the whole ancient genomes possible, opening up unprecedented opportunities for understanding the dynamics of human-environment interactions in the past.