Least squares methods are of common use when one needs to approximate a function based on its noiseless or noisy observation at $n$ scattered points by a simpler function chosen in an $m$ dimensional space with $m$ less than $n$. Depending on the context, these points may be randomly drawn according to some distribution, or deterministically selected by the user. In this talk, I shall analyze the stability and approximation properties of least squares method, in relation with the spatial distribution of the sampling. Applications will be discussed in acoustics and high-dimensional parametric PDEs.