

## **You can't hear the shape of a manifold**

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Associated to every Riemannian manifold is a Laplace-Beltrami operator acting on smooth functions on the manifold. To what extent does the eigenvalue spectrum of the Laplace-Beltrami operator of a compact Riemannian manifold encode the geometry and topology of the manifold? After briefly surveying various positive results, we will focus on constructions of manifolds with the same spectrum. The various constructions will reveal many geometric and topological properties that are not spectrally determined. We will also consider the spectra of other natural differential operators such as the Hodge Laplacian.