The spectral decomposition of the Laplace operator on a manifold or a domain in $\mathbb{R}^n$ is of high importance in mathematics and physics. It describes wave propagation, one particle quantum mechanics, but also has significance in number theory in case the underlying geometry has arithmetic symmetries. Derived quantities such as the spectral determinant of the Laplace operator appear as effective actions in quantum field theories but also as natural functionals on the space of metrics. I will discuss some background and computational aspects of the spectral decomposition on hyperbolic surfaces and the spectral determinant. I will also show numerical evidence that the spectral determinant attains its maximum in genus 2 at the Bolza surface.