Fractal zeta functions - a short overview

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In this talk I will give a short overview of the theory of fractal zeta function and complex dimensions of subsets of Euclidean spaces. The theory has been developed in a series of papers and in a research monograph "Fractal Zeta Functions and Fractal Drums: Higher-Dimensional Theory of Complex Dimensions" coauthored by M. L. Lapidus, G. Radunovic and D. Zubrinic. It is a far-reaching generalization of the one-dimensional theory for fractal strings developed by M. L. Lapidus, M. van Frankenhuijsen as well as by their numerous collaborators. The complex dimensions of a set are defined as poles of the corresponding fractal zeta function and generalize the notion of Minkowski dimension. Although the complex dimensions are defined analytically, they have an explicit geometric meaning revealed in the Steiner-like fractal tube formula of the volume of its ϵ-parallel set. We will illustrate the theory by interesting examples and also reflect on application in dynamical systems.