

# FUNCTIONS: TECHNIQUES AND APPLICATIONS (THE UGLY BUSINESS OF HEAT KERNEL COEFFICIENTS)

**Klaus Kirsten**

*Baylor University, USA*

Functions of the eigenvalue spectrum of certain, mostly geometric, differential operators play a crucial role in different branches of mathematics and physics. Prominent representatives of these so-called spectral functions are the zeta function and the heat kernel.

Using different examples from mathematics and physics, I will explain where the interest in spectral functions comes from. New methods for their analysis will be outlined and applied to a variety of problems in topics such as the heat equation and quantum theory.