

The problem of delivering upper and lower bounds for moments of the Riemann zeta function, or further establishing asymptotic formulae when possible, has attracted the attention of numerous scholars over the last hundred years, conclusions of the requisite precision having applications in several topics in analytic number theory that includes zero-density estimates, the distribution of prime numbers, bounds for error terms in various divisor problems... In this talk we shall analyse a collection of mixed moments and twisted mixed moments of the Riemann zeta function and establish the validity of asymptotic formulae comprising on some instances secondary terms of the shape $P(\log T)T^C$ for a suitable constant $C < 1$ and a linear polynomial $P(x)$. Such examinations are performed both unconditionally and under the assumption of a weaker version of the *abc*-conjecture.