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Moments of the zeta function and mean values of long Dirichlet polynomials

The $2k$ -th moments $I_k(T)$ of the Riemann zeta function have been studied extensively. In the late 90's, Keating-Snaith gave a conjecture for the size of $I_k(T)$. At the same time Conrey-Gonek connected $I_k(T)$ to mean values of long Dirichlet polynomials with divisor coefficients. Recently this has been further developed by Conrey-Keating in a series of 5 articles. I will discuss my work relating $I_3(T)$ to smooth shifted ternary additive divisor sums and also recent joint work with Alia Hamieh on mean values of long Dirichlet polynomials with higher divisor coefficients.