A group is said to have polynomial representation growth if the sequence enumerating the isomorphism classes of finite dimensional irreducible representations according to their dimension is polynomially bounded. The representation zeta function of such group is the associated Dirichlet generating series. In this talk I will focus on representation zeta functions of arithmetic groups and their analytic properties. I will explain the ideas behind a proof of a variant of the Larsen-Lubotzky conjecture on the representation growth of arithmetic lattices in high rank semisimple Lie groups (joint with Nir Avni, Benjamin Klopsch and Christopher Voll). Time permitting, I will talk about results on arithmetic groups of type A_2 in positive characteristic (joint with Amritanshu Prasad and Pooja Singla) and results towards meromorphic continuation (joint with Shai Shechter).