Let $L$ be a positive definite lattice. There are only finitely many positive definite lattices $L'$ which are isomorphic to $L$ modulo $N$ for every $N > 0$: in fact, there is a formula for the number of such lattices, called the Siegel mass formula. In this talk, I'll review the mass formula and explain how it was reformulated by Tamagawa and Weil as a statement about volumes of adelic groups. I'll then describe some joint work with Dennis Gaitsgory on computing these volumes over function fields, using ideas from algebraic topology.