The moduli space of curves (by which I mean its Deligne-Mumford compactification) is a well studied object in algebraic geometry. Mumford introduced the notion of tautological intersection theory to study a part of the intersection theory which is simple enough to be tractable, but rich enough to be meaningful. Hodge integrals are a class of tautological intersection numbers that arise from intersecting the chern classes of the Hodge bundle and of the cotangent line bundles. In the first part of the talk I will introduce all these concepts and review some "classical" structural results about Hodge integrals.

When running the MMP on the moduli space of curves, after the first wall-crossing one sees the moduli space of pseudo stable curves, which is the target of a birational regular morphism from the moduli space of curves. We investigate how the Hodge bundles on either side of this morphism are related, and how, correspondingly, there are very rich combinatorial relation between Hodge integrals and pseudo stable Hodge integrals.

This talk is based on joint work with Gallegos, Ross, Wise, Van Over and on some of Matthew Williams' doctoral work.