

**Joana Cirici**

**Title:** Shapes of Algebraic Varieties

**Abstract:** A fundamental problem in Algebraic Geometry is to understand which topological spaces can be endowed with the structure of an algebraic variety. A main approach is to encode geometric information into additional structure on classical invariants from algebraic topology, such as homotopy or cohomology groups. In this talk, I will explore two complementary perspectives on this idea, inspired by the work of Grothendieck and Deligne. The first is the de Rham approach, which uses Hodge structures to refine topological data; the second is the étale approach, which captures arithmetic and geometric information via Galois actions on étale cohomology. Together, these frameworks provide powerful tools for probing the “shape” of algebraic varieties.