

**Title:** Introduction to Geometric Invariant Theory and Moduli Spaces

**Instructor:** Yi Hu

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**Description:** In this course, I will introduce the basic ideas and techniques in Geometric Invariant Theory (GIT) and Moduli Spaces. Besides the standard theory, we will study many concrete moduli examples throughout the course, emphasizing the geometric intuition behind the heavy techniques.

The standard theory will include the definition of GIT quotient, Hilbert-Mumford numerical criterion, Moment map criterion, and Chow quotient, etc.. Examples will include the moduli spaces of projective configurations, moduli spaces of hypersurfaces and moduli space of Deligne-Mumford stable curves, etc..

The textbook is my lecture notes written several years ago (these notes have been used twice: one semester at U of A and one semester at Chinese University of Hong Kong). The main reference is the book by S. Mukai: Introduction to Invariants and Moduli. I will select various examples from this book to enhance my notes.

**Prerequisites:** A one-semester course on algebraic geometry such as 536A or the equivalent is (more than) sufficient. As I will fill in some necessary algebraic geometry materials from time to time, a solid background in geometry and topology but without AG may also suffice. If you do not have any background in algebraic geometry but are still interested in taking this course, please talk to me.