Math 6370: Introduction to Deformation Theory, Fall 2018

- **Meeting:** T/Th 2:00-3:20, CSC 12
- **Instructor:** Stefan Patrikis, office JWB 309, email patrikis@math.utah.edu
- **Office hours:** As needed: please don't hesitate to contact me to schedule a meeting.
- **Text:** None (references to be posted on the course website)
- **Course Description:** This course will be an idiosyncratic introduction to both classical and derived formal deformation theory. We will draw examples both from algebraic geometry and from the deformation theory of group representations. The first part of the course will introduce the classical theory: tangent-obstruction theories in both of these settings, the Schlessinger representability criteria, and many examples. The second part of the course will transition to the derived setting, providing background in homotopical algebra (eg, the Dold-Kan correspondence, the model structure on simplicial commutative rings, the cotangent complex) and then explaining Lurie's derived Schlessinger criterion. As time allows, the third part of the course will apply this general theory and follow recent work of Galatius-Venkatesh that lays the foundations for a derived deformation theory of group representations.
- **Prerequisites:** The course will be rather wide-ranging, but I will spend a lot of time on preliminaries so that the class is accessible to students whose preparation includes graduate courses in algebra and algebraic topology and some scheme-theoretic algebraic geometry (less than chapters II and III of Hartshorne will suffice, and for most of the course we'll only need some basic commutative algebra). Students looking to ease the transition to the second part of the course might study up on a little homotopy theory, but I will explain whatever we need.
- **Coursework and Grading:** Enrolled students will take turns typing up lecture notes.