Motivation & Background

- Cam and Roller follower mechanisms are used to
  - Operate the valve train in internal combustion engines
  - Pressurize the fuel to be injected in the throttle body or combustion chamber
- Previous work examined the role of slip within the cam follower interface as well as its direct effect on wear and failure
  - Interface is generally assumed as pure rolling
  - However, evidence exists of slip on the interface
- Lubrication is used to reduce wear and failure
  - However, in high pressure contacts, the lubricant film is dependent on the elastic deformation of the two contacting elements
  - This phenomenon is referred to as Elastohydrodynamic Lubrication or EHL

Objectives

- The objectives of this investigation are to understand and characterize the surface texture effects on a cam follower system
- Enhance the lubrication performance at the cam follower interface

Cam Follower Kinematics

- Cam follower kinematics are necessary to derive theoretical roller speed profile
  - The roller speed profile is defined as the ratio of the angular velocity of the roller follower to the angular velocity of the camshaft

Elastohydrodynamic Lubrication (EHL)

- The simultaneous solution of Reynolds and elasticity equations subjected to the previous boundary conditions generates the EHL output.