A. Briefly describe overall research program at your laboratory.

My research lab studies fluctuations both in nanocolloidal suspensions and in critical fluids. The nanocolloidals experiments are carried out at the College of Charleston (CofC). The supercritical fluids experiments are carried out by my collaborators on the International Space Station (ISS).

B. Briefly describe specific project(s) for your teacher:

Fluctuations in nanocolloids. At the interface between two miscible fluids the interface is not smooth due to competing gravitational, thermal, and concentration-driven gradients. We use direct imaging techniques to record fluctuations at the interface between water and nanocolloids. The purpose of the research is to derive thermomechanical parameters from interface fluctuations.

Critical fluctuations in microgravity. In fluids near the critical point under microgravity (on ISS), the density fluctuations become extremely large (of the order of microns) and can last for hours. We record images of fluctuations with the purpose of determining critical compressibility and viscosity. The goal is to establish accurate equation of states.

C. Will any other people (post docs, grad students, undergraduate students, colleagues, etc.) be involved directly with your teacher?

The teacher would work with me and possibly an undergraduate student.

D. Will you require any advanced reading/preparation for the teacher? If yes, please briefly describe.

Yes, I will assign appropriate reading materials for the respective project. Working with optical equipment requires an in-depth study of the user manual. For image processing projects we will cover some basic Matlab programming.