**A. Briefly describe the overall research program at your laboratory.**

My research lab studies fluctuations both in nano colloidal suspensions and in critical fluids. The nanocolloids experiments are carried out in my Soft Matter Lab at the College of Charleston (CofC). The supercritical fluids experiments are carried out by my collaborators on the International Space Station (ISS). The lab has been recently funded by the South Carolina Space Grant Consortium to study critical fluids experiments recorded on the International Space Station (ISS).

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

- **a. 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 to determine critical compressibility and viscosity. The goal is to establish to find power-law exponents as well as other critical fluids' thermophysical properties.

- **b. Free diffusion and concentration fluctuations in nanocolloids.** We performed experiments for the iron oxide suspension in the presence and the absence of a vertical magnetic field using shadowgraph methods for cells of different heights to verify the influence of confinement on non-equilibrium concentration fluctuations. Extracted frames from these recordings will be processed through a Differential Dynamic Algorithm (DDA) that determines the physical properties of the process, such as the correlation time, the structure-function, the structure factor, and the mass diffusion coefficient.

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

The teacher would work directly with me. The teacher may also interact with an undergraduate or graduate student working on the same or similar project.

**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. I will provide tutorials for image processing projects and we will cover some basic Matlab programming. Participating teachers will receive training on responsible conduct of research-based of the National Science Foundation guidelines.