1. Bring three (3) well thought out questions about the literature paper to class and hand them in.

2. Homework problems:

   **Watching kinesin take steps with single fluorophore tracking.** Make the following assumptions. The single fluorophore localization precision improves in the same manner as the standard error in the mean does with respect to the standard deviation and the resolution limit for the microscope is 220 nm.

   (a) How many photons need to be detected at the camera to achieve a 2 nm precision?

   (b) The camera collects 4 frames/sec. Assuming a microscope collection efficiency of 10%, what is the rate (photons/sec) at which a single fluorophore needs to emit photons to achieve this precision?

   **Graduate students (d)** As the graduate student doing the experiment, you control the ATP concentration and hence the rate of stepping. What stepping rate would you use to measure kinesin stepping under these illumination conditions? Justify your answer by considering the limited time resolution and the stochastic nature of stepping at low ATP (assume stepping time is exponentially distributed). Note this last question is more a general question about making measurements and more statistical in nature. There is not a unique answer and therefore you need to carefully justify your methodology.