Lab 3: Brownian motion

Team info

Lab section: C01 (12-3 PM) | C02 (3-6 PM)

Table number: \_\_\_\_\_\_\_\_\_\_\_

Team name: \_\_\_\_\_\_\_\_\_\_\_

Journalist: \_\_\_\_\_\_\_\_\_\_\_

Data Interpreter: \_\_\_\_\_\_\_\_\_\_\_

Critic: \_\_\_\_\_\_\_\_\_\_\_

Checker: \_\_\_\_\_\_\_\_\_\_\_

[This is a shell of a blank writeup. Strip out the verbiage, including this sentence, and replace it with your own.]

# Journal

This corresponds roughly to Materials and Methods in a scientific paper. It won’t have all the technical detail of an academic paper (for instance, you don’t need to report what kind of microscope you used), but it should have enough information that *the reader can understand exactly what you did and how you did it*. It is particularly important to explain any deviations from the lab instructions, or anything not explicit in the lab instructions.

*For instance, this week* you would probably swiftly recap the instruction and also tell us about some details that vary from group to group: which size beads you used, what magnification you chose on the microscope, at what point in the analysis you averaged over all beads, and where you converted from pixels to microns.

# Data and Interpretation

Your findings, displayed in an easy-to-understand form, with the important features explicitly described and explained.

We are mostly concerned that you display your data to us in a comprehensible and elegant way. *You* can decide exactly how to do so, but we often offer hints or suggestions.

*This week, for instance*, you should probably include

1. Plots of the mean and mean-square displacement as a function of time, in x and y, for each of your bead sizes. Typically, if it doesn’t make your graph too cluttered, you can plot everything with the same units on the same graph (with different colored lines and legends to identify the different lines). So here you could plot mean x and mean y for each of the two bead sizes on one graph (with fit lines as well); on a separate graph, plot mean-square displacement in x, y and r for each of the bead sizes (with fit lines as well)
2. Report the diffusion coefficient from the fit lines above

# Evaluation

Deeper reflection on what your results mean. Do they make sense? Are they consistent with other things you know?

*This week, for instance*, you might comment on

1. Are your mean and mean-square graphs the right shape for what you expect from Brownian motion?
   1. If not, what could explain the deviation? Is the motion in x al least *consistent* with the motion in y?
2. Is the diffusion coefficient consistent with the Stokes-Einstein prediction for D?

**Make sure you answer all the questions from the lab page somewhere in your writeup!**