Reproduce Figure 1 from main paper:

Figure 1A:

Shows that:

1. The characteristics of period and dampness are not coupled.
2. The proportion of damped cells does not affect FRP in constant darkness.

Figure 1B:

Shows that:

1. Independent of light intensity when you have a higher proportion of damped cells, the system is more easily entrained.
2. When you adjust the intensity, higher intensities further boost the entrainment ability of the model.

Steps:

For both figures:

Step 0 – Make sure the model with multiple cells is able to synchronize:

1. Plot the trajectory of one of the proteins for each of the cells in the model
2. Calculate the order parameter.

Step 1 – determine a library of dampened and sustained oscillators:

1. Douglas use Stephanie's library although there may be correlation
2. Jay adjust lambda and a_0 -> you will need to determine the threshold that makes the oscillators damped and sustained for you model.
3. Fan part of the model, use Gaussian to adjust parameters
4. Victoria create a library 75 damped, 75 sustained.

Step 2 – determine a scalar on the mean field coupling that creates weak, moderate and strong coupling intensity

Step 3 – determine a scalar for the light pulse function that creates weak, moderate and strong coupling intensity.

For Figure 1A:

In order to calculate the FRP you will want to find the mean period of all of the cells for a single model protein and get the period, report this for:

1. varying coupling strengths: weak, moderate and strong.
2. In constant darkness
3. varying proportions of damped cells: 0-100%

For Figure 1B:

In order to calculate the LLE find the mean period of all of the cells for a single model protein and get the period. For each data point you need to find the lower level of entrainment, which will require multiple runs. For each run adjust the t-cycle to find the lowest that the cells can entrain to. In order to adjust the t-cycle, adjust the mod on the light pulse function. Report this for:

1. varying light intensities: weak, moderate and strong.
2. a coupling strength of moderate.