**Note: read through the shiny Instructions in the Introduction folder if you haven’t already, or have forgotten how to make shiny run.**

**Genetic differentiation between populations driven by genetic drift.**

This simulator (“GeneticDriftDifferentiation.R”) simulates a single population that splits into two subpopulations at the beginning of the simulation, and which then evolve completely independently from that point forward (i.e., no mating between individuals of different subpopulations or migration between the subpopulations).

**Input:** The sliders on the left allow you to set up the simulation, including:

*N,* the number of individuals in each subpopulation

*p,* the initial frequency of the A allele.

the number of generations to allow the simulation to run

the number of independent loci to track in the simulation

**Output:**

The top plot shows allele frequencies at different loci in the two subpopulations, tracking allele frequencies through time in the ‘red’ and ‘blue’ subpopulations. It is easiest to see what is going on if you set the ‘number of loci’ to 2—sometimes the red and blue populations will drift in the same direction, sometimes in the opposite direction. They are unlikely to track each other exactly, though—in other words, they start to differentiate genetically. Remember, there is no selection in this simulation, so the alleles tracked have equal fitness.

The bottom plot shows genetic differentiation, or Fst, between the ‘red’ and ‘blue’ subpopulations through time, averaged over all the loci in the simulation.

Press escape to end the simulation when you are done.

**Questions to work through**

1. **Genetic differentiation through time.** To get a feel for genetic differentiation, set up the simulator with whatever parameters you choose; anything should work, as long as the initial frequency is between 0 and 1, and you use a reasonable number of loci and reasonable population size.
   1. As time goes on, what happens to genetic differentiation—does it increase or decrease?
   2. Set the population size to a small number, and the number of generations to a large number. Genetic differentiation should level off—can you explain why?
   3. Set both the population size and number of generations to large numbers. Does genetic differentiation increase more or less slowly than in the small population, and why?