Exercises

- *Space is the place.* Play with population density in the host pathogen model. What if a proportion of cells are initially empty. Does this affect how often the pathogen dies out? What is some cells are not only empty, but unfillable, representing barriers in physical or network space?
- *Evolving contagion.* Adapt the host-pathogen model so that transmissibility is an evolvable trait (see Goodnight et al. 2008 for suggestions how to accomplish this). Do pathogens evolve to be as transmissible as possible? Why or why not?
- *Making more room.* In the metaethnic frontier model, we used a 21 x 21 grid. How does the overall size of the territory (in terms of habitable regions) influence the spread of empires? What if make the grid considerably large, like 51 x 51? How does this effect our conclusions about the number of empires at one time, and the persistence of those empires?
- *Thinking through assumptions.* Consider the metaethnic frontier model. Describe the model's assumptions. Why do those assumptions lead to cycles (or fail to do so)?
- *Possibilities.* Imagine you had advanced the metaethnic frontier model so as to be able to accurately model the rise and fall of modern states. How would you calibrate that model? Would it be possible to make concrete predictions?