Some ideas for the final project. (Feel free to propose your own too!)

- One of many of the research papers on modeling COVID-19.

- Google's PageRank algorithm, which is closely related to Markov chains. It has also been used in a recent paper on probabistic Boolean networks: `https://arxiv.org/abs/1608.00535`.

- CpG islands in a genome, and using hiddden Markov models (HMMs) to detec them) but not about the *CpG Educate* online software. Write up a description of this is present it to the class.

- The 2009 paper is about the smallest chemical reaction network (using ODEs) that exhibit bistability: `http://bmcsystbiol.biomedcentral.com/articles/10.1186/1752-0509-3-90`.

- Neuronal networks (see Chapter 6, but there are many other references too), or other models in neuroscience.

- Modeling of metabolic pathways using linear algebra (see Chapter 8).

- Cellular automata (CA). This is a broad topic; here are some subtopics:

    - Elementary cellular automata (there are 256 ECA rules).
    - Some of the more widely-studied ECA rules (e.g., 30, 110).
    - Cellular automata in nature.
    - Langton's loops – a "species" of artificial life within a cellular automaton.
    - Stephen Wolfram's book *A New Kind of Science*.

- Design an experiment in NetLogo. See how the dynamic behavior of an agent based system depends on certain parameters. This may involve existing parameters, or new ones can be programmed.

- Mathematical modeling in sports.

- Phylogenetic or evolutionary trees.

- Food web networks in evolutionary biology.

- Probabilistic Boolean networks – models for gene regulatory networks that incorporate stochasticity in the update rules.

- Mendelian genetics.

- Petri nets – a mathematical framework for distributed computing systems.

- Bayesian network – describes conditional dependencies of random variables using a directed acyclic graph.