# Introduction to Mathematical Modeling in the Life Sciences
# Ideas for Term Project

Do you have a life science field you are already interested in? Perhaps you can find a paper that uses dynamical models to study a problem in that field. In particular, you should look for a paper that uses one of the following classes of model we have studied (or will study) in class:

1. Discrete-time linear / nonlinear map models
2. Stochastic models (Markov chains)
3. System of ordinary differential equations
4. Simple partial differential equations

A good place to start looking is in the reference sections of [EG], even in the sections of the book we may not get to cover in class!

For instance, you may want to look at the references mentioned in [EG] Sections 2.7.1 and 2.7.2, i.e., stochastic matrix models and density dependence, or the references cited in Chapter 1.

Or you can look at

- Hodgkin Huxley (or another) neuronal model
- Circadian rhythm
- Infectious diseases (see references of Chapter 6)
- Systems biology: Gene or regulatory networks motifs (see references of Chapter 4, papers by U. Alon, C. Tang, …); persisters, …
- Agent-based models (Chapter 8, swarming work by I. Couzin, …)
- Single molecule imaging work: enzymology (see papers by X.S. Xie), gene expression (see review by Raj & van Oudenaarden, Ann Rev Biophys 2009), …
- Ecology and conservation biology models
- Neuronal network models
- Demographics models
- PDE models (e.g., morphogen gradients in developmental biology)
- Scaling in biological systems or other complex systems