

PHYSICS 239 Spatiotemporal Biodynamics

Final Project

Presentation: 9:30am on March 18, 2022

You are to work on one of the following projects as a member of an assigned team. Each team will choose a distinct project and give a coherent presentation of 20-25min, with each team member presenting at least one component of the project. The components should include (but not limited to) biological background, derivation of the model, model behavior (analytic or numeric), and biological implications.

Note 1: The projects below are unevenly distributed, some more mathematical, others more biological. Each team is advised to take a look at several and think about what they involve and how they fit with your team composition, before deciding on which one to take on.

Note 2: Send to the instructor your preferred topic and a backup topic by the end of day, Friday March 11. In case where two teams pick the same topic, it will be given to the team who sent in their selection first; the other team will take the backup topic.

Note 3: The reference given below for each project is meant to get you started; you should look up references extensively as needed to give a comprehensive presentation.

1. **Propagation of Calcium wave on Amphibian Eggs ([Murray Book I: Ch.13.6](#))**
2. **Speedy mitotic waves in Drosophila early embryogenesis ([Vergassola et al, PNAS, 2018](#))**
3. **Microtubule assembly as a chemical wave ([Ishihara et al, RSTB 2014](#))**
4. **Effect of genotype-dependent dispersal on evolution ([Novak & Kollar, Genetics 2017](#))**
5. **Animal coat patterns ([Murray Book II: Ch.3.1-3.3](#))**
6. **Teeth primordia in the Alligator ([Murray Book II: Ch.4.4-4.10](#))**
7. **Limb bud development in mice ([Raspopovic et al, 2014](#))**
8. **Pigment patterning in fish skin ([Watanabe & Kondo, 2015](#))**
9. **Fin-to-limb transition ([Onimaru et al, 2016](#))**
10. **Skin denticle development in sharks ([Cooper et al, 2018](#))**