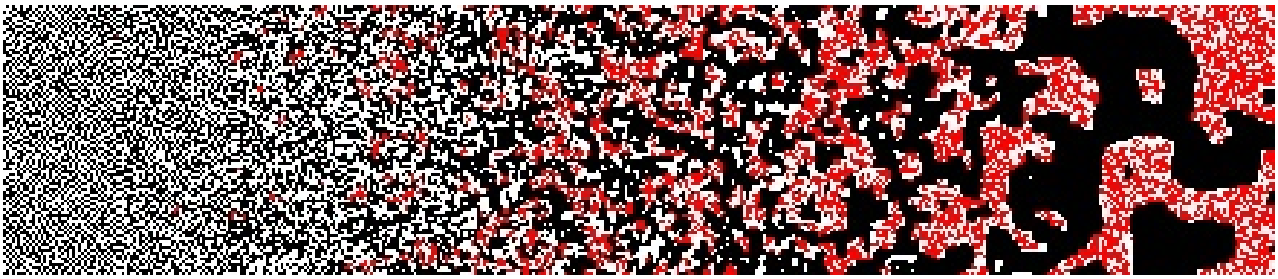
MAT 486, Biological Modeling & Simulation

Instructor: David Hiebeler (david.hiebeler@maine.edu)

MWF 1:00-1:50pm, Spring 2023



Locally-dispersing population in a gradient landscape with heterogeneous habitat

Course description: This course explores some models in population biology and epidemiology. Models will be explored both mathematically and computationally, using the R software platform as a programming language. Likely main topics include:

- Discrete-time population models (difference equations)
  - Single-species models
  - Systems (age/stage-structured populations, or multiple species)
  - Stochastic models: variation in space, and variation in time
- Continuous-time models (differential equations)
  - Single-species models
  - Systems (multiple species or states)
  - Stochastic models: Poisson processes
- Spatial models: simulating spatial population/epidemiological models, and mathematical approximations of them; possibly some network models

Prerequisites: Department permission is required. Contact Cathy Brown (cmbrown@maine.edu) or Kerry Davis (kerryd@maine.edu). Background needed for the course is primarily:

- A course covering basic probability, such as STS 332, STS 434, or equivalent
- Linear algebra, MAT 262
- Having seen some differential equations (MAT 259) and/or having some programming experience in any programming language would also be helpful, but is not strictly necessary.

Textbook: None required; notes will be provided