

# Agent-Based Modelling in NetLogo

David Hales www.davidhales.com/abm-netlogo

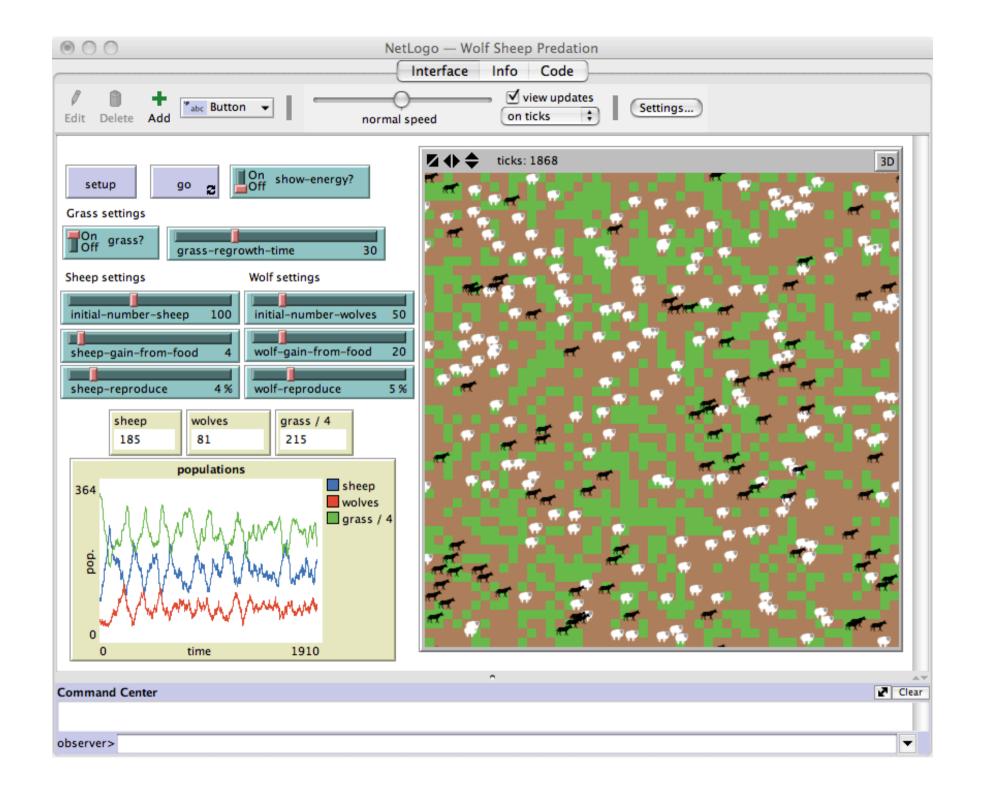
#### Resources

- The Open ABM website contains various resources including tutorials and an expanding models library: <a href="https://www.openabm.org/">https://www.openabm.org/</a>
- Open access Journal of Artificial Societies and Social Simulation with many ABM related papers: http://jasss.soc.surrey.ac.uk/

## Wolf Sheep Predation Model

- Simple predator / prey ecological model
- Sheep eat grass and wolves eat sheep
- Both reproduce a fixed rates
- Explores coupled dynamics of population sizes
- Developed for the purposes of education of high school students
- Allowing them to explore and experiment rather than learn differential equations

File > Models Library > Biology > Wolf Sheep Predation



#### Notable code

- Introduces the "breed" command:
  - Breed [wolves wolf]
  - Breed [sheep, a-sheep]
  - Defines new turtle subtypes (breeds)
- You can use breeds with commands used for turtles:
  - e.g. create-sheep 10, count sheep etc.

## Code in detail – see exercise sheet

### Task 1

- Modify code adding a breed of called "humans":
  - humans behave like wolves but catch wolves rather than sheep.
  - add three sliders to the Interface to set the parameters for humans
  - add a line to the plot for the total number of humans
  - add a monitor to show the the total number of humans.
  - note that there is a shape called "person".
- Can you find some parameters that keep all three turtle breeds alive for a long time?

### Task 2

- Modify the behaviour of humans:
  - They feed on sheep not wolves but only eat a sheep with a probability set by a slider
  - If wolves and humans find themselves sharing a patch they fight but do not eat each other
  - If there are more wolves in the patch than humans the wolves win and the humans die otherwise the humans win and the wolves die
  - See what happens when you run it