

RNR 696A

Agent-based Modeling for Natural Resources

Course Description

- The goal of this course is to introduce the concepts and techniques of agent-based modeling in natural resources. The focus of this course is the development and implementation of original models using the agent-based modeling software Netlogo.

Location and Times

- Wednesday 9:00am-10:50am – Biological Science East. Room 328

Instructor Information

Randy Gimblett
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Course Objectives:

By the end of the course the student will become proficient in:

- When and why to use agent-based models
- Define features of agent-based models
- Agent-based model planning and design
- Programming in the Netlogo modeling software
- Develop an original agent-based model to solve a natural resources problem

Class Format:

This class will be taught using a lecture format, laboratory modules, and group project. You will be expected to attend each class period.

Class overview: The class has been divided into two modules. In the first module, students will be taught through lecture and lab the basics of agent-based modeling and the Netlogo modeling software. In the second module, students will divide into groups and spend the remaining of the semester developing an original agent-based model. Groups are expected to present a final model at the end of the semester, including a project write-up (10 pages).

Grading Policy

Final course grades will be based on:

- Project Paper (50%)
- Final Presentation (50%)

Attendance Policy

- You will be expected to attend all classes. If you have to miss class, please send the instructor and your group an email to provide sufficient warning that you will be absent. It will up to the student to get caught up on the materials missed during that time.

Special Needs and Accommodations Statement

Students who need special accommodation or services should contact SALT (Strategic Alternatives Learning Techniques) Center for Learning Disabilities (SALT Center, Old Main PO Box 210021, Tucson, Arizona 85721-0021, (520)621-9448 TTY (520)626-6072), <http://www.salt.arizona.edu/>, and/or the Disability Resources Center, 1540 E. 2nd Street, PO Box 210064, Tucson, Arizona 85721-0064, (520)621-3268, FAX (520)621-9423, <http://drc.arizona.edu/>.

Schedule

August	27 -	Introduction to the Class, Description of Group Project
September	3 -	Introduction to Agent-Based Modeling, Netlogo Lab 1
	10 -	Introduction to Coding in Netlogo, Netlogo Lab 2
	17 -	Selection of Group Projects
	24 -	Group Project – Agent-based Model Architecture
October	1 -	Group Project – Data Collection and Cleaning
	8 -	Group Project – Data Collection and Cleaning
	15 -	Group Project – Model Development
	22 -	Group Project – Model Development
	29 -	Group Project – Model Development

November	5 –	Group Project – Model Development
	12 –	Group Project – Model Development
	19 –	Group Project – Model Development
	26 –	Validation and Uncertainty
December	3 –	Student Presentations
	10 –	Student Presentations

Additional Readings

Grimm V, Railsback, SF. Individual-Based Modeling and Ecology. Princeton: Princeton University Press; 2005.

- Individual = agent. Introduction to agent-based models, focused on ecological phenomena.

O'Sullivan D, Perry G. Spatial Simulation: Exploring Patterns and Processes. Wiley-Blackwell. 2013.

- Introduction to spatial modeling, focused on dynamic patterns of landscapes. [Free ebook via UofA library]