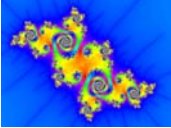
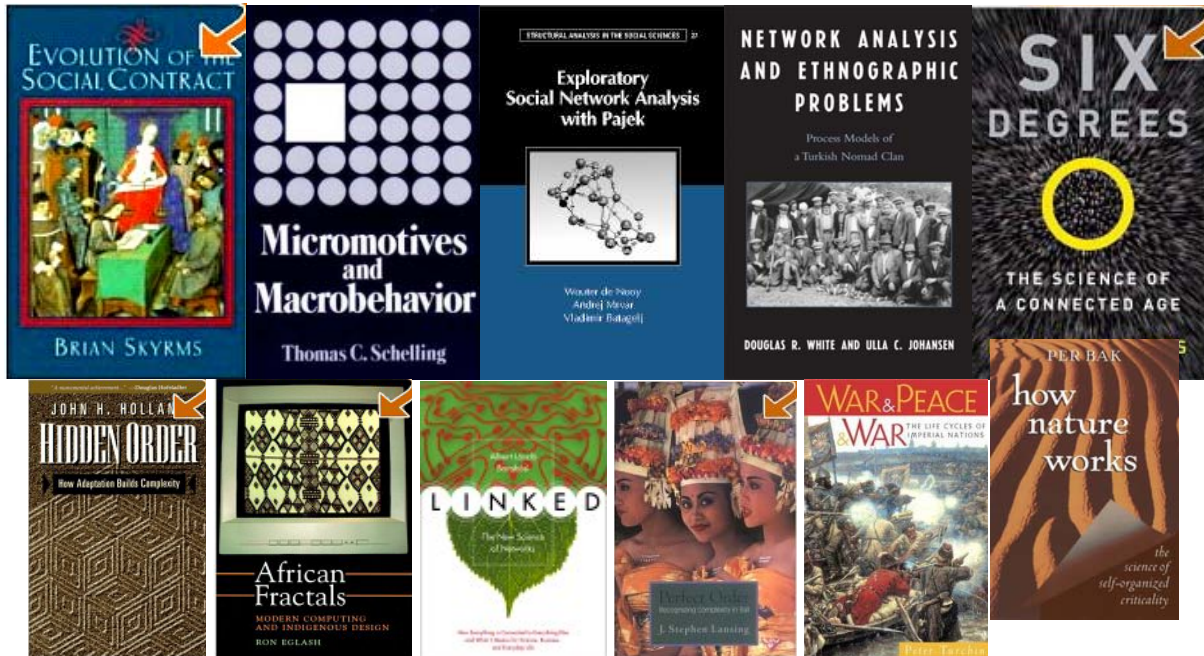


Syllabus
UCI Human Complex Systems SocSci 180F / Anthropology 179A
Networks and Complexity

Lecture/Lab: Tuesday/Thursday SST155
Instructor: Douglas White drwhite@uci.edu
Office: SSPA 4169. **Description:** Social networks and dynamics studied through complexity theory, simulating interactions in social networks & realistic network modeling

 as an approach to understanding society, organizations, historical change, and structural/dynamical approaches to social science problems.



Purchase two of the texts online. Data come with the Pajek text.

- Evolution of the Social Contract**
- Macromotives and Macrobehavior**
- Six Degrees: The Science of a Connected Age**
- Exploratory Social Network Analysis with Pajek**
- Network Analysis and Ethnographic Problems**
- Hidden Order: How Adaptation Builds Complexity**
- African Fractals: Modern Computing and Indigenous Design**
- Linked: The New Science of Networks**
- Perfect Order: Recognizing Complexity in Bali**
- War and Peace and War: The Life Cycles of Imperial Nations**
- How Nature Works**

Also available in pdf:

Social Network Basics for sociologists and everybody else
 Jeroen Bruggeman

Grading:

3 Quizzes: 20%

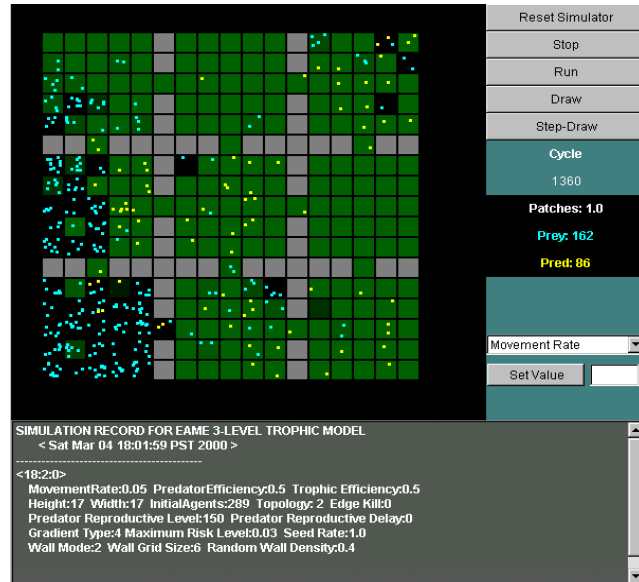
Homework Exercises and book reports: 25%

In-class activities and participation: 15%

Final Project Paper: 40%

Topics: Each week we explore different ways to model social systems. The details of this outline are subject to change.

1. modeling and simulation - Evolutionary Game Theory
2. analyzing networks and dynamics
3. modeling dynamical social systems
4. simulating networks
5. modeling culture
6. scaling and dynamics
7. complex social systems
8. conflict and dynamical instabilities
9. the multi-agent systems approach
10. using a multiple models research method



Predators and prey is a sophisticated interactive multi-agent system using evolutionary game theory. Computer simulations like these help us explore and test models against the complexity of real world social and cultural life.

All links are live in pdf

1. Evolutionary Game Theory: Evolving Artificial Moral Ecologies

Java: <http://www.ethics.ubc.ca/eame/eameweb/frcont2.htm>

From Simulation Model to Critique of Structuration *Structure and Dynamics* 1:146-172

<http://repositories.cdlib.org/imbs/socdyn/sdeas/iss2/art1>

Book reports: Evolution of the Social Contract;

2. Analyzing networks and dynamics with Pajek

Stories, Scripts, Roles, and Networks *Structure and Dynamics* 1: 267-290

<http://repositories.cdlib.org/imbs/socdyn/sdeas/iss2/art5>

About the Image: Diffusion Dynamics in an Historical Network *Structure and Dynamics*

1:133-141 <http://repositories.cdlib.org/imbs/socdyn/sdeas/iss1/art10>

The use of formal methods to map, analyze and interpret *hawala* and terrorist-related alternative remittance systems *Structure and Dynamics* 1:291-307
<http://repositories.cdlib.org/imbs/socdyn/sdeas/iss12/art6>

Book report: Exploratory Social Network Analysis with Pajek; Six Degrees

3. Modeling dynamical social systems

Dynamical Feedbacks between Population Growth and Sociopolitical Instability in Agrarian States *Structure and Dynamics* 1:49-69 <http://repositories.cdlib.org/imbs/socdyn/sdeas/iss1/art3>

Book report: War and Peace and War: The Life Cycles of Imperial Nations

4. Simulating networks

Fighting a Hydra: A Note on the Network Embeddedness of the War on Terror *Structure and Dynamics* 1:353-359 <http://repositories.cdlib.org/imbs/socdyn/sdeas/iss12/art9>

Book report: Network Analysis and Ethnographic Problems

5. Modeling culture

More Kin: An Effect of the Tradition of Marriage *Structure and Dynamics* 1:250-266
<http://repositories.cdlib.org/imbs/socdyn/sdeas/iss2/art4>

Atlas of Chiefdoms and Early States *Structure and Dynamics* 1:738-756
<http://repositories.cdlib.org/imbs/socdyn/sdeas/iss14/art1>

Book report: Perfect Order: Recognizing Complexity in Bali
African Fractals: Modern Computing and Indigenous Design

6. Scaling and dynamics

City-system resilience: China and Europe historically and today *Structure and Dynamics* 2:
forthcoming

A Primer on Statistical Analysis of Dynamical Systems in Historical Social Sciences (with a Particular Emphasis on Secular Cycles) *Structure and Dynamics* 1:070-81
<http://repositories.cdlib.org/imbs/socdyn/sdeas/iss1/art4>

Book report: Hidden Order: How Adaptation Builds Complexity

7. Modeling organizations

Network Dynamics and Field Evolution: The Growth of Interorganizational Collaboration in the Life Sciences. *American Journal of Sociology* 110(4):1132-1205

2003 A note on **structural holes theory** and niche overlap (co-authors Gianluca Carnabuci and Ivar Vermeulen), *Social Networks* 25: 97-101. <http://users.fmg.uva.nl/jbrugge/SN03.pdf>

Book report: Linked: The New Science of Networks

8. Modeling culture and agency

Network Analysis, Culture, and the Problem of Agency. Mustafa Emirbayer and Jeff Goodwin. *American Journal of Sociology* 99: 1411-
<http://www.journals.uchicago.edu/cgi-bin/resolve?id=doi:10.1086/230450&erFrom=-3782062303802642306Guest>

Book report: Macromotives and Macrobehavior

9. General Principles

Book report: How Nature Works

10. Summing up

Book Report: Each student will be responsible for a book report on one chapter from each of two books, in coordination with other students.

Quizzes: Quizzes will be given every 3 weeks on the most recent material. Quiz dates will be announced in lectures ahead of time. They are tentatively scheduled for Wednesdays in weeks 4, 6, 8 and 10. Typical quiz questions ask you to write a definition, evaluate a case study, or apply a model. Quizzes are 50 percent multiple choice.

Homework Exercises: We will use Excel to implement the several homeworks in weeks 2 and 6. Always have your name, student id, and the homework number included on what you turn in! Late homework will only be accepted under special circumstances.

Software: I will provide you with software and to explore various topics (Pajek, Java simulation, R, iGraph). <http://eclectic.ss.uci.edu/~drwhite/Anthro179a/syllabus03.html#Pajek>

Virtual World Participation: You can download software that is a portal to a virtual community called "There" at www.there.com. What you do in that world is up to you. Your "avatar" will be able to communicate with others and use tools (the basics of culture!)

Final Research Paper: The suggested topic is to apply and compare two different models to a phenomenon or system of your choice. Past research papers explored dynamics of Gini nation-level inequality indices, kindergarten networks, ants at work, forest food webs, cross-national trade; and so on. It's your choice!

Note: The purpose of this course is for you to learn and practice analytical thinking skills applied to social science problems and cultural questions, and to learn network and complexity research methods. The mathematics in the course mostly involve drawing graphs, calculating percentages and scaling distributions.

2003 course: <http://eclectic.ss.uci.edu/~drwhite/Anthro179a/syllabus03.html>

