

**LEHRSTUHL FÜR STEUERUNG
INNOVATIVER UND KOMPLEXER
TECHNISCHER SYSTEME
DR. YUSHIM KIM**



Education Program SS 2015

Seminar: Policy Informatics: Environmental Justice and Agent-Based Modeling

Room: FMA/00.07
Time: Monday, 12-14 h
Start: 13th of April 2015

Description:

That the world we inhabit is complex is not a new idea. The novelty is that we now have a better understanding of complexity, thanks to new concepts and research approaches. The study of Complex Adaptive Systems (CAS)—Complexity Science—is an intellectual child of early systems theory and its subsequent developments, such as chaos theory. Holland (1995) defined CAS as “systems composed of interacting agents described in terms of rules. The agents adapt by changing their rules as experience accumulates” (p. 10). The system of interacting agents is necessarily dynamic, and the agents can exhibit recognizable patterns of organization across spatial and temporal scales (Holland & Miller, 1991). The CAS perspective offers several insights that would be helpful for policymakers and public managers in dealing with the problems they face.

This seminar is designed to identify, articulate, and experience the “value-adds” of complexity science to public policy analysis. In specific, the course focuses on understanding environmental injustice as emergence and how agent-based modeling helps us gain new insights on the challenging problem. Environmental injustice—a disproportionate collocation of racial or ethnic minorities near environmentally harmful sites or facilities (i.e., disamenities)—has been a concern of policymakers and researchers for the past several decades (Liu, 2000; Ringquist, 2005). Now there is a rich body of literature on the explanations of race and ethnicity-based environmental injustice in US. This course will reexamine what has been learned from the previous research and what different insights agent-based modeling approach provides.

The general format of this course includes reviews of reading materials, discussions, and modeling exercise. Prior to each class, students are expected to read the required chapters and articles. Students are responsible for content included in the readings, even if it is not explicitly reviewed in class. Students are expected to participate actively in class discussions.

Readings:

[CKE] Campbell, H., Kim, Y., & Eckerd, A. (2015). Rethinking Environmental Justice: Insights from Agent-Based Modeling. New York: Routledge

We will also read articles and excerpts during the semester. These articles are noted with [On] in the reading assignment section of this syllabus. You can find the articles from Virtual Campus.

Class Assignment

1. Midterm Assignment

Your midterm project is to create a toy model using NetLogo. I will provide a written case and instruction to build a simple model. The case will be distributed to you in Week 6 class. You can work on this midterm assignment at your home between Week 6 and Week 8. No class on Week 7 (holiday) and Week 8 (midterm week). You must finish and submit the model by June 3(Wed), noon via email to me (ykim@asu.edu) or to a designated site (To Be Determined (TBD) later).

2. Final Project

Each student will be asked to write a short research proposal using ABM (approximately 10-15 pages double-spaced). For this task, you have two choices. 1) You can build on the EJ ABM we will discuss thoroughly in this class. The code for the very early EJ ABM will be distributed to students in class. If you choose this path, your proposal should include your plan on how to extend the current research and the model. It may include a research question, relevant literature reviews, and the explanation of how the EJ ABM can be modified to get meaningful simulation data to explore the research question. Or, 2) you can propose your own research project using ABM. Since we will go over the full research process with the EJ ABM, you will have a pretty good sense on how to do a research using ABM for a policy problem you are interested. If you choose option 2), please discuss with me in person during the class.

Submit your research proposal by July 10 (Friday), 5:00 PM via email to me or to a designated site (TBD).

3. Class Discussion

You will be expected to complete all required reading assignments prior to the class meeting. Your participation in class discussions and discussions with me via e-mail or during office hours will influence your participation grade. I value good attitude, passion, and process in the learning environment. If you wish to have clarification of anything that you read or hear in class but do not wish to ask a question in class, send me an email and I will respond to it in the following class session. Please actively participate in class discussion.

Reading Assignments

Week 1 (4/13)

No Class

Week 2 (4/20)

Policy Informatics: The State of the Field

Introduction Syllabus [On] Desai, A., & Kim, Y. (2015). Policy Informatics. *Journal of Policy Analysis and Management*, 34(2): 354-357.

- Week 3 (4/27)** **Agent-Based Modeling: A Tool**
 Install the most recent NetLogo in your laptop (5.1.0)
<http://ccl.northwestern.edu/netlogo/>
 Required to read and practice NetLogo tutorial before the class (especially tutorial #3)
<http://ccl.northwestern.edu/netlogo/docs/>
 o NetLogo Tutorial #1: Models
 o NetLogo Tutorial #2: Commands
 o NetLogo Tutorial #3: Procedures
- Week 4 (5/4)** **Simulation**
 [On] Gilbert, N., & Troitzsch, K. (2005). Chapter 1: Simulation and Social Science, *Simulation for the Social Scientist*, 1-14
 [On] Gilbert, N., & Troitzsch, K. (2005). Chapter 2: Simulation as a Method. *Simulation for the Social Scientist*, 15-27
- Week 5 (5/11)** **Environmental Justice (EJ)**
 [On] Liu, F. (2001). Ch. 1 Environmental Justice, Equity and Policies, 1-13.
 [On] Liu, F. (2001). Ch. 2 Theories and Hypotheses, 19-44.
 [On] Ringquist, E. J. (2005). Assessing Evidence of Environmental Inequities: A Meta-analysis. *Journal of Policy Analysis and Management*, 24, 223–247
- Week 6 (5/17)** **EJ: ABM Approach**
 [CKE] Ch. 1-3
- Week 7 (5/25)** **No Class**
 National Holiday – Please play with NetLogo and work on the midterm assignment on your own
- Week 8 (6/1)** **No Class**
 Working on your midterm assignment at home
- Week 9 (6/8)** **Firm and Resident Location Choice**
 [On] Schelling, T. (2008). Sorting and Mixing: Race and Sex, In *Emergence*, 235-248
 [On] Clark, W. (1992). Residential Preferences and Residential Choices in a Multiethnic Context. *Demography*, 29, 451–466[CKE] Ch. 4-5
- Week 10 (6/15)** **Residential Choice Constraints**
 [On] Downey L. (1998). Environmental Injustice: Is race or Income a Better Predictor? *Social Science Quarterly*, 79, 766–778.
 [On] Banzhaf, H. S., & Walsh, R.P. (2008). Do People Vote With Their Feet? An Empirical Test of Tiebout's Mechanism. *American Economic Review*, 98(3), 843-63. [CKE] Ch. 6-7

- Week 11 (6/22)** **Local Zoning**
[On] Maantay, J. (2002). Zoning Law, Health, and Environmental Justice: What's the Conclusion? Journal of Law, Medicine & Ethics, 30, 572–93. [CKE] Ch. 8
- Week 12 (6/29)** **Government Policy**
[CKE] Ch. 9-10
- Week 13 (7/6)** **Summary**
[CKE] Ch. 11
[On] Epstein, J. (2008). Why Model?, Journal of Artificial Societies and Social Simulation 11(14),
<http://jasss.soc.surrey.ac.uk/11/4/12/12.pdf>
(check this URL)
- Week 14 (7/13)** **Final Week**

* The syllabus is subject to change by the instructor.

Note:

The seminar is taught in English.
Students will conclude the course with a paper.

Registration:

Registration will be done during the first lesson.

Speaking hours:

Monday, 02:00-03:00 p.m.

Mail:

ykim@asu.edu

Class Website:

Virtueller Campus