

Theory Construction and Simulation (Graduates)

Topics and Readings:

Introduction

- Hanneman, RA. 1995. "Simulation Modeling and Theoretical Analysis in Sociology." *Sociological Perspectives* 38:457-462.
- Hanneman, RA, and S Patrick. 1997. "On the Uses of Computer-Assisted Simulation Modeling in the Social Sciences." *Sociological Research Online* 2.
- Goldspink, C. 2002. "Methodological implications of complex systems approaches to sociality: Simulation as a foundation for knowledge." *Journal of Artificial Societies and Social Simulation* 5:1-19.
- Hanneman, RA, and JR Hollingsworth. 1984. "Modeling and Simulation in Historical Inquiry." *Historical Methods* 17:150–63. (Optional)

Dimensions of Social Structure, Mechanism, and Macro-micro Link

- Hedstrom, P, and R Swedberg. 1998. "Social mechanisms: An introductory essay." In *Social Mechanisms: An Analytical Approach to Social Theory*. Edited by P Hedstrom and R Swedberg. Cambridge University Press.
- Van Den Berg, A. 1998. "Is sociological theory too grand for social mechanisms?" In *Social Mechanisms: An Analytical Approach to Social Theory*. Edited by P Hedstrom and R Swedberg. Cambridge University Press.
- López, José, and J Scott. 2000. *Social Structure*: Open University Press.
- Coleman, JS. 1990. *Foundations of Social Theory*: Harvard University Press. Chapter 1 and 2.
- Klüver, J, C Stoica, and J Schmidt. 2003. "Formal Models, Social Theory and Computer Simulations: Some Methodical Reflections." *Journal of Artificial Societies and Social Simulation* 6:8.
- Blau, PM. 1977. "A Macrosociological Theory of Social Structure." *American Journal of Sociology* 83:26.(Optional)
- Smith, TS. 1997. "Nonlinear Dynamics and the Micro-Macro Bridge." *Chaos, Complexity and Sociology*: 52-78. (Optional)

System Dynamics

- Hanneman, RA. 1988. *Computer-assisted theory building: modeling dynamic social systems*: Sage Publications, Inc. Chapter 1 through 3
- Collins, R, and RA Hanneman. 1998. "Modelling the interaction ritual theory of solidarity." *The Problem of Solidarity: Theories and Models*.
- Collins, R. 2004. *Interaction Ritual Chains*: Princeton University Press.

Activities -- Building models of Interaction Ritual Chains and Predator-Prey Eco-system.

Complex Adaptive System

- Miller, J. and SE Page. 2007. *Complex Adaptive Systems: An Introduction to Computational Models of Social Life*. Princeton University Press.
- Waldrop, MM. 1992. "Complexity: The Emerging Science at the Edge of Order and Chaos." *New York*. (Optional)

Evolution and Genetic Algorithms

- Campbell, DT. 1956. "Variation and Selective Retention in Socio-Cultural Evolution." *General Systems: Yearbook of the Society for the Advancement of General Systems Theory*.
- Holland, JH. 1996. *Hidden Order: How Adaptation Builds Complexity*: Addison Wesley Publishing Company. Chapter 1 and 2

- Bruderer, E, JV Singh, and SE Center. 1996. "Organizational Evolution, Learning, and Selection: A Genetic-Algorithm-Based Model." *Academy of Management Journal* 39:1322-1349.
- Biethahn, J, and V Nissen. 1994. "Combinations of simulation and Evolutionary Algorithms in management science and economics." *Annals of Operations Research* 52:181-208.
- Chattoe, E. 1998. "Just how (un) realistic are evolutionary algorithms as representations of social processes." *Journal of Artificial Societies and Social Simulation* 1.
- Burke, PJ. 2004. "Extending Identity Control Theory: Insights from Classifier Systems." *Sociological Theory* 22:574-594. (Optional)

Action Theories: From Rational to Adaptive and Cognitive

- Axelrod, R, and MD Cohen. 1999. *Harnessing Complexity: Organizational Implications of a Scientific Frontier*: Free Press.
- Fararo, TJ. 1989. *The Meaning of General Theoretical Sociology: Tradition and Formalization*: Cambridge University Press. Chapter 3
- DiMaggio, P. 1997. "Culture and Cognition." *Annual Reviews in Sociology* 23:263-287.
- Phan, D. 2003. "From Agent-Based Computational Economics towards Cognitive Economics." *Cognitive Economics: An Interdisciplinary Approach*. Edited by P Bourguine and JP Nadal. Springer.
- Elster, J. 1989. *Nuts and Bolts for the Social Sciences*: Cambridge University Press. (Optional)
- Berk, RA. 1974. "A gaming approach to crowd behavior." *American Sociological Review* 39:355-373. (Optional)

Agent-based Simulation

- Epstein, JM. 1999. "Agent-based computational models and generative social science." *Complexity* 4:41-60.
- Epstein, JM, and R Axtell. 1996. *Growing Artificial Societies: Social Science from the Bottom Up*: Mit Press. Chapter 1
- Macy, MW, and R Willer. 2002. "From Factors to Actors: Computational Sociology and Agent-Based Modeling." *Annual Reviews in Sociology* 28:143-166.
- Sawyer, RK. 2005. *Social Emergence: Societies as Complex Systems*: Cambridge University Press. Chapter 8
- Schelling, TC. 1978. *Micromotives and Macrobehavior*. Norton. Chapter 1 (Optional)

Introduction of NetLogo

The Manual, The NetLogo User Guide (This title is tentative).

Its contents: 1) Variables, Statements, and Functions; 2) Objected-oriented Programming; 3) Classes; 4) Control Structure; 5) List; 6) Dealing with Networks; 7) File Input/Output; 8) Graphics; 9) Debugging; 10) How to Use BehaviorSpace

Modeling I: Worker Protest

- Epstein, JM. 2002. "Modeling civil violence: An agent-based computational approach." Pp. 7243-7250 in *Proceedings of the National Academy of Sciences*: National Acad Sciences.
- Goldstone, RL, and MA Janssen. 2005. "Computational models of collective behavior." *Trends in Cognitive Sciences* 9:424-430.
- Brichoux, D, and PE Johnson. 2002. "The Power of Commitment in Cooperative Social Action." *Journal of Artificial Societies and Social Simulation* 5. (Optional)

Modeling II: Tag-mediated N-Person Prisoner's Dilemma Game

- Kollock, P. 1998. "Social Dilemmas: The Anatomy of Cooperation." *Annual Reviews in Sociology* 24:183-214.
- Heylighen, F. 1992. "Evolution, Selfishness and Cooperation." *Journal of Ideas* 2:70-76.
- Riolo, RL, MD Cohen, and R Axelrod. 2001. "Evolution of cooperation without reciprocity." *Nature* 414:441-443.

- Nettle, D, and RIM Dunbar. 1997. "Social Markers and the Evolution of Reciprocal Exchange." *Current Anthropology* 38:93.
- Dawkins, R. 1989. *The Selfish Gene*. New York: Oxford University. Chapter 11.
- Grim, P, S Wardach, and V Beltrani. 2006. "Location, Location, Location: The Importance of Spatialization in Modeling Cooperation and Communication." *Interaction Studies* 7:43–78. (Optional)
- Hammond, RA, and R Axelrod. 2006. "The Evolution of Ethnocentrism." *Journal of Conflict Resolution* 50:926. (Optional)
- Miller, JH, CT Butts, and D Rode. 2002. "Communication and cooperation." *Journal of Economic Behavior and Organization* 47:179-195. (Optional)
- Eguiluz, VM, MG Zimmermann, CJ Cela-Conde, and MS Miguel. 2005. "Cooperation and the Emergence of Role Differentiation in the Dynamics of Social Networks 1." *American Journal of Sociology* 110:977-1008. (Optional)

Modeling III: Cultural Evolution

- Aunger, R. ed. 2000. *Darwinizing Culture: The Status of Memetics as a Science*. Oxford University Press.
- Axelrod, RM. 1997. *The Complexity of Cooperation: Agent-Based Models of Competition and Collaboration*: Princeton University Press. Chapter 7.
- Huckfeldt, RR, PE Johnson, and JD Sprague. 2004. *Political Disagreement: The Survival of Diverse Opinions Within Communication Networks*: Cambridge University Press. Chapter 6 and 7.
- Baldassarri, D, and P Bearman. 2007. "Dynamics of Political Polarization." *American Sociological Review* 72:784.
- Rousseau, D, and AM van der Veen. 2005. "The Emergence of a Shared Identity: An Agent-Based Computer Simulation of Idea Diffusion." *Journal of Conflict Resolution* 49:686. (Optional)
- Stocker, R, DG Green, and D Newth. 2001. "Consensus and cohesion in simulated social networks." *Journal of Artificial Societies and Social Simulation* 4. (Optional)
- Milroy, L, and J Milroy. 1992. "Social Network and Social Class: Toward an Integrated Sociolinguistic Model." *Language in Society* 21:1-26. (Optional)
- Dodsworth, R. 2005. "Attribute networking: A technique for modeling social perceptions 1." *Journal of Sociolinguistics* 9:225-253. (Optional)

Modeling IV: Network Dynamics (MCMC)

- Jin, EM, M Girvan, and MEJ Newman. 2001. "Structure of growing social networks." *Physical Review E* 64:46132.

Debugging, Behavior-Space, Verification, and Validation

- Axtell, R, R Axelrod, JM Epstein, and MD Cohen. 1996. "Aligning simulation models: A case study and results." *Computational & Mathematical Organization Theory* 1:123-141.
- Aydinonat, NE. 2007. "Models, conjectures and exploration: an analysis of Schelling's checkerboard model of residential segregation." *Journal of Economic Methodology* 14:429-454.
- Clark, WA. 1991. "Residential preferences and neighborhood racial segregation: a test of the Schelling segregation model." *Demography* 28:1-19.
- Edmonds, B, and D Hales. 2003. "Replication, Replication and Replication-Some Hard Lessons from Model Alignment." *Journal of Artificial Societies and Social Simulation* 6:11.
- Leombruni, R, M Richiardi, NJ Saam, and M Sonnessa. 2006. "A common protocol for agent-based social simulation." *Journal of Artificial Societies and Social Simulation* 9. (Optional)
- Moretti, S. 2002. "Computer Simulation in Sociology: What Contribution?" *Social Science Computer Review* 20:43.
- Wilensky, U, and W Rand. 2007. "Making Models Match: Replicating an Agent-Based Model." *Journal of Artificial Societies and Social Simulation* 10:2.