

Syllabus

UCI SocSci 180G UCLA HCS 110 Artificial Culture: Experiments in Synthetic Anthropology Nicholas Gessler

Exploring artificially evolved multiagent worlds through computer simulations provides new insight into describing, understanding and explaining the complex causal web of biological and cultural processes that make us human. These massively parallel reflexive interactions have remained largely intractable to discursive and mathematical models. This project extends the trajectory that began with artificial life and artificial society towards a creative and critical practice of artificial culture. It embraces an evolutionary and computational epistemology, explores the envelopes of possibility for alternative counterfactual worlds, and experiments with "what-if" scenarios for explaining worlds around us. It focuses on the emergence of distributed cultural cognition, the rich intermediation between humans and their technologies. It investigates the dynamic interplay among cultural-things-that-think.

Syllabus

As part of the new Human Complex Systems Program, we will take a critical look at the cutting-edge of theory-building in the social sciences informed by hands-on practice in the revolutionary "new sciences of complexity." We will construct our own social and cultural agents, as well as the physical and social environments in which they "live" and turn them loose to study their interactions. We will study the interaction of different individual behavioral "rules" in various physical and social "environments." In this way we can explore the entailments of various "what if" scenarios and conduct experiments on different hypothetical situations. We visualize the patterns of behavior in these "theoretical worlds" through highly graphical quantitative visualizations on PCs.

Why call this "Artificial Culture?" Yes, we know culture is artificial by definition, but that's not the point we're making. We are referring to the trajectory in advanced computation from "Artificial Intelligence" to the field of "Artificial Life." We are projecting that trajectory from "Artificial Life," to "Artificial Culture." If you have seen the movies "Dark City" or "The Thirteenth Floor," read Greg Egan's "Permutation City" or Stanislaw Lem's "Non-Serviam," you probably already have some insights into the philosophy of "Artificial Life." However, in contrast to this popular fiction, we will take a serious look at the science, practice and epistemology of evolutionary computation and multiagent modeling in order to evaluate its potential as a new way of describing, explaining and understanding the dynamics of culture.

What if you've never programmed before? It's not rocket science. Yes, you will have to pay a great deal of attention to detail, but that is nothing new to anthropologists. We try to minimize the nasty details of Windows programming so that you can get right into the systematic details of cultural programming. This course and its content have been developed in Anthropology and other departments over the last six years. All participants, most of whom began with no previous programming experience, have succeeded in writing interesting simulations. We have over 100 simulations, many including source code, available for download from the Web.

We will be working in the de-facto universal object-oriented language C++, using Borland's "Rapid Application Development" system for Windows PCs. Please join us in this introduction to a practice that is changing the way we look at the world. We will be meeting in the CLICC PC

computer lab in Powell. Enrollment is limited, so please register early. Email me if you have any questions or suggestions...

The Software:

Borland C++ Builder 6.0 Professional is available in ALL the CLICC labs for free. It is NOT presently available in the SSC labs. A time-limited trial version is available on CD-ROM. I have two copies of the CD-ROM to loan out, or as I understand it, you can order your own CD-ROM trial for \$10. It is also available for free from the Web although folks have had difficulty downloading it. For those of you who would like to purchase your own copies for your own PCs, here is what the UCLA Computer Store had to say: (We'll get an update soon.)

Longer Description:

As part of the *Human Complex Systems Program*, this course is an introduction to *Artificial Culture*: the theory and methods of constructing computational human social worlds. We take a critical look at the cutting-edge of theory-building in the computational social sciences informed by hands-on practice in the revolutionary *new sciences of complexity*. We will design and create our own highly visual computer simulations of "what-if" scenarios on PCs. Movies have examined some of the epistemological issues. If you have seen the film *Dark City*, or the *Thirteenth Floor (Simulacron 3)*, read the novel *Permutation City*, read Stanislaw Lem's short story *Non-Serviam*, or played console simulation games, then you probably already have some good ideas and questions about how the technologies of artificial worlds can be applied to serious social science research questions. We will investigate the challenges and provide some answers. Participants will create their own social and cultural agents (a multiagent multitude of them), as well as the physical and social environments for them to "live" in. Then we will each study the consequences of our simulated agents' interactions as colorful quantitative graphical visualizations. We will gain an understanding of the new philosophies and technologies of *artificial worlds* and what computation and evolution may offer us as new ways of describing, explaining and understanding the dynamics of culture. You will read and see examples of some of the best work in being shown in international conferences and you will evaluate the social and scientific implications of these interactive techniques for cultural policy and research. Most importantly, you will learn how to build these worlds from the bottom-up and how to modify existing simulations, in order to analyze the results of different "what-if" counterfactual situations. We will work in the de-facto universal object-oriented language C++, using Borland's *Rapid Application Development* system for Windows on PCs. We have uploaded over 100 *simulations* and countless *topics* to the Web, resources that we have developed for related courses. Contrary to many expectations, you DO NOT need any previous programming experience. However, you do need a curiosity for figuring out how culture works in detail and an appetite for discovering how actions taken by individuals (based upon their own limited local knowledge of the larger world around them) result in complex global patterns of group behavior that no single individual may fully understand. This course is intended to "get you started" in this counterintuitive and empowering new field and to introduce you to several resources in the field of simulation that you can continue to rely upon throughout your professional life.

Everyone has an *equal opportunity* to excel : Similar courses have attracted an equal number of females and males, freshmen, juniors, sophomores and seniors, as well as a few graduates, north and south campus humanities and sciences majors, experienced and new computer users. Participants from all these backgrounds have done equally well in these courses.

Topics will include:

1. The new philosophies of representation and reality. The evolution of different modes of representation - the advantages and disadvantages of each. Thinking and reasoning with representations - performance, graphics, discourse, mathematics and simulation. Simulation as the convergence of computational and evolutionary epistemology and how they change what it means to describe, explain and understand the world around us. (For critiques of some interesting movies unraveling multiple realities, please see my co-authored article "*The Slipstream of Mixed Realities...*")
2. Examples of cellular automata, evolutionary computation, artificial life, artificial societies and artificial culture.
3. Examples relevant to anthropology, communications, economics, geography, management, political science and sociology.
4. The evolution of techno/cultural *things-that-think*. How we have come "full circle" from defining computers as people, through defining computers as artifacts, to present speculations defining people as computers.
5. How to represent space, time and a population of human individuals inside a computer: how to model social and physical environments inside a simulation and how these different representational choices will change the outcomes.
6. How to build an agent with senses, thoughts and actions. How to build a population at different levels of complexity: from agents as modules of the mind, through agents as individual persons, to agents as groups and collectivities.
7. How to schedule multiagent interactivity: who and what interacts with what and whom, how and when?
8. How to experiment with "what-if" scenarios: changing the parameters of a simulation by hand or under program control. How to explore the full range of possibilities and express the results in graphical visualizations.
9. How to build learning and evolution into a simulation. How to build a world that makes its own choices, not just one that follows your directions.
10. What do artificial life, artificial societies and artificial culture tell us about real life, society and culture? Are they insightful? What can they tell us about traditional modes of describing, explaining, understanding, predicting and managing human affairs? How do they challenge contemporary social science?