Intercampus Group on Human Sciences and Complexity

The human sciences are ripe for new kinds of integration served by interlocking research agendas that develop new connections between problem areas, approaches, and theories. Our group offers an integration of complex systems, networks, simulation, and human (culture-bearing) actors. Through intellectual interaction between disciplines and subdisciplines, the use of new tools for data collection, database integration, simulation, visualization and other analyses, and through close attention to the canons of scientific procedures, we expect to contribute cumulative discoveries and understandings to the human sciences. – **White, Colby, Bonacich**

I MultiCampus Activities

Seeking to generate new ideas, the goal of the UC Intercampus Group on Human Sciences and Complexity (including an Informatics component) to bring together faculty and graduate students who are housed in different UC campuses and departments but who share a common vision of the intellectual potential that can be derived by the integration of the social sciences, informatics and complex systems approaches. The group will constitute an institutional framework allowing for regularized communication, interaction, and cooperation. We seek to accomplish this, in part, by developing an intercampus graduate PhD program serviced initially by current faculty at UC campuses. However, we foresee that the Intercampus group will eventually be able to recruit further faculty directly to its program, as needed. An important role for the intercampus group will be the development of on-line databases and archives (human genetics, historical-evolutionary and archaeological archives, and field-study resources) providing new and accessible methods and means for investigating problems bearing on the human sciences, including the use of computers with focus on computational methods and agent based simulations. The Intercampus Group will also advise and provide information resources for the social science community worldwide and for those disciplines that use and contribute to its resources. - **Algaze**

The anthropological sciences will likely play a central role in these endeavors as they are at the nexus of a number of different disciplines and draws on tools from different disciplines. Their focus on human communities, human biology and our on-going evolution involves connections between different systems - material, biological, geographic, cultural, linguistic, social interaction, cognitive, emotional, and neural. We focus on processes and relations as well as categorical phenomena. These include development, learning, and other processes of cultural transmission. – **Read, Colby**

Each of our UC faculty subgroups brings an overlapping set of research interests to the enterprise. Synergies are achieved in a variety of ways. We have twice-monthly videoconferences in our multicampus colloquium series at which cutting-edge research is presented by faculty and graduate students. Each campus lists (or should arrange) a F-W-S colloquium with a course number for the local campus so that faculty, graduate students and other researchers can participate. Local course numbers provide videoconferencing underwritten by the instructional budget on each separate campus. The first year colloquim (4 unit credits over three quarters meeting weekly or biweekly for one hour) may be replaced by the Proseminar (4 unit credits for each of three quarters meeting weekly for three hours) in year two or three. Graduate seminars that attract multicampus enrollments will be included in our curriculum. – **Read and White**

Quarterly, we have 1-2 day face-to-face conferences where, in addition to research summaries and presentations, we draft collaborative projects and grant proposals. Weekly or biweekly,
students from each campus may participate in seminars hosted on a rotating basis among the campuses. In hiring new faculty, as with graduate admissions, we propose to have evaluations and voting across campuses, with FTE and student admissions to individual campuses, with the idea that these new faculty and students would participate as well in the intercampus program. Further, undergraduate students on one campus will hear invited speakers from other campuses and be able to attend videoconferences and quarterly conferences, getting to know graduate students and faculty with whom they might work at an affiliated campus. – Read and White

II Guiding Principles

Individuals embedded in social systems are interlinked via implementation of conceptual structures that transcend individual experience and may have an internal logic that affects and shapes how individuals in a given society interact. Information pertinent to individual and collective decisions is distributed across people. It may be derived from collective representations, or it may come in tacit, intuitive, or experiential form and be difficult, or even impossible, for people to articulate. Failures of information aggregation occur because of herding effects and strategic manipulations, but also when it is impossible for people to articulate the information they hold. When information is distributed, it makes sense from a group perspective to use processes and structures that allow for bottom-up, or decentralized, decision-making rather than top-down decision-making. Economic, political and social networks make possible bottom up information pooling. Evolving conceptions guided by computer models of social behavior can raise questions for studies of actual behavior as well as being evaluated against the results of past studies.– Read, Bell

The perspectives of networks and dynamics provide ways of mapping out and arriving at understandings of changing relationships among elements at various levels and places, be they individuals, sites, communities, cultures, cities; or whether they are constructed through processes that are economic, political, social, symbolic, or material. Like the problems of individuals and cognition, which are multilevel and dynamic, the network perspective is embedded in a view that is integrative and capable of achieving an understanding of complex interactions that lead to emergent phenomena in each of the areas we study. As regards connections between individual cognition and networks, for example, it is well understood that network position affects cognition, but not yet well recognized that networks external to individuals are very much a part of cognition itself. – White

The world is dynamic and ever-changing: what is foreseeable is that unforeseen things will happen. For this reason, it is important for structures to be open to change and respond flexibly to shocks so that they break down only partially when “hit” by extreme unforeseen contingencies. People’s brains and bodies, the ideational and emotional contents of the brain and the structures that organize people’s interactions – culture, emotions, networks – are subject to evolutionary (biological and cultural; natural and artificial) selection pressures. As a result of evolutionary selection pressures, people are subject to cognitive constraints, emotion, and allostatic adjustments. For this reason, it is important for structures to be open to change and respond flexibly to shocks so that they break down only partially when “hit” by extreme unforeseen contingencies. Emotions can serve as commitment mechanisms in bargaining situations and exchange relationships. Intuition and imagination are qualities of powerful “search-engines in the mind”—search engines that can recognize patterns and perform highly complex computations in a system pervaded with deep uncertainty. Systems with distributed information and dispersed decision-making powers are both complex and powerful. Because of the counterintuitive nature of emergence, people have a hard time making sense of complex systems. Because of distributed information, different people “see” different pieces of the action. They come up with different
mental models, or ideologies. The geography of people and things—matters. Information flows and personal linkages depend on spatial relations, and new ideas are the inevitable result of increases in the frequency and intensity of contact and communication. – Read, Algaze, Colby, Bonacich

**Multicampus eJournal, Structure and Dynamics, and eRepositories**

The UC eScholarship Journal of Anthropological and Related Sciences, *Structure and Dynamics*, accepts articles, book reviews, and special issues that examine aspects of human evolution, social structure and behavior, culture, cognition, simulation or related topics. Our goal is to advance the historic mission of anthropology and the human sciences to describe and explain the range of variation in human biology, society, culture and civilization across time and space. Another eJournal that will have our sponsorship for current and legacy issues in the eScholarship UC publication system is the *World Cultures* electronic journal. – White

**III Relevant Campus Organizations**

Existing regulations allow students at one UC campus to enroll in courses at other UC campuses. No separate admission to a second PhD program (or undergraduate campus) is required, and students at each campus can enroll additionally in our transdisciplinary program. We aim also to recruit students directly into the program, but with simultaneous admission at a home campus. We also encourage and support our students to participate in activities of the Santa Fe Institute of complexity studies.

(1) **UC Irvine: Social Dynamics and Evolution group, Mathematical Behavioral Sciences**

– Bell, Colby and White

The *Social Dynamics and Evolution* group at UCI is a degree-granting subgroup within the Mathematical Behavioral Sciences Ph.D program at UC Irvine. It was founded in 2004 in order to advance Anthropology as a scientific discipline, addressing biological, cognitive, social and cultural aspects of human societies with a special focus on dynamic and evolutionary processes. The MBS research focus group in Social Dynamics and Evolution is developing several emphases within the program. The first to be developed is the Graduate Emphasis in Social Dynamics and Evolutionary Anthropology. It emphases: mathematical and statistical modeling, network analysis, cognitive anthropology and agent-based modeling, population and historical dynamics, evolution of social behavior and biosocial stress, molecular anthropology, adaptive potential, evolutionary inferences from population genetics, and computational data extraction (e.g., content analysis) and analysis.

Graduate students at UCI may satisfy the requirements for Human Sciences and Complexity, in addition to those of MBS, by completing the three-quarter Proseminar/Colloquim and two additional courses, with the approval of the graduate advisor. Admission to the MBS or any other PhD program on the UC campus qualifies a student to participate.

The MBS encourages applications for the PhD program for students interested in pursuing a Social Science degree (we will also propose PhD degrees with our partner campuses such as in Human Complexity-Anthropology / Human Complexity-Sociology / Human Complexity-Political Science to provide disciplinary concentrations) with strong emphasis on mathematical modeling, computational and quantitative methods, and cross-disciplinary linkages. Graduate students apply to the Graduate program in Mathematical Behavioral Sciences. Our general emphasis on computational and research methods can strongly prepare graduate students for teaching and employment opportunities in both academic and applied careers. Other emphases
under development may include disciplinary topics such as Social Dynamics, Decision Analysis and Evolutionary Game Theory and/or Social Dynamics, Evolution, and Sociology.

(2) UC Los Angeles: IDP In Human Complex Systems (Minor Program) – Read

UCLA’s minor in *Human Complex Systems* began in Spring 2005. The minor allows students to study the social systems people create, as well as how humans interact and behave within those systems. These systems are complex because humans conceptualize, communicate and construct them interactively; they are shaped not only by factors extrinsic to the individuals making up the social system, but they are also shaped by the humans embedded within them. Humans are agents who analyze, reflect upon, affect, shape, modify and construct the social systems of which they are a part. The goal of the Minor is to develop a transdisciplinary curriculum that focuses on these dimensions and how they relate to the complexity of society.

Conceptually, the minor program is aimed at integrating new ideas and methods not typically found in any one discipline but common to many of them. Methodologically, the minor program is part of the developing field of Complexity Social Science (CSS).

Students in the minor program will learn ways of thinking that will help them make sense of and move effectively in today's world—a world that is complex, information-rich, and prone to fast and furious change. They will develop analytical skills and learn methodological tools that are relevant for the workplace in the emerging techno-economy. Students who seek to enter graduate school will be well prepared by virtue of participating in some of most exciting and novel research programs linking the frontiers of the social sciences with computer science, the life sciences, humanities, management, public policy and the media arts.

Methodologically, the proposed minor program is part of an emerging research area known as Computational Social Science. Computational Social Science focuses on decentralized, or complex, biological, social, cultural, technological, and creative systems by analyzing the behavior and interaction of the inhabitants of these systems. Research in this area considers how culture and system structure influence behavior and patterns of interaction and thereby affect system performance. Conversely, the way individual choices and social interaction shape system structure and culture are also investigated. Goals of Computational Social Science research include explaining how we might go about designing structures that improve performance, taking into account individual-level behaviors and interactions between individuals. Special emphasis is placed on the role of information (how information is represented, processed and communicated) and order-creating mechanisms (competition, evolution and emergence).

(3) UC Riverside: Network Analysis and Dynamics involvement in Political Science and Cognitive/Linguistic/Biological Anthropology – Chase-Dunn, Doyle, Fix, and Kronenfeld

At this point there is no single program at Riverside, but instead a couple of interrelated foci. Participants are drawn from anthropology, political science, and sociology.

a) *Integrative Human and Global Ecology* (IHGE): This proposed integrated graduate education, research and training program is based on an interdisciplinary combination of the social, physical and biological sciences to study long-term social change in interaction with the natural environment. The program combines the strengths of the comparative world-systems approach to long-term social change with integrative human and natural ecological complexity to formulate solutions to contemporary global environmental and social problems.
b) A set of modeling and simulation approaches, including:  
   i. Social dynamics and evolution: socio-cultural factors structuring human population genetics and demography. E.g., simulation modeling of the interaction of social structure and genetic/demographic processes—including migration models and meta-population selection models.  
   ii. Complex agent-based systems: How they are created, how they work, how they are learned by participants, how they are adapted to changing situations and problems, and how they might be modeled.  
   iii. Cultural models for culturally specific everyday behavior: How such models are used in the generation of one’s own behavior and the interpretation of behavior of others. How individuals code-switch among such models. The role of social groups (communities of one sort or another) as the entities to which such models are ascribed, including the overlapping membership of all individuals in a variety of such.  
   iv. Visual explanations driven by computational mathematics lead to greater precision in understanding. Perceiving cognitive frameworks of interpretation or adaptation of ideologies, through causal processes, leads to greater understanding of the allocation of resources and the distribution of power. Structural functional modeling reveals an intricate interaction of all known actors, flows of information in decision making-processes, and potential outcomes.

(4) UCSD: The Archaeology of Complex Societies

At this preliminary stage, interest in the Intercampus Group on Human Sciences, Informatics, and Complexity Sciences within the UCSD community rests largely with the group of archaeologists in the Department of Anthropology. The group is composed of two Old World (Ancient Near East) and two New World (Tiwanaco, Maya) specialists, all working from a comparative perspective on problems related to the rise, maintenance and collapse of early civilizations. Their work, by definition, is of substantial import to all social scientists interested in the early stages of the evolution of social complexity.

In addition to an array of Graduate and Undergraduate classes pertinent to UC Students interested in the rise of socially complex societies, the archaeological faculty at UCSD co-teach an annual graduate seminar entitled Topics in Archaeology, which regularly has addressed many issues of interest to the Intercampus Group on Human Sciences, Informatics, and Complexity Sciences. For instance, recent topics examined in the last two years include relationships between environmental change and social change, and comparative studies of ancient writing and reckoning systems in early civilizations.

Students from non UCSD campuses interested in using archaeological data in the context of complexity science analyses are encouraged to attend courses at UCSD. By the same token, some UCSD faculty stand ready to co-teach courses with faculty belonging to the Intercampus Group on Human Sciences and Complexity, whether held at UCSD or in any of the other UC southern Campuses.

Use of video courses?