Books, Chapters, Articles

Abrahamson, John; James Dinniss. 2000. Ball lightning caused by oxidation of nanoparticle networks from normal lightning strikes on soil. *Nature* 403, 519 - 52.1

Observations of ball lightning have been reported for centuries, but the origin of this phenomenon remains an enigma. The 'average' ball lightning appears as a sphere with a diameter of 300 mm, a lifetime of about 10 s, and a luminosity similar to a 100-W lamp. It floats freely in the air, and ends either in an explosion, or by simply fading from view. It almost invariably occurs during stormy weather. Several energy sources have been proposed to explain the light, but none of these models has succeeded in explaining all of the observed characteristics. Here we report a model that potentially accounts for all of those properties, and which has some experimental support. When normal lightning strikes soil, chemical energy is stored in nanoparticles of Si, SiO or SiC, which are ejected into the air as a filamentary network. As the particles are slowly oxidized in air, the stored energy is released as heat and light. We investigated this basic process by exposing soil samples to a lightning-like discharge, which produced chain aggregates of nanoparticles: these particles oxidize at a rate appropriate for explaining the lifetime of ball lightning.

Adamic, Lada A; Huberman, Bernardo A. 2001. The Web's Hidden Order. *Communications of the ACM*, 44 (9), 55-59.

Wet side growth and popularity actually follow rule that can be explained mathematically and are useful for predicting the Web's future behavior. The past decade has seen the birth and explosive growth of the Web in terms of content and user population. Whereas in 1996 there were 61 million Internet users world-wide, at the end of 1998, more than 147 million people were Internet users worldwide, and able growth, the Web has popularized e-commerce, and result an increasing segment of the world's population conducts commercial transactions online.

Alberich, R; Miro-Julia, J; Rossello, F. 2002. *Marvel Universe looks almost like a real social network.* Spanish: Elsevier.

We investigate the structure of the Marvel Universe collaboration network, where two Marvel characters are considered linked if they jointly appear in the same Marvel comic book. We show that this network is clearly not a random network, and that it has most, but not all, characteristics of "real-life" collaboration network, such as movie actors or scientific collaboration networks. The study of this artificial universe that tries to look like a real one, helps to understand that there are underlying principle that make real-life networks have definite characteristics.

Banavar, Jayanth R; Amos Maritan; Andrea Rinaldo. 1999. *Nature* 399, 130 - 132.

Many biological processes, from cellular metabolism to population dynamics, are characterized by allometric scaling (power-law) relationships between size and rate. An outstanding question is whether typical allometric scaling relationships—the power-law dependence of a biological rate on body mass—can be understood by considering the general features of branching networks serving a particular

volume. Distributed networks in nature stem from the need for effective connectivity, and occur both in biological systems such as cardiovascular and respiratory networks and plant vascular and root systems,,, and in inanimate systems such as the drainage network of river basins. Here we derive a general relationship between size and flow rates in arbitrary networks with local connectivity. Our theory accounts in a general way for the quarter-power allometric scaling of living organisms, recently derived under specific assumptions for particular network geometries. It also predicts scaling relations applicable to all efficient transportation networks, which we verify from observational data on the river drainage basins. Allometric scaling is therefore shown to originate from the general features of networks irrespective of dynamical or geometric assumptions.

Barabasi, Albert-Laszlo; Albert, Reka. 1999. Emergence of scaling in random networks. *Science*, 286, 509-512. http://www.nd.edu/~networks/Papers/science.pdf

Systems as diverse as genetic networks or the world wide web are best described as networks with complex topology. A common property of many large networks is that the vertex connectivities follow a scale-free power-law distribution. This feature is found to be a consequence of the two generic mechanisms that networks expand continuously by the addition of new vertices, and new vertices attach preferentially to already well connected sites. A model based on these two ingredients reproduces the observed stationary scale-free distributions, indicating that the development of large networks is governed by robust self-organizing phenomena that go beyond the particulars of the individual systems.

Barabási, Albert-Lásló. 2002. *Linked: The New Science of Networks*. Perseus Publishing.
The past few years have seen an explosion of interest in so-called complex networks. In the physical sciences we are familiar with regular lattice networks of atoms, in which the local environment of each atom is identical. Such systems have traditionally been used to model the cooperative behaviour of interacting lattice systems — such as phase transitions — in which interactions are mediated by the underlying lattice.

However, recent work by Steven Strogatz and Duncan Watts on small worlds and by Albert-Lásló Barabási and Réka Albert on scale-free networks has suddenly enlarged our notions of what actually constitutes a network. For example, in social settings it is clear that the acquaintance network formed by a collection of individuals is strongly heterogeneous. Some people are essentially reclusive and have few links to the outside world, whereas others are linked to a wide circle of friends. It would be inappropriate to describe such friendship networks as a regular lattice; something more akin to an airline route map, with a large number of poorly linked nodes and a few well-linked major 'hubs', seems more relevant. In fact, many man-made and natural networks, with the Internet and the web being two of the most obvious examples of the former type, appear to have just this kind of interconnection. Cooperative behaviour in such networks, as in the transmission of viruses among people or computers, is drastically different from that in lattices, and has many important epidemiological implications.

In Linked, Barabási presents an entertaining introduction to this vital field at a level that is generally accessible to the layperson interested in modern science. Barabási has made seminal contributions to the characterization of complex networks and has become an authoritative and forceful spokesman for the field. His enthusiasm is apparent throughout the narrative, a feature that makes for good reading. The book unravels many of the intriguing features of complex networks and will greatly enlarge a layperson's conceptions of what networks are all about.

The early sections of the book are interesting and informative. They include, for example, the stories about the original work on the six degrees of separation (the idea that just five links can connect any two people), the many amusing tales about the legendary mathematician Paul Erdos and his contributions to random graph theory, and the advances on small-world networks by Strogatz and Watts. Many applications are introduced with compelling examples, such as the AIDS epidemic to describe virus propagation through complex networks, or the early development of the Internet. It is very easy to be drawn in; many sections of the book have the feel of entertaining storytelling during conversations at a pavement café.

The middle chapters — called links — present a personalized account of recent advances in the field, including the many substantial contributions made by the author and his research group. Among these

are the original formulation of the scale-free network and its myriad of applications, the 'fitness' model, the behaviour of networks under attack, the spread of viruses and the role of complex networks in living organisms. Again, much of the work is presented in a highly digestible form (the numbered subsections help considerably here) and will pique the interest of many readers. Reviewed by Sidney Redner, 2002 . *Nature* 418, 127-128.

Boase, Jeffrey: Wellman, Barry. 2001. A Plague of Viruses: Biological, Computer, and Marketing. *Current Sociology*, Current Sociology 49 (6).

We analyze the transfer of biological, computer and word of mouth marketing viruses. Despite differences between these three types of viruses, network structure affects their spread in similar ways. We distinguish between two types of networks—densely knit and ramified—and show that biological, computer and marketing viruses all behave in similar ways depending on the type of network. densely knit networks promote the quick dissemination of a virus, and increase the odds that many of the members will become infected, Ramified networks allow a virus to disperse widely, jumping between different milieus. In the end, the spread of viruses in the real world involves a combination of both densely knit and ramified networks, which we call “glocalization”.

Boudourides, Moses A. 2001. Networks, Fluids, Chaos. Unpublished manuscript. (contribution to the International Conference *Spacing and Timing Rethinking Globalization & Standardization* Palermo, Italy).

Our aim in this essay is to talk about three forms of social spatiality: networks, fluids and chaos. These forms are being inscribed into various theories and are being mobilized into multiple translations (metaphors) as states in which things exit or as processes through which things are transformed. Although these specialities are sometimes recognized in their static instantiations (as frozen topologies, static structure or equilibrium patterns), the full extend of their existence does include time-duree (as the signature of recurrent agency permeating in their modalities). Dynamic or evolving networks, non-stationary flows and irreversible chaotic processes are all examples of time dependent processes structuring these complex spatialities.

Buchanan, Mark. 2002. *Nexus: Small Worlds and the Groundbreaking Science of Networks/Small World: Uncovering Nature's Hidden Network*s. W. W. Norton/Weidenfeld & Nicolson.

Nexus is very similar to *Linked* (Barabási, 2002). Written by Mark Buchanan, a science writer and physics doctorate, it gives a cogent and engaging description of recent developments in complex networks. There is much overlap with *Linked*, in both content and style. But Barabási's book is more focused and follows many of his own very important contributions, whereas Buchanan's provides a slightly broader perspective but sometimes strays from the topic of networks. Reviewed by Sidney Redner, 2002. *Nature* 418, 127-128.

Cancho, Ramon Ferrer; **Ricard V Solé.** 2001. The small world of human language. *Proc. R. Soc. Lond.* 268, 2261-2265.

Words in human language interact in sentences in non-random ways, and allow humans to construct an astronomic variety of sentences from a limited number of discrete units. This construction process is extremely fast and robust. The co-occurrence of words in sentences reflects language organization in a subtle manner that can be described in terms of a graph of word interactions. Here, we show that such graphs display two important features recently found in a disparate number of complex systems. (i) The so called small-world effect. In particular, the average distance between two words, d (i.e. the average minimum number of links to be crossed from an arbitrary word to another), is shown to be $d \circ 2 \hat{} 3$, even though the human brain can store many thousands. (ii) A scale-free distribution of degrees. The known pronounced effects of disconnecting the most connected vertices in such networks can be identified in some language disorders. These observations indicate some unexpected features of language organization that might reflect the evolutionary and social history of lexicons and the origins of their flexibility and combinatorial nature.

Carpenter, Mason A; Westphal, James D. 2001. The strategic context of external network ties: Examining the impact of director appointments on board involvement in strategic decision making. *Academy of Management Journal*, 44 (4): 639-660.

This study examines how external network ties determine a board's ability to contribute to the strategic decision making process. Although the simple number of director appointments to other boards does not affect board monitoring or advice on strategy, appointments that can provide directors with relevant strategic knowledge and perspective do predict such involvement. In effect, the strategic context of social network ties, not simply the number of ties, is an important influence on corporate governance.

Cate, Rodney M; Levin, Lauren A.; Richmond, Lucinda S. 2002. Premarital relationship stability : A review of recent research. *Journal of Social and Personal Relationships*, 19(02).

This article is a review of the theory and recent literature on premarital relationship stability. First, current theories and models that have been used to explain the development of premarital relationships are discussed. Second, research since 1990 that focuses on the individual, dyadic, and social network factors that predict premarital relationship stability is presented. Third, we integrate the findings of the review into a commitment model and make some brief observations about theoretical, conceptual, and methodological issues that must be addressed to further understand the development of premarital relationships.

Chase, Ivan D; Tovey, Craig; Spangler-Martin, Debra; Manfredonia, Michael. 2002. Individual differences versus social dynamics in the formation of anima dominance hierarchies. *Publication of the Natural Academy of Sciences*, 99 (8): 5744-5749.

Linear hierarchies, the classic pecking-order structures are formed readily in both nature and the laboratory in a great range of species including humans. However, the probability of getting linear structures by chance alone is quite low. In this paper, we investigate the two hypotheses that are proposed most often to explain linear hierarchies: they are predetermined by differences in the attributes of animals, or they are self-organizing. We evaluate these hypotheses using cichlid fist as model animals, and although differences in attributes play a significant part, we find that social interaction is necessary for high proportions of groups with linear hierarchies. Our results suggest that dominance hierarchy formation is much richer and more complex phenomenon that previously thought, and we explore than implications of these results for evolutionary biology, the social sciences, and the use of animal models in understanding human social organization.

Dayan, Joelle; Doyle, Anna-Beth; Markiewicz, Dorothy. *2001*. Social support networks and self-esteem of idiocentric and allocentric children and adolescents. *Journal of Social and Personal Relationships*, 18(6), 767-784.

People who have an idiocentric value orientation tend to emphasize their own goals and needs over those of the groups to which they belong, and to be independent and self-reliant. Allocentric individuals tend to be cooperative, interdependent, and to have a stronger need to affiliate with others than idiocentric. A goal of this study was to investigate how children's social relationships and self-esteem vary as a function of their allocentrism. Participants were 419 children between 9 and 18 years of age from a variety of ethnic backgrounds (French Canadian/ Quebecois, Greek, Arabic, and Caribbean). As expected, allocentric children reported sources of intimacy and companionships, for example from best friends, mothers, and relatives. Also, the self-esteem of idiocentric children, but not of allocentric children, was predicted by social support from their best friend. Implications are that idiocentric and allocentric individuals seek out different members of their social networks to satisfy various needs, and to strengthen their self-esteem

Eckmann, Jean-Pierre; Moses, Elisha. 2001. *Curvature of Co-links uncovers hidden thematic layers in the world wide web*. Proc. Natl. Acad. Sci. USA published 23 April 2002,.

Beyond the information stored in pages of the World Wide Web, novel types of "meta-information" are created when they connect to each other. The information is a collective effect of independent users writing and linking pages, hidden from the casual user. Accessing it and understanding the inter-relation of connectivity and content in the WWW is a challenging problem (1-4). We demonstrate here how thematic relationships can be located precisely by looking only at the graph of hyperlinks, gleaning content and context from the Web without having to read what is in the pages. We begin by noting that reciprocal link (co-links) between pages signal a mutual recognition of authors, and then focus on triangles containing such links, since triangles indicate a transitive relation. The importance of triangles indicates a transitive relation. The importance of triangles is quantified by the clustering coefficient (5) which we interpret as a curvature. This defines a Web-landscape whose connected regions of high curvature characterize a common topic. We show experimentally that reciprocity and curvature, when combined accurately capture this meta-information for a wide variety of topics. As an example of future directions we analyze the neural network of C. elegans, using the same methods

Farrell, Michael P. 2001. *Collaborative Circles*. Chicago: The University of Chicago Press.

In a unique study that will become a rich source of ideas for professionals and anyone interested in fostering creative work in the arts of sciences, Michael P. Farrell looks at the group dynamics in six collaborative circles: the French Impressionists; Sigmund Freud and his friends; C. S. Lewis, J. R. R. Tolkien, and the Inklings; social reformers Elizabeth Candy Stanton, Susan B. Anthony, and the "Ultra s" in the women's movement; the Fugitive poets; and their friends. Farrell presents vivid narrative accounts of the development of each circle and the roles each member played. He considers how circles from; how the leadership, group rituals, and interpersonal relations change as circles develop; how the dynamics of circles stimulate creative work; and why some circles flourish while others flounder

Goh, K.-I; Kahng, B. ; Kim, **D.** 2001. Spectra and eigenvectors of scale-free networks. *Phys. Rev. E*. 64. 051903.

We study the spectra and eigenvectors of the adjacency matrices of scale-free networks when bidirectional interaction is allowed, so that the adjacency matrix is real and symmetric. The spectral density shows an exponential decay around the center, followed by power-law long tails at both spectrum edges. The largest eigenvalue λ_1 depends on system size N as $\lambda_1 \sim N^{1/4}$ for large N, and the corresponding eigenfunction is strongly localized at the hub, the vertex with largest degree. The component of the normalized eigenfunction at the hub is of order unity. We also find that the mass gap scales as $N^{-0.68}$.

Hardin, Russell. 2002. *Trust and Trustworthiness*. New York: Russell Sage Foundation.

What does it mean to "trust"? What makes us feel secure enough to place our confidence—even at times out welfare—in the hands of other people? Is it possible to "trust" an institution? What exactly do people mean when they claim to "distrust" their governments? As difficult as it may be to define, trust is essential to the formation and maintenance of a civil society. In *Trust and Trustworthiness* political scientist Russell Hardin addresses the standard theories of trust and articulates his own new and compelling idea; that much of watch we call trust can be best described as "encapsulated interests".

Hastie, Reid; Dawes, Robyn M. 2001. *Rational Choice in an uncertain world*. Thousand Oaks, CA: Sage.

An understanding of the principles of rational decision making can help students improve the quality of their lives. Thus, the material in *Rational Choice in an Uncertain World* is not only of scholarly interest, but practical as well. Created specifically for courses on judgment and decision-making, this book makes research readily accessible to both undergraduate and graduate students.

Johnson, J.C; Weller, S.C; Brewer, B.D. 2002. Systematic Data Collection and Analysis. *Field Methods*, *14* (1): 3-5.

Although this special issue highlights systematic methods of data collection and analysis, the true contribution of the articles in this volume concerns the value of such methods in facilitating valid comparisons among and between groups, individuals, sub-populations, and so forth. As the quote by Campbell implied, theoretical understanding is gained through comparisons of one form or another as in, for example, classic experimental control/ treatment designs despite this, any methods, used by contemporary social scientists vary dramatically in their ability to allow for valid comparisons among units of interest, comparisons that are critically important for the development and testing of theory. The series of articles in this issue represents one of three special issues based on papers presented at a symposium in honor of A. Kimball Romney. Each article in this special issue reflects Romney's important contribution to the development and application of systematic methods of data collection and analysis. The first four provide examples of comparative research in which the use of systematic methods is critical for making valid theoretical assessments.

Keeble, Leigh; Loader, Brain, D. *2001. Community Informatics Shaping computer-mediated social relations*. New York, USA: Routledge.

This book is the outcome of an international conference which was organized by the Community Informatics Research and Applications Unit (CIRA) based at the University of Teesside, UK, in April 2000. It was an event which brought together a number of leading practitioners, academics and community activists who share a common desire to understand and use the potentially transforming equalities of information and communications technologies (ICTs) for developing stronger community relationship. The vision and energy of community informatics practitioners is now beginning to provide us with some exciting examples of innovative applications and a growing source of lay experience and academic research outputs upon which to gain a clearer understanding of these developments and their potential consequences for community relations. The chapters in this book provide a wide coverage of the lessons which are beginning to be learnt from many of these social experiments, They sometimes identify a significant divergence between the rhetoric of enthusiasts and the actual experience on the ground. Moreover, we cannot even be sure that they do not represent a transitory set of well-intentioned rejects that the torches of the early community-network pioneers will not be extinguished by greater social and economic forces. Yet they may also give us an insight into the potential of people to shape the new media in ways which are emancipatory, creative, educational and socially supportive. As such they could provide some valuable early lessons to inform future policy choices.

Kim, Beom Jun; Chang No Yoon; Seung Kee Han; Hawoong Jeong. Path-fnding strategies in scale-free networks. http://www.tp.umu.se/~kim/Network/network.pdf

We numerically investigate the scale-free network model by Barabási and Albert (Science, 1999, 286, 509) through the use of various path finding strategies. In real networks, the global network information is not accessible to each vertex, and the actual path connecting two vertices can sometimes be much longer than the shortest one. A generalized diameter depending on the actual path finding strategy is introduced, and a simple strategy, which utilizes only the local information on the connectivity, is suggested and shown to yield the small-world behavior: the diameter D of the network increases logarithmically with the network size N, the same as found with the global strategy. If paths are sought at random, $D \sim N^{0.5}$ is found.

Kleinberg, Jon M. 2000. Navigation in a small world. *Nature* 406: 845.

The small-world phenomenon — the principle that most of us are linked by short chains of acquaintances — was first investigated as a question in sociology and is a feature of a range of networks arising in nature and technology. Experimental study of the phenomenon revealed that it has two fundamental components: first, such short chains are ubiquitous, and second, individuals operating with purely local information are very adept at finding these chains. The first issue has been analysed, and here I investigate the second by modelling how individuals can find short chains in a large social network.

Lawler, Edward J. 2001. An affect theory of Social exchange. *American Journal of Sociology*, 107 (2): 321-52.

This article develops a theory that explains how and when emotions, produced by social exchange, generate stronger or weaker ties to relations, groups, or networks. It is argued that social exchange produces positive or negative global feelings, which are internally rewarding or punishing. The theory indicates that social units (relations, groups, networks) are perceived as a source of these feelings, contingent on the degree of jointness in the exchange task. The jointness of the task is greatest if (1) actors find it difficult to distinguish their individual effects on or contributions to solving the exchange task (nonseparability) and (2) actors perceive a shared responsibility for success or failure at the exchange task. The theory explicates the effects of different exchange structures on these conditions and, in turn, on cohesion and solidarity. Implications are developed for network-to-group transformations.

Lazega, Emmanuel. 2001. *The collegial Phenomenon: The Social Mechanisms of Cooperation among Peers in a Corporate Law Partnership*. Oxford, UK: Oxford University Press.

The author examines cooperation (and competition) among partners in a US corporate law firm and provides a grounded theory of collective action among rival peers, or collegiality. He employs a broadly-conceived structural approach involving social network analysis and combining it with ethnographi es of task forces, and analysis of management and internal politics of the firm. The book recommends itself and not just become he published one of his scientific articles on the subject in the BMS: Emmanuel Lazega and Stephane Vari, "Acteurs, cibles et leviers: Analyse factorielle des relations de contro le indirect dans une firme americaine d'avocats d'affairs", BMS, December 1992, n 37: 41-51

Levitt, Peggy. 2001. The *Transnational Villagers*. Berkeley, California: University of California Press.

This book is organized into three parts. I begin, in the following chapter, with a historical overview of the Dominican Republic, its migration patterns, and the Latino community in Boston. In Chapter 2, I introduce the concept of social remittances. Part Two describes how migration transforms daily life in ways that encourage transnational-community continuity. Chapter 3 examines changes in work, family, and school life. Chapter 4 describes the value transformations underlying these changes. Part Three analyzes the political, religious, and community organizational forms that create and are created by these relationships and their consequences for social and political life. I examine the Partido revolucionar io Dominicano, the Catholic Church, and the Miraflores Development Committee. The conclusion includes a summary of my findings and a discussion of their implications for our thinking about incorporation, participation, and citizenship.

Liljeros, Fredrik; Edling, Christofer R.; Nunes Amaral, Luís A.; Stanley, H. Eugene; Åberg, Yvonne. 2001. The web of human sexual contacts. *Nature* 411, 907-908.

Unlike clearly defined 'real-world' networks1, social networks tend to be subjective to some extent2,3 because the perception of what constitutes a social link may differ between individuals. One unambiguous type of connection, however, is sexual contact, and here we analyse the sexual behaviour of a random sample of individuals to reveal the mathematical features of a sexual-contact network. We find that the cumulative distribution of the number of different sexual partners in one year decays as a scale-free power law that has a similar exponent for males and females. The scale-free nature of the web of human sexual contacts indicates that strategic safe-sex campaigns are likely to be the most efficient way to prevent the spread of sexually transmitted diseases.

Our results may have epidemiological implications, as epidemics arise and propagate much faster in scale-free networks than in single-scale networks6,13. Also, the measures adopted to contain or stop the propagation of diseases in a network need to be radically different for scale-free networks. Single-scale networks are not susceptible to attack at even the most connected nodes, whereas scale-free networks are resilient to random failure but are highly susceptible to destruction of the best-connected nodes14. The possibility that the web of sexual contacts has a scale-free structure indicates that strategic targeting of safe-sex education campaigns to those individuals with a large number of partners may significantly

reduce the propagation of sexually transmitted diseases.

Lomi, Alessandro; Larsen, Erik R. 2001. *Dynamics of Organizations*, Cambridge, MA: MIT Press.

AN organization is more than the summer of its parts, and the individual components that function as a complex social system can be understood only by analyzing their collective behavior. This book shows how state-of- art simulation methods including genetic algorithms, neural networks and cellular automata can be brought to bear on central problems of organizational theory related to the emergence, permanence, and dissolution of hierarchical macrostructures. The emphasis is on the application of a new generation of equation and agent-based computational models that can help students of organizations to reformulate their basic research questions starting from assumptions about how to link—rather than separate—different levels of organizational analysis.

Lovelace, Kay; Shapiro, Debra L; Weingart, Laurie R. 2001. Maximizing cross-functional new product teams' innovativeness and constraint adherence: A conflict communications perspective. *Academy of Management Journal*, 44 (4): 779-793.

Increasing competition resulting from the global and technological nature of markets has heightened the need for businesses to rely on cross-functional new product teams to produce innovations in a timely manner; yet functionally diverse teams' inevitable disagreements often appear to prevent this. In a study of 43 such teams, it was found that the effect of task disagreement on team outcomes depended on how free members felt to express task-related doubts and how collaboratively or contentiously these doubts were expressed. Implications for managing the journey from disagreement to agreement in cross-functional new product teams are discussed.

Madhavan, Sangeetha. 2001. Female Relationships and Demographic Outcomes in Sub-Saharan Africa. *Sociological Forum*, 16 (3).

This paper examines possible ways in which female relationships can affect demographic outcomes within the context of an extended family structure is sub-Saharan Africa. The level of collaboration and competition that exists among co resident women is likely to have an impact on fertility through changes in birth spacing and stopping behavior. In addition, the extent of collaboration could be a contributing factor in the survival chances of infants and young children. Given the multitude of ethnic groups found on the African continent, the paper also addresses the independent and interactive roles of culture. The paper ends with a discussion of theoretical and methodological implications for demographic research and suggestions for further study.

Matzat, Uwe. 2001. *Social Networks and Cooperation in Electronic communities: A theoretical-empirical study on academic communication and internet discussion group*s. Unpublished Thesis.

This book would like to show that it is useful to link research about effects of the Internet and about interaction in electronic groups to general sociological theories about human behavior. Such a link makes it possible to explain under which social conditions an Internet tool is accepted or rejected by the user, how it is used, and what outcomes of the user of a tool of the Internet are to be expected. The strategy used here is to use a very simple model of goal oriented human behavior to explain the relationship between different phenomena at the macro-level.

McMahon, S.M. et al. 2001. Ecology and Social Network Analysis. *Science*, 293:1604.

The authors discuss ecology and social network analysis. For the past 30 years, a subdiscipline of the social sciences knows as “social network analysis” has developed structural models to analyze human interactions. In social network analysis, discrete mathematics and statistics are combined with the emerging epistemology of complex systems to explore processes and phenomena as diverse as the diffusion of information through an organization, the adoption of innovations on society, and the spread of infectious disease in a population. Researchers working on social network analysis draw upon many

disciplines: sociology, anthropology, psychology, geography, mathematics, statistics and computer science.

McPherson, Miller; Smith-Lovin, Lynn; Cook, James M. *2001*. Birds of a Feather: Homophily in Social Networks. *Annual Review of Sociology*, 27, 415-44.

Similarity breeds connection. This principle--the homophily principle--structures network ties of every type, including marriage, friendship, work, advice, support, information transfer, exchange, comembership, and other types of relationship. The result is that people's personal networks are homogeneous with regard to many sociodemographic, behavioral, and intrapersonal characteristics. Homophily limits people's social worlds in a way that has powerful implications for the information they receive, the attitudes they form, and the interactions they experience. Homophily in race and ethnicity creates the strongest divides in our personal environments, with age, religion, education, occupation, and gender following in roughly that order. Geographic propinquity, families, organizations, and isomorphic positions in social systems all create contexts in which homophilous relations form. Ties between nonsimilar individuals also dissolve at a higher rate, which sets the stage for the formation of niches (localized positions) within social space. We argue for more research on: (a) the basic ecological processes that link organizations, associations, cultural communities, social movements, and many other social forms; (b) the impact of multiplex ties on the patterns of homophily; and ©) the dynamics of network change over time through which networks and other social entities co-evolve.

Menczer, Filippo. 2002. Growing and navigating the small world Web by local content. *Proceedings of the National Academy of Science, USA*, Vol. 99, Issue 22, 14014-14019.

Can we model the scale-free distribution of Web hypertext degree under realistic assumptions about the behavior of page authors? Can a Web crawler efficiently locate an unknown relevant page? These questions are receiving much attention due to their potential impact for understanding the structure of the Web and for building better search engines. Here I investigate the connection between the linkage and content topology of Web pages. The relationship between a text-induced distance metric and a link-based neighborhood probability distribution displays a phase transition between a region where linkage is not determined by content and one where linkage decays according to a power law. This relationship is used to propose a Web growth model that is shown to accurately predict the distribution of Web page degree, based on textual content and assuming only local knowledge of degree for existing pages. A qualitatively similar phase transition is found between linkage and semantic distance, with an exponential decay tail. Both relationships suggest that efficient paths can be discovered by decentralized Web navigation algorithms based on textual and/or categorical cues.

Mesch, Gustavo S; Manor, Orit. 2001. Ethnic Differences in Urban Neighbor Relations in Israel. *Urban Studies*, 38 (11): 1943-1952.

This study considers the role of ethnic differences in the relevance of the local community as a network of social relations that provide companionship, friendship and social support. Data for this study were collected from a representative sample of the population in the Haifa metropolitan area, the third-largest metropolitan area in Israel. It was found that measures of investment in the neighborhood such as homeownership and stage in the life-cycle were not related to the number of locally based instrumental ties. However, nationality had a negative effect. Israeli Jews reported fewer locally based instrumental ties than the Arab Israelis. The findings provide partial support for compression theory. Israeli Arabs reported a higher number of locally based instrumental social ties than Israeli Jews. Apparently their higher levels of residential segregation compressed their social relationships to the local neighborhood more than was the case for Israeli Jews. Implications of the findings for other theoretical frameworks are discussed.

Miller, Alison L; Notaro, Paul C.: Zimmerman, Marc A. 2002. Stability and change in internal working models of friendship : Associations with multiple domains of urban adolescent functioning. *Journal of Social and Personal Relationships*, 19 (02).

We examined the role of stability and change in low-achieving urban African American adolescents' internal working models of their close friendships across multiple domains of functioning. We compared three groups of youth defined by their attachment orientation based on two ratings one year apart: (i) stable-secure (secure both years); (ii) stable-insecure (insecure both years); and (iii) changing orientation. We assessed psychological well-being, participation in problem behaviors, negative peer influences, school attitudes, and sexual behavior, hypothesizing that adolescents reporting stable secure internal working models of friendship would show the highest levels of functioning across all domains, followed by adolescents reporting instability in their friendships and adolescents reporting stable insecure orientations. Internal working models of friendship were assessed using a modified version of Hazan and Shaver's (1987) Adult Attachment Classifications. Across all domains, adolescents with stable secure orientations functioned better than those with stable insecure internal working models (e.g., less problem behavior and more positive school attitudes). The change group either resembled the stable-insecure group or fell in between the two stable groups. Analyses comparing outcomes based on the direction of change in attachment orientation (i.e., change to secure versus change to insecure) revealed main effects for problem behaviors and sex by change direction interaction effects for sexual behavior. These results suggest that low-achieving adolescents' attachment orientations change over time and are associated with deleterious outcomes. They extend attachment theory to adolescents' relationships with friends.

Mitchell, Carey Usher; LaGory, Mark. 2002. Social Capital and Mental Distress in an Impoverished Community. *City & Community*, 1(2): 195-216.

According to recent investigations of social capital, this social resource represents a key ingredient in a community's capacity to respond to environmental challenges and promote change. This article investigates the significance of social capital for the health and well-being for inner-city residents using data collected from a sample of household decision makers residing in a high-poverty, racially segregated urban neighborhood in a mid-sized southern city (N = 222). A psychosocial resources model of distress is employed to explore the role of social capital as a critical social resource mediating the impact of poverty-related economic and environmental stressors and mental health. While bridging social capital is actually positively related to mental distress. Bonding social capital appears to increase individuals' levels of mental distress in this impoverished community. On the other hand, a psychological resource, mastery, plays a significant role in modification of recent claims that social patently, in high-poverty, high-minority, inner-city communities, active participation in the local area comes at some cost to the individual. This article demonstrates the importance of doing further research on the social capital of inner-city areas.

Moreno, Y; Gómez, J.B.; Pacheco, A.F. 2002. Instability of scale-free networks under node-breaking avalanches. *Europhys. Lett.*, **58** (4): 630–636.

The instability introduced in a large scale-free network by the triggering of nodebreaking avalanches is analyzed using the .ber-bundle model as conceptual framework. We found, by measuring the size of the giant component, the avalanche size distribution and other quantities, the existence of an abrupt transition. This test of strength for complex networks like Internet is more stringent than others recently considered like the random removal of nodes, analyzed within the framework of percolation theory. Finally, we discuss the possible implications of our results and their relevance in forecasting cascading failures in scale-free networks.

Montoya, Jose M; Solé, Richard V. Small World Patterns in Food Webs. *Journal of Theoretical Biology*, Volume 214 (3): 405-412.

The analysis of some species-rich, well-defined food webs shows that they display the so-called small world behavior shared by a number of disparate complex systems. The three systems analysed (Ythan estuary web, Silwood web and the Little Rock lake web) have different levels of taxonomic resolution, but all of them involve high clustering and short path lengths (near two degrees of separation) between species. Additionally, the distribution of connections P (k) which is skewed in all the webs analysed

shows long tails indicative of power-law scaling. These features suggest that communities might be self-organized in a non-random fashion that might have important consequences in their resistance to perturbations (such as species removal). The consequences for ecological theory are outlined.

Newbery, David M. 2000. *Privatization, Restructuring, And Regulation of Network Utilities*. Cambridge, MA: MIT Press.

Network utilities, such as electricity, telephones, and gas, are public utilities that require a fixed network to deliver their services. Because consumers have no choice of network, they risk exploitation by network owners. Once invested, however, a network's capital is sunk, and the bargaining advantage shifts from investor to consumer. The tension between consume and investor can be side-stepped by state ownership or by regulation that reconciles private ownership and consumers' political power. Either way, network utilities operate under terms set by the state.

Okhuysen, Gerardro Andres. 2001. Structuring change: Familiarity and formal interventions in problem-solving groups. *Academy of Management Journal*, 44 (4): 794-808.

This paper presents evidence for an incremental change process in decision-making groups whereby change unfolds through self-generated interruptions. Group members initiate self-interruptions by switching their attention to social concerns. During such interruptions, members evaluate activities, propose alternative approaches and provide flexible structures that lead to superior performance. A central finding reveals that using a formal intervention in familiar groups hurts performance because pre-established interaction patterns are altered.

Pastor-Satorras, Romualdo; Vespignani, Alessandro. 2000. Epidemic Spreading in Scale-Free Networks. *Physical Review Letters* 86(14): 3200-3203.

The Internet has a very complex connectivity recently modeled by the class of scale-free networks. This feature, which appears to be very efficient for a communications network, favors at the same time the spreading of computer viruses. We analyze real data from computer virus infections and find the average lifetime and persistence of viral strains on the Internet. We define a dynamical model for the spreading of infections on scale-free networks, finding the absence of an epidemic threshold and its associated critical behavior. This new epidemiological framework rationalizes data of computer viruses and could help in the understanding of other spreading phenomena on communication and social networks.

Pennock, David M; Flake, Gary W.; Lawrence, Steve; Glover, Eric J.; Giles, C. Lee. 2002. Winners don't take all: Characterizing the competition for links on the web. *Proceedings of the National Academy of Science, USA,* Vol. 99, Issue 8, 5207-5211.

As a whole, the World Wide Web displays a striking "rich get richer" behavior, with a relatively small number of sites receiving a disproportionately large share of hyperlink references and traffic. However, hidden in this skewed global distribution, we discover a qualitatively different and considerably less biased link distribution among subcategories of pages---for example, among all university homepages or all newspaper homepages. Although the connectivity distribution over the entire web is close to a pure power law, we find that the distribution within specific categories is typically unimodal on a log scale, with the location of the mode, and thus the extent of the rich get richer phenomenon, varying across different categories. Similar distributions occur in many other naturally occurring networks, including research paper citations, movie actor collaborations, and United States power grid connections. A simple generative model, incorporating a mixture of preferential and uniform attachment, quantifies the degree to which the rich nodes grow richer, and how new (and poorly connected) nodes can compete. The model accurately accounts for the true connectivity distributions of category-specific web pages, the web as a whole, and other social networks

Shy, Oz. 2001. *The Economics of Network Industries*. Cambridge: Cambridge University Press.

This book introduces upper-level undergraduates, graduate students, and researchers to the latest developments in network economics, one of the fastest-growing fields in all industrial organization. Network industries include the Internet, e-mail, telephony, computer hardware and software, music and video players, and service operations in the banking, legal and airlines industries among many others. The work offers an overview of the subject matter as well as investigations about specific industries. It conveys the essential features of how strategic interactions between firms are affected by network activity, as well as, converting social interaction and its influence on consumers' choices of products and service. Virtually no calculus is used in the text, and each chapter ends with a series of exercise and selected references. The text may be used for both one and two-semester course.

Passy, Florence and Giugni, Marco. Social Networks and Individual Perceptions: Explaining Differential Participation in Social Movements. *Sociological Forum*, 16 (3).

This paper seeks to explain differential participation in social movements. It does so by attempting to bridge structural-level and individual-level explanations. We test a number of hypotheses drawn from the social networks and the rationalist perspectives on individual engagement by means of survey data on members of a major organization of the Swiss solidarity movement. Both perspectives find empirical support: The intensity of participation depends both on the embeddedness in social networks and on the individual perceptions of participation, that is, the evaluation of a number of cognitive parameters related to engagement. In particular, to be recruited by an activist and the perceived effectiveness of one's own potential contribution are the best predictors of differential participation. We specify the role of networks for social movements by looking at the nature and content of networks and by distinguishing between three basic functions of networks: structurally connecting prospective participants to an opportunity to participate, socializing them to a protest issue, and shaping their decision to become involved. The latter function implies that the embeddedness in social networks significantly affects the individual perceptions of participation.

Plug, L. J.; Werner, B. T.. 2002. Nonlinear dynamics of ice-wedge networks and resulting sensitivity to severe cooling events. *Nature* 417, 929 - 933.

Patterns of subsurface wedges of ice that form along cooling-induced tension fractures, expressed at the ground surface by ridges or troughs spaced 10-30 m apart, are ubiquitous in polar lowlands. Fossilized ice wedges, which are widespread at lower latitudes, have been used to infer the duration and mean temperature of cold periods within Proterozoic and Quaternary climates, and recent climate trends have been inferred from fracture frequency in active ice wedges. Here we present simulations from a numerical model for the evolution of ice-wedge networks over a range of climate scenarios, based on the interactions between thermal tensile stress, fracture and ice wedges. We find that short-lived periods of severe cooling permanently alter the spacing between ice wedges as well as their fracture frequency. This affects the rate at which the widths of ice wedges increase as well as the network's response to subsequent climate change. We conclude that wedge spacing and width in ice-wedge networks mainly reflect infrequent episodes of rapidly falling ground temperatures rather than mean conditions.

Podolny, Joel. M. *2001*. Networks as the pipes and prisms of the market (1). *American Journal of Sociology*, 107 (1): 33-60.

This article draws an analytical distinction between two types of market uncertainty: egocentric, which refers to a focal actor's uncertainty regarding the best way to convert a set of inputs to an output desired by a potential exchange partner, and altercentric, which denotes the uncertainty confronted by a focal actor's exchange partners regarding the quality of the output that the focal actor brings to the market. Given this distinction, the article considers how the value of "structural holes" and market status vary with these two types of uncertainty. The article proposes that the value of structural holes increases with egocentric uncertainty, but not with altercentric uncertainty. In contrast, the value of status increases with altercentric uncertainty, but declines with egocentric uncertainty. Thus actors with networks rich in structural holes should sort into markets or market segments that are high in egocentric uncertainty;

high-status actors should sort into markets that are low in egocentric uncertainty. Support for this claim is found in an examination of the venture capital markets.

Redner, Sidney. 2000. Networking comes of age. *Nature* 418, 127 - 128.
The past few years have seen an explosion of interest in so-called complex networks. In the physical sciences we are familiar with regular lattice networks of atoms, in which the local environment of each atom is identical. Such systems have traditionally been used to model the cooperative behaviour of interacting lattice systems — such as phase transitions — in which interactions are mediated by the underlying lattice. However, recent work by Steven Strogatz and Duncan Watts on small worlds and by Albert-Lásló Barabási and Réka Albert on scale-free networks has suddenly enlarged our notions of what actually constitutes a network.

Riles, Annelise. 2001. *The Network Inside Out*. Ann Arbor, USA: The University of Michigan Press.

"Networks" and other artifacts of institutional life, such as documents, funding proposals, newsletters, and organizational charts, are such ubiquitous aspects of the information age that they go unnoticed to most observers' of late modern society. In this new kind of working the ethnography of legality, Annelise Riles takes a sophisticated theoretical approach to the aesthetics of such artifacts by analyzing the experiences of a group of Fijian bureaucrats and activists preparing for the participating in the United Nations Fourth World Conferences on Women in 1995. In describing and theorizing this aspect of transnational existence, Riles enacts a new ethnographic method for apprehending the network from the inside out. Working with the premise that anthropologists are inside the network—that they are producers, consumers, and aesthetes, not simply observers, of the artifacts of late modern institutional life—she produces a fascinating study of institutional knowledge practices and makes an important contribution to the anthropology of transnational phenomena.

Roschelle, Anne R. 1997. *No More Kin (Exploring Race, Class and Gender in Family Networks)*. California, USC: Sage Publications.

Using an integrative framework, this book examines extended kinship networks among African American, Chicano, Puerto Rican, and non-Hispanic White families in contemporary America. I have selected these four racial-ethnic groups for several reasons. First and foremost, my expertise in the area of racial and ethnic minorities is on African Americans, Chicanos, and Puerto Ricans. In addition, although the National Survey of Families and Households (NSFH), from which I draw my data, include Natives Americans and Cubans, in both cases they comprise less than 1% of the sample, making comparisons problematic. Furthermore, the categories "other Hispanic" and Asian American" consolidate distinct Latino and Asian American ethnic groups, homogenizing their unique sociohistorical experiences. Finally, the inclusion of non-Hispanic White in the sample is necessary because the literature on minority families claims that they are less likely to participate in extended kinship networks than are Latinos and Blacks.

Ross, Lynda; Spinner, Barry. *2001*. General and specific attachment representations in adulthood: is there a relationship? *Journal of Social and Personal Relationships*, 18(6): 747-766.

Social and relational research assessing adult attachment often appears to be based on the assumption that adults operate, in their interpersonal relationships, with a single internal working models of attachment. The current investigation explored attachment from an alternative perspective. We hypothesized that most adults will rate their relationship orientations differently depending on the relation-ship context in which the ratings are taken. We also expected that general measures of attachment, taken outside the on text of specific relationships, would vary from attachment ratings adults report when they are referring to specific attachment relation-ships. Two hundred and twenty-four participants responded to a survey containing standardized measures (RQ: Bartholomew, 1990; Bartholomew & Horowitz, 1991) assessing Secure, Fearful, Pre-occupied and relationships. The RQ was also used to measure general attachment orientations. Results indicated that the majority of adults rated themselves differently on

each of the Secure, Fearful, Preoccupied and Dismissing dimensions of the RQ across their various attachment relationship s and that attachments rating and that attachment rating measured in response to specific attachment relationships were not equivalent to the attachment rating measured.

Shatkay, H; Kaelbling, L. P. 2002. Learning Geometrically-Constrained Hidden Markov Models for Robot Navigation. *Journal of Artificial Intelligence Research*, 16, 167-207.

Hidden Markov models (HMMs) and partially observable Markov decision processes (POMDPs) provide useful tools for modeling dynamical systems. They are particularly useful for representing the topology of environments such as road networks and office buildings, which are typical for robot navigation and planning. The work presented here describes a formal framework for incorporating readily available odometric information and geometrical constraints into both the models and the algorithm that learns them. By taking advantage of such information, learning HMMs/POMDPs can be made to generate better solutions and require fewer iterations, while being robust in the face of data reduction. Experimental results, obtained from both simulated and real robot data, demonstrate the effectiveness of the approach.

Sheu, Tair-Rong; Carley, Kathleen. 2001. Monopoly Power on the Web - A Preliminary Investigation of Search Engine. *29th Telecommunications Policy Research Conference*. http://arxiv.org/ftp/ cs/ paper s/ 0109/0109054.pdf

E-Commerce challenges traditional approaches to assessing monopolistic practices due to the rapid rate of growth, rapid change in technology, difficulty in assessing market share for information products like web sites, and high degree of interconnectivity and alliance formation among corporations. This paper has provided a fundamental framework that integrates a network and economic perspective to the search engine market. The findings indicate that (1) despite an increasing number of search engines, barriers to entry seem high, largely due to the exponential growth in the number of web sites and the non-scalability of the current search technology and collective switching costs; (2) older search engine sites tend typically to have more features to lock in users. Using standard economic indicators (CR4=58% and HHI=1163), the industry looks close to being plagued by anti-competitive practices. But based on a network adjusted HHI constructed in this paper, its value, 870, suggests that there is less cause for concern. Based on all indicators, it suggests that Yahoo would be a contender. Other possible contenders are MSN and Netscape. On the basis of results to date, some search engines keep increasing their audience reach while others don't. The trend shows that some search engines may dominate the search engine market. We suggest conducting research in the coverage performance of search engines and investigate "information search cost" as a performance indicator of search techniques. In addition, we suggest paying attention to any anti-competitive conduct (e.g. product bundling) that may lesson competition and reduce consumer welfare. The combination of network theory and economic theory to study the search engine market is a particularly powerful approach for E-Commerce.

Smaglik, Paul. 2002. Science and technology networks in Scandinavia. *Nature (Scandinavian supplement)*, Vol. 420, No. 6916.

The dominant science hubs in Scandinavia are akin to the open sandwiches favoured throughout the Nordic region — each country has its own name for, and unique approach to preparing, this delicacy. So, too, with science. Each hub has had different motivations and methods for building up local networks, as articles in this supplement reveal. But increasingly, scientific leaders in each of these areas are realizing that they cannot go it alone — even though each hub shows signs of expanding, both in terms of academic and industrial research. That realization is reflected across much of Europe. To compete with international juggernauts such as the United States, nations are realizing that they must pool their resources. The European Commission's Sixth Framework Programme for funding research, which came into effect last month, is designed to reward scientists who can build the most effective cross-border networks.

Solé, Ricard V; Cancho, Ramon Ferrer; Montoya, Jose M.; and Valverde, Sergi. 2002. Selection, Tinkering and Emergence in Complex Networks.

Complex biological networks have very di®erent origins than technologic ones. The latter involve extensive design and, as engineered structures, include a high level of optimization. The former involve (in principle) contingency and structural constraints, with new structures being incorporated through tinkering with previously evolved modules or units. However, the observation of the topological features of different biological nets suggests that nature can have a limited repertoire of "attractors" that essentially optimize communication under some basic constraints of cost and architecture or that allow the biological nets to reach a high degree of homeostasis. Conversely, the topological features exhibited by some technology graphs indicate that tinkering and internal constraints play a key role, in spite of the "designed" nature of these structures. Previous scenarios suggested to explain the overall trends of evolution are re-analyzed in light of topological patterns.

Solé, Ricard V; Montoya, Jose M.. 2001. Complexity and fragility in ecological networks, *Proc. Roy. Soc. London B* 268, 2039-2045 (2001))

A detailed analysis of three species-rich ecosystem food webs has shown that they display skewed distributions of connections. Such graphs of interaction are, in fact, shared by a number of biological and technological networks, which have been shown to display a very high homeostasis against random removals of nodes. Here, we analyse the responses of these ecological graphs to both random and selective perturbations (directed against the most-connected species). Our results suggest that ecological networks are very robust against random removals but can be extremely fragile when selective attacks are used. These observations have important consequences for biodiversity dynamics and conservation issues, current estimations of extinction rates and the relevance and de¢nition of keystone species.

Solé, Ricard V; Pastor-Satorras, Romualdo. 2002. Complex Networks in Genomics and Proteomics. In: Handbook of Graphs and Networks, S. Bornholdt & H. G. Schuster (eds.) John Wiley-VCH.

Complex multicellular organisms contain large genomes in which each structural gene is associated with at least one regulatory element and each regulatory element integrates the activity of at least two other genes. The main conclusion of this study is that the major cause of robustness comes from the interactions among unrelated genes. This mechanism would be illustrated by the following example: given a metabolic network, completely unrelated enzymes can catalyse different reactions but contribute to a pathway whose goal is to sustain an optimal €ux of metabolites. Under these conditions, mutations in genes encoding those enzymes will have little or mild effects. Simple models of complex biological interactions have been used through the last decades as powerful metaphors of natural complexity. Networks pervade biology and there is little doubt that the untangling biological complexity demands a considerable degree of simpli£cation. This view works well when generic mechanisms are at work: percolation close to criticiality in random graphs would be a perfect example in this context. Since information transfer (network communication) is a key property to all biosystems, reaching a threshold in connectivity allows information to propagate in a very effective way under a low wiring cost.

Solomon, D.H, Knobloch, L.K. 2001. Relationship uncertainty, partner interference, and intimacy within dating relationships. *Journal of Social and Personal Relationships*, 18 (6): 804-820.

The transition from casual to serious involvement appears to constitute a unique period of relationship with courtships. We suggest that the moderate levels of intimacy characterizing this phase correspond with heightened uncertainty about the relationship and greater interference from partners in everyday activities. In a test of these predictions, individuals in dating relationship (N = 341) completed self-report measures of intimacy, relationship un-certainty, partner's influence in the respondent's everyday activities, and partner's interference in those activities. Contrary to our expectations, we observed a negative linear association between intimacy and relationship uncertainty. Although the effect size was small, results indicated support for a curvilinear association between the experience of interference from partners and intimacy; as predicted, interference was greatest at moderate levels of intimacy. In addition,

results revealed an ordinal interaction between intimacy and partner's influence in everyday activities, such that the partner's influence was more positively associated with inferences at low level of intimacy than at high levels of intimacy. The discussion highlights the implications of these findings for conceptualization the development of romantic relationship.

Stokman, Frans N; Doreian, Patrick. 2001. Evolution of Social Networks. Part II. *Journal of Mathematical Sociology*, 25 (1): 138.

The Journal of Mathematical Sociology published a special issue on Evolution of Social Networks in 1996 under the responsibility of the two present guest editors. Gordon and Breach published in 1997 a volume that contained the original articles of the special issue together with three new articles (Doreian and Stokman), editors. In the first JMS special issue and a subsequent volume, a distinction was made between network dynamics and network evolution. The guest authors were primarily interested in studies that concentrated on the underlying mechanisms that induce network change. In other works, they were interested in network evolution and not only with network change. Partly as a consequence of this emphasis, most contribution in the first volume focused on theory, methods and between theory and empirical testing. This induced the guest editors to edit a second volume on Evolution of Social Networks where modeling and empirical analyses are integrated or at least combined. The present special issue contains four of such contributions. A number of others will follow next year in the third special issue on the topic of Evolution of Social Network.

Stoll, Michael A. 2001. Race, Neighborhood Poverty, and Participation in Voluntary Associations. *Unknown journal* .

This paper examines racial differences in participation in voluntary association. It extends past research by accounting for the influences of neighborhood poverty on participation. Using unique data from the 1993-94 Los Angeles Survey of Urban Inequality (LASUI), the analysis reveals that neighborhood poverty influences the number of associations to which individuals belong, even when considering differences in personal and other residential characteristics. Moreover, once the negative influence of neighborhood poverty is taken into account, black participate in more voluntary associations than do whites and other groups, while Asians participate the least. Evidence supports the ethnic community theory of blacks' greater participation, as black living in black communities participate in more organizations, particularly in ones that are political, that black who do not.

Strogatz, Steven H. 2001. Exploring complex networks. *Nature* 410, 268 - 276.

The study of networks pervades all of science, from neurobiology to statistical physics. The most basic issues are structural: how does one characterize the wiring diagram of a food web or the Internet or the metabolic network of the bacterium Escherichia coli? Are there any unifying principles underlying their topology? From the perspective of nonlinear dynamics, we would also like to understand how an enormous network of interacting dynamical systems — be they neurons, power stations or lasers — will behave collectively, given their individual dynamics and coupling architecture. Researchers are only now beginning to unravel the structure and dynamics of complex networks.

Tu, Yuhai. 2000. How robust is the Internet? *Nature* 406, 353 - 354.

Complex systems, such as the Internet, are surprisingly resistant to random errors. But a new study warns against complacency — the feature that makes the Internet immune to accidents also makes it vulnerable to attack. What can we learn from this study? The good news is that we do not have to worry about random fluctuations of these networks. The bad news is that Internet terrorists could cause great damage by targeting the most connected routers or web sites. The average performance of the Internet is reduced by a factor of two if just 1% of the most connected nodes are destroyed; and with only 4% of its most important nodes destroyed, the Internet loses its integrity, becoming fragmented into small disconnected domains.

Veeramalai, Mallika; Gilbert, David. 2002. Bioinformatics tools for protein structure. *Bioinformatics World*. 12-15.

A major goal of bioinformatics is to determine the function of each gene in the genome. The major products of genes are proteins, which are the building blocks not only of the physical structure of living organism but also of their biochemical networks. A protein's function is due to its native conformation including surface structure, binding sites and active sites plus the biochemical and biophysical properties of its constituent amino acids. A protein's structure is determined by the sequence of its amino acids, which are derived by transcription and translation from DNA (genomic coding sequences), and which fold into the final conformation.

Wellman, Barry. 1999. *Networks in the Global Village: Life in Contemporary communities*. Boulder, CO: Westview Press.

This book examines networks in a variety of communities around the world (i.e. communities in Canada, the United States, Chile, France, Hungary, Japan and Hong Kong, including communities in cyberspace). Through analysis of a variety of communities, *Networks in the Global Village* argues against a pervasive argument that communities have disappeared due to industrialization technological development, and urbanization. The book investigates the evidence that networks in communities still thrive around the world. Although the compositions and structures of communities have changed, people maintain communities through loosely or tightly knit kin and social networks. Through examinations of different networks in different communities, it reveals how the different communities manage networks distinctively under different social structures, contexts and circumstances.

Wellman, Barry. *2001* Physical Place and Cyber Place: The Rise of Personalized Networking. *International Journal of Urban and Regional Research*. 25, (2): 227-52.

We find community in networks not groups. Although people often view the world in terms of groups (Freeman, 1992), they function in networks. In networked societies: boundaries are permeable, interactions are with diverse others, connections switch between multiple networks, and hierarchies can be flatter and recursive. The change from groups to networks can be seen at many levels. Trading and political blocs have lost their monolithic character in the world system. Organizations from complex networks for alliance and exchange rather than cartels, and workers report to multiple peers and superiors. Management by multiple-connected network is replacing management by hierarchal tree and management by two-dimensional matrix (Berkowitz, 1982; Wellman, 1988; Castells, 1996). Communities are far-flung, loosely-bounded, sparsely-knit and fragmentary. Most people operate in multiple, thinly-connected, partial communities as they deal with networks of kin, neighbors, friends, workmates and organizational ties. Rather than fitting into the same group as those around them, each person has his/her own 'personal community' (Wellman and Leighton, 1979; Wellman, 1999).

Wellman, Barry; Frank, Kenneth A. 2001. Network Capital in a Multilevel World: Getting Support From Personal Communities. In *Social Capital: Theory and Research*. New York: Aldine De Gruyter

When people need help, they can either buy it, trade for it, steal it, get it from governments and charities, or obtain it through their *"personal community networks"*—supportive ties with friends, relatives, neighbors and workmates. Such ties supply *"network capital"*, the form of "social capital" that makes resources available through interpersonal ties. It is widely available, usually specialized, and unevenly distributed among people, ties and networks. Network members provide emotional aid, material aid, information, companionship, and a sense of belonging. Their *"social support"* is one of the main ways that households obtain resources to deal with daily life, seize opportunities, and reduce uncertainties.

Wellman, Barry. 2001. Computer Networks As Social Networks. *Science* 293, 14, Sept 2001: 2031- 34.

Computer Networks are inherently social networks, linking people, organizations, and knowledge. They are social institutions that should not be studied in isolation but as integrated into everyday lives. The

proliferation of computer networks has facilitated a de-emphasize on group solidarities at work and in the community and afforded a turn to networked societies that are loosely bounded and sparsely knit. The Internet increases people's social capital, increasing contact with friends and relatives who live nearby and far away. New tools must be developed to help people navigate and find knowledge in complex, fragmented, networked societies.

Wellman, Barry; Tindall, D.B. 2001. Canada as Social Structure: Social Network Analysis and Canadian Sociology. *Canadian Journal of Sociology*, 26 (4). 265-308.

We review the social network approach to structural analysis, give a brief historical sketch of its development in Canada and abroad, and provide an overview of Canadian contributions to this field. We review research in the following areas: personal communities, computer supported social networks, social capital (social mobility, social support, social exchange), culture capital, structural social psychology (social comparison and evaluation, attitude formation), collective action (mobilization for collective action and social movements, inter-and-intra movement dynamics), inter-organizational and class relations, and world systems. We discuss the core contributions of network, scholars, challenges faced by network researchers, and make suggestions for future lines of inquiry. We conclude that while social network analysis is undoubtedly an international enterprise, Canadian scholars have made core contributions on a number of fronts over the past two decades.

Wellman, Barry. 2002. Little Boxes, Glocalization, and Networked Individualism. In *Digital Cities 2*. Berlin: Springer-Verlag.

Much thinking about digital cities is in terms of community groups. Yet, the world is composed of social networks and not of groups. This paper traces how communities have changed from densely-knit "Little Boxes" (densely-knit, linking people door-to-door" to "Glocalized" networks (sparsely-knit but with clusters, linking households both locally and globally) to "Networked Individualism" (sparsely-knit, linking individuals with little regard to space). The transformation affects design considerations for computer systems that would support digital cities.

White, Harrison. 2002. *Markets from Networks: Socioeconomics Models of Production*. Princeton, New Jersey: Princeton University Press.

White seeks a richer, more empirically based alternative, and offers a more lucid, generalized treatment of the market models described in his early work, and shows how any given market is positioned in a broader exchange economy. White begins by arguing that the key to economic action is that producers seek market niches to maximize profit and minimize competition. As they do so, they base production decisions not only on anticipated costs from supplies and anticipated demand from buyers, but also on assessment of their competitors. In fact, White asserts, producers act less in response to actual demand than by anticipating it: they gauge where competitors have found demand and thus determine what they can do that is similar and yet different enough to give themselves special niche. Building on these and related insights, White creates new mathematical models of how the economy works and how the interaction of its sectors creates mutual protection from the uncertainties of business. These models provide new ways of accounting for profits, princes, market shares, and other vital economic phenomena. He shows, for example, that prince are determined by the coalescing of local variables rather than set in term of averages as implied by the "law" of supply and demand. The model of "pure" competition favored by economics is deficient, he concludes, as it fails to account for the varied circumstances of particular industries.