

# Fifth International Workshop on Network Theory: Network Science Meets the Science of Teams

October 3-5, 2013

**Northwestern University**

Kellogg School of Management

Wieboldt Hall, Room 150

340 E. Superior

Chicago, Illinois

<http://sonic.northwestern.edu/news/events/ann-sonic/>

Twitter hash tag: #teamnetsci

Fifth International Workshop on Network Theory: Network Science Meets the Science of Teams  
The workshop is being organized by the Annenberg Networks Network (ANN) at the University of Southern California, the Developing Effective Leaders, Teams, & Alliances (DELTA) research laboratory at the Georgia Institute of Technology, the Northwestern Institute on Complex Systems (NICO), and the Science of Networks in Communities (SONIC) research group at Northwestern.

Luís Amaral, NICO, Northwestern

Manuel Castells, ANN, USC

Noshir Contractor, SONIC, Northwestern

Leslie DeChurch, DELTA, Georgia Institute of Technology

Janet Fulk, ANN, USC

Peter Monge, ANN, USC

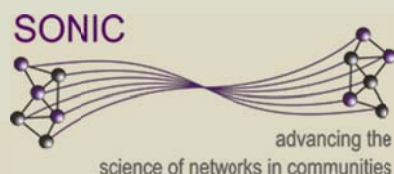
Brian Uzzi, NICO, Northwestern

First International Workshop on Network Theory: Interdisciplinary Approaches to Social Network Theory, September 15–16, 2006, Annenberg Center for Communication, University of Southern California, Los Angeles

Second International Workshop on Network Theory: Network Multidimensionality in the Digital Age, February 19–20, 2010, Annenberg Research Park, University of Southern California, Los Angeles

Third International Workshop on Network Theory: Web Science Meets Network Science, March 4-6, 2011, James L. Allen Center, Northwestern University

Fourth International Workshop on Network Theory: Networked Social Movements and Network Theory, April 26-28, 2012, Annenberg Research Park, University of Southern California, Los Angeles



# Schedule

## October 3

**5 pm – 8 pm**

**Registration and Welcome Reception @ Hyatt Chicago Magnificent Mile**  
Streeterville Room,  
Second Level

## October 4

**7:30 am**

**Continental Breakfast**  
Wieboldt Hall, 112

**8:15 am**

**Welcome**  
Wieboldt Hall, 150

**8:30 am - 9:15 am**

**Atypical Knowledge and Scientific Impact**  
Brian Uzzi

**9:15 am - 10 am**

**Transactive Memory Errors in Teams**  
Andrea Hollingshead

**10:00 am - 10:30 am**

**Break**  
Wieboldt Hall, 112

**10:30 am - 11:15 am**

**Individuals' Formal Power in Groups and Their Social Network Accuracy: A Situated Cognition Perspective**  
Joe Labianca

**11:15 am – 12 pm**

**Collective intelligence in Human Groups**  
Anita Woolley

**12 pm**

**Lunch**  
Wieboldt Hall, 317

**1 pm**

**Group Photo**  
Wieboldt Hall, 440

**1:30 pm - 2:15 pm**

**Some Assembly Required: Organizing in the 21<sup>st</sup> century**  
Noshir Contractor

**2:15 pm - 3 pm**

**The Network of Innovative Teams: Structural Folds with Cognitive Distance**  
Balazs Vedres

**3 pm - 3:30 pm**

**Break**  
Wieboldt Hall, 112

**3:30 pm - 4:15 pm**

**Impact of Leadership Network Structure on the Creative Output of Cross-Functional Multiteam Systems**  
Leslie DeChurch

**4:15 pm - 5 pm**

**Seeing Too Much: Too Much In Sight, Too Little Insight? An Attention-Driven View of Organizational Productivity**  
Ethan Bernstein

**5 pm**

**Cocktail reception**  
Wieboldt Hall, 317

**5:30 pm**

**Dinner**  
Wieboldt Hall, 317

**Keynote Speaker**

**The Social Physics of Team Performance**  
Sandy Pentland

**6:45 pm**

**Depart for Second City**

**8 pm**

**Second City Presents "Let Them Eat Chaos"**

## October 5

**8 am**

**Continental Breakfast**  
Wieboldt Hall, 112

**9 am - 9:45 am**

**Mining and Exploring Semi-Structured, Heterogeneous Social and Information Networks Distance**  
Jiawei Han

**9:45 am - 10:30 am**

**Knowledge Utilization, Coordination, and Team Performance**  
Ray Reagans

**10:30 am - 11 am**

**Break**  
Wieboldt Hall, 112

**11 am - 11:45 am**

**The Impact of Prior Collaboration Ties on Group Heterogeneity and Productivity in Research Groups**  
Jonathon Cummings

**11:45 am - 12:45 pm**

**Lunch**  
Wieboldt Hall, 317

**12:45 pm - 1:45 pm**

**Closing Panel: *Quo Imus***  
Paul Leonardi, Judy Olson, Woody Powell, Boleslaw "Bolek" Szymanski

**1:45 pm**

**Adjourn**

# Abstracts

## Ethan Bernstein

### **Seeing Too Much: Too Much In Sight, Too Little Insight? An Attention-Driven View of Organizational Productivity**

Leaders of organizations are increasingly paying attention to the design of communication and observation structures to optimize organizational performance. In practice, influenced by strong forces towards transparency, many leaders have adopted network strategies designed to make everything visible to everyone as efficiently as possible. Nonetheless, as much as we may see benefit in transparently observing others (particularly those for whom we are responsible), we tend to offer a much more conservative view when considering how much we should be observed by others. Demanding transparency of others while wanting privacy for ourselves, however, is an unstable asymmetry—we all play the role of both ego (observer) and alter (observed) based on the context. Good management theory should be able to provide a congruent, performance-driven answer. Using a selection of studies conducted at both the networks (macro) and teams (meso) levels of analysis, this talk will present both evidence of the value of certain boundaries for performance (of networks and teams) and several novel mechanisms through which boundaries enable such increased effectiveness.

## Noshir Contractor

### **Some Assembly Required: Organizing in the 21<sup>st</sup> Century**

Recent technological advances provide comprehensive digital traces of social actions, interactions, and transactions. These data provide an unprecedented exploratorium to model the socio-

technical motivations for creating, maintaining, dissolving, and reconstituting into teams. Using examples from research on collaboration in science, software development and massively multiplayer online games, Contractor will argue that Network Science serves as the foundation for the development of social network theories and methods to help advance our ability to understand the emergence of effective teams. More importantly, he will argue that these insights will also enable effective teams by building a new generation of recommender systems that leverage our research insights on the socio-technical motivations for creating ties.

## Jonathon Cummings

### **The Impact of Prior Collaboration Ties on Group Heterogeneity and Productivity in Research Groups**

Building on Cummings et al (2013) "Group Heterogeneity Increases the Risks of Large Group Size: A Longitudinal Study of Productivity in Research Groups", this presentation will focus on how prior collaboration ties among research group members (networks) impacts both group heterogeneity and group productivity (teams). Cummings et al (2013) found that larger research groups were more productive than smaller research groups, but their marginal productivity declined as their heterogeneity increased, either because their members belonged to more disciplines or to more institutions. New analyses incorporating data collected on the collaboration ties among group members *prior* to the research group suggest important pathways through which networks shape both the composition and outcomes of teams.

**Leslie DeChurch**

### **Impact of Leadership Network Structure on the Creative Output of Cross-Functional Multiteam Systems**

We advance a topological view of leadership to understand how patterns of emergent leadership within and between teams give rise to innovation. As knowledge becomes increasingly specialized, teams need to bridge with other specialized teams forming cross-functional multiteam systems (MTSs). Leadership networks provide a valuable lens for understanding how the social structure of influence within and between teams holds the potential to catalyze innovative new ideas. We advance hypotheses about the structure of leadership networks and resulting creative output, testing them in a sample of geographically distributed cross-functional MTSs formed by linking semester-long projects across two universities in the US and France. Findings reveal the structure of leadership networks, both during early exploration and later exploitation phases, has important downstream consequences for innovation. Findings uncover three topological features of leadership networks. Innovation arises in those MTSs whose leadership networks are high in: (1) bridging ties during both exploration and exploitation phases, (2) mutuality among emergent leaders during both exploration and exploitation phases, and (3) concentration of influence in the hands of a few during the exploitation phase.

**Jiawei Han**

### **Mining and Exploring Semi-Structured, Heterogeneous Social and Information Networks Distance**

People and informational objects are interconnected, forming gigantic, interconnected, integrated social and

information networks. By structuring these data objects into multiple types, such networks become semi-structured heterogeneous social and information networks. Most real world applications that handle big data, including interconnected social media and social networks, medical information systems, online e-commerce systems, or database systems, can be structured into typed, semi-structured, heterogeneous social and information networks. For example, in a medical care network, objects of multiple types, such as patients, doctors, diseases, medication, and links such as visits, diagnosis, and treatments are intertwined together, providing rich information and forming heterogeneous information networks. Effective analysis of large-scale heterogeneous social and information networks poses an interesting but critical challenge.

In this talk, we present a set of data mining scenarios in heterogeneous social and information networks and show that mining typed, heterogeneous networks is a new and promising research frontier in data mining research. Departing from many existing network models that view data as homogeneous graphs or networks, the semi-structured heterogeneous information network model leverages the rich semantics of typed nodes and links in a network and can uncover surprisingly rich knowledge from interconnected data. This heterogeneous network modeling will lead to the discovery of a set of new principles and methodologies for mining interconnected data. The examples to be used in this discussion include (1) meta path-based similarity search, (2) rank-based clustering, (3) rank-based classification, (4) meta path-based link/relationship prediction, (5) construct semi-structured networks from unstructured data. We will also point out some

promising research directions and provide convincing arguments on that mining heterogeneous information networks could be a promising theme in data mining.

### **Andrea Hollingshead**

#### **Transactive Memory Errors in Teams**

The theory of transactive memory first developed by social psychologists explains the development of distributed cognition among humans in collectives, and has generated interest among researchers across a wide array of disciplines. A transactive memory system is a group-level memory system that often develops in close relationships and work teams. It involves the division of responsibility among members with respect to the encoding, storage, retrieval and communication of information from different knowledge areas, and a shared awareness about each member's knowledge responsibilities (or "who knows what"). Originally proposed to explain memory distribution among intimate couples, evidence of transactive memory has been discovered in a variety of other relationships and groups, including families, friends, coworkers, teams and organizations. Most transactive memory research has focused on the benefits to collective processes and outcomes that a distributed memory structure can provide. However, teams with an efficient transactive memory also make errors that can have negative consequences. My talk will focus on the difficulties and dark side inherent in the creation and maintenance of transactive memory systems. I will explore how a network perspective might help specify the underlying processes and mechanisms of transactive memory errors.

### **Joe Labianca**

#### **Individuals' Formal Power in Groups and Their Social Network Accuracy: A Situated Cognition Perspective**

Individuals differ in the accuracy of their perceptions of the social environment, but research and theory provide conflicting predictions on whether those with power are more or less accurate than others. Drawing on social network theory and the situated focus theory of power, we examine the relationship between individuals' formal power and their perceptual accuracy of social network relationships within their group. We propose that individuals' perceptual accuracy is affected by: 1) their formal power in the group; and 2) the type of relationship being perceived (expressive/instrumental, positive/negative) and its relevance to task and goal completion, and 3) the dependence relationship with the target of perception (whether the perceiver is dependent on the perceived to get their work done). Predictions were tested using cognitive social network data collected from a technical call center within a division of a large corporation in the US. Results showed that formal power was linked to increased accuracy for some relationship content (negative expressive relationships), and managers tended to be more accurate than non-managers when perceiving their own personal incoming relationships.

### **Sandy Pentland**

#### **The Social Physics of Team Performance**

The rate and character of social learning ('idea flow') is shaped by the patterns of interaction within social networks. These patterns can be altered by using social network incentives ('nudges') in order to dramatically enhance performance.

## Ray Reagans

### **Knowledge utilization, coordination, and team performance**

Although there is considerable evidence that teams that utilize the knowledge of individual members effectively and coordinate that knowledge perform better than teams that are low in knowledge utilization and coordination, we know little about the consequences for team performance of being high on knowledge utilization and low on coordination or conversely low on knowledge utilization and high on coordination. We argue that knowledge utilization and coordination are conceptually and empirically distinct and develop theory and provide empirical evidence about the effect on team performance of being high or low in knowledge utilization and high or low in coordination. We predict that knowledge utilization is beneficial when team members can coordinate their activities but that knowledge utilization is less beneficial when team members do not have a capacity for coordination. We also predict that coordination is beneficial when team members utilize specialized knowledge but coordination is less beneficial when team members do not utilize specialized knowledge. We test our theory in two laboratory studies in which we manipulated knowledge utilization and coordination in a 2 x 2 factorial design. Results are generally supportive of our predictions. Further, there is some evidence that teams in the high coordination and low knowledge utilization condition perform better than teams in the high knowledge utilization and low coordination condition. We develop the implications of our results for theory and practice.

## Brian Uzzi

### **Atypical Knowledge and Scientific Impact**

Novelty is an essential feature of creative ideas, yet building blocks of new ideas are often embodied in existing knowledge. From this perspective, balancing atypical knowledge with conventional knowledge may

be critical to the link between innovativeness and impact. Our analysis of 17.9 million papers spanning all scientific fields suggests that science follows a nearly universal pattern: the highest-impact science is primarily grounded in exceptionally conventional combinations of prior work yet simultaneously features an intrusion of unusual combinations. Papers of this type were twice as likely to be highly cited works. Notably, novel combinations of prior work are rare, yet teams are 37.7% more likely than solo authors to insert novel combinations into familiar knowledge domains.

## Balazs Vedres

### **The Network of Innovative Teams: Structural Folds with Cognitive Distance**

Network research suggests that a team topology balancing familiarity (via cohesion) and diversity (via brokerage) is the key to success. We go beyond the duality of brokerage and closure by adopting the concept of structural folding the generative tension in overlapping cohesive groups. In elaborating the causal mechanisms at work in structural folding, we hypothesize that the effects of structural folding on inventiveness and on creative success are especially strong when overlapping groups are cognitively distant. Teams are most likely to produce game changing creative success when their cognitively heterogeneous communities have points of intersection. We draw on work on topologies of knowledge in the field of semiotics to conceptualize the role of folding in channelling and mobilizing the productive tension of cognitive distance. To test our hypothesis about structural folding and cognitive distance, we study the historical mechanisms of team reassembly in the video game industry. We collected data on 12,094 video games that were produced from

the inception of the industry in 1979 to 2009. Because we measure inventiveness independently from critical success, we can test whether teams with structural folds that span cognitively distant communities are able to develop distinctive products that are, at the same time, recognized as successful in the video gaming field.

## Anita Woolley

### **Collective intelligence in Human Groups**

Most of us are familiar with the idea of "general intelligence" in individuals, but no one has systematically examined whether a similar kind of "collective intelligence" exists for groups of people. In four studies, we find converging evidence of a general collective intelligence factor that explains a group's performance on a wide variety of tasks. This "c factor" is not strongly correlated with the average or maximum individual intelligence of group members, but is correlated with the average social sensitivity of group members, the equality in distribution of conversational turn-taking, and the proportion of females in the group. Ongoing research explores the relationship between collective intelligence and performance in a variety of environments, as well as the relationship between collective intelligence, diversity, and learning.



# Participants



**Luís A. Nunes Amaral** received his BS (1990) and MS (1992) in Physics from the University of Lisbon. He went on to obtain a PhD (1998) from the Department of Physics at Boston

University under the guidance of Gene Stanley. Amaral's research centers on the field of complex systems. He has published more than 150 peer-reviewed papers in major scientific journals. He received a K-25 CAREER award from the National Institutes of Health, has been named a Distinguished Young Scholar in Medical Research by the Keck Foundation, and was appointed an Early Career Scientist by the Howard Hughes Medical Institute. Amaral has recently proposed the development of cartographic methods for the representation of complex biological networks.



**Raquel Asencio** is a PhD student in the IO Psychology program at Georgia Tech, and currently involved in several major grants and projects on teams and multiteam systems. She

is interested in systems of science teams, interdisciplinary teams, and distributed teams, as well as the emergent properties and processes that enable the success of these collectives. She is currently working on countervailing forces in multiteam systems. For example, what happens to the processes at one level of analysis, when processes at another level of analysis take precedent? Her research relies heavily on social network analysis (SNA) and more recently, digital trace data.



**Prasad Balkundi** is an associate professor of management in the University at Buffalo, State University of New York. He received his Ph.D. in business administration from

Pennsylvania State University. His research interests include social networks and leadership in teams and his work has appeared in the *Academy of Management Journal*, *Academy of Management Review* and *Journal of Applied Psychology*.



**Ethan Bernstein** is an Assistant Professor of Leadership and Organizational Behavior at the Harvard Business School, focused on topics related to collaboration,

learning, design thinking, and organizational performance. In his current research, Professor Bernstein examines how, and under what conditions, privacy makes groups more productive--and, more specifically, how the sharing of information across and within boundaries affects learning, innovation, and organizational performance. In a world obsessed with transparency, his findings suggest that boundaries may sometimes provide unanticipated benefits and be an underutilized managerial performance lever. Put differently, attention matters for performance, and boundaries can be strategically important in directing it.



**Michael T. Braun**, Ph.D. is an Assistant Professor in the Industrial/Organizational Psychology program at the Virginia Polytechnic Institute and State University. His research interests are in the areas of team knowledge building and decision making, team collaboration and effectiveness, team leadership, longitudinal data analysis, and dynamic modeling. His work currently appears in *Psychological Methods*, *Organizational Research Methods*, and *Behavior Research Methods*. He currently serves on the Editorial Board of *Organizational Research Methods* and as a reviewer for the *Journal of Applied Psychology*, *Journal of Management*, and *Multivariate Behavioral Research*. He received his B.A. in Psychology from Purdue University (2006) and his M.A. (2009) and Ph.D. (2012) from Michigan State University.



**Ron Burt** is the Hobart W. Williams Professor of Sociology and Strategy at the University of Chicago Booth School of Business. He is a fellow of the American Academy of Arts and Sciences, worked as Vice President of Strategic Learning at Raytheon Company and as professor at the University of California Berkeley, Columbia University, INSEAD, and University of Chicago. His research describes how social networks create advantage (<http://faculty.chicagobooth.edu/ronald.burt/research>). Recent examples are a book on advantage spillover, *Neighbor Networks* (2010, Oxford), an analysis of personality affecting advantage (2012 *Am. J. Sociol.*), and a review of network advantage (2013 *Ann. Rev. Psychol.*).



**Dorothy R. Carter** is an Industrial/Organizational Psychology graduate student working with Dr. Leslie DeChurch at the Georgia Institute of Technology. Dorothy's research focuses on understanding leadership as a collective phenomenon in teams and larger collectives. In particular, she integrates social network analytic techniques and collective leadership theories to better understand drivers and optimal patterns of distributed leadership. She has been a lead graduate student on multiple large-scale nationally funded projects focused on understanding the functioning of complex globally distributed systems. Her work has appeared in outlets such as *The Oxford Handbook of Leadership* and *The Leadership Quarterly*.



**Joshua Clark** is a third year Ph.D student at the University of Southern California. His primary area of research is the social nature of online games. Josh has written on trust, distrust, criminality and information diffusion as expressed within various virtual worlds such as EVE Online, Team Fortress Two and League of Legends. His primary methodological interests lie at the intersection between social network analysis and machine learning, with a focus on a fusion between the two fields.



**Noshir Contractor** is the Jane S. & William J. White Professor of Behavioral Sciences in the McCormick School of Engineering & Applied Science, the School of Communication and the Kellogg School of Management at Northwestern University, USA. He is the Director of the Science of Networks in Communities (SONIC) Research Group at Northwestern University. He is investigating factors that lead to the formation, maintenance, and

dissolution of dynamically linked social and knowledge networks in a wide variety of contexts including communities of practice in business, translational science and engineering communities, public health networks and virtual worlds.



**Jonathon Cummings** is an Associate Professor of Management at the Fuqua School of Business, Duke University. After completing his dissertation and post-doc at

Carnegie Mellon University, he spent three years at the MIT Sloan School of Management as an Assistant Professor. His subsequent research has focused on virtual teams in corporations as well as collaboration in science, and his publications have appeared in outlets across a number of fields, including *Organizational Behavior* (e.g., *Management Science*, *Academy of Management Journal*, *Academy of Management Review*), *Information Systems* (e.g., *MIS Quarterly*, *Information Systems Research*), *Human-Computer Interaction* (e.g., *CHI*, *CSCW*, *CACM*), and *Science Policy* (e.g., *Social Studies of Science*, *Research Policy*).



**Leslie DeChurch** is Associate Professor of Industrial & Organizational Psychology at Georgia Institute of Technology, where she is the Director of the

DELTA (Developing Effective Leaders, Teams, and Alliances) laboratory. Professor DeChurch is a leading scholar in the area of teams and leadership, and was an originator of research on multiteam systems (MTSs). Multiteam systems theory explains the dynamics and performance of complex multilevel systems of teams in settings ranging from scientific innovation to disaster response to military engagement. Professor DeChurch serves on the editorial boards of the *Journal of Applied Psychology*, *Small Group Research*, the *Journal of Occupation and*

*Organizational Psychology*, and the *Journal of Business and Psychology*, she is a member of the boards of the Interdisciplinary Network for Group Research (INGRoup) and the Science of Team Science (SciTS). Professor DeChurch is the recipient of an NSF CAREER award examining leadership in virtual organizations, and she is co-PI (with Noshir Contractor) on a NSF Research Coordination Network grant to build community that will advance social scientists' ability to leverage big, broad, and digital data to understand social phenomena. Her research on teamwork and leadership has been continuously funded by the National Science Foundation and the Army Research Institute for the Social and Behavioral Sciences for the past 7 years. Professor DeChurch is co-editor of, "Multiteam systems: An organizational form for dynamic and complex environments", and dozens of articles in top journals including *Journal of Applied Psychology*, *Organizational Behavior and Human Decision Processes*, *Journal of Management*, and *Leadership Quarterly*.



**Amy C. Edmondson** is the Novartis Professor of Leadership and Management at Harvard Business School, where she has taught since 1996. Edmondson's research

examines the social and psychological dimensions of learning and innovation in organizations, and has been published in numerous academic and managerial articles. Her book, *Teaming: How organizations learn, innovate, and compete in the knowledge economy*, was published by Jossey-Bass in April, 2012. In the early eighties she was Chief Engineer for R. Buckminster Fuller, and her book, *A Fuller Explanation*, clarifies Fuller's mathematical contributions for a non-technical audience. Edmondson received her PhD in organizational behavior, AM in psychology, and AB in engineering and design, all from Harvard University.



**Janet Fulk** is Professor of Communications in the Annenberg School for Communication and Journalism, and Professor of Management and Organization the

Marshall School of Business at University of Southern California. Her research centers on social aspects of knowledge and distributed intelligence, enterprise social networking, nongovernmental organization networks, and dynamics of online communities. Current projects examine social dynamics in Threadless, factors leading to post-funding success of Kickstarter projects, motivations and social capital in enterprise social networking in private industry, and the evolution of the social networking site organizational form. She is a Fellow of The Academy of Management and of the International Communication Association, and she holds lifetime achievement awards from The Academy of Management.



**Heidi K Gardner**, PhD researches, teaches and speaks on topics related to leadership, collaboration and teamwork in complex, knowledge-based, high autonomy organizations.

She is an Assistant Professor of Organizational Behavior at Harvard Business School. Her current research analyses the benefits and costs to firms and individuals of working collaboratively. Heidi has published articles in *Administrative Science Quarterly*, *Academy of Management Journal*, *Harvard Business Review* and elsewhere. Heidi has lived and worked on four continents, including as a consultant with McKinsey & Co and as a Fulbright fellow. She earned a Masters degree from the London School of Economics and a PhD from London Business School.



**Dr. Gerald F. Goodwin** is Chief, Foundational Science Research Unit at the U. S. Army Research Institute for Behavioral and Social Sciences (ARI). In addition to overseeing ARI's

basic research program, he is responsible for research teams focused on emerging and developing concepts within the applied research program including assessment of unit command climate and unit resilience, assessment of cross-cultural competence, and assessing and developing unit cohesion. Dr. Goodwin received his M.S. and Ph.D. in Industrial/Organizational Psychology from the Pennsylvania State University. He is a member of the Society for Industrial and Organizational Psychology, the American Psychological Association (APA), and APA Division 19 (Military Psychology).



**Kristen Guth** is a second year PhD student at Annenberg School of Communication at the University of Southern California. Her research integrates organizational

communication, the Internet, and new and emerging technologies. She has researched with the Youth and Media Project at the Berkman Center for Internet and Society at Harvard University. Kristen's work has been presented at the conferences of the National Communication Association, International Network for Social Network Analysis Sunbelt, and the Association of Internet Researchers. Prior to her graduate studies, Kristen worked as a journalist in New York and as a public relations professional in Washington, DC.



**Jiawei Han** is Abel Bliss Professor in Engineering, in the Department of Computer Science at the University of Illinois. He has been researching into data mining, information network

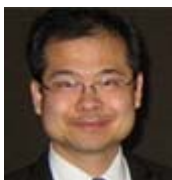
analysis, and database systems, with over 600 publications. He served as the founding Editor-in-Chief

of ACM Transactions on Knowledge Discovery from Data (TKDD) and on the editorial boards of several other journals. Jiawei has received IBM Faculty Awards, HP Innovation Awards, ACM SIGKDD Innovation Award (2004), IEEE Computer Society Technical Achievement Award (2005), IEEE Computer Society W. Wallace McDowell Award (2009), and Daniel C. Drucker Eminent Faculty Award at UIUC (2011). He is a Fellow of ACM and a Fellow of IEEE. He is currently the Director of Information Network Academic Research Center (INARC) supported by the Network Science-Collaborative Technology Alliance (NS-CTA) program of U.S. Army Research Lab. His book "Data Mining: Concepts and Techniques" (Morgan Kaufmann) has been used worldwide as a textbook.



**Andrea B. Hollingshead** (Ph.D., University of Illinois at Urbana-Champaign) is Professor of Communication in the Annenberg School of Communication and

Journalism at the University of Southern California (USC). She holds joint appointments in the USC Marshall School of Business and the Department of Psychology. Her research focuses on the factors and processes that lead to effective and ineffective knowledge sharing in groups. She has been a co-investigator on projects funded by the National Science Foundation. She has co-authored three books, *Research Methods for Studying Groups and Teams*, *Theories of Small Groups: Interdisciplinary Perspectives*, and *Groups Interacting with Technology* and has published many articles in communication, management, and psychology journals.



**Yun Huang** is a research associate in the Science of Networks in Communities (SONIC) research group in the department of Industrial Engineering and Management

Sciences at Northwestern University. His research explores the dynamic and evolution of individual behavior and interactions in digital-enabled environments such as scientific collaboration, online communities, and virtual worlds using data mining, social network analysis, and economics approaches. He holds a doctorate in management science and information systems from McCombs School of Business at the University of Texas at Austin and bachelor's and master's degrees in computer science from Tsinghua University.



**Steve W. J. Kozlowski**, Ph.D., professor of organizational psychology, Michigan State University. Research focuses on learning, team effectiveness, and

multilevel theory. He is Editor of the *Journal of Applied Psychology* and *Oxford Series in Organizational Psychology*; Associate Editor of the *Archives of Scientific Psychology*. He serves on Editorial Boards of the *Journal of Management* and *Oxford Research Reviews* and previously on the *Academy of Management Journal*, *Human Factors*, the *Journal of Applied Psychology*, and *Organizational Behavior and Human Decision Processes*. Fellow: American Psychological Association, Association for Psychological Science, International Association for Applied Psychology, and Society for Industrial and Organizational Psychology.



**Giuseppe (Joe) Labianca** (Ph.D., Business Administration, Penn State) is a Gatton Endowed Professor of Management at the University of Kentucky's Gatton College of

Business and Economics and a co-founder of the LINKS Social Network Research Center ([linkscenter.org](http://linkscenter.org)). Joe's research involves understanding behavior in organizations from a social network perspective, including informal network

approaches to organization design, innovation and collaboration, interpersonal conflict, and teamwork. His work has appeared in *Science*, *Harvard Business Review*, the *Academy of Management Journal*, the *Academy of Management Review*, *Organization Science*, *Strategic Organization*, and elsewhere. He teaches organization and management, organization theory and design, conflict and negotiations, organizational behavior, human resources management, and organizational change management. He recently won the University of Kentucky Alumni Association's Great Teacher Award.



**Roger Leenders** is professor of Intra-Organizational Networks at Tilburg University in The Netherlands. His research focuses mainly on social networks in and of teams and how they affect (or are affected by) team-level creativity and innovation. He also studies effects of inter-team competition on team processes and team performance. Current work includes a focus on the antecedents of team-level risk-taking and work on relational event networks, where network interaction in continuous time is modeled.



**Paul Leonardi** (Ph.D., Stanford University) is the Pentair-Nugent Associate Professor at Northwestern University. He teaches courses on the management of innovation and organizational change in the School of Communication, the McCormick School of Engineering, and the Kellogg School of Management. Leonardi's research focuses on how companies can create organizational structures and employ advanced information technologies to more effectively create and share knowledge. He is particularly interested in how data intensive technologies, such as simulation and social media tools, enable new ways to access, store, and share information; how the new sources of

information these technologies provide can change work routines and communication partners; and how shifts in employees' work and communication alter the nature of an organization's expertise.



**Alina Lungeanu** is a PhD candidate in Technology and Social Behavior at Northwestern University. Her research examines the assembly of scientific teams and the role of scientific collaborations in the emergence and evolution of new scientific fields. She is a member of the Science of Networks in Communities (SONIC) Research Laboratory where she has performed extensive analyses comparing the assembly of funded and unfunded NSF proposals teams and capturing the mechanisms by which the sub-discipline of Oncofertility has emerged and was shaped by the NIH funded Interdisciplinary Research Consortium. In her work, Alina applies social networks concepts and methodological tools, as well as theories and concepts from the wider field of social science.



**Michael Macy** is Goldwin Smith Professor of Sociology and director of the Social Dynamics Laboratory at Cornell University. His recent research uses data from Twitter to track diurnal and seasonal mood changes; telephone call logs to measure network structure at the population level; and Amazon book reviews to determine whether reviewers are influenced by previous reviews. He has also used computational models to study the spread of high- threshold social contagions on small-world and scale- free networks. Macy's research has been published in such leading journals as *Science*, *Proceedings of the National Academy of Sciences*, the *American Journal of Sociology*, the *American Sociological Review*, and the *Annual Review of Sociology*. He earned his PhD from Harvard University.



**John Mathieu** is a Professor of Management at the University of Connecticut, and holds the Cizik Chair in Management at UConn. His primary areas of interest include

models of team and multi-team effectiveness, leadership, training effectiveness, and cross-level models of organizational behavior. He has over 100 publications, 200 presentations at national and international conferences, and has been a PI or Co-PI on over \$8.5M in grants and contracts. He is a Fellow of the APA, SIOP, and the Academy of Management. He serves on numerous prestigious editorial boards and holds a Ph.D. in Industrial/Organizational Psychology from Old Dominion University.



**Dr. Luke Matthews** is Activate Networks' Senior Scientific Director. His responsibilities include the ongoing development and application of Activate Networks algorithms. He

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**Satyam Mukherjee** obtained his PhD degree in Physics from Indian Institute of Technology Madras, India in the year 2009. The broad area of research of his doctoral work involved the analysis of congestion and decongestion phenomena in model communication networks. Between Feb 2010 and January 2012 he worked in the Amaral lab as a post-doctoral fellow. As a postdoc in Amaral lab he worked on various topics, which included visualization of online weight-loss friendship network, analysis of the Internet Movie Database (IMDb) and political prediction markets. Since Feb 2012 He has been working as a post doctoral fellow with Prof. Brian Uzzi in Kellogg School of Management. His research interests include physics of social networks, complex systems and sports statistics.



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**Alexandros Nathan** is a second year PhD student in the Department of Industrial Engineering and Management Sciences at Northwestern University, and a member of the SONIC Lab. His research interests span the areas of Analytics, Social Network Analysis and Optimization. Alexandros is currently working with Professors Noshir Contractor and Sanjay Mehrotra on a new data driven approach for optimizing team performance. This new method will also be generic enough to be applied to various multi-objective optimization settings. In his free time, Alexandros enjoys playing tennis.



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**Dr. Edward T. Palazzolo** is the Associate Director of the SONIC Lab at Northwestern University. He earned his Ph.D. at the University of Illinois at Urbana-Champaign (2003) and held faculty positions at The Ohio State University and Arizona State University. Dr. Palazzolo's research focuses on the interrelations between communication and knowledge networks and their impact on team performance in organizational settings through social network analysis, multilevel modeling, and computational modeling. The range of organizational settings he studies include for-profit, not-for-profit, education, government, military, terrorist, aerospace, virtual, international, and rapid-design teams.



**Alex 'Sandy' Pentland** directs MIT's Human Dynamics Laboratory and the MIT Media Lab Entrepreneurship Program, co-leads the World Economic Forum Big Data and Personal Data initiatives, and is a founding member of the Advisory Boards for Nissan, Motorola Mobility, Telefonica, and a variety of start-up firms. He has previously helped create and direct MIT's Media Laboratory, the Media Lab Asia laboratories at the Indian Institutes of Technology, and Strong Hospital's Center for Future Health. In 2012 Forbes named Sandy one of the 'seven most powerful data scientists in the world', along with Google founders and the CTO of the United States, and in 2013 he won the McKinsey Award from Harvard Business Review. He is among the most-cited computational scientists in the world, and a pioneer in computational social science, organizational engineering, wearable computing (Google Glass), image understanding, and modern biometrics. His research has been featured in Nature, Science, and Harvard Business Review, as well as being the focus of TV features on BBC World, Discover and Science channels. His most recent book is 'Honest Signals,' published by MIT Press.



**Walter W. Powell**, Professor of Education (and) Sociology, Organizational Behavior, Management Science and Engineering, Public Policy, and Communication at Stanford University. He works in the areas of organization theory, economic sociology, and the sociology of science. His interests focus on the processes through which knowledge is transferred across organizations, and the role of networks in facilitating or hindering innovation and of institutions in codifying ideas. He is the author or editor of *Books*: *The Culture and Commerce of Publishing*, with Lewis Coser and Charles Kadushin (Basic Books, 1982); *Getting Into Print: The Decision-Making Process in Scholarly Publishing* (U. of Chicago Press, 1985); *The New Institutionalism in Organizational Analysis*, with Paul DiMaggio (U. of Chicago Press, 1991); *Private Action and the Public Good*, with Elisabeth Clemens (Yale U. Press, 1997); and *The Nonprofit Sector*, with Richard Steinberg (Yale U. Press, 2006). His most recent book, with John Padgett, is *The Emergence of Organizations and Markets* (Princeton U. Press, 2012). He received his Ph.D. in Sociology from SUNY – Stony Brook, and previously taught at Yale, MIT, and the University of Arizona. He holds honorary degrees from Uppsala University, Copenhagen Business School, and the Helsinki School of Economics, and is a foreign member of the Swedish Royal Academy of Science.



**Ray Reagans** is the *Alfred P. Sloan Professor of Management* and Professor of Organization Studies at the MIT Sloan School of Management. Reagans studies the origin and influence of social capital on knowledge transfer, learning rates, and overall team performance. More specifically, he examines how demographic characteristics such as race, age, and gender affect the development of network relations. He also

considers how particular network structures affect performance outcomes, including the transfer of knowledge among individuals and the productivity of research and development teams. Reagans holds a BA in sociology and economics from Brown University and a PhD in sociology from the University of Chicago.



**Daniel M. Romero's** research focuses on the empirical and theoretical analysis of Social and Information Networks. He is particularly interested in understanding the mechanisms that control network evolution, information diffusion, and user interactions in online social networks. In his research, Daniel aims to complement the methods used in sociology with approaches that draw on large data sets from the Web, mathematical models, and new algorithms. Using these tools, Daniel's research focuses on validating existing social theories at large scale and discovering new ones. While much of Daniel's work is academically motivated, the results of his research have important implications for the development of useful applications such as user influence ranking, friend recommender systems, and spam detection. Daniel is a postdoctoral fellow at the Northwestern Institute on Complex Networks (NICO). He obtained his Ph.D in Applied Mathematics at Cornell University in 2012.



**Aaron Schecter** is currently a second year PhD. candidate at Northwestern University in the department of Industrial Engineering and Management Science. He is a member of the SONIC research group, where he is involved in the ongoing MTS study. Aaron's current research is focused on relational event modeling for team communication. Additionally, he is interested in statistical modeling, optimization, and simulation.



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**Bonnie Spring** is Professor of Preventive Medicine, Psychology, and Psychiatry, Director of the Center for Behavior and Health, and Co-Program Leader for Cancer

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**Sophia Sullivan** is a fourth year Ph.D. student in Industrial Engineering and Management Sciences at Northwestern. As a member of the SONIC Lab, she has participated in a variety of projects including the development of metrics for analyzing team ecosystems, simulation of creativity in teams, and studying gold farming in Massively Multiplayer Online Games. Her current projects include simulating the development of leadership reliance networks in Multi-Team Systems and simulating of the evolution of a scientific field using Agent-Based Models.



**Dr. Boleslaw K. Szymanski** is the Claire and Roland Schmitt Distinguished Professor and the Director of the ARL Social and Cognitive Networks Academic Research Center at the Rensselaer Polytechnic Institute. He received his Ph.D. in Computer Science from National Academy of Sciences in Warsaw, Poland, in 1976. He published over 300 scientific articles, is a foreign member of the National Academy of Science in Poland and an IEEE Fellow and was a National Lecturer for the ACM. In 2009, he received the Wilkes Medal from the British Computer Society and the honorific title of Presidential Professor from the Republic of Poland. His current research interests focus on network science with focus on technology-based social networks and computer networks.



**Lena Uszkoreit** is a second-year PhD student at USC. She received her B.A. and M.A. degrees from Berlin University of the Arts in 'Communication in Social and Economical Contexts'. Rather a novice to networks, Lena is intrigued by studying social interaction in virtual worlds and online games from a multi-methodological perspective. She is interested in the relationships of social capital, trust, and reciprocity of

MMO players as well as in looking at online and offline social networks and how they intersect and overlap (or don't).



**Brian Uzzi** is the Richard L. Thomas Distinguished Professor of Leadership at the Kellogg School of Management, Northwestern University. He also directs the Northwestern University Institute on Complex Systems (NICO) and is a professor of sociology and management science at the McCormick School of Engineering. His award winning and highly referenced research examines the role of complex systems and social networks in promoting outstanding human achievement, creativity, and crowd behavior. Brian has won 10 teaching awards and been on the faculty of Harvard University, INSEAD, University of Chicago, and UC Berkeley where he was the Warren E. and Carol Spieker Professor of Leadership. Media reports of his work have appeared in the WSJ, Newsweek, on Television, and in the New Yorker Magazine.



**Balazs Vedres** is Associate Professor of Sociology at the Central European University where he directs the Center for Network Science. His research furthers the agenda of understanding historical dynamics in network systems, with insights from historical sociology, social network analysis, and studies of complex systems in physics and biology. His research tackles questions of creativity in teams, the role of technology in civic activism, transnational networks and social movements, the political segregation of business networks, robustness in energy delivery networks, and organizational design. His research results were published in the top journals of sociology, attracting four major international awards over the past two years. His most recent book, "Networks in Social Policy Problems" was published by Cambridge University Press in 2012.



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**Cindy Weng** is pursuing her Ph.D. in Media, Technology and Society at Northwestern University. Her interests and areas of expertise lay in the internet sector, particularly

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**Bei Yan** is a second year PhD student at the Annenberg School of Communication, University of Southern California, and a member of the Annenberg Networks Network.

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