

RPPR Final Report

as of 24-Jun-2021

Agency Code: 21XD

Proposal Number: 74656NSCF

Agreement Number: W911NF-19-1-0014

INVESTIGATOR(S):

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Organization: **Northwestern University Evanston Campus**

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Report Date: 18-Jan-2020

Date Received: 14-Nov-2019

Final Report for Period Beginning 19-Oct-2018 and Ending 18-Oct-2019

Title: ANN SONIC NICO Workshop on Brain Science and Social Networks

Begin Performance Period: 19-Oct-2018

End Performance Period: 18-Oct-2019

Report Term: 0-Other

Submitted By: Noshir Contractor

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Distribution Statement: 1-Approved for public release; distribution is unlimited.

STEM Degrees: 1

STEM Participants: 18

Major Goals: The major goal of the project is to convene an international workshop on network theory with a focus on brain science and social networks. We aim to invite 35 participants in total, with 25 scholars as workshop attendees and 8-10 speakers as presenters. By bringing together these scientists who are experts in brain sciences and social network analysis, we hope to advance understanding across multiple fields, including brain science and computational social sciences.

This year we decide to strategically shape a program that puts neuroscientists and social network scientists in dialogue with one another to address critical gaps in the literature. Recent advances in brain imaging techniques present a remarkable opportunity to gain a mechanistic understanding of brain functions, and their role in cognition and disease. Such an understanding necessitates bringing together interdisciplinary teams of researchers. One particularly powerful approach builds functional networks from fMRI data to provide insights into human cognition its variation over individuals and its alteration in disease. For example, functional networks activated in response to health interventions can predict behavioral trajectories. Yet, current tools and approaches to studying network architecture largely focus on static snapshots of the brain over long time intervals. Cutting-edge dynamic network tools can begin to infer organizational principles and their temporal variation in response to our proposed cognitive manipulations. In parallel, foundational work conceptualizes social network structure as a type of individual difference that affects and is affected by a broader array of psychological functions and behaviors. Further, mounting empirical evidence shows that behaviors spread from person to person, in both online and offline social networks.

Bringing these domains together, emerging work has begun to quantify the ways in which group structure, brain, and behavior relate to one another. Differing social network properties are associated with differences in processing within brain systems necessary for navigating the social world, such that social network structures both shape the types of social interactions that people have and are also shaped by individual differences in the tendency to use the brain in particular ways. To this end, higher information brokerage (i.e., greater betweenness) is associated with greater use of brain regions implicated in mentalizing when making recommendations to others. Yet, few neuroscientific studies have taken account of this broader influence on human experience and action. To address this critical gap, we bring together researchers with experience and expertise across domains in an intimate conference setting to take a deeper dive into these issues.

Accomplishments: We brought together 21 speakers in total, including 15 non-Northwestern faculty from institutions such as University of Pennsylvania and University of Southern California, 4 Northwestern faculty, and 2 government employees from the Army Research Laboratory and the Neurobehavioral Clinical Research Section of

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the National Human Genome Research Institute. Additionally, we had 39 participants, including Northwestern and non-Northwestern faculty members, postdoctoral researchers, doctoral students, and government employees.

We hosted 5 sessions in total during which 16 speakers gave expanded presentations on topics such as “Brain and Social Network Dynamics Associated with Susceptibility to Social Influence,” “Neural Markers of Popularity and the Evolution of Liking Over Time,” and “What Comes to Mind? Dynamic Construction of Personal Networks.”

We also hosted spark talks (5 minute short presentations) to further discussion on neuroscience and social networks.

Training Opportunities: This project provided valuable training and professional opportunities for participants, including Northwestern and non-Northwestern faculty, postdoctoral researchers, doctoral students, and government employees. In particular, by bringing together neuroscientists and social network scientists from a wide variety of disciplines, we are able to enhance the need and opportunity for interdisciplinary conversations and potential future collaborations on the topic of brain science and networks.

In addition to advancing knowledge in the scientific field, the project also advanced education for graduate students and postdoctoral researchers. We have asked each invited presenter to bring along either a graduate student or postdoctoral researcher to accompany them to the workshop. Thus, not only did the workshop facilitate professional development of scientists in brain science and social networks by fostering multidisciplinary discussion and potential new collaborations, but also shape the growth of emerging scholars in these fields by giving them the opportunity to network and discuss research interests with scholars who are conducting innovative and cutting-edge work in the field.

Results Dissemination: We have made recordings of presentations publicly accessible. They can be downloaded through this website:

<https://kellogg-northwestern.hosted.panopto.com/Panopto/Pages/Sessions/List.aspx#folderID=%223afcc8ff-00ec-441a-8d91-a9830156c98f%22>

Additionally, we had discussed the possibility of doing a special issue for the journal Network Science but due to bandwidth considerations among the organizers we have not made any progress so far.

Honors and Awards: Nothing to Report

Protocol Activity Status:

Technology Transfer: Nothing to Report

PARTICIPANTS:

Participant Type: PD/PI

Participant: Noshir Contractor

Person Months Worked: 12.00

Project Contribution:

National Academy Member: N

Funding Support:

Participant Type: Graduate Student (research assistant)

Participant: Brennan Antone

Person Months Worked: 1.00

Project Contribution:

National Academy Member: N

Funding Support:

Participant Type: Graduate Student (research assistant)

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Participant: Elisa Baek

Person Months Worked: 1.00

Project Contribution:

National Academy Member: N

Funding Support:

Participant Type: Faculty

Participant: Leslie DeChurch

Person Months Worked: 1.00

Project Contribution:

National Academy Member: N

Funding Support:

Participant Type: Graduate Student (research assistant)

Participant: Jacob Fisher

Person Months Worked: 1.00

Project Contribution:

National Academy Member: N

Funding Support:

Participant Type: Staff Scientist (doctoral level)

Participant: Sean Fitzhugh

Person Months Worked: 1.00

Project Contribution:

National Academy Member: N

Funding Support:

Participant Type: Staff Scientist (doctoral level)

Participant: Javier Garcia

Person Months Worked: 1.00

Project Contribution:

National Academy Member: N

Funding Support:

Participant Type: Graduate Student (research assistant)

Participant: Diego Gómez-Zára

Person Months Worked: 1.00

Project Contribution:

National Academy Member: N

Funding Support:

Participant Type: Graduate Student (research assistant)

Participant: Clare Grall

Person Months Worked: 1.00

Project Contribution:

National Academy Member: N

Funding Support:

Participant Type: Graduate Student (research assistant)

Participant: Nick Harder

Person Months Worked: 1.00

Funding Support:

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Project Contribution:
National Academy Member: N

Participant Type: Faculty
Participant: Ágnes Horvát
Person Months Worked: 1.00 **Funding Support:**
Project Contribution:
National Academy Member: N

Participant Type: Graduate Student (research assistant)
Participant: Niloufar Izadinia
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Project Contribution:
National Academy Member: N

Participant Type: Graduate Student (research assistant)
Participant: Mia Jovanova
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Project Contribution:
National Academy Member: N

Participant Type: Non-Student Research Assistant
Participant: Hyunuk Kim
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Project Contribution:
National Academy Member: N

Participant Type: Postdoctoral (scholar, fellow or other postdoctoral position)
Participant: Hee Youn Kwon
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Project Contribution:
National Academy Member: N

Participant Type: Faculty
Participant: PJ Lamberson
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Project Contribution:
National Academy Member: N

Participant Type: Graduate Student (research assistant)
Participant: Lindsay Larson
Person Months Worked: 1.00 **Funding Support:**
Project Contribution:
National Academy Member: N

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Participant Type: Graduate Student (research assistant)
Participant: Yiqi Li
Person Months Worked: 1.00 **Funding Support:**
Project Contribution:
National Academy Member: N

Participant Type: Faculty
Participant: Alessandro Lomi
Person Months Worked: 1.00 **Funding Support:**
Project Contribution:
National Academy Member: N

Participant Type: Graduate Student (research assistant)
Participant: Eleonora Lomi
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Project Contribution:
National Academy Member: N

Participant Type: Other Professional
Participant: Edward Palazzolo
Person Months Worked: 1.00 **Funding Support:**
Project Contribution:
National Academy Member: N

Participant Type: Postdoctoral (scholar, fellow or other postdoctoral position)
Participant: Mahnaz Roshanaei
Person Months Worked: 1.00 **Funding Support:**
Project Contribution:
National Academy Member: N

Participant Type: Postdoctoral (scholar, fellow or other postdoctoral position)
Participant: Koustav Rudra
Person Months Worked: 1.00 **Funding Support:**
Project Contribution:
National Academy Member: N

Participant Type: Graduate Student (research assistant)
Participant: Hui Sun
Person Months Worked: 1.00 **Funding Support:**
Project Contribution:
National Academy Member: N

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Participant Type: Graduate Student (research assistant)
Participant: Jingyi Sun
Person Months Worked: 1.00 **Funding Support:**
Project Contribution:
National Academy Member: N

Participant Type: Graduate Student (research assistant)
Participant: Kyosuke Tanaka
Person Months Worked: 1.00 **Funding Support:**
Project Contribution:
National Academy Member: N

Participant Type: Graduate Student (research assistant)
Participant: Marlon Twyman
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Project Contribution:
National Academy Member: N

Participant Type: Faculty
Participant: Dashun Wang
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Project Contribution:
National Academy Member: N

Participant Type: Graduate Student (research assistant)
Participant: Yuanxin Wang
Person Months Worked: 1.00 **Funding Support:**
Project Contribution:
National Academy Member: N

Participant Type: Technician
Participant: Nick Wasylyshyn
Person Months Worked: 1.00 **Funding Support:**
Project Contribution:
National Academy Member: N

Participant Type: Postdoctoral (scholar, fellow or other postdoctoral position)
Participant: Adrienne Wood
Person Months Worked: 1.00 **Funding Support:**
Project Contribution:
National Academy Member: N

Participant Type: Graduate Student (research assistant)

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Participant: Yu Xu

Person Months Worked: 1.00

Project Contribution:

National Academy Member: N

Funding Support:

Participant Type: Faculty

Participant: Yang Yang

Person Months Worked: 1.00

Project Contribution:

National Academy Member: N

Funding Support:

Participant Type: Graduate Student (research assistant)

Participant: Yian Yin

Person Months Worked: 1.00

Project Contribution:

National Academy Member: N

Funding Support:

Participant Type: Faculty

Participant: Hyejin Youn

Person Months Worked: 1.00

Project Contribution:

National Academy Member: N

Funding Support:

Participant Type: Graduate Student (research assistant)

Participant: Dongping Zhang

Person Months Worked: 1.00

Project Contribution:

National Academy Member: N

Funding Support:

Participant Type: Faculty

Participant: Joseph Bayer

Person Months Worked: 1.00

Project Contribution:

National Academy Member: N

Funding Support:

Participant Type: Faculty

Participant: Matthew Brashears

Person Months Worked: 1.00

Project Contribution:

National Academy Member: N

Funding Support:

Participant Type: Faculty

Participant: Moran Cerf

Person Months Worked: 1.00

Funding Support:

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Project Contribution:
National Academy Member: N

Participant Type: Faculty
Participant: Morteza Dehghani
Person Months Worked: 1.00
Project Contribution:
National Academy Member: N

Funding Support:

Participant Type: Faculty
Participant: Emily Fulk
Person Months Worked: 1.00
Project Contribution:
National Academy Member: N

Funding Support:

Participant Type: Faculty
Participant: Adam Kleinbaum
Person Months Worked: 1.00
Project Contribution:
National Academy Member: N

Funding Support:

Participant Type: Faculty
Participant: Talia Lerner
Person Months Worked: 1.00
Project Contribution:
National Academy Member: N

Funding Support:

Participant Type: Faculty
Participant: Sylvia Morelli
Person Months Worked: 1.00
Project Contribution:
National Academy Member: N

Funding Support:

Participant Type: Faculty
Participant: Kevin Ochsner
Person Months Worked: 1.00
Project Contribution:
National Academy Member: N

Funding Support:

Participant Type: Faculty
Participant: Carolyn Parkinson
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Project Contribution:
National Academy Member: N

Funding Support:

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Participant Type: Faculty
Participant: Eric Quintane
Person Months Worked: 1.00
Project Contribution:
National Academy Member: N

Funding Support:

Participant Type: Faculty
Participant: Aaron Schechter
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Project Contribution:
National Academy Member: N

Funding Support:

Participant Type: Faculty
Participant: Ralf Schmäelzle
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Project Contribution:
National Academy Member: N

Funding Support:

Participant Type: Staff Scientist (doctoral level)
Participant: Philip Shaw
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Project Contribution:
National Academy Member: N

Funding Support:

Participant Type: Faculty
Participant: Edward Smith
Person Months Worked: 1.00
Project Contribution:
National Academy Member: N

Funding Support:

Participant Type: Faculty
Participant: Diana Tamir
Person Months Worked: 1.00
Project Contribution:
National Academy Member: N

Funding Support:

Participant Type: Faculty
Participant: Brian Uzzi
Person Months Worked: 12.00
Project Contribution:
National Academy Member: N

Funding Support:

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as of 24-Jun-2021

Participant Type: Faculty
Participant: Timothy Verstynen
Person Months Worked: 1.00
Project Contribution:
National Academy Member: N

Funding Support:

Participant Type: Staff Scientist (doctoral level)
Participant: Jean Vettel
Person Months Worked: 1.00
Project Contribution:
National Academy Member: N

Funding Support:

Participant Type: Faculty
Participant: Rene Weber
Person Months Worked: 1.00
Project Contribution:
National Academy Member: N

Funding Support:

Participant Type: Faculty
Participant: Jaent Fulk
Person Months Worked: 12.00
Project Contribution:
National Academy Member: N

Funding Support:

Participant Type: Faculty
Participant: Peter Monge
Person Months Worked: 12.00
Project Contribution:
National Academy Member: N

Funding Support:

International Collaboration:

CHE
CHE

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as of 24-Jun-2021

Partners

,

I certify that the information in the report is complete and accurate:

Signature:

Signature Date:

Attached are the program agenda and a summary of how funds are use. In addition to the document, the following links below will lead you to the website, videos of presentation, and images taken at the workshop

More details about the workshop and program agenda can be accessed through this link:

<https://www.kellogg.northwestern.edu/news-events/conference/international-workshop-on-network-theory/>

Recordings of presentation during the workshop: <https://kellogg-northwestern.hosted.panopto.com/Panopto/Pages/Sessions/List.aspx#folderID=%223afcc8ff-00ec-441a-8d91-a9830156c98f%22>

Images taken at the workshop:

<https://northwestern.app.box.com/s/cq54qolh773h6w5gkt8frgc6ikre7zlo>

This is to confirm that the following were participants of the Network Theory Workshop (held October 25-27, 2019) whose travel and lodging were funded on the ARO grant SP0051583/610- 4620000-60051618:

Speakers:

1. Joseph Bayer - Ohio State Univ.
2. Matthew Brashears - Univ. of South Carolina
3. Morteza Dehghani - USC
4. Emily Falk - U. Penn
5. Adam Kleinbaum - Dartmouth
6. Carolyn Parkinson - UCLA
7. Kevin Ochsner- Columbia University
8. Eric Quintane - Univ. of Los Andes, Bogota, Colombia
9. Aaron Schechter - UGA
10. Ralph Schmaezle - MSU
11. Diana Tamir - Princeton Univ.
12. Tim Verstynen -Carnegie Mellon Univ.
13. Rene Weber- UC Santa Barbara

Participants:

14. Elisa Baek - U. Penn
15. Jacob Fisher - UC Santa Barbara
16. Janet Fulk -- USC
17. Clare Grall -- MSU
18. Nick Harder -USC
19. Mia Jovanova - U. Penn
20. PJ Lamberson - UCLA
21. Alessandro Lomi - Univ. of Lugano, Switzerland
22. Peter Monge - USC
23. Jingyi Sun - USC
24. Yu Xu - USC
25. Adrienne Wood - Dartmouth

PI name: Noshir Contractor

PI signature : N. Contractor

Date: 10/27/19

9TH ANN / SONIC / NICO NETWORK THEORY WORKSHOP: *Brain Science and Social Networks*

October 25 – 27, 2018
Kellogg Global Hub
Northwestern University, Evanston, IL

Sponsored by:
Annenberg Networks Network (ANN)
University of Southern California
www.usc.edu/ann

Science of Networks in Communities (SONIC) research group
Northwestern University
www.sonic.northwestern.edu

Northwestern Institute of Complexity (NICO)
Northwestern University
www.nico.northwestern.edu

U.S. Army Research Office (ARO)
United States Army Research Laboratory
www.arl.army.mil

Northwestern | Kellogg

Schedule

Thursday, October 25, 2018

5:30 p.m. – 8:30 p.m.

Opening Reception

Terra & Vine, 1701 Maple Avenue, Evanston, IL

Welcome

Michael J. Fishman, Senior Associate Dean, Faculty and Research and Norman Strunk Professor of Financial Institutions, Kellogg School of Management, Northwestern University

Friday, October 26, 2018

7:45 a.m. – 9:00 a.m.

Transportation from Hilton Garden Inn to Kellogg Global Hub (*chartered shuttle will be available for this duration*)
Participants staying at Hampton Inn & Suites will be provided Uber codes for transport.

8:30 a.m. – 9:00 a.m.

Breakfast

Seminar Room 5101, 5th Floor, Kellogg Global Hub, 2211 Campus Drive, Evanston, IL

9:00 a.m. – 9:15 a.m.

Welcome & Opening Remarks

Noshir Contractor, Jane S. & William J. White Professor of Behavioral Sciences, Northwestern University

Julio M. Ottino, Dean of the Robert R. McCormick School of Engineering and Applied Sciences, Distinguished Robert R. McCormick Institute Professor and Walter P. Murphy Professor of Chemical and Biological Engineering, Northwestern University

9:15 a.m. – 10:15 a.m.

Session 1

Brain and Social Network Dynamics Associated with Susceptibility to Social Influence

Emily Falk, Associate Professor of Communication, Psychology and Marketing, Annenberg School for Communication at University of Pennsylvania

Neural Markers of Popularity and the Evolution of Liking Over Time

Kevin Ochsner, Professor and Director of Graduate Studies, Psychology, Columbia University

10:15 a.m. – 10:45 a.m.

Break



Schedule

- 10:45 a.m. – 11:45 a.m. **Session 2**
Wilde’s Dilemma: The Role of Deception in Social Networks
Matthew Brashears, Associate Professor, Sociology, University of South Carolina
- Making Predictions in the Social World**
Diana Tamir, Assistant Professor of Psychology, Princeton University
- 12:00 p.m. – 1:00 p.m. **Lunch**
Seminar Room 4101, 4th Floor, Kellogg Global Hub
- 1:15 p.m. – 2:15 p.m. **Session 3**
Neural Homophily: Similar Neural Responses Predict Friendship
Carolyn Parkinson, Assistant Professor, Psychology, University of California, Los Angeles
- Linguistic Homophily: Language Style Similarity and Friendship Networks**
Adam Kleinbaum, Associate Professor of Business Administration, Tuck School of Business, Dartmouth College
- 2:15 p.m. - 3:15 p.m. **Session 4**
Contributions of Parallel Nigrostriatal Dopamine Circuits to Reward Learning and Habit Formation
Talia Lerner, Assistant Professor of Physiology, Feinberg School of Medicine, Northwestern University
- What Synchronicity Between Brains Can Predict when it Comes to Content and Experiences**
Moran Cerf, Associate Professor of Marketing, Kellogg School of Management, Northwestern University
- 3:15 p.m. – 3:45 p.m. **Break**
- 3:45 p.m. – 4:45 p.m. **Session 5**
An Artificial and Human Intelligence Approach to the Replication Problem in Science
Brian Uzzi, Richard L. Thomas Professor of Leadership and Organizational Change, Kellogg School of Management and Co-Director of Northwestern Institute on Complex Systems (NICO), Northwestern University
- Cognitive Search and Social Networks**
Edward (Ned) Smith, Associate Professor of Management and Organizations, Kellogg School of Management, Northwestern University
- 4:45 p.m. - 5:00 p.m. **Group Photo**
Gies Plaza, 1st Floor, Kellogg Global Hub

Schedule

5:00 p.m. – 6:00 p.m.

Reception & Spark Talks

White Auditorium, 2nd Floor, Kellogg Global Hub

Understanding Social Influence on Communication Success in a Real-Risk Environment

Jean Vettel, Senior Science Lead / Neuroscientist, U.S. Army Research Laboratory

Network Neuroscience: Superior in Explanation, Inferior in Prediction. A Dimensionality Problem?

Rene Weber, Professor Media Neuroscience, University of California Santa Barbara

Childhood Peer Network Characteristics: Genetic Influences, Links with Early Mental Health Trajectories, but What of the Brain?

Philip Shaw, Earl Stadtman Investigator, Neurobehavioral Clinical Research Section of the National Human Genome Research Institute

Who Comes to Mind? Dynamic Construction of Personal Networks

Joseph Bayer, Assistant Professor, School of Communications, The Ohio State University

The Coupled Brains of Captivated Audiences

Ralf Schmäelzle, Assistant Professor, Communication, Michigan State University

New Methods for Event Network Analysis

Aaron Schecter, Assistant Professor, Management Information Systems, University of Georgia, Terry College of Business

6:15 p.m. – 7:15 p.m.

Presentation and Performance

Stephen Alltop, Senior Lecturer, Conducting and Ensemble, Bienen School of Music, Northwestern University and Orchestra

7:15 p.m. – 8:45 p.m.

Dinner

8:15 p.m. – 9:00 p.m.

Transportation from Kellogg Global Hub to Hilton Garden Inn (*chartered shuttle will be available for this duration*)

Participants staying at Hampton Inn & Suites will be provided Uber codes for transport



Schedule

Saturday, October 27, 2018

- 7:45 a.m. – 9:00 a.m. Transportation from Hilton Garden Inn to Kellogg Global Hub (*chartered shuttle will be available for this duration*)
Participants staying at Hampton Inn & Suites will be provided Uber codes for transport.
- 8:30 a.m. – 9:00 a.m. **Breakfast**
Seminar Room 5101, 5th Floor, Kellogg Global Hub
- 9:00 a.m. – 9:15 a.m. **Opening Remarks**
Barbara J. O’Keefe, *Dean of the School of Communication and Annenberg University Professor of Communication Studies, Northwestern University*
- 9:15 a.m. – 10:15 a.m. **Session 6**
Neural Detection of Socially Valued Community Members
Sylvia Morelli, *Assistant Professor of Psychology, University of Illinois at Chicago*
- Do Structural Holes Increase Innovative Performance: Evidence from a Field Experiment**
Eric Quintane, *Associate Professor of Management, The University of Los Andes, Bogota, Colombia*
- 10:15 a.m. – 10:45 a.m. **Break**
- 10:45 a.m. – 11:45 a.m. **Session 7**
Linking the Social World to the Structural Human Connectome
Tim Verstynen, *Associate Professor of Psychology, Dietrich College of Humanities and Social Sciences, Carnegie Mellon University*
- Decoding the Neural Representation of Story Meanings Across Languages**
Morteza Dehghani, *Associate Professor of Psychology, University of Southern California*
- 11:45 a.m. – 12:30 p.m. **Boxed Lunch & Panel Discussion on Charting the Future**
Moderators: **Emily Falk & Moran Cerf**
- Panelists:
Alessandro Lomi, *Professor of Organization Theory and Behavior, University of Lugano (Switzerland)*
- Kevin Ochsner**, *Professor and Director of Graduate Studies, Psychology, Columbia University*
- Jean Vettel**, *Senior Science Lead / Neuroscientist, U.S. Army Research Laboratory*
- 12:30 p.m. – 12:45 p.m. **Workshop Wrap-Up**

Speakers



Joseph Bayer is Assistant Professor in the School of Communication at The Ohio State University. His research centers on social media, social networks, and mobile technologies. Taking an interdisciplinary and methodological

approach, his work examines the social cognitive processes underlying communication technologies and personal network characteristics. In doing so, his research program provides insight into how people perceive and experience the contemporary social media ecosystem -- alongside their personal offline networks. More broadly, his research studies help to inform public health challenges such as distracted driving and societal concerns such as technology addictions.

Who Comes to Mind? Dynamic Construction of Personal Networks

Abstract: Extant research on social network cognition provides an expanding set of evidence that personal networks are often transitory, situated, and unplanned. Despite recent advances and reviews, however, much remains unknown about the mechanisms and effects of moment-to-moment network activation in daily life. This brief spark talk highlights the potential of examining in vivo social network cognition, with special emphasis on the role of real-world network habits and their implications for emergent communication technologies.

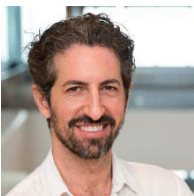


Matthew Brashears is Associate Professor of Sociology at University of South Carolina. Brashears earned his PhD in Sociology from the University of Arizona in 2008. He is primarily interested in social networks, with a particular emphasis on the

connections between networks and social psychology. His current research focuses on linking cognition to social network structure and studying the effects of error and error correction on diffusion dynamics. He uses a variety of experimental, quasi-experimental, and non-experimental methods to investigate these issues both with student populations and representative samples of larger groups.

Wilde's Dilemma: The Role of Deception in Social Networks

Abstract: The Social Brain Hypothesis argues that human intelligence evolved in order to cope with social rather than physical challenges. While unlikely to be the sole driver of human intelligence, considerable evidence has linked social complexity to cognitive ability, including cross-species correlations between group size and the neocortical ratio, fMRI studies in humans, and laboratory investigation of "compression heuristics" (methods of reducing the mental burden of encoding and recalling social networks). However, this research has generally focused on static networks (e.g., memory for unchanging targets) or the outcome of network maintenance processes (e.g., equilibrium networks). Less attention has been devoted to the strategies and tactics group members use in networks to achieve their goals. I discuss a new research direction, and describe several developing data collection strategies, focusing on a particularly important aspect of social interaction: the use of deception. I argue that humans keep secrets, and advance lies, as part of their overall social strategy, that these secrets and lies (i.e., deception) are predictable, and even expected, and that deception is often an integrative component of the social structure.



Moran Cerf is Professor of Neuroscience and Business at the Kellogg School of Management and the Neuroscience Program at Northwestern University, and a member of the Institute on Complex Systems. His research uses methods

from neuroscience to understand the underlying mechanisms of our psychology, behavior changes, emotion, decision-making and dreams. Recently, his focus has been on the neural mechanisms that underlie decision-making, thereby offering a new perspective on predicting future choices and investigating how much free will we have in our decisions.

What Synchronicity Between Brains Can Predict when it Comes to Content and Experiences

Abstract: numerous studies looking at the alignment between multiple brains have shown that content can drive multiple brains in similar fashion and suggest shared experience. We look at the drivers for the neural synchrony as well as the ability to use those to predict outcomes.

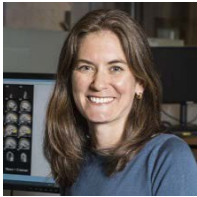


Morteza Dehghani is Assistant Professor of Psychology, Computer Science and the Brain and Creativity Institute (BCI) at University of Southern California. He is also the PI of USC's Computational Social Sciences Laboratory (CSSL). His

research spans the boundary between psychology and artificial intelligence, as does his education. His work investigates properties of cognition by using documents of the social discourse, such as narratives, social media, transcriptions of speeches and news articles, in conjunction to behavioral studies. His research interests include: 1. Human Values, 2. Theory Constrained Natural Language Processing, and 3. Neuro-Semantic Representations. He received his PhD and M.S. from Northwestern University and M.S. and B.S. from University of California at Los Angeles.

Decoding the Neural Representation of Story Meanings Across Languages

Abstract: Drawing from a common lexicon of semantic units, humans fashion narratives whose meaning transcends that of their individual utterances. However, while brain regions that represent lower-level semantic units, such as words and sentences, have been identified, questions remain about the neural representation of narrative comprehension, which involves inferring cumulative meaning. To address these questions, we exposed English, Mandarin, and Farsi native speakers to native language translations of the same stories during fMRI scanning. Using a new technique in natural language processing, we calculated the distributed representations of these stories (capturing the meaning of the stories in high-dimensional semantic space), and demonstrate that using these representations we can identify the specific story a participant was reading from the neural data. Notably, this was possible even when the distributed representations were calculated using stories in a different language than the participant was reading. Our results reveal that identification relied on a collection of brain regions most prominently located in the default mode network. These results demonstrate that neuro-semantic encoding of narratives happens at levels higher than individual semantic units and that this encoding is systematic across both individuals and languages.



Emily Falk is an Associate Professor of Communication at the Annenberg School for Communication at University of Pennsylvania with secondary appointments in Psychology and Marketing. Falk employs a variety of methods in the

performance of her research, with a focus on functional magnetic resonance imaging (fMRI). She has worked to develop a program of research that links neural activity (in response to persuasive messages) to behaviors at the individual, group, and population levels. In particular, Falk is interested in predicting behavior change following exposure to persuasive messages and in understanding what makes successful ideas spread (e.g. through social networks, through cultures). At present, much of her research focuses on health communication and linking neural responses to health messages to population level behavioral outcomes; other areas of interest include political communication, cross-communication, and the spread of culture, social norms, and sticky ideas.

Brain and Social Network Dynamics Associated with Susceptibility to Social Influence

Abstract: Brain dynamics shape learning and behavior, and social context shapes brain structure and function. In this talk, I will present evidence from a series of studies linking brain network dynamics to individual differences in social network structure. Specifically, I will focus on how brain systems implicated in processing social rewards, social threats, and more general understanding of others' mental states are associated with different types of social network properties, and in turn how these differences relate to individuals' susceptibility to social influence.



Adam Kleinbaum is Associate Professor in the Strategy and Management area at the Tuck School of Business at Dartmouth College. He teaches a core MBA course in organizational behavior, an elective seminar on social networks, and a

global insight expedition to Israel.

Linguistic Homophily: Language Style Similarity and Friendship Networks

Abstract: This paper demonstrates that linguistic similarity drives network tie formation and friends exhibit linguistic convergence over time. Study 1 analyzes the linguistic styles and the emerging friendship network in a complete cohort of 285 students. Study 2 analyzes a large-scale dataset of online reviews. Across both studies, we collected data in two waves to examine changes in both friendship networks and linguistic

styles. Using the LIWC linguistic framework, we analyze the text of students' essays and of 1.7 million reviews by 159,651 Yelp reviewers. We find that similarity in linguistic style increases the likelihood that a friendship forms and that friendship ties, in turn, induce a convergence in linguistic style. Finally, using an agent-based simulation, we argue that these processes contribute to the fragmentation of social networks into disconnected and homogenous clusters, forming the structural basis of echo-chambers.



Talia N. Lerner is Assistant Professor of Physiology at Northwestern University's Feinberg School of Medicine. Lerner received her B.Sc. in Molecular Biophysics and Biochemistry from Yale University and her Ph.D. in Neuroscience from

UCSF. In her new lab at Northwestern, Lerner plans to build on her previous work using transformative technologies to dissect dopaminergic connectivity motifs and in vivo activity patterns by applying these findings to understand how differences in dopaminergic signaling and circuit incorporation underlie differences in motivation and learning across individuals. Identifying the precise circuitry underlying these variations in behavior will ultimately allow her lab to identify principles that can impact human well-being.

Contributions of Parallel Nigrostriatal Dopamine Circuits to Reward Learning and Habit Formation

Abstract: Habit formation – which allows the fluid, nearly effortless execution of complex motor tasks – requires an interface between the brain circuits underlying reward learning and motor learning. The Lerner Lab uses a mouse model of habit formation, in combination with bioengineering tools to monitor and manipulate brain circuits, to dissect the mechanisms of habit formation. We have found dynamic changes in connectivity within nigrostriatal dopamine circuits that track with habit formation and predict mechanisms by which actions are automated to become habits.



Sylvia Morelli is Assistant Professor of Psychology at the University of Illinois at Chicago and Director of the Empathy and Social Connection Lab. She received her BA in Psychology from Princeton University and PhD from UCLA. Her

work explores whether positive empathy (i.e., our ability to share and understand others' positive emotions) promotes prosocial behavior, social connection, and well-being. She uses a combination of behavioral and neuroimaging techniques, including functional magnetic resonance imaging, laboratory experiments, daily experience sampling, and social network analyses. Overall, her research aims to broaden our understanding of empathy and demonstrate its critical role in promoting well-being and positive social relationships.

Neural Detection of Socially Valued Community Members

Abstract: As people form social groups, they benefit from being able to detect socially valuable community members—individuals who act prosocially, support others, and form strong relationships. Multidisciplinary evidence demonstrates that people indeed track others' social value, but the mechanisms through which such detection occurs remain unclear. Here, we combine social network and neuroimaging analyses to examine this process. We mapped social networks in two freshman dormitories ($n = 97$), identifying how often individuals were nominated as socially valuable (i.e., sources of friendship, empathy, and support) by their peers. Next, we scanned a subset of dorm members ("perceivers"; $n = 50$) as they passively viewed photos of their dorm mates ("targets"). Perceiver brain activity in regions associated with mentalizing and value computation differentiated between highly valued targets and other community members but did not differentiate between targets with middle versus low levels of social value. Cross-validation analysis revealed that brain activity from novel perceivers could be used to accurately predict whether targets viewed by those perceivers were high in social value or not. These results held even after controlling for perceivers' own ratings of closeness to targets, and even though perceivers were not directed to focus on targets' social value. Overall, these findings demonstrate that individuals spontaneously monitor people identified as sources of strong connection in the broader community.



Kevin Ochsner is Professor of Psychology and Director of Graduate Studies in the Department of Psychology at Columbia University. Ochsner received his bachelor's degree *summa cum laude* in psychology from the University of

Illinois at Urbana-Champaign and his Masters and PhD in psychology from Harvard University. He has also received postdoctoral training in social psychology at Harvard (Daniel Gilbert lab) and functional neuroimaging at Stanford University (John Gabrieli, now at MIT, lab). His research interests include the psychological and neural processes involved in emotion, self-control, and person perception. All of his work employs a social cognitive neuroscience approach that seeks to integrate the theories and methods of social psychology on the one hand, and cognitive neuroscience on the other. He is a recipient of the Young Investigator Award from The Cognitive Neuroscience Society, Columbia University's Lenfest Distinguished Faculty Award, and the APA Division 3 New Investigator Award

Neural Markers of Popularity and the Evolution of Liking Over Time

Abstract: Successfully navigating our complex social networks isn't easy. In this talk I present studies suggesting that affective processes are essential for doing so. All studies make use of a round-robin face-viewing task where all members of a social network view images of each other's faces - and their own face - while we record neural and behavioral responses. The first study using these methods shows that activity in affective learning systems are the key for tracking the sociometric popularity of the members of our social networks. The second shows that activity in these systems recorded soon after new group members meet - over and above behavioral measures of liking and affiliation - can be used to predict who friends becomes over a nine week span. The third shows that activity in response to your own face can be used to calculate a neural index of self-enhancement, which predicts subsequent drops in popularity and in closeness with other group members over and above alternative behavior predictors. Together these studies provide insight into the mechanisms by which social connection depends on affective ties.



Carolyn Parkinson is Assistant Professor of Psychology at UCLA. She's interested in how the human brain represents, navigates, and shapes its social environment. Her research integrates theory and methods from social psychology with

computational techniques that exploit the wealth of information contained in patterns of ties in real-world social networks and in distributed patterns of brain activity. Her current work is primarily concerned with better understanding the mental architecture involved in encoding the structure of our social networks, and the cognitive and behavioral consequences of this structure. By combining the systematic characterization of real-world social relationships with methods for assessing information processing within individual brains, this line of research aims to provide insight into interactions between social networks and human cognition.

Neural Homophily: Similar Neural Responses Predict Friendship

Abstract: We resemble our friends on a wide range of dimensions (e.g., age, gender). If similarities between friends actually reflect deeper similarities in how we perceive, interpret, and respond to our surroundings, then friendship should be associated with increased similarity of real-time cognitive responding. Functional magnetic resonance imaging (fMRI) responses during free-viewing of naturalistic stimuli (e.g., movie clips, natural scenes) provide an unobtrusive window into individuals' unconstrained mental processes as they experience the world around them; inter-subject correlations of fMRI response time series during natural viewing have previously been shown to predict similarities in participants' attention to and interpretations of stimuli. Here, we characterized the social network of a graduate school cohort ($n = 279$), a subset of whom ($n = 42$) participated in an fMRI study involving free-viewing of naturalistic video clips. We compared fMRI response time series between corresponding brain regions across pairs of individuals and found that neural response similarity decreased with increasing distance in the social network. Further, it was possible to accurately classify both the distance between individuals in their social network, as well as whether or not they were friends, based solely on the similarity of their fMRI response time series. These results suggest that we are exceptionally similar to our friends in how we perceive and react to the world around us, with possible implications for interpersonal influence and attraction. In addition, in this session, we will discuss our motivations for combining theory and methods from social network analysis and neuroscience, and future directions for this research program.



Eric Quintane is Associate Professor of Management at the School of Management, The University of Los Andes, Bogota, Colombia. He received his PhD from the University of Melbourne (Australia). His research interests

include dynamics of organizational networks, temporality of social processes, creativity and innovation. His main research focus is to examine the temporal dimension of social processes (i.e., brokerage, closure, cohesion) through modelling social interactions in teams and organizations and their implication for individual and organizational outcomes.

Do Structural Holes Increase Innovative Performance: Evidence from a Field Experiment

Abstract: We present the results of a longitudinal field experiment designed to test whether forming interpersonal ties that bridge across structural holes causes employees to achieve higher levels of innovative performance, as hypothesized by structural holes theory. We use a “baseline-treatment design” whereby the “treatment” – an executive education training aimed at increasing participants’ tendency to form bridging relations across structural holes – was assigned to a random subset (44/109) of the employees working in the Italian subsidiary of a global electronics company. Both causal mediation analysis and instrumental variables estimations show that the treated group formed significantly more bridging ties relative to the control group following the executive education session; furthermore, providing evidence of causality, the treatment-induced increase in bridging ties improved employees’ innovation performance as rated by their supervisor six months after the treatment. In a “heterogeneous treatment” analysis, we explore how gender, personality traits and network related behaviors affect the propensity of participants to create structural holes when given the opportunity, but also to receive benefits from the structural holes that they have built.



Aaron Schecter is Assistant Professor in the Department of Management Information Systems at the University of Georgia, Terry College of Business. His research interests include social networks, team behavior and performance,

online communities and digital innovation, and statistical methods.

New Methods for Event Network Analysis

Abstract: As digital trace data becomes more prevalent from sources such as sensors, clickstreams, or images, there is a greater need for methods to analyze this information. One such method is the relational event model, which recently has been used to study sequences of interactions in a variety of contexts. We extend this method to address more complex theoretical issues, including coevolution, clustering, and temporal heterogeneity.



Ralf Schmäelzle is Assistant Professor of Communication at Michigan State University. He is uniquely cross-trained in health psychology and communication as well as in social, cognitive and

affective neuroscience. He received his doctorate from the University of Konstanz, Germany, where he also held a postdoctoral position. Most recently, Schmäelzle worked as a postdoctoral research associate at the University of Pennsylvania in the Communication Neuroscience Lab.

The Coupled Brains of Captivated Audiences

Abstract: When different individuals watch the same movie (or listen to the same story, or process any type of message), it will evoke similar responses in separate brains. These hidden, but collectively shared brain responses can be exposed by computing cross-recipient correlations of brain activity time series, called inter-subject correlations (ISCs). Put simply, we create inter-brain networks in which an edge between brains (or brain regions) indexes how similarly people respond to the same content. In this short presentation I will discuss how temporal variations of this ISC can be used to reveal the flocking and diffusing of collective brain engagement. I will illustrate this with fMRI data recorded while people watch suspenseful movies that repeatedly create and resolve tension within individual’s audience members, and collectively among them as a group. Next, I will focus on individual differences and showcase recent work in which inter-brain similarities during movie-viewing are used to predict demographic characteristics. In sum, measuring these inter-brain similarities and examining them from a network perspective can explain and predict bio behavioral and social phenomena, and this approach creates many possibilities for integrative multilevel studies of social networks.



Philip Shaw is an Earl Stadtman Investigator at the Neurobehavioral Clinical Research Section of the National Human Genome Research Institute in Bethesda, United States. His main interest is in the genetic and environmental factors that influence the development of brain and behavior. A focus of his work is the most common neurobehavioral disorder of childhood, attention deficit hyperactivity disorder. He has degrees in experimental psychology and medicine from Oxford University, and a PhD in psychological medicine from the Institute of Psychiatry in London. He completed residencies in internal medicine and psychiatry in England, and is a member of both the Royal College of Physicians and the Royal College of Psychiatry.

Childhood Peer Network Characteristics: Genetic Influences, Links with Early Mental Health Trajectories, But What of the Brain?

Abstract: Using data from a 1,288 Dutch birth cohort, we showed that a child's classroom peer networks (for rejection, acceptance and prosocial behavior) were associated with earlier life trajectories of mental health. Using Genome-wide Complex Trait Analysis on genotyped children, we further found closeness centrality emerged as significantly heritable across all networks. We now propose to test for associations between peer network positions and functional connectivity networks, defined using resting state fMRI.

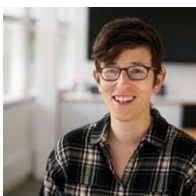


Edward (Ned) Smith is an Associate Professor of Management and Organizations at the Kellogg School of Management, Associate Professor (by courtesy) of Sociology, core faculty member of the Northwestern Institute for Complexity

(NICO), and faculty associate at the Northwestern Institute for Policy Research. Prior to joining Northwestern, Smith was the NBD Bancorp Assistant Professor of Strategy at the University of Michigan Stephen M. Ross School of Business. He has two main areas of research. First, he studies the effects of social structure on the behavior and decision-making of individuals and organizations. His research in this area was awarded a Kauffman Foundation Fellowship in 2009. Second, he works to connect research on cognitive processes and network theories of social capital to better understand how people utilize (and squander) the resources available to them in their social networks.

Cognitive Search and Social Networks

Abstract: Social networks are critical to individuals' pursuit of social and economic goals. Yet the immense potential value of social networks is not always translated into actual value. In this project, we argue that such success is partially contingent on a complex, antecedent search process by which people cognitively activate social information. Realizing that the traditional name generator task in social network research is not simply a network task, but more fundamentally a free recall memory task, we develop a new measure (*jump*) that quantifies individuals' mental search strategies when generating names. These measures suggests that even when two people are embedded in identical social worlds, their different search strategies may reflect an underlying difference in how they mentally organize their social contacts. We hypothesize that individuals' social network search strategies may explain residual variations of their economic outcomes after considering variances in network content and structure. We find preliminary results that those who jump less - meaning that they tend to organize their social contacts according to network relations - are more cognitively aware of group boundaries in their social networks, and subsequently, are better able to harvest brokerage benefits when their actual network structure presents the capacity to do so.

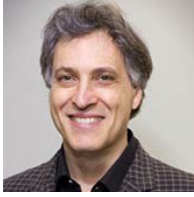


Diana Tamir is Assistant Professor of Psychology at Princeton University. Her research proceeds from the observation that both the internal and external worlds exert an enormous influence on our thoughts and behaviors. On the one hand, each of

us has to experience the world through our own singular perspective. On the other hand, our survival necessitates that we escape our subjective perspective to think about the external social world. Her research investigates the thoughts, cognitive processes, and behaviors that arise from these self and social forces using a combination of functional neuroimaging, behavioral experiments, and data science methods.

Making Predictions in the Social World

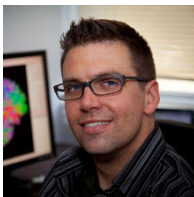
Abstract: Prediction is central to social cognition. Whether in cooperation or competition, successful social interactions require people to anticipate others' future thoughts, feelings, and actions, and prepare their own actions accordingly. Across both behavioral and neuroimaging studies, we find that people are able to make accurate predictions about others future emotions and actions, and moreover, that they do so automatically. These accurate predictions translate into social success, in both individual relationships, and with the broader social network. Together, these findings demonstrate that the social brain is tailored to the problem of predicting other people.



Brian Uzzi is the Richard L. Thomas Professor of Leadership and Organizational Change; Co-Director, Northwestern Institute on Complex Systems (NICO); Faculty Director, Kellogg Architectures of Collaboration Initiative (KACI); Professor of Industrial Engineering and Management Sciences, McCormick School (Courtesy); and Professor of Sociology, Weinberg College (Courtesy) at Northwestern University. Uzzi is a globally recognized scientist, teacher, consultant and speaker on leadership, social networks, data science, artificial intelligence and machine learning. He has lectured and advised companies and governments around the world and has been on or visited the faculties of INSEAD, University of Chicago, University of California at Berkeley, and Harvard University. He has been awarded 13 teaching prizes and 12 scientific research prizes worldwide.

An Artificial and Human Intelligence Approach to the Replication Problem in Science

Abstract: Artificial intelligence (AI) systems have been shown to have superhuman learning capabilities and the ability to alter human performance in complex decision-making situations. However, (AI) systems have yet to be applied to pressing scientific problems that have eluded traditional methods. Here, we test the ability of an AI system to address the replication problem in science. While complete replicability is neither expected nor necessary for advancing science, replication research has found a disturbing result. In top journals across disciplines, significantly more papers fail than pass replication tests, and non-replicating results are cited as frequently as replicating results, creating concern that the literature may be unduly affected by weak ideas. We developed a novel method for estimating replicability that combines human and artificial intelligence. Using data on 100 studies that underwent rigorous manual replication tests, we trained a neural network and machine learning AI model to estimate a paper's likelihood of replicability based only on a paper's text—the part of a paper hardest for humans to quantify. We then tested our model's generalizability on 245 of out-of-sample studies from over 100 journals and diverse disciplines. Our analysis finds: (i) The AI model yields robustly generalizable estimates of replicability across disciplines that are more accurate and have higher confidence than prevailing approaches. (ii) While statistics are typically used to evaluate a paper's replicability, we find that the narrative text has more explanatory power than reported statistics, suggesting that our AI model detects unique and pertinent scientific information that humans overlook or find hard to process. (iii) Analysis of the mechanisms behind the model's expositional power indicate that conspicuous features of scientific research—such as word or persuasion phrase frequencies, writing style, discipline, journal, authorship, or topics—do not explain the results. Rather, the network of linguistic relationships contains information that predicts replicability, implying that the combinations of human and machine intelligence can advance theory and inform many scientific problems.



Timothy Verstynen is Associate Professor of Psychology and the Center for the Neural Basis of Cognition at Carnegie Mellon University. His research centers on how we plan our actions, how this changes with experience and how the

organization of the underlying neural pathways regulates these abilities. Using a combination of psychophysics, computational modeling and multimodal brain imaging (fMRI, diffusion imaging, TMS, etc.), his lab focuses on three main research themes. Selecting or stopping actions: How do we quickly convert sensory cues into motor plans? How do we stop a planned action? How do these abilities break down in different populations? Dynamics of skill learning: Why are some skills learned quickly while others require days or weeks of practice?

Linking the Social World to the Structural Human Connectome

Abstract: Diverse aspects of the social environment relate to physical, affective, and cognitive health, suggesting a link between the social environment and the brain. Using results from cross-sectional diffusion MRI studies, I will show how reduced access to resources (e.g., lower education, lower income, lower community socioeconomic status) and reduced social integration (e.g., smaller social network diversity scores) are associated with weaker microstructural integrity of the white matter fascicles that form the structural core of the human connectome. I will also show how levels of circulating inflammatory cytokines, modulated by health behaviors, can explain a portion of the variability in social-white matter associations. This highlights a plausible physiological pathway by which the social environment could directly impact the myelin sheath that facilitates long-range neural communication. Taken together these findings present a plausible pathway by which the social environment could indirectly impact the human connectome itself.



Jean Vettel earned her PhD in Cognitive Neuroscience from Brown University, funded by an NSF Graduate Fellowship (2004-2007) and a DoD SMART Fellowship (2007-2009), following a lab position at Washington University in St. Louis and BA from Carnegie Mellon. She is currently a Senior Science Lead in the

Future Soldier Technologies Division at the U.S. Army Research Laboratory with joint appointments at University of California, Santa Barbara and University of Pennsylvania. Her collaborative research investigates how physiological signals from the brain and body can be used in adaptive technology to enhance human-agent teaming by accounting for individual differences and the influence of social context.

Understanding Social Influence on Communication Success in a Real-Risk Environment

Abstract: In a longitudinal study, we investigated the influence of social influence on dyadic communication in a real-risk environment as well as daily individual tasks. The spark talk will briefly present ongoing analyses from the dyadic communication. Dyads ($n=22$) were assigned a driver or passenger role and asked to openly discuss a set of news topics while they drove for an hour along interstate-95 while we measured brain and body physiology. They returned a few weeks later to complete a second drive and serve in the other role. Ongoing analyses look at the influence of their social network and metrics from their physiology to capture variability in communication success in the real-risk, multitasking environment.



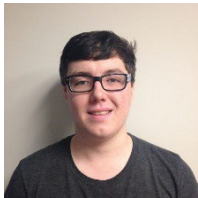
Rene Weber is Professor of Media Neuroscience at University of California Santa Barbara. His research program focuses on mass communication and new media technology phenomena as a product and determinant of complex

cognitions. Weber is the past chair of International Communication Association's Mass Communication Division, the current chair of ICA's Communication and Biology Interest Group, and he is the founder and director of UCSB's Media Neuroscience Lab.

Network Neuroscience: Superior in Explanation, Inferior in Prediction. A Dimensionality Problem?

Abstract: Recent technical, statistical, theoretical, and philosophical advances are pushing communication neuroscience toward an understanding of the brain as the result of complex networked interactions between multiple brain regions [1]. Members of UCSB's Media Neuroscience Lab (<http://medianeuroscience.org>) have successfully employed network neuroscience approaches to test theories in the area of flow experiences with media [2,3], allocation of attentional resources to media stimuli [4,5], persuasion [6,7], and other areas. While recent findings in these areas have increased explanatory value as network analytical perspectives are at face value better representations of brains, evidence from our research suggests that, counterintuitively, their predictive value falls short. This spark talk will briefly present recent accomplishments in the Media Neuroscience Lab using a network neuroscience approach and then offers the following discussion points for the audience: Does network neuroscience introduce a curse of dimensionality when it comes to building models of human behavior? Does adding more dimensions to complex phenomena make it actually more difficult to constrain researcher degrees of freedom and avoid (numerical and theoretical) overfitting?

Participants



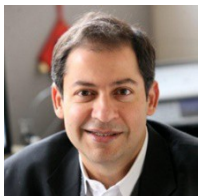
Brennan Antone is a PhD Student, Industrial Engineering and Management Sciences at Northwestern University and a member of SONIC. He has undergraduate degrees in Psychology and Industrial Engineering and Management Sciences from

Northwestern. He works on modeling and optimizing crew composition for long distance space exploration, modeling adoption of modern contraceptive methods in Kenya and inferring organizational networks from digital trace data generated from the use of enterprise social media



Elisa Baek is a doctoral candidate at Annenberg School for Communication at the University of Pennsylvania. Baek is broadly interested in using neuroscientific tools to understand questions of interest in communication.

Specifically, she is interested in the underlying cognitive mechanisms that lead to successful information propagation in both communicators and receivers of influence. Baek received her B.A. in Communication and Cognitive Neuroscience at the University of Pennsylvania.



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. 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 enterprises using social media, crowdsourcing platforms, scientific collaborations, and space travel.



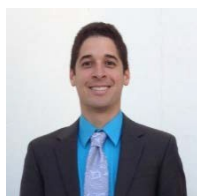
Leslie DeChurch investigates teamwork and leadership in organizations. She is Professor of Communication Studies, and holds a courtesy appointment in the Department of Psychology, Weinberg College of Arts & Sciences at Northwestern University.

She is President and Chairperson of the Board of INGRoup, the Interdisciplinary Network for Group Research. DeChurch leads the ATLAS lab: Advancing Teams, Leaders, and Systems. ATLAS explores the dynamics through which teams form, and how these dynamics affect their performance as teams, and their ability to work as larger organizational systems (multiteam systems).



Jacob Fisher is a PhD student in the Communication Department at UC Santa Barbara. He received his M.A. from Texas Tech University. His research focuses on dynamic attention patterns, salience filtering, multitasking, and media processing in ADHD and

Autistic Populations. Before joining the Department of Communication at UCSB, Fisher worked as an Academic Counselor in the TECHniques Center at Texas Tech University, focusing on the creation and analysis of success strategies for students with learning and developmental disabilities in higher education. His work has been presented at various national conferences, including the National College Learning Center Association, the Association on Higher Education and Disability, and the Association for the Tutoring Profession.



Sean Fitzhugh is a Research Sociologist for the U.S. Army Research Laboratory. Fitzhugh completed his PhD at University of California, Irvine. His research spans a variety of topics in network data, analysis and modeling.

Fitzhugh specializes in developing and applying innovative methodologies for collecting, analyzing and modeling network data. While his methodological work spans many domains in the social sciences, his substantive work focuses on individual and group dynamics in organizational contexts and disrupted environment.



Janet Fulk is Professor of Communication in the Annenberg School for Communication and Professor of Management & Organization in the Marshall School of Business at University of Southern California. She holds an MBA and PhD

in administrative sciences from The Ohio State University. Her publications include three books, one of which won the best book award from the National Communication Association in 1990. Recent articles on organizations and communication technology and NGO networks have appeared in *Human Relations*, *Communication Theory*, *Human Communication Research* and *Organization Science*, and an award-winning article appeared in *Academy of Management Journal*. She has served on the Board of Governors of Academy of Management, where she also was elected Fellow.



Javier Garcia is a Neuroscientist at the U.S. Army Research Laboratory. As a cognitive neuroscientist, stated broadly, Garcia ascribes function to brain matter. He has integrated current neuroimaging techniques (measuring blood flow, electrical activity, or

injected electrical activity into brain) with behavioral measures to challenge existing theories of functional processing of specific brain regions, and developed a research program that uses innovative strategies and converging measures to answer critical questions that are foundational to understanding the relationship between the brain and the body, in a variety of contexts.



Diego Gómez-Zará is a PhD Student in Technology and Social Behavior Program at Northwestern University, which is a joint doctoral program in Computer Science and Communications. He is a member of SONIC. His academic career started at

Pontificia Universidad Católica de Chile (PUC), where he was an Adjunct Assistant Professor at the School of Communications and at the Department of Computer Science. His research examines the mobilization of social movements and the assembly of teams using online platforms. Additionally, he has been part of research projects related to data visualization, social media network analysis, and computational tools for journalists.



Clare Grall holds a Bachelor's degree in Psychology and Mass Communication with a minor in Marketing from Miami University (Ohio, 2014) and a Master's degree in Communication from Michigan State University (2015). She is currently a

PhD student at Michigan State University where she conducts research in the nascent subfield of media neuroscience with a general focus on how the brain processes media as rich, complex stimuli. She uses biological data to understand successful messages, with a focus on the use of neuroimaging data to create effective, entertaining media narratives through the study of audience engagement. She manages the Neuroscience of Messages Lab in the College of Communication Arts and Sciences at Michigan State University.



Nicolas Harder is a Ph.D student at the University of South Carolina. He is interested in social networks and group processes, especially how information, meaning, value, and status spreads through networks. His current research focuses on how objects gain value, and

how the value an object gains spreads via interaction with others. He is also active on projects dealing with Blau Space and ecological models, homophily, and personality and network construction. He has experience in a variety of research methods, including laboratory experiments, network analysis, and simulation and modeling.



Ágnes Horvát Assistant Professor in the Department of Communication Studies, an affiliated faculty of the Northwestern Institute on Complex Systems (NICO), and the Department of Management and Organizations of the Kellogg School of Management (by courtesy). She seeks to measure,

understand, and forecast the collective behavior of networked crowds in large-scale sociotechnical systems like peer-to-peer platforms. Her current research develops empirical and theoretical methods to support creativity and predict success in culture industries, identify expressions of collective intelligence and opportunities for innovation in crowdsourcing communities, as well as detect shared misconceptions and biases in online capital markets.



Niloufar Izadinia is a second year PhD candidate in Industrial Engineering and Management Sciences at Northwestern University and a member of SONIC. She is working on modeling optimal individual, team and multiteam performance among crew and mission control engaged in long distance space exploration. Her research interests are social networks analysis, optimization and data science.



Mia Jovanova is a Doctoral Student at the Annenberg School for Communication at University of Pennsylvania and part of the Communication Neuroscience Lab. She is interested in integrating neuroimaging, behavioral, and network analysis methods to examine how brain dynamics and social factors interact at multiple levels to predict health behavior. Previously, Jovanova conducted research at the health communication lab at Cornell University, where she received her undergraduate degree in 2017.



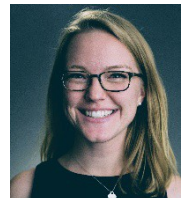
Hyunuk Kim is a visiting pre-doctoral fellow at the Kellogg School of Management, working with Professor Hyejin Youn, and PhD candidates in Industrial and Management Engineering at Pohang University of Science and Technology. His research interests are computational social science, innovation, and science of science. He is interested in understanding how collective and evolutionary behaviors lead disruptive innovation in society.



Hee Youn Kwon is currently a postdoc in Professor Hyejin Youn's research group at Northwestern Institute on Complex Systems (NICO) and Kellogg School of Management conducting research in the field of computational social science. She received her PhD in Systems and Entrepreneurial Engineering from University of Illinois at Urbana-Champaign in May 2018.



PJ Lamberson is Assistant Professor in the Communication Department at UCLA. He holds degrees in mathematics from The University of Chicago and Columbia University, and has taught on the faculty at MIT Sloan and the Kellogg School of Management, where he was also the Associate Director of the Northwestern Institute on Complex Systems (NICO). His research focuses on social influence, networks, and collective intelligence.



Lindsay Larson is a fourth-year PhD student in the Media, Technology, and Society program in Northwestern University's School of Communication, working in Leslie DeChurch's ATLAS Lab. Her research interests include team composition and leadership issues in organizational teams and multiteam systems. Her current research projects focus on the effects of identity and identification on leadership emergence within and between groups. Lindsay holds a BS in Psychology with a minor in Business Administration from the University of Florida.



Yiqi Li is a Doctoral Student at the University of Southern California Annenberg School for Communication and Journalism. Li received her BA in Journalism from Shanghai International Studies University and M.S. in Communication from Northwestern University. Her prior experience in Xinhua News Agency, a state-owned international media in China, inspired her interest in organizational and managerial communication.

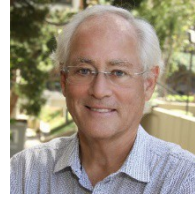


Alessandro Lomi is Professor of Organization Theory and Behavior at the University of Lugano in Switzerland and an ordinary member of the Swiss National Science Foundation, where he also serves as vice-chair of the Commission for Interdisciplinary Research. His current research includes the dynamics of social networks within and between organizations and demographic models of organizational populations and communities. In 2012 he was elected into life membership at Clare Hall College, University of Cambridge. He holds a PhD from Cornell University.





Eleonora Lomi is a Doctoral Student in the Department of Experimental Psychology at the University of Oxford. Lomi does research in neuroscience. Using a combination of behavioral and electrophysiological techniques, her PhD research investigates how the anteroventral nucleus of the anterior thalamus (AVN) contributes to our ability to learn new information. This research will add to the already well characterized mapping of head direction cells, and will enhance understanding about the information that is available to support learning and navigation within the hippocampal system, in which the AVN remains an uncharacterized, yet critical structure.



Peter Monge is Professor of Communication at Annenberg School for Communication & Journalism and Professor of Management and Organization at the Marshall School of Business, University of Southern California. He is also the Director of the Annenberg Networks Network, a research center focused on communication network theory and research. He is also an associated faculty with the Center for Effective Organizations in the Marshall School of Business. His most recent book (with Noshir Contractor) is *Theories of Communication Networks*. He has also co-published *Communicating and Organizing*, *Multivariate Techniques in Human Communication Research*, *Policing Hawthorne* and *Reasoning with Statistics*.



Edward Palazzolo is a Program Manager at the U.S. Army Research Office. He has served on the faculty at The Ohio State University's School of Communication and Arizona State University's Hugh Downs School of Human Communication and was the

Associate Director of the SONIC Research Lab in Industrial Engineering and Management Science at Northwestern University. His current research focuses on the network science of teams, team cognition, and cognitive neural networks. Palazzolo is strong leader, team member, and change agent with over 15 years of diverse experience in information technology, education, project management, business analysis, research, coaching, and training.



Mahnaz Roshanaei is a Postdoctoral Research Associate at University of Illinois at Chicago College of Engineering. She completed her PhD in Computer Sciences from University of Colorado at Boulder in 2016 where she worked with Dr. Shivakant Mishra in the System Lab. Her graduate work is

related to study and analysis of emotions in online social networks and smartphones. Prior to that, she worked as a research scientist at Toshiba Research America Inc. for almost a year and then joined Cal State Long beach as a lecturer. She is currently working on a project that use machine learning algorithm to determine which psychological and linguistic features predict empathy for other's stories. She is broadly interested in the study and analysis of social networks and its interaction with human's behavior.



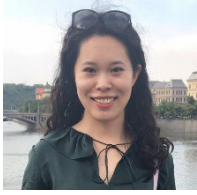
Koustav Rudra is a Postdoctoral Researcher at SONIC at Northwestern University. He completed his PhD from the Department of Computer Science & Engineering, Indian Institute of Technology, Kharagpur, India. He is developing machine learning models to

predict social network ties from multimodal interaction data in simulated space missions. His research interests include AI for data science, crisis informatics, social computing, information retrieval and data mining.



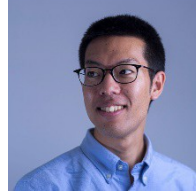
Hui Sun is a doctoral student in the Management and Organizations Department at Northwestern University Kellogg School of Management. Her research interests revolve around the interplay between human cognition and organizational environment. Using experimental and archival data, she

explores how individuals mentally organize their social contacts and why mental representations of social networks matter. Prior to graduate school, Sun received her B.S. in cognitive psychology and B.A. in digital entertainment design at Tsinghua University.



Jingyi Sun is a Doctoral Student at the University of Southern California Annenberg School for Communication and Journalism. She obtained a BA in Journalism and English from Beijing Foreign Studies University and a

Master's degree in Film Aesthetics from University of Oxford. Her research interest lies in organizational communication and social networks, particularly how network positions and innovation behaviors coevolve, and multiplex/multilevel inter-organizational networks.



Kyosuke Tanaka is a PhD Student in Media, Technology, and Society (MTS) at Northwestern University and a member of SONIC. His research interests lie in network heuristics. As behavioral economics have revealed that people rely on simple, efficient rules

when they make judgments and decisions, Tanaka is interested in expanding such heuristics to relational situations in which people communicate and interact with each other. Specifically, his research concerns relational situations where individuals perceive, search and use their surrounded connections and connections of connections.



Marlon D. Twyman II is a PhD Candidate in Technology and Social Behavior (TSB) at Northwestern University and a member of SONIC. His research interests include studying the emergence of new collaborations through team assembly. He merges

perspectives from social networks, organizational behavior, and computational social science to understand this phenomenon. One of his main projects focuses on the invitation process inherent to team assembly, i.e. the network that is created when people invite others to join their team. Another project investigates the impact on performance of different strategies to search a network when assembling problem-solving teams.



Dashun Wang is Associate Professor of Management and Organizations at Kellogg School of Management, the McCormick School of Engineering, and the Northwestern Institute on Complex Systems at Northwestern University. Wang leads a

group of researchers who are extremely passionate about data. Their research combines statistical physics, computer science, and computational social science to exploit the opportunities and promises offered by Big Data. Through the lens of new and increasingly available large-scale datasets, they use and develop tools of network science to help us better understand and predict social interactions, human mobility, knowledge production, and scientific impact.



Yuanxin Wang is a PhD student at the School of New Media, Peking University and a Visiting Scholar at SONIC at Northwestern University. Her research interests are social media, social network analysis, market and media analysis and user behavior. At

SONIC, she's working on understanding the impact of enterprise social media on organizational functioning.



Nick Wasylyshyn is a Mathematician at the U.S. Army Research Laboratory. As a mathematician working with a team of neuroscientists and psychologists, he leverages his background in math to study brain-behavior relationships. He

has taught (IUPUI) or assisted (University of Michigan, Penn) courses ranging from College Algebra to Proof-based Calculus.





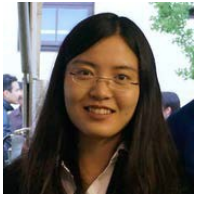
Adrienne Wood is a Postdoctoral Researcher in the Social Systems Lab at Dartmouth College, working with Thalia Wheatley on the behavioral markers of social connectedness. She earned her PhD in Psychology in 2018 from the University of Wisconsin -

Madison, where she studied the perception, social functions, and cultural shapers of emotion expression with her advisor, Paula Niedenthal. Her BA is from Colorado College, where she majored in psychology with distinctions and minored in music.



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Yang Yang received her Bachelor's degree in Physics and Mathematics, from Tsinghua University (Beijing) on 2010. She joined the Department of Physics and Astronomy at Northwestern University (Evanston, IL) and received her PhD in 2016. In her PhD research,

she studied the fundamental principles of collective behaviors in different complex systems. She is pursuing research on better understanding of emergent patterns in a broader context of complex systems, including the contagion dynamic in financial systems, the propagation of innovations in social networks, and science of science.



Yian Yin is a second-year PhD candidate of Industrial Engineering & Management Sciences (IEMS) at McCormick School of Engineering, Northwestern University, with affiliations at Northwestern Institute on Complex Systems (NICO). His research interest

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Hyejin Youn is an Assistant Professor of Management & Organization Department at the Kellogg School of Management, and a core faculty at the Northwestern Institute on Complex Systems (NICO). She is also Royal Society of Arts fellow, and an

external fellow at London Mathematical Laboratory, London, UK. Prior to joining Kellogg, she worked at University of Oxford, Harvard University, and MIT Media Lab, and Santa Fe Institute, as a research fellow. Youn received her PhD in Physics in 2011 from Korea Advanced Institute of Science and Technology (KAIST). She was a Principal Investigator of the project a National Science Foundation grant (USA) to study Technological Change from the Map of Capabilities.



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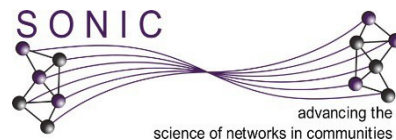
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—Manuel Castells, Noshir Contractor, Janet Fulk, Peter Monge & Brian Uzzi

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