

INSNA Sunbelt 2025 Conference
Paris, June 23 – 29

Final List of Workshops (by order of submission)

The list below can help you find the right workshop for you. To do so please browse this document using thematic keywords or names of session organizers. You can sign up for a workshop upon registration at the conference.

Social Network Approaches for Behavior Change

Thomas Valente

This workshop introduces the many ways that social networks influence individual and network-level behaviors. It also provides a brief introduction to analytic approaches for understanding network influences on behaviors; and reviews existing evidence for the utility of using social network data for behavior change in a variety of settings including health behaviors and organizational performance. A framework for using networks during program implementation is presented. The workshop also presents a typology of network interventions and reviews existing evidence on the effectiveness of network interventions. (Students familiar with the R environment may follow an R script written to demonstrate the 24 or so tactical interventions presented.) No software or computing requirements are needed. The workshop will be conducted by Tom Valente who has been developing and implementing network-based interventions for nearly 25 years.

SBS BI: Mastering the Analysis of Words and Networks

Andrea Fronzetti Colladon, Francesca Grippa, Roberto Vestrelli

Leveraging the power of big data represents an opportunity for researchers and managers to reveal patterns and trends in social and organizational behaviors. This workshop demonstrates how to successfully integrate Text Mining with Social Network Analysis for business and research applications. It introduces the Semantic Brand Score (SBS) and other advanced methods and tools for analyzing semantic networks, assessing brand/semantic importance, and performing complex NLP tasks. Participants will also learn about network topic models and methods for measuring language novelty and impact, among other key techniques.

The workshop highlights the functionalities of the SBS Business Intelligence App (SBS BI), which is designed to produce a wide range of analytics and mine textual data. Through several case studies, we show how these methods have been used, for example, to predict tourism trends, select advertising campaign testimonials, and make economic, financial, and political forecasts. SBS BI's analytical power extends beyond "brands", with applications that include: commercial brands (e.g., Pepsi vs. Coke); products (e.g., pasta vs. pizza); personal brands (e.g., the name and image of political candidates); and concepts related to societal trends (e.g., terms used in media communication that shape public perceptions of the economy).

By combining text analysis with network science, the workshop equips participants with tools that can transform decision-making and organizational management in the era of big data.

More info and materials are available at: <https://learn.semanticbrandscore.com>

Social Network Theory

Jan Fuhse

Theory matters! It guides our attention in research, it gives us expectations for empirical analysis, and it allows us to interpret results as examples of wider significance. Traditionally, network research focuses more on methods than on theory, leading to laments about the lack of theory. Over the last 35 years, there have been important advances in this regard. Now we have a variety of theoretical approaches to networks particularly from sociology (rational choice, analytical sociology, relational sociology etc.) available, as well as a number of middle-range theoretical concepts (social capital, network mechanisms). However, often enough, researchers do not know which concepts and approaches work well with their research.

The workshop gives an introduction and reflection into the general perspective of social network analysis, it offers an overview of the currently most important concepts and theoretical approaches to social networks, and provides for a forum for participants to discuss their own empirical research in relation to theory. The focus of the workshop lies on theories that give answers to the questions: What are social networks? Why, and how, do they matter for social phenomena?

The following topics will be covered:

- the general perspective of network research in the social sciences, with its difference to other approaches;
- what is theory, and how does it matter in the research process?
- networks as social capital;
- two-mode networks;
- varieties of relational sociology (inspired by pragmatism, symbolic interactionism, and by Harrison White);
- network mechanisms (foci-of-activity, homophily, institutionalized role patterns, reciprocity, transitivity, preferential attachment, social control, brokerage, access to information), the epistemological status of network mechanisms;
- methodology: which theoretical approach work with which methods?
- what concepts and theoretical approaches fit the attendants' empirical research projects?

Much of the workshop will be run as presentations by the lecturer, complemented by short discussions among the participants. I will also be available for one-to-one counselling. A selection of texts will be sent to the participants, in case they want to prepare for the workshop. However, reading these is not mandatory.

Understanding social-ecological systems as multilevel social-ecological networks

Örjan Bodin, Manuel Fischer

Schedule: 3 hours

Limited to 30 seats

In this workshop we will elaborate on how coupled social-ecological systems (or coupled natural and human systems) have been described and analyzed as multilevel networks and the research questions that have been addressed. Further, they will take stock in recent research that has identified different possibilities and barriers for further developments of this line of research.

Critical issues such as what are nodes and links in a social-ecological system and how to accomplish some level of comparability across different study contexts will be addressed.

They will also discuss the range of problems (design, data collection, methodological) that many have encountered when doing this kind of synthetic research.

In addition, there will be practical hands-on exercises on how to conduct and understand analytical results deriving from multilevel network analyses. The analyses will be utilizing the MPNet software (<http://www.melnet.org.au/pnet>), which should be downloaded and installed prior to the workshop. Since MPnet require Windows, an alternative software is Statnet (<https://statnet.org/>), although using Statnet, not all of the multilevel analyses will be possible to conduct.

All exercises and examples will be based on real data, and both patterns of social relations among actors as well as environmental interactions among biophysical components will be examined. The workshop includes the following elements:

1. Why a social-ecological network approach? What are the presumed benefits?
2. What is a node, and what is a link in a complex social-ecological system?
3. How to move beyond just describing a social-ecological system as a multilevel network to actually ask some challenging questions, and perhaps even get some answers?
4. Investigate how patterns of social- and social-ecological relations among resource users can be related to social- and environmental outcomes.
5. Gain exposure to commonly used software for studying multilevel social-ecological networks, i.e. multilevel ERGMs implemented in MPnet.

Prerequisites

Familiarity with the concept of networks (i.e. nodes and ties) as well as some experiences of network-centric analyses. Previous exposure to ERGM is valuable.

Mediation and Moderation Analysis in ERGM using ergMargins

Scott Duxbury, [Jenna Wertsching](#)

Exponential random graph models (ERGM) are widely used in the social sciences to examine determinants of graph structure. This 3-hour workshop will introduce attendees to mediation and moderation analysis in ERGM using the ergMargins package for R. The workshop will describe why ERGM coefficients cannot be compared between models and why coefficients for interactions—including node matching, node mixing, and other common measures of homophily and heterophily—cannot be interpreted without adjustment. Topics covered will include (1) mediation analysis, (2) moderation analysis, (3) mediation analysis when the mediator is an interaction, and (4) mediation analysis when the main effect is an interaction. We will review a range of special cases, including interactions involving both continuous and discrete variables, necessary conditions for a causal interpretation, and mediation analysis involving endogenous graph statistics. Attendees will come away from the workshop with a deeper understanding of inferential difficulties in ERGM and with knowledge on how to address each issue using ergMargins.

Bayesian exponential random graphs with Bergm

[Alberto Caimo](#)

INSTRUCTOR: Alberto Caimo, University College Dublin, Ireland

CRAN: <https://CRAN.R-project.org/package=Bergm>

WEBSITE: <http://acaimo.github.io/Bergm>

Bayesian analysis is a promising approach to social network analysis because it yields a rich fully probabilistic picture of uncertainty which is essential when dealing with relational data. Using a Bayesian framework for exponential random graph models (ERGMs) leads directly to the inclusion of prior information about the network effects and provides access to the uncertainties by evaluating the posterior distribution of the parameters. The growing interest in

Bayesian ERGMs can be attributed to the development of very efficient computational tools developed over the last decade.

This hands-on workshop will provide participants with the opportunity to acquire essential knowledge of the main characteristics of Bayesian ERGMs using the Bergm package for R.

TOPICS:

- Brief overview of ERGMs;
- Intro to Bayesian analysis;
- Prior specification;
- Model fitting and model selection;
- Interpretation of model and parameter posterior estimates;
- Model assessment via goodness-of-fit procedures.

The workshop will have a strong focus on the practical implementation features of the software that will be described by the analysis of real network data.

Interactive material will support the acquisition of concepts and understanding of the tutorial through code, scripts, and documentation.

PREREQUISITES:

Basic knowledge of social network analysis and R. Participants are recommended to bring a laptop with R/RStudio, and Bergm installed.

REFERENCES:

Caimo, A., Bouranis, L., Krause, R., and Friel, N. (2022) “Statistical Network Analysis with Bergm.” *Journal of Statistical Software*, 104(1), 1–23.

Introduction to inference with networks in R

Robert W Krause, Tomas Diviak, Filip Agneessens, James Hollway

This 3-hour workshop provides an introduction to statistical methods for analyzing social networks. The focus is on nodal and dyadic level analysis. We will be using R packages `migraph`, `sna`, and `xUCINET` to perform these analyses.

The course outline is as follows:

- 1) testing a network’s basic properties using conditional uniform graph (CUG) test (e.g., reciprocity, homophily)
- 2) nodal level statistical tests
- 3) permutation-based comparisons between groups of nodes
- 4) QAP correlation and linear regression – the underlying logic of QAP, data format etc.
- 5) QAP GLM – logistic, poisson, cognitive-social-structures, and other types and extensions

Analysing Mobility Networks with MoNAn

Per Block

This workshop is about analysing mobility networks, that is, networks in which nodes represent locations and ties are individuals that are mobile between these locations. Examples of mobility networks include migration of individuals between countries and mobility of workers between organisations. Mobility networks as understood here are directed and weighted. The workshop teaches a statistical method to analyze such data, which is introduced in “Block, P., Stadtfeld, C., & Robins, G. (2022). A statistical model for the analysis of mobility tables as weighted networks with an application to faculty hiring networks. *Social Networks*, 68, 264-278.”. The method is implemented in MoNAn, a package of the statistical system R. The workshop will demonstrate the basics of using MoNAn. Attention will be paid to the underlying statistical methodology, to examples, and to the use of the software.

The goal of this method is to model endogenous (network) patterns in mobility networks, such as concentration, reciprocation, and triadic clustering. The prevalence of these endogenous structure can be modelled alongside classical predictors of mobility that concern attributes of individuals and locations (i.e., “controlling for” these predictors). As such, it is in the spirit of ERGMs but applies to mobility data. Technically, the presented model represents an extension of classical log-linear models applied to mobility tables.

The first part of the workshop will focus on the intuitive understanding of the model and operation of the software. The second part will present a deeper treatment of the statistical model and detailed introduction into some advanced features of the software, for example, goodness of fit, or advanced model specification.

A basic introduction of the software and pointers to further material is provided on the MoNAn github page (github.com/stocnet/MoNAn).

Prerequisites:

Course participants should have a basic understanding of model-based statistical inference (say, logistic regression), some prior knowledge of social networks, and should have had some basic exposure to the R statistical software environment. They are expected to bring their own laptop to the course (Windows, Mac or Linux), with the R statistical software environment and the MoNAn package pre-installed. Participants for whom R is new are requested to learn the basics of R before the workshop: how to run R and how to give basic R commands. This is to reduce the amount of new material to digest at the workshop itself. Further instructions will be given before the conference starts.

Workshop length: 6 hours. Max Participants: 30

Mixed methods for Social Network Analysis

Elisa Bellotti

The workshop focuses on the use of mixed methods research designs when studying whole and ego-centered social networks. The workshop will be conducted in two parts. The first part introduces social network qualitative research and the principles of mixed methods research designs and its contributions to the study of social networks, pointing out advantages and challenges of this approach. Illustrations of the theoretical and methodological aspects are given by bringing examples from a variety of fields of research. The second part is devoted to the presentation of concrete procedures to apply mixed methods in network research both at the level of data collection and analysis. This part includes an introduction of different approaches to the collection of whole and ego-centered network data, i.e. interviews, ethnographic methods, archival data, together with visual instruments. It then moves to the analysis of the quantitative and qualitative dimensions of network relationships and structures in a mixed method perspective.

The origins and history of the social network’s perspective

Alejandro Espinosa-Rada

The development of the social network perspective has progressed rapidly, evolving from "random pieces sitting out in the midst of the desert (forest?)" (Mullins & Mullins, 1973, p. 264) to a field of study that is "Finally, there is reason to be hopeful since the field of social network analysis is currently very “hot,” growing at an amazing rate." (Freeman, 2004, p. 167). Much has changed since these early observations, as we will see through recent bibliometric studies (e.g., Espinosa-Rada & Ortiz, 2022; Maltseva & Batagelj, 2020, 2021, 2022, 2024). The history of social network analysis reveals key groups and institutional milestones that have driven its development and consolidation, including events like the Sunbelt conferences, the

establishment of INSNA, and the launch of network-focused journals (Freeman, 2004; Scott, 2011). The field of network science (Brandes et al., 2013) has also significantly influenced this trajectory. Furthermore, we aim to contextualize phenomena such as the “physicist invasion” and the more recent “data scientist invasion,” as well as the emergence of advanced statistical models in social network research to identify the contribution of modern interdisciplinary trends. The field continues to be shaped by a vibrant community of practitioners, as illustrated in resources like the Knitting Networks podcast.

By revisiting the history of the social network perspective, participants will gain insight into the origins of key concepts such as homophily, structural balance, cliques, or roles. They will also explore how different research groups have used social network approaches to address core questions in the social sciences. By understanding the field’s evolution, participants can more fully appreciate the opportunities and challenges the social network perspective faces today, leveraging historical insights to shape future research.

Advanced RSiena workshop

Tom A.B. Snijders

This workshop is intended for participants who have experience in working with RSiena.

Topics treated will be the following – all in the framework of modelling network panel data using the RSiena package

1. Parameter interpretation: semi-standardized parameters; entropy-based approach to explained variation.
2. Score-type tests.
3. Problems with convergence: various kinds.
4. Elementary effects and contextual effects.
5. Multivariate networks: cross-network effects; with attention to the associated hierarchy requirements.
6. Two-mode networks, and their co-evolution with one-mode networks.
7. Some effects that are little known, but which may be useful for analyzing two-mode networks.
8. If time allows: Non-directed networks.
9. If time allows: Valued networks (two kinds: networks with weak and strong ties; signed networks).

SIENA website: <http://www.stats.ox.ac.uk/~snijders/siena>

Mapping and Geovisualization with Social Networks

Clio Andris

The goal of this workshop is to lower the barriers of using geographic information systems (GIS) and geospatial mapping in social network analysis, and to explain what is possible with GIS and mapping in SNA.

Participants will learn to put social networks on maps and answer basic questions such as: Do nodes with high closeness centrality cluster together? Do different communities overlap in geographic space? Which places have mostly local or distant ties? Which nodes have the closest or most distant connections? How many nodes are in a certain part of the study area? Which nodes are spatial outliers? Which nodes are nearby but very disconnected? Which edges cross administrative units or natural features?

We will use a free, open-source, web-based tool called the Social Network Mapping Analysis (SNoMaN) for exploratory spatial data visualization (ESDA) in research and classroom use.

Participants will explore case studies of a networks of social impact organizations, GitHub collaborations, a U.S. Congressional network of vote agreements, spatial actor-movie networks, examples in published literature, and other examples of geographic node-edge structures. They will learn to plot nodes and edges on a map, filter by geographic selection, and stylize the map based on factors of interest such as node degree, edge distance, node type, cluster, etc. They will learn how to use cutting-edge visualization methods such as cluster-cluster plots, centrality-centrality plots, route factor diagrams, and perform a spatial cluster detection of network communities. They will also explore newly published optimization-based statistics such as k-fulfillment, and local and global network flattening ratios, as well as geo-based methods such as average nearest neighbor (ANN) clustering and spatial modularity detection analysis. Participants will interactively compute and visualize spatial social network metrics, describe spatial distributions, explore associations, and learn to detect anomalies.

SECTIONS OF THE WORKSHOP

Introduction and demonstration: We will introduce basic concepts behind mapping a social network (e.g., how to pin your nodes to a location). Then we will do a demonstration/tutorial on the Social Network Mapping Analysis (SNoMaN) software and its functionality.

Hands-on guided session: This will be a hands-on guided analysis with directions, where participants can navigate the software to generate insights. We will encourage participants to pair up or work in small groups. The leader will assist participants and encourage interaction between pairs of participants.

Open exploration: Participants will get help formatting and exploring their own social network data, or use a built in dataset, with the SNoMaN tool.

Open mic session: During this session, participants will be invited to show the insights they derived about their own spatial social network data or their own exploration.

Closing thoughts: Participants can share thoughts or ideas with the group and how they may incorporate geographic space and GIS into their social network analysis in the future.

No experience or preparation necessary. This workshop is suitable for geo-beginners. We encourage participants to bring a laptop to this workshop to get the most out of the hands-on activities.

Temporal Exponential Random Graph Models (TERGMs) for dynamic networks

Steven Goodreau, Martina Morris

This workshop provides a hands-on introduction to working with temporal network data in statnet, from exploratory data analysis and visualization to statistical modeling with Temporal Exponential-Family Random Graph Models (TERGMs). TERGMs are a broad, flexible class of models for representing the structure and dynamics observed in temporal networks. They can be used for both estimation from and simulation of dynamic network data. The topics covered in this workshop include:

- A brief overview of exploratory data analysis with temporal network data (using the statnet packages 'tsna' for descriptive statistics and 'ndtv' to create network movies),
- different types of dynamic network data (network panel data, a single cross-sectional network with link duration information, and cross-sectional, egocentrically sampled network data)
- statistical model elements and specification using the statnet package tergm
- model estimation tools for each type of data in tergm
- model diagnostics in tergm, and
- Simulating dynamic networks from fitted models with tergm.

Multiplex social network analysis with multip2

Anni Hong, Nynke M.D. Niezink

Social actors are often embedded in multiple social networks, and there is a growing interest in studying social systems from a multiplex network perspective. Consequently, there is a growing demand for analytical methods and tools for these network structures. This workshop offers a practical introduction to the multip2 R package for analyzing multiplex network data. Participants will learn the essentials of our Bayesian multiplex mixed-effects network model in the p2 (van Duijn et al., 2004) modeling framework and gain hands-on experience with the entire workflow, from data wrangling to model interpretation and assessment through a data example. The workshop will enable participants to model cross-layer dyadic dependencies as fixed effects and actor-specific dependencies as random effects, while also considering the influence of covariates in the analysis of cross-sectional, directed binary multiplex network data.

topics include:

- Introduction to the multiplex p2 modeling framework
- a brief introduction to Bayesian analysis
- Overview of the R package multiP2 and the underlying estimation procedure in stan
- Data preparation
- Picking priors via prior predictive checks
- Model fitting and convergence diagnostics
- Interpretation of model coefficients
- Goodness-of-fit assessment via simulations and plotting

Note: participants are expected to have a basic familiarity with R for the practical segment of the workshop and some understanding of statistical inference for the conceptual portion.

Expected length: 3 hr, Max attendance: 20

Tidy Networks: the tidyverse and tidygraph for social network analysis in R

Matthew Smith, Yasaman Sarabi

This 3-hour workshop provides an introduction to the R programming language for those without any previous or limited experience. It will introduce the tidyverse – a set of functions and packages for data processing, cleaning, and visualisation in R. In particular, we will focus on dplyr for data processing, ggplot2 for visualisation, and Rmarkdown for creating reports. We will go on to demonstrate how the tidyverse can be applied to social network analysis - more specifically through the use of the tidygraph package. The tidygraph permits you to utilise the underlying grammar structure of the tidyverse when dealing with graph objects in R. By using the tidygraph package you can manage edgelist and network attributes in a single object, along with implementing analysis on these objects. The tidyverse allows you to create tidy data frames, whilst the tidygraph allows you to create tidy graph objects – or tidy networks!

Learning Outcomes:

By the end of the session participants should be able to:

- Use R and RStudio.
- Make use of the tidyverse for data processing – more specifically preparing datasets for SNA.
- Visualising networks in R using ggplot2 (part of the tidyverse) and tidygraph.
- Create tidygraph objects and undertake some initial network analysis using the tidygraph package.

These users will benefit from gaining an insight into how to use R for data processing and social network analysis following the tidy philosophy.

The analysis of longitudinal social network data using RSiena

Viviana Amati, Marion Hoffman

This workshop offers a basic introduction to the theory and application of Stochastic Actor-oriented Models (SAOMs). SAOMs are a statistical model family developed for the analysis of social networks panel data, understood here as two or more repeated observations of a network on a given node set (usually between 20 and a few hundred nodes). The method is implemented in the RSiena, package in the R software.

The first part of the workshop will focus on the intuitive understanding of the model and operation of the software. The second part will present models for the simultaneous dynamics of networks and behavior and other more advanced topics such as model specification, multivariate networks, and goodness of fit checking.

Course participants should have a basic understanding of social network analysis concepts and methods and basic knowledge of the R programming language is necessary to successfully follow the workshop. Basic knowledge of multivariate statistical models (e.g. linear regression) is recommended. They should bring a laptop to the workshop with the latest versions of R, RStudio (or their preferred GUI if any) and the RSiena R package installed.

Net-Map workshop: Increasing Social Network Knowledge through participatory mapping

Amitaksha Nag, Ana Elia Ramon Hidalgo

Net-Map is an interview-based mapping tool that helps people understand, visualize, discuss, and improve situations in which many different actors influence outcomes. It is an innovative, analogue and accessible approach to achieving results in complex projects where many different interests influence the result. By creating Influence Network Maps, individuals and groups can clarify their own view of a situation, foster discussion, and develop a strategic approach to their networking activities.

Social and organizational change often involves diverse actors outside a single hierarchy, making it challenging to coordinate actions through mandates alone. Quantitative Social Network Analysis (SNA) has been widely applied to explore these dynamics, yet Net-Map is a mixed-methods approach that enables participative collection of both qualitative and quantitative data. Net-Map moves beyond understanding network structure to reveal the “how” and “why” behind relationships and engages participants in mapping their networks, discussing opportunities and challenges, and working toward a shared vision.

Net-Map has increasingly been adopted by practitioners in action research, communication strategy, advocacy, political networks, social movements, program implementation, personal development, project management, organization learning, and change management. For instance, it has been employed for strategizing government reforms in Zimbabwe, improving business relationships between fortune 500 companies, supporting personal transformation through network coaching or empowering grassroots political change movements.

- A hands-on workshop:

During the workshop, participants will be introduced to the Net-Map process and will practice drawing a multiplex network while also identifying perceived levels of influence of actors. Participants will indicate the actors’ goals and have an in-depth discussion about the situation. This workshop will help users to answer questions such as: Do you need to strengthen the links to an influential potential supporter (high influence, same goals)? Do you have to be aware of an influential actor who doesn’t share your goals? Can increased networking help empower your dis-empowered beneficiaries?

By creating Influence Network Maps, individuals and groups can clarify their own view of a situation, foster discussion, and develop a strategic approach to their networking activities. More specifically, Net-Map will help participants to determine:

- what actors are involved in a given network,
- how they are linked,
- how influential they are, and
- what their goals are

You can learn more about the technique here - <http://netmap.wordpress.com/about/>

- Workshop format

This is a 3-hour workshop; the maximum number of attendees is 20. After a brief introduction to the approach, the participants will map actual or potential cases to experience the use of Net-Map. We will discuss these cases identifying benefits and limitations, feasibility and requirements of this approach.

- Instructors

Amitaksha Nag – As a systems change expert focused on facilitating collective learning in complex systems, he utilizes participatory and group modeling approaches to drive impactful outcomes. He developed the Datamuse Network Analysis tool, which has advanced the online application of Net-Map for network analysis and visualization.

Ana Elia Ramon Hidalgo – Certified Net-Map trainer and currently works as an independent consultant in organizational development. She holds a PhD in Social Networks in Community-Based Natural Resources Management.

Many metrics and models for network diffusion and learning

James Hollway

From infectious diseases to innovations, from policies to norms, networks often influence how outcomes are distributed. This workshop introduces the many analytic and visualisation tools available in the ‘manynet’, ‘migraph’ and associated packages in R for studying network diffusion, contagion, or learning. First, we look at the tools available for simulating various contagion processes, including simple and complex diffusion. We extend these models to a range of different compartment models, e.g. SEIRS, that can better represent more varied processes, and suggest how to evaluate the fit of these simulations with observed diffusions. Second, we look at tools for measuring, describing, or inferring aspects of these processes, from hazard rates to thresholds. We show how they can be used on observed diffusions too, so please bring data from any salient projects you are working on. Lastly, we will explore how, with the rest of the tools available in ‘manynet’ and ‘migraph’, we can identify points of intervention to accelerate or obstruct diffusion. Because these procedures are based on ‘manynet’, they work with many different network formats and types, including ‘igraph’ and ‘network’ classes, as well as directed, multimodal, signed and multiplex data. Familiarity with R and RStudio is recommended.

Co-occurrence and Correlation Networks

Srebranka Letina, Mark McCann

The network approach is increasingly employed to explore relationships among concepts, specifically the relationships between co-occurring health conditions (e.g., binary health condition indicators from hospital episode data) and the relationships between psychological variables (continuous scales from survey data). Given the multitude of approaches available for constructing and analyzing such networks and their application across different fields of study, determining the most appropriate methods and analyses can be challenging.

In this workshop, we will cover:

Theoretical Frameworks: An overview of the theoretical basis for applying network analysis to study relationships among health conditions or individual attributes.

Methodological Approaches: An exploration of existing methodologies for constructing networks and robustness testing of their estimations.

Analytical Techniques: A comprehensive set of analyses applicable to co-occurrence or correlation networks, including basic descriptive analysis, filtering methods, community detection, centrality analysis, and network comparisons.

We will offer a critical assessment of methods tailored to specific types of data and interpretations. Practical demonstrations will cover a range of methodological options and the various R packages to conduct them. In the final segment of the workshop, participants are encouraged to discuss the application of these methods to their specific datasets.

Names and contact information of organizers:

Srebrenka Letina; Srebrenka.letina@glasgow.ac.uk

Mark McCann; Mark.Mccann@glasgow.ac.uk

Length of the workshop: 3 hours

Maximum number of attendees: 30

Analysis of weighted networks

Vladimir Batagelj

The structure of the network $N=(V, L, W, P)$ is determined by the graph $G=(V, L)$, where V is the set of nodes and L is the set of links. In addition, additional data about links (weights from W) and nodes (properties from P) are often known. The network N is weighted if its set of weights is nonempty. The weights can be either measured (such as trade networks - BACI/CEPII https://www.cepii.fr/CEPII/en/bdd_modele/bdd_modele_item.asp?id=37) or computed (for example a projection of a two-mode network).

The workshop will cover the following topics:

- examples and sources of weighted networks,
- transformations of weighted networks (dealing with large ranges of values of weight, making nodes comparable, Balassa index),
- visualization of weighted networks (graph drawing, monotonic recoding, matrix representation, ordering of nodes),
- clustering and blockmodeling.
- important nodes - hubs and authorities,
- skeletons - important parts of the network: cuts, k-neighbors, Pathfinder, cores, trusses, backbone, islands,
- temporal weighted networks.

Most of the topics are discussed in the book Batagelj, Doreian, Ferligoj, Kejžar (2014) *Understanding Large Temporal Networks and Spatial Networks*.

The workshop is based on the programming system R <https://cran.r-project.org/>. The network data and additional R code will be available on GitHub

<https://github.com/bavla/Nets/tree/master/ws> .

Co-authors' spatial networks analysis with Cortext Manager and Arabesque

Lionel Villard, Françoise Bahoken, Etienne Come, Luis Daniel Medina, Marion Maisonobe

In the field of scientometrics, methods derived from Social Network analysis (SNA) and Natural language processing (NLP) are among common techniques used to analyze and visualize graphs. These methods focus on both the structural and morphological aspects of the

social networks investigated, whether or not their actors are localized. SNA and NLP approaches are not specifically interested in the spatial component (i.e. localization, interactions, geovisualization) of social networks. Their complementarity with gravitational approaches, combining analysis of actors' positions and separations (distance, proximity, neighborhood) has nevertheless been widely used in the field of spatial analysis in geography. This workshop aims to present a scientometric co-authorship' analysis on a preselected topic (e.g., low carbon initiatives, climate change, AI in transportation), using Cortext Manager [1] and Arabesque [2]: two web applications respectively mobilized to geocode authors' affiliations addresses at several geographical scales and filtering and exploration spatial networks for thematic mapping purposes. Emphasis will be placed on examining the contributions of different countries or groups of countries to scientific advancements in the selected field and the collaboration patterns that emerge. This hands-on session will guide participants through spatial data analysis and network analysis enabling them to identify thematic and territorial patterns within scientific communities.

For doing that, participants will learn how to classify documents by lexical extraction and semantic clustering, or by tagging the textual content of scientific articles with the corresponding Sustainable Development Goals (SDG) categories. This will be followed by the geocoding of authors' affiliation addresses to pinpoint their exact geographic locations. Next, geographic/spatial aggregation methods will be explored, preparing data at different scales, from the address scale to larger meso-level units of analysis, such as: Eurostat's NUTS3, OECD's Functional Urban Areas or NETSCITY's perimeters (most active urban areas in science production [3]). Finally, the resulting co-author' spatial networks files will be geovisualize in Arabesque, a cartographic tool based on the paradigm of visualization cartography. Several methods of statistical filtering with options adding contextual geographic information or cartographic (re)projections will be applied to the dataset. A particular attention will be paid to the cartographic design of actors' interrelations at different scales through arrows: to their geometry and their semantics, playing on their graphic semiology.

Participants will have time to play with the datasets and tools covered in the workshop, with guidance from the trainers and access to a set of materials: a mini-website giving access to all the resources, including datasets, tutorials and examples of results.

[1] <https://docs.cortext.net/space/>

[2] <https://arabesque.univ-eiffel.fr/>

[3] <https://www.irit.fr/netscity/prod/public/intro/>

This workshop is part of RETICULAR (RÉseaux, Territoires en Interactions et interrelations Cartographiques), a collaborative research program funded by Université Gustave Eiffel and supported by the LISIS, Aménagement Mobilités Environnement (AME-splott) and Composants et systèmes(COSYS-grettia) départements, with the collaboration of CNRS (Géographie-cités).

Addressing Unprecedented Global Challenges: How to Create Structures Through Social Network Analysis to Support Team Development and Effectiveness using the Archintor® – A Transformative Framework

Ellyn M. Dickmann, Hannah Love, Ellen R. Fisher

In today's complex and interconnected workplaces, understanding the dynamics of teams goes beyond traditional organizational charts. Teams are influenced not only by formal hierarchies but also by the informal networks that drive collaboration, communication, and innovation. As the world grapples with unprecedented challenges—ranging from climate change, global pandemics, and geopolitical instability to technological disruption and social inequality—effective problem-solving and collaboration have become more critical than ever. Addressing

these multifaceted issues requires interdisciplinary approaches and high-performing teams that can adapt quickly, communicate effectively, and innovate relentlessly. This workshop introduces participants to the concept of the Archintor®, a transformative framework leveraging social network analysis to identify, analyze, and optimize team dynamics and structures to meet these demands.

The Archintor® concept (architect + instructor + facilitator) was first introduced in 2023 via a PLOS ONE publication. It represents a paradigm shift in applied social network analysis for team building, emphasizing how expectations shape network structures. By identifying the “ideal” network structure perhaps even before a team has formed, an Archintor® is tasked with designing and fostering expectations that drive specific interactions, ultimately reshaping team networks to enhance effectiveness and success.

This workshop grounds participants in existing research and practice, drawing on findings from two recent studies to illustrate the power of social network analysis in real-world applications. Participants will explore:

- The foundations of social network analysis and its role in identifying team types and guiding team formation and development.
- How to identify and leverage critical network types and roles such as connectors, boundary spanners, and structural holes.
- Strategies for shifting network structures to achieve desired configurations.
- The importance of communication, learning, and social connections in fostering ideal team structures.
- Best practices for designing and maintaining effective team networks.
- Tips for conducting longitudinal network analysis to monitor and refine team dynamics.

The workshop features several interactive experiences, including small group problem-solving activities and collaborative discussions. Participants will gain hands-on practice in mapping and analyzing networks, as well as developing strategies to intentionally shift team dynamics to align with organizational goals.

By the end of this session, participants will be equipped with practical tools and actionable insights to become an effective Archintor®, capable of designing and guiding network structures that maximize team potential. This workshop is ideal for network analysts, evaluators, organizational development specialists, and researchers interested in leveraging social network analysis to build and sustain high-performing teams that can address today’s unprecedented global challenges.

3 Hours, 30 Maximum Participants

Modeling Relational Event Dynamics with statnet

Carter Tribley Butts

Prerequisites: Some experience with R and familiarity with descriptive network concepts and statistical methods for network analysis in the R/statnet platform is expected.

Synopsis:

This workshop session will provide an introduction to the analysis and simulation of relational event data (i.e., actions, interactions, or other events involving multiple actors that occur over time) within the R/statnet platform. We will begin by reviewing the basics of relational event modeling, with an emphasis on models with piecewise constant hazards. We will then discuss estimation, assessment, and simulation of dyadic relational event models using the relevant package, with an emphasis on hands-on applications of the methods and interpretation of results. Attendees are expected to have had some prior exposure to R and statnet, and completion of the "Introduction to Network Analysis with R and statnet" workshop session is suggested (but not required) as preparation for this session. Familiarity with parametric

statistical methods is strongly recommended, and some knowledge of hazard or survival analysis will be helpful.

statnet is a collection of packages for the R statistical computing system that supports the representation, manipulation, visualization, modeling, simulation, and analysis of relational data. statnet packages are contributed by a team of volunteer developers, and are made freely available under the GNU Public License. These packages are written for the R statistical computing environment, and can be used with any computing platform that supports R (including Windows, Linux, and Mac). statnet packages can be used to handle a wide range of simulation and analysis tasks, including support for large networks, statistical network models, network dynamics, and missing data.

Continuous Time Network Dynamics with statnet

Carter Tribley Butts

Prerequisites: Some experience with R and familiarity with descriptive network concepts and statistical methods for network analysis in the R/statnet platform is expected. This workshop also assumes familiarity with ERGMs.

Synopsis:

This workshop will provide an introduction to modeling of network dynamics in continuous time using ERGM generating processes (EGPs). The exponential family random graph models (ERGMs) are a widely used framework for describing graph distributions, allowing flexible and parsimonious specification of both inhomogeneity (i.e., some ties are more likely than others) and dependence (i.e., some ties depend on others). EGPs complement ERGMs by providing ways of specifying continuous time dynamics whose long-run behavior recapitulates a specified ERGM distribution - thus allowing for dynamic network models that are consistent with specific cross-sectional behavior. In this session, we will begin with an overview of known classes of EGPs, with an eye to understanding the types of dynamic behavior embodied by each (and where they might be appropriate as empirical models). We will then discuss simulation and calibration of EGPs within the R/statnet platform, using the `ergmgp` package. We will show examples of the use of EGPs to generate dynamics consistent with cross-sectional network data combined with information on tie durations, including continuous time generalizations of the separable temporal ERGMs (STERGMs). Attendees are expected to have had some prior exposure to R and statnet, and completion of the statnet ERGM workshop session is strongly suggested as preparation for this session (as we will make extensive use of the `ergm` package). statnet is a collection of packages for the R statistical computing system that supports the representation, manipulation, visualization, modeling, simulation, and analysis of relational data. statnet packages are contributed by a team of volunteer developers, and are made freely available under the GNU Public License. These packages are written for the R statistical computing environment, and can be used with any computing platform that supports R (including Windows, Linux, and Mac). statnet packages can be used to handle a wide range of simulation and analysis tasks, including support for large networks, statistical network models, network dynamics, and missing data.

Exponential Random Graph Models (ERGMs) using statnet

Michal Jan Bojanowski, Steven Goodreau

This workshop provides a hands-on tutorial to using exponential-family random graph models (ERGMs) for statistical analysis of social networks, using the “`ergm`” package in statnet. The `ergm` package provides tools for the specification, estimation, assessment and simulation of

ERGMs that incorporate the complex dependencies within networks. Topics covered in this workshop include:

- * an overview of the ERGM framework;
- * types of terms used in ERGMs
- * defining and fitting models to empirical data;
- * interpreting model coefficients;
- * goodness-of-fit and model adequacy checking;
- * simulation of networks using fitted ERG models;
- * degeneracy assessment and avoidance.

Workshop length: 3 hours

Max attendees: 30

Visualizing networks from the comfort of Jupyter notebooks with ipysigma

Guillaume PLIQUE

People tend to use a variety of desktop or web tools such as Gephi to practice visual network analysis. Unfortunately, It often means being forced to work on the graph's data in separate tools, such as spreadsheets or processing them using programming languages. This makes the feedback loop between data wrangling and visualisation a bit tedious.

On the other hand, the scientific community now has access to fantastic tools such as Jupyter notebooks, able to mix interactive programming and visualizations seamlessly. So why not use this new medium to also perform visual network analysis? This is exactly what the "ipysigma" Jupyter widget, developed at SciencesPo médialab, intend to do.

ipysigma is a powerful tool that renders an interactive view of a graph directly in a notebook cell. It lets you zoom and pan the graph to explore it fully. You can also search & filter nodes, node categories and edges, apply a real-time animated 2d layout algorithm, all while remaining able to customize a large variety of the graph's visual variables: node and edge sizes, color, borders, halos, being just the most basic examples. It is notably relying on the sigma.js library, using WebGL, to make sure it can display large graphs in a web browser, which is not the case with most other graph rendering engines.

In this workshop, participants will learn how to leverage the widget to perform their visual network analysis, through typical use-cases ranging from lexicometry to webmining, all while being able to process the graph data itself in python, using a graph processing library such as networkx or igraph.

Participants are therefore expected to have some basic knowledge of python and Jupyter notebooks.

Egocentric network analysis with R

Raffaele Vacca

This workshop offers an introduction to the R programming language and its tools to represent, manipulate, and analyze egocentric or personal network data. Topics include: introduction to ego-network research and data; data structures and network objects in R; visualizing ego-networks; calculating measures on ego-network composition and structure; converting ego-network measures to R functions; applying these functions to many ego-networks. The workshop heavily relies on R tidyverse packages for data science, showing how they can be used to easily conduct common operations in ego-network analysis and scale those operations up to large collections of networks. We'll cover specific packages for network analysis (igraph, network, egor), data management (dplyr) and programming (purrr). No previous familiarity with R is required; participants only need a laptop with R and RStudio installed. This workshop

has been taught for the past several years at different international conferences, including INSNA's Sunbelt and EUSN meetings. It draws on concepts and methods presented in "Conducting personal network research: A practical guide" by Christopher McCarty, Miranda Lubbers, Raffaele Vacca and José Luis Molina (Guilford Press). More details on the workshop's materials and requirements are here: raffaelevacca.com/egonet-r.

Advanced Exponential-Family Random Graph Modelling with Statnet

Pavel N. Krivitsky, David R. Hunter

This workshop will provide a tutorial of advanced usage of 'ergm' and extension packages, focusing on binary networks. Topics include specifying complex structural constraints, estimation tuning, use of term operators, and observational (e.g., missing data) structure. Also included is using the new 'ergm.multi' package for modelling multilayer and multimode networks, as well as joint models of ensembles of networks.

Prerequisites: Familiarity with R and 'ergm' required. If you are new to ERGMs, the introductory workshop on ERGMs using Statnet is strongly suggested.

Valued Tie Network Modelling with Statnet

Pavel N. Krivitsky, Carter T. Butts

This workshop provides instruction on how to model social networks with ties that have weights (e.g., counts of interactions) or are ranks (i.e., each actor ranks the others according to some criterion). We will cover the use of latent space models and exponential-family random graph models (ERGMs) generalised to valued ties, emphasising a hands-on approach to fitting these models to empirical data using the 'ergm' and 'latentnet' packages in Statnet. Statnet is an open source collection of integrated packages for the R statistical computing environment that support the representation, manipulation, visualisation, modelling, simulation, and analysis of network data.

Prerequisites: Familiarity with R and 'ergm' required. If you are new to ERGMs, the introductory workshop on ERGMs using Statnet is strongly suggested.

Intro to Network Analysis Tools In R

Lorien Jasny, Michal Bojanowski

Those wishing to use the R programming language for network analysis now have a plethora of choices when it comes to libraries. In this workshop, we survey the main packages used for network data management, analysis, and visualization. We will cover 1) importing network data (from actual files), 2) network objects and attributes, 3) computing basic descriptives (attribute distribution, mixing matrix, density, degrees, betweenness, closeness), and 4) visualization (layouts, node aesthetics). These will be done side by side for the different packages, as well as discussion of the strengths and weaknesses of each. We conclude with time for attendees to work either on toy datasets or with their own data with help from instructors. This workshop is a unification of workshops "Using R and 'igraph' for Social Network Analysis" and "Introduction to Social Network Analysis with R and statnet" that has been offered on Sunbelt and EUSN conferences since 2011. It will serve as an introduction for those wishing to take "An introduction to ERGM with Statnet", or other Statnet-related workshops on the program.

SOCITS: Integrating Social Network Analysis in Mental Health Research through Qualitative, Quantitative, Simulation, and Systems Thinking Methods

Nolwazi Nadia Ncube, Mark McCann, James @glasgow.ac.uk, Srebenka Letina

A significant proportion of the population enters adulthood having already faced mental health challenges. These issues during adolescence have enduring effects on health, education, and socio-economic outcomes throughout life. Current approaches to adolescent mental health often fail to capture the intricate social and emotional contexts of young people. Traditional methods tend to focus on individuals in isolation, neglecting the broader social networks that play a crucial role in mental health. Unsituated social network analysis may fail to account for how relationships vary across time and space within social settings. This workshop will introduce the SOCially sITuated Systems (SOCITS) approach to measuring and modelling adolescent mental health. The methodology was developed with a focus on stress and loneliness in schools, but the approach can be applied to other constructs, behaviours and social settings. SOCITS integrates qualitative, systems thinking workshops, Agent Based Modelling and quantitative survey data; taking a co-production approach with young people and school staff. Qualitative and workshop data are used to inform the development of rules for an Agent Based Model, and also to develop situated survey items that are tailored to the places, interactions, and social situations that are relevant to specific schools and the topic of interest. The workshop will introduce participants to the conceptual integration of complexity theory and situated cognition theory; outline approaches for study design; and provide an overview of the range of analytical options, R packages, tutorial datasets and scripts available when analysing situated cognition and situated network data.

Workshop learning objectives:

1. Introduce participants to relevant concepts and theories underpinning the SOCITS approach.
2. Explore qualitative methods that can be employed in identifying stressful situations in schools and ways that these can be improved.
3. Demonstrate how workshop methods can be applied to co-produce situated assessment and social network survey items.
4. Apply agent-based models to model social and spatial dynamics influencing wellbeing in schools.

Modeling Relational Events in R Using goldfish

Alvaro Uzaheta, Maria Eugenia Gil-Pallares, Christoph Stadtfeld, Marion Hoffman, James Hollway

The goldfish package offers tools for applying statistical models to relational event data. The study of relational events is growing in social network research, driven by the increasing availability of data. For example, data collected from digital traces of individuals' interactions—such as communication exchanges, transactions, and collaboration—provide in-depth details regarding the timing or sequence of relational actions between actors.

The workshop provides an introductory theoretical overview from a social science perspective, complemented by a hands-on tutorial (as time permits) on the different models implemented in the package:

* Dynamic Network Actor Models (DyNAM): Investigate relational event models as an actor-oriented decision process.

- rate: Actors compete to create the next relational event (Hollway, 2020).

- choice: The active actor chooses the receiver of the event from among the same (Stadtfeld and Block, 2017) or a different set of nodes (Haunss and Hollway, 2023).

- choice_coordination: The creation of coordination ties as a two-sided process (Stadtfeld, Hollway, and Block, 2017a), as in studies analyzing agreements between countries.

* Dynamic Network Actor Models for interactions (DyNAMi): Investigate dynamics of conversation groups and interpersonal interaction in different social contexts from an actor-oriented perspective (Hoffman et al., 2020), as in studies using social sensors.

- rate: Actors compete to join or leave groups.

- choice: The active actor chooses the group to join.

* Relational Event Models (REM): Investigate relational event models as a tie-oriented process (Butts, 2008), taking into account right-censoring (Stadtfeld, Hollway, and Block, 2017b).

Prerequisites:

Participants should be familiar with R and model-based statistical inference (such as logistic regression). Please bring a laptop with the R software environment, the goldfish package installed, and its dependencies.

More information about the package and installation is available at: <https://github.com/stocnet/goldfish>

References:

Butts, Carter. 2008. "A Relational Event Framework for Social Action." *Sociological Methodology* 38 (1): 155–200.

Haunss, Sebastian, and James Hollway. 2023. "Multimodal Mechanisms of Political Discourse Dynamics and the Case of Germany's Nuclear Energy Phase-Out." *Network Science* 11 (2): 205–23. <https://doi.org/10.1017/nws.2022.31>.

Hoffman, Marion, Per Block, Timon Elmer, and Christoph Stadtfeld. 2020. "A Model for the Dynamics of Face-to-Face Interactions in Social Groups." *Network Science* 8 (S1): S4–25. <https://doi.org/10.1017/nws.2020.3>.

Hollway, James. 2020. "Network Embeddedness and the Rate of Water Cooperation and Conflict." In *Networks in Water Governance*, edited by Manuel Fischer and Karin Ingold, 87–113. Cham: Palgrave MacMillan. https://doi.org/10.1007/978-3-030-46769-2_4.

Stadtfeld, Christoph, and Per Block. 2017. "Interactions, Actors, and Time: Dynamic Network Actor Models for Relational Events." *Sociological Science* 4 (14): 318–52. <https://doi.org/10.15195/v4.a14>.

Stadtfeld, Christoph, James Hollway, and Per Block. 2017a. "Dynamic Network Actor Models: Investigating Coordination Ties Through Time." *Sociological Methodology* 47 (1): 1–40. <https://doi.org/10.1177/0081175017709295>.

———. 2017b. "Rejoinder: DyNAMs and the Grounds for Actor-oriented Network Event Models." *Sociological Methodology* 47 (1): 56–67. <https://doi.org/10.1177/0081175017733457>.

Length: 3 hours. Participants: 30

Introduction to Core Social Network Concepts

Rich DeJordy, Steve Borgatti

This workshop introduces the major streams of social network theory, taking a conceptual view grounded in and contrasted with the broader landscape of social theory. This is not a course on network methodology, although mathematical concepts such as centrality and structural equivalence are discussed. The workshop is intended as a survey of the major conversations network researchers from the social sciences are engaged in. It is suggested for those new to the network perspective who are interested in a map of the theoretical landscape. The workshop does not use any software or data.

Network Theory -- Outcomes of network variables/mechanism

Here we consider network theorizing in both the social capital literature (e.g., weak ties, structural holes, social resource theory) and the contagion literature (e.g., interpersonal influence, diffusion of innovation). We examine how concepts like centrality and core-periphery structures are interpreted in these different contexts. Topics include multiple levels of analysis, theoretical network mechanisms, and social cognition (perceived ties). Themes include the interplay of node characteristics and network structure, as well as ...

Theory of Networks -- Antecedents of Network Variables

This section deals with theories of tie formation, why networks have the shapes they do, and why actors occupy the network positions they do. Topics include homophily, preferential attachment, mechanisms of choice and opportunity, balance theory, etc.

Walking through a Social Network Project in UCINET

Rich DeJordy, Steve Borgatti, Paulo Serôdio

This workshop is focused on the practical application of one specific network analysis tool, UCINET (a Windows program, there is no Mac or Linux version) in completing the analysis for a particular study. Anonymized data from one of the instructors will be provided, and the workshop will walk the participants through a defined research project.

The workshop will cover:

Importing the data

Data transformations

Dealing with missing data

Network Visualizations using NetDraw

Exploring dyadic hypotheses

Characterizing a node's network environment

Measuring structural holes and centrality

Exploring overall network structure

Testing hypotheses

The workshop is intended for people with a basic understanding of the network concepts covered and designed to be a hands-on supplement to the "Introduction to Core Network Concepts" workshop. Participants should bring a Windows-based laptop (or any machine with a Windows emulator). Participants do not need to own UCINET for this workshop. One to two weeks prior to the workshop, participants will be sent instructors for downloading the trial version of UCINET.

Community Detection in Networks: An Overview

Guillermo Romero Moreno, Adarsh Prabhakaran

This workshop will provide a comprehensive introduction to the problem of Community Detection (CD), i.e. dividing a network into groups of nodes, along with materials and code for its implementation. It will cover the main families of algorithms and the major challenges in implementation, as well as means to compare and evaluate solutions. The workshop will mostly focus on the standard problem of non-overlapping partitions on undirected, unweighted networks, although other problem and network variations will be briefly reviewed at the end. While the code and examples will be provided in python within an interactive online platform, so familiarity with the language will not be required and there is no setup needed previous to the workshop.

Overview of content:

- Introduction to the problem and applications

- Overview of the main families of problem definitions and the most common algorithms, and their implementations
- Evaluation of CD solutions
- Comparing and combining multiple solutions
- Quick overview of variations: overlapping CD, multiplex, temporal

Simulating Complex Agent-Based Models with epiworldR: A fast and flexible ABM framework

Andrew David Pulsipher, George G. Vega Yon

This workshop introduces epiworldR, an R package with a fast (C++ backend) and highly customizable framework for building network-based transmission/diffusion agent-based models (ABM). These models provide valuable information that may aid in performing complex simulation studies and make informed, evidence-based policy decisions for the general population. epiworldR is a flexible tool that can capture the complexity of transmission/diffusion dynamics resulting from agents' heterogeneity, network structure, transmission dynamics, environmental factors (e.g., policies), and many other elements. Some key features of epiworldR are the ability to construct multi-disease models (e.g., models of competing multi-pathogens/multi-rumor), design mutating pathogens, architect population-level interventions, and build models with an arbitrary number of compartments/states (beyond SIR/SEIR). Moreover, epiworldR is really fast. For example, simulating a SIR model with 100,000 agents for 100 days takes less than $\frac{1}{3}$ of a second (about three times faster than most popular packages).

The workshop will be 100% hands-on. It will feature examples of simulating multi-disease/rumor models, policy intervention models, and mutating variants. You can learn more about what to expect by visiting <https://uofuepibio.github.io/epiworldR-workshop/>. Participants should have a working knowledge of R (e.g., some experience with statnet). We will be using the latest version of epiworldR and will also provide a cloud environment with all the required components for the workshop.

Duration: 3 hours

Maximum number of attendees: 30

Agent-Based Modelling for Social Good: Concepts, Tools, and Applications

Adarsh Prabhakaran, Guillermo Romero Moreno

This workshop will explore the potential of agent-based modelling (ABM) to address complex social challenges. Through a combination of theoretical foundations and hands-on exercises, participants will develop practical skills in designing, implementing, and analysing ABMs across various domains of social impact.

Morning Session (3 hours)

Foundations (1.5 hours)

x ABM fundamentals and integration with social network analysis

x Key concepts: emergence, interaction networks, behavioural rules

x Case studies: public health interventions, educational outcomes, environmental behaviour change

Tools and Implementation (1.5 hours)

x Introduction to NetLogo and Python's Mesa framework

x Setting up simulation environments

x Basic model development

Afternoon Session (3 hours)

- Applications and Practice (2 hours)
- x Hands-on exercises with real-world scenarios
 - x Model building in small groups
 - x Implementation strategies and best practices
- Validation and Analysis (1 hour)
- x Model validation techniques
 - x Results interpretation
 - x Documentation and sharing
 - x Resources for advanced modelling

Extension the relational event model

Ernst Wit, Alessandro Lomi, Juergen Lerner, Martina Boschi, Melania Lembo

Advances in information technology have increased the availability of time-stamped relational data such as those produced by email exchanges or interaction through social media. Whereas the associated information flows could be aggregated into cross-sectional panels, the temporal ordering of the interactions frequently contains information that requires new ideas for the analysis of continuous-time interactions, subject to both endogenous and exogenous influences. The Relational Event Model (REM) has turned out to be a versatile framework that has allowed further methodological extensions to address a multitude of applied demands: how to deal with non-linear and time-varying effects, how to account for network heterogeneity, how to analyze relational hypergraphs, how to address goodness-of-fit. In this short course, we introduce the REM, define its core properties, and discuss why and how it has been considered useful in empirical research. Then we will focus on how new applications have pushed the development of relational event modelling forward.

1. Introduction to REMs

If a process consists of a sequence of temporally ordered events involving a sender and a receiver, such as email communication or bank transactions, the REM can be used to identify drivers of this process. It is based on event history modelling, in particular the Cox model, which allows for convenient and efficient estimation.

2. Mixed effect additive REMs

We show how to extend REM formulations with non-linear specifications of endogenous effects, as well as time-varying influence of covariates on the event rate. We explain how the incorporation of random effects can uncover latent heterogeneity associated with individual actors or groups of them. Furthermore, we will describe a general method to assess the goodness-of-fit of such models.

3. Modelling relational hyperevents

We will discuss "polyadic" social interaction processes in which events can connect varying and potentially large numbers of nodes simultaneously. Examples of such polyadic events (or "hyperevents") include meeting events or social gatherings, multicast (i.e., "one-to-many") communication events such as emails in which one actor sends the same message to several receivers, co-offending, or scientific collaboration (e.g. co-authoring and citation networks).

The workshop will feature a mix short explanatory sessions with hands-on computer practicals. Participants are encouraged to bring their own laptop with Rstudio pre-installed. The workshop is targeted at participants interested in statistical modelling of networks based on relational event data, with a specific focus on non-linear, time-varying and random effects, and polyadic interaction events. The software eventnet together with R-package mgcv will be explained and used in the context of this tutorial. Additional reading material will be made available to the participants beforehand.

Introduction to social network analysis using R

Filip Agneessens, Tomáš Diviák

This 6-hour workshop provides an overview of network measures, as well as a short introduction into data collection and data management. The focus is on complete networks, although some topics might also be useful for analyzing egonetwork data.

The course outline is as follows:

- Introduction to social networks, different types of networks (including two-mode/affiliation networks and valued networks)
- Different types of datastorage: adjacency matrices, nodelists and edgelist, and incorporating attributes
- Basic visualization
- Centrality measures
- Whole network structural measures (density, centralization)
- Subgroups, such as cliques, as well as community detection

Analysis of Multiplex Social Networks (hands-on)

Matteo Magnani, Valeria Policastro

Many real social networks contain multiple types of ties, for example representing different types of interactions or different contexts where interactions happen. Through the use of R libraries for the analysis of multiplex networks, this workshop explores the main theoretical concepts and analysis methods in a practical way. Participants will be introduced to the key principles of multilayer social network analysis, including intra-layer and inter-layer interactions, measures and community detection methods. Emphasis will be placed on understanding how multilayer structures differ from traditional single-layer networks and the unique insights they provide. Multiplex networks have been studied in different disciplines, including sociology, computer science, and physics, because of their ability to provide richer, more qualitative information than simple graphs, but still allow quantitative processing.

The main topics covered are: visualization, micro-level analysis (actor centrality and role of edge types), meso-level analysis (communities), macro-level analysis (comparison of different edge-types), and integration. The practical component will focus on using two main R packages `multinet` and `INetTool` to analyze multilayer networks. With `multinet` participants will learn how to model multilayer networks, perform descriptive analyses, and compute multilayer metrics, while with `INetTool` participants will explore how to integrate networks, including merging heterogeneous datasets, and extracting insights from real-world case studies.

Case studies will be drawn from diverse domains, such as social media interactions, organizational collaboration, and others, providing participants with practical examples of how to apply these tools to real-world problems.

By the end of the workshop, participants will:

- Understand the theory of multilayer social networks.
- Gain proficiency in using `multinet` and `INetTool` for network analysis.
- Be equipped to apply multilayer network analysis to their research.

Understanding Diffusion with `netdiffuseR`

George G Vega Yon, Thomas W Valente, Anibal Olivera Morales

The `netdiffuseR` package provides tools for analyzing and simulating diffusion of innovations and contagion processes on networks. In this workshop, we demonstrate the package's features by analyzing empirical and simulated data on the diffusion of innovations. The session will include examples of using `netdiffuseR` jointly with other network analysis packages such as

RSiena, statnet, and igraph. NetdiffuseR's main features are computing network exposure models based on weight matrices (direct ties, structural equivalence, attribute-weighted, etc.), thresholds, infectiousness and susceptibility. The package works with both static and dynamic networks. Some other capabilities include handling relatively large graphs, simulating networks and diffusion of innovation processes, and visualizing the diffusion of innovations. While there are no prerequisites, it is suggested that you have a working knowledge of the R programming language.

While there are no prerequisites, it is suggested that you have a working knowledge of the R programming language. We will use the latest version of the netdiffuseR R package, which can be found on GitHub here: <https://github.com/USCCANA/netdiffuseR>. During the workshop day, we will provide access to a cloud version of RStudio with the latest version of netdiffuseR, so do not worry if you cannot install the package before the workshop.

Duration: 3 hours

Max participants: 30

Epidemic modeling on networks using EpiModel

Steven Goodreau, Adrien le Guillou

Modeling the dynamics of infectious diseases on networks has a long history, and has become more prominent in recent years. This workshop provides a hands-on tutorial for the use of the R package EpiModel for network modeling of epidemics. EpiModel builds on the statnet suite of packages, especially tergm and other packages for temporal network modeling. Thus, familiarity with the concepts and methods of tergms, especially model terms, is important, although we will provide a rapid refresher. Familiarity with the basic concepts of epidemic modeling is also helpful. Familiarity with R is essential. We will cover:

- An overview of the EpiModel framework
- A rapid refresher on ergms and tergms
- A rapid overview of epidemic modeling concepts
- Specification and parametrization of models from egocentric network data
- Specification and parametrization of models from complete network data
- Visualization of network and epidemic outcomes
- Hands-on examples for basic models
- Introduction to the EpiModel API to expand models beyond the basics
- Pointers to research-level models with published EpiModel code

Bringing Social Network Analysis into Practice: An Introduction to Using PARTNERTM CPRM for Network Data Collection and Analysis

Danielle Varda, Jennifer Lawlor

In this accessible workshop, we will provide an introduction to using the PARTNERTM CPRM (Community Partner Relationship Manager) software to collect and analyze social network data for continuous network monitoring and improvement in community settings. This platform reduces the complexity of network data collection, provides automated analysis and visualizations, and creates opportunities for community ownership and public-facing data sharing. We will highlight the key components of capturing data with PARTNERTM CPRM, including:

> Member Management: Participants will learn how to populate a PARTNERTM CPRM ecosystem with a list of network members, assign attributes to those members, and include them in a data capture. We will also discuss how to build on existing approaches community networks and organizations may be using to track their members (e.g., via spreadsheet or database).

> Question Design & Data Collection: Participants will learn about how to use the standard survey questions included in the PARTNERTM CPRM platform as well as how to design their own. They will also learn about how to schedule in-platform email recruitment and track responses as they come in. We will also demonstrate ways to track networks as they develop over time and to capture data about “networks of networks” using the tool.

> Analysis & Dissemination: All participants will have a chance to explore the analysis tools on the platform, including network visualization, key metrics, GIS mapping, and chart/table development. Participants will also learn how to disseminate results through the platform using member profiles (individualized profiles for each member of the network) and dashboards (which can track whole network data as it comes in).

Participants will leave the session with improved capacity for using PARTNERTM CPRM to: (1) design and implement community-engaged social network analysis projects, (2) track community networks over time, and (3) disseminate results of network analyses in practical contexts.

Participants should bring their own computer to access workshop resources and follow along with tutorials to use the software.

Navigating social capital theory and literature

Tristan Claridge

A brief description of your workshop (max. 500 words)

This workshop provides a roadmap for understanding the concept of social capital with practical tools to help organize and understand the different conceptual and theoretical approaches. It is designed to rapidly introduce the concept and its use in research, helping avoid weeks or even months of reading. It will help you quickly navigate the different meanings and conceptual approaches, directing you to the best approach for your research or interest and giving you reference lists and readings.

Social capital is a complex concept with many different meanings and conceptual approaches that can be difficult and complicated to understand and apply. The literature on the topic is incredibly broad and diverse, presenting an ongoing challenge for anyone interested in using the concept in research or practice. The concept has numerous theoretical foundations, making reading the literature challenging, even for experienced scholars. Most people reading the literature report feeling confused and uncertain, and everyone can benefit from a deeper understanding of the theories of social capital.

Over the last 20 years of working on the concept of social capital, Tristan Claridge, the facilitator of this workshop, has developed numerous typologies for understanding the concept. His work has sought to identify the differences and similarities of different approaches to social capital, and he has constantly asked difficult questions to explore the deeper meanings and theoretical foundations.

There are no “silver bullets” and no quick simple solutions that are appropriate for every discipline and every application. But this workshop guides and directs you. Ultimately, the goal of this workshop is to help you understand the concept better, apply it more effectively, and save you time in doing so. You will come away with a deeper understanding of the concept of social capital and how to apply it in research or practice.

Names and contact information of all organizers

Tristan Claridge, Director, Institute for Social Capital

President, International Social Capital Association

Email tristan@socialcapitalresearch.com

Phone +61 (0)493 175 542

Length of the workshop: 3 hours. Maximum number of attendees 50.

Advanced Modeling of Relational Events in R Using goldfish.latent

Alvaro Uzaheta, Maria Eugenia Gil-Pallares, Christoph Stadtfeld

This workshop provides an advanced introduction to `goldfish.latent`, an R package that extends relational event modeling by incorporating latent variable models. Participants will learn to model actor heterogeneity through the package's implementation of random effects powered by Stan.

Practical examples and hands-on exercises will guide attendees through model specification, estimation, and interpretation, enabling them to apply these advanced methods to their relational event data.

A particular focus will be given to analyzing multiple sequences as a case study for using random effects, highlighting the package's flexibility in handling complex relational event structures.

Prerequisites:

Participants should be familiar with R and the `goldfish` package. Those new to `goldfish` are encouraged to attend the introductory “Modeling Relational Events in R Using `goldfish`” workshop.

What to Bring:

- A laptop with the following installed:
 - R statistical computing system
 - Stan (via `cmdstanr` or `rstan`)
 - `goldfish` and `goldfish.latent` packages with all dependencies
- Installation links:
 - `goldfish.latent`: <https://github.com/snlab-ch/goldfish.latent>
 - Stan: <https://mc-stan.org/cmdstanr/>

References:

- Stadtfeld, Christoph, and Per Block. 2017. “Interactions, Actors, and Time: Dynamic Network Actor Models for Relational Events.” *Sociological Science* 4 (14): 318–52. <https://doi.org/10.15195/v4.a14>.
- Uzaheta, Alvaro, Viviana Amati, and Christoph Stadtfeld. 2023. "Random Effects in Dynamic Network Actor Models." *Network Science* 11(2): 249-266. <https://doi.org/10.1017/nws.2022.37>.

Length: 3 hours

Participants: 30

Creating New Effects in RSiena

Nynke Niezink

Stochastic actor-oriented models as implemented in the R package `RSiena` help researchers study social network dynamics and the co-evolution of social networks and social actors' individual behavior. While originally developed for directed networks and discrete behavior, the model now accommodates a wide range of data types as dependent variables, including undirected networks, two-mode networks, multiplex networks, and continuous behavior.

Over the years, a large selection of effects has been implemented for stochastic actor-oriented models. Many of these were motivated by the diverse set of research questions network researchers have about social dynamics. Yet, you may still run into the problem of wanting to study a social mechanism for which the `RSiena` manual does not contain a matching effect. In this case, if you feel comfortable programming in R, you may want to implement an effect in `RSiena` yourself.

This workshop will discuss how to create an effect in `RSiena`. Since the back-end of the `RSiena` code was implemented in C++ for computational efficiency, creating `RSiena` effects involves

coding in both R and C++. The workshop will give a brief introduction to C++, discussing just those parts you need to be able to create your effect. We will go through the several phases of developing an RSiena effect, going from social mechanism to effect definition to implementation and testing. We will also see how implementing effects can go wrong and discuss how you can debug your work. Finally, we will discuss how you can decide per effect, depending on your coding experience, whether to implement it yourself or to ask for help.

The target audience for this workshop consists of RSiena users who feel comfortable programming in R (e.g., writing a function, writing for-loops, etc). No prior experience in C++ is required. The workshop will not introduce the stochastic actor-oriented modeling framework but only focus on implementing effects. Please refer to the Sunbelt 2025 workshop list for introductory workshops on RSiena.

Length: 3 hours. Capacity: 30 people

Mapping Semantic Networks with KnowKnow

Alec McGail

This workshop introduces participants to constructing and analyzing term co-occurrence networks using the open-source Python package knowknow. Co-occurrence networks are particularly effective for analyzing small, linguistically diverse datasets, enabling researchers to identify features and trends that may appear in only a few documents. Participants will gain hands-on experience analyzing a curated dataset of journal articles from anthropology, economics, political science, psychology, and sociology (1970–2020), with the option to bring and work with their own datasets.

The session covers techniques for building co-occurrence datasets from academic texts and preparing them for analysis; methods for identifying meaningful terms, their relationships, and the structural properties of co-occurrence networks, such as clusters, hubs, bridges, and temporal patterns; and practical guidance on sharing workflows and datasets using Harvard Dataverse and GitHub to ensure replicability and collaboration.

Morning Session: Building and Visualizing Semantic Co-occurrence Networks. 1) Overview of co-occurrence networks and their application to social science research. 2) Preparing a dataset and building initial co-occurrence networks using knowknow. 3) Visualizing networks using built-in tools. 4) Exporting datasets, documenting workflows, and publishing on open platforms.

Afternoon Session: Interpreting Semantic Co-occurrence Networks. 1) Temporal trends and structural features of semantic networks. 2) Formulating and answering research questions about the dynamics of the social sciences. 3) Hands-on projects.

Prerequisites: Beginner-level familiarity with Python (basic scripting, running code in Jupyter Notebooks). No prior experience with knowknow is required.

Participants should bring a laptop with Python pre-installed or access to an online Python environment (e.g., Google Colab).

Introduction to the analysis of multilevel network dynamics using multiSiena

Johan Henrik Koskinen

Stochastic Actor-oriented Models (SAOMs), as implemented in RSiena, are statistical models for analysing network dynamics. SAOMs assume that you have observed the network at at least two points in time. These models have been extended to handle many forms of longitudinal networks and could be said to collectively be regarded as the gold standard methods for such data.

Having observations on multiple networks, multilevel networks, is becoming increasingly common. This workshop deals with longitudinal analysis of such multilevel models, in particular the random coefficient multilevel longitudinal network analysis implemented in the function `sienaBayes` which is part of `multiSiena`, the sister package of `RSiena`. This method is based on the Stochastic Actor-oriented Model (SAOM). The basic idea of this random coefficient model will be presented, with the approach taken by the analysis using `sienaBayes`. The use of this function will be explained, and guidance will be given for parameter interpretation.

Topics treated are:

principles of Bayesian inference; the random coefficient multilevel version of the SAOM (ML-SAOM); MCMC estimation of the ML-SAOM; operation of `sienaBayes`; parameter interpretation.

Prerequisites

The workshop is intended for participants who know about the Stochastic Actor-oriented Model, and have practical experience in working with `RSiena`.

Literature:

Ripley, Ruth M., Tom A.B. Snijders, Zsofia Boda, Andras Voros, and Paulina Preciado (2023). Manual for `RSiena`.

URL: https://www.stats.ox.ac.uk/~snijders/siena/RSiena_Manual.pdf

Koskinen, Johan H. and Tom A.B. Snijders (2023). Multilevel longitudinal analysis of social networks. *Journal of the Royal Statistical Society, Series A*.

DOI: <https://doi.org/10.1093/jrssa/qnac009>

SIENA website: <http://www.stats.ox.ac.uk/~snijders/siena>

Maximum number of participants 30.

Introduction to Bayesian estimation of Auto-logistic actor attribute models (ALAAM) in R

Johan Henrik Koskinen

Auto-logistic actor attribute models (ALAAMs) are models for analysing social influence or social contagion for cross-sectional networks, when the outcome of interest is dichotomous. If no dependencies among the outcomes of the nodes are assumed, this model reduces to logistic regression. When dependencies through the network, such as social contagion, are assumed, however, the ALAAM provides testable parameters that capture these processes.

The workshop will introduce the R package “`balaam`”, which provides a range of different parameters for network dependencies and estimates the model using Bayesian inference. The package also provides goodness-of-fit analysis, model selection indices, as well as principled approaches for dealing with missing outcomes.

Topics treated are:

principles of Bayesian inference; model specification; MCMC estimation for the ALAAM; model selection; missing data analysis.

Prerequisites

The workshop is intended for participants who have working knowledge of quantitative analysis and experience in empirical network research. Fundamental social network analysis skills are assumed.

Literature:

Koskinen, J. and Daraganova, G. (2022) Bayesian analysis of social influence. *Journal of the Royal Statistical Society Series A: Statistics in Society* 185.4, pp. 1855–1881.

Daraganova, G. & Robins, G. (2013) Autologistic actor attribute model. In: Lusher, D., Koskinen, J. & Robins, G. (Eds.) Exponential random graph models for social networks: theory, methods and applications. New York: Cambridge University Press. pp. 102–114.

Daraganova, G. & Pattison, P. (2013) Autologistic actor attribute model analysis of unemployment: dual importance of who you know and where you live. In: Lusher, D., Koskinen, J. & Robins, G. (Eds.) Exponential random graph models for social networks: theory, methods and applications. New York: Cambridge University Press, pp. 237–247.

ALAAM website: <https://github.com/johankoskinen/ALAAM>

Next-generation ERGMs: Scaling Up

Michael Schweinberger, Cornelius Fritz

In large networks with thousands or millions of actors, the interactions among actors are not affected by the interactions among all other actors, because many social networks are more local than global in nature: Indeed, actors may not even know most other actors, and therefore cannot be influenced by them. A simple class of models that respects the local nature of many social networks assumes that actors are divided into communities and that actors are affected by other actors of the same community, but are not affected by actors outside of the community. The communities may be known or unknown. If the communities are unknown, one can infer the unobserved communities from the observed social network along with the social forces that govern interactions among actors within and between communities. The proposed workshop focuses on next-generation ERGMs for large networks implemented in R package `bigergm`, which is an evolution of R packages `hergm` and `lighthergm`. The workshop will introduce the basic ideas of next-generation ERGMs and will demonstrate them by examples. Participants will be provided with sample R scripts.

Software:

Fritz, Schweinberger, Komatsu, Dahbura, Nishida, and Mele (2024). R package `bigergm`. <https://cran.r-project.org/web/packages/bigergm/index.html>

Literature:

The basic idea is introduced in Schweinberger and Handcock (2015). Local dependence in random graph models: Characterization, properties and statistical inference. *Journal of the Royal Statistical Society, Series B*, 77, 647-676.

An application to systemic risk in social networks can be found in Fritz, Georg, Mele and Schweinberger (2024). Vulnerability webs: Systemic risk in software networks.

Computational details are provided in Babkin, Stewart, Long, and Schweinberger (2020). Large-scale estimation of random graph models with local dependence. *Computational Statistics & Data Analysis*, 152, 1-19.

The ACT (Activate, Connect, Transform) model to design social and collaborative interventions for implementation and action

Reza Yousefi Nooraie

The ACT (Activate, Connect, Transform) model aims to guide the design, implementation, and evaluation of social and collaborative interventions that Activate, Connect, and Transform individuals, organizations, health systems, and communities.

The ACT model responds to pressing needs in healthcare and community action: how to meaningfully engage patients in decision-making, research, and policy; how to leverage social networks for the dissemination and implementation of high-quality innovations; and how to create networks of learning and improvement in healthcare and community settings. This is essential in our rapidly changing landscapes, where bridging formal and informal social

networks and relations can enhance outcomes and quality of services and equip health and social systems to respond dynamically to emerging needs and crises.

The three pillars of ACT involve:

Activate: empowering individuals, organizations, and communities with the motivation, skills, and strategies to mobilize resources and foster relationships.

Connect: Building and nurturing supportive relationships, networks of influence and knowledge sharing, and partnerships among individuals, teams, and communities to strengthen collective capacity and achieve shared goals.

Transform: Driving improvement in behaviors, processes, and outcomes by implementing and sustaining evidence-based innovations.

The workshop Agenda:

- Introduction to the three-pillar approach

- Activate interventions:

•“Network diagnostics”/charting at the individual or community levels to provide network actors with a bird’s eye view of their existing networks and potentials for further activation.(Yousefi Nooraie, et al., 2021)

•Asset mapping

- Connect interventions:

•Strategies to facilitate connectivity and optimize social structure, following the framework developed by Yousefi Nooraie, et al. (2021)

- Transform interventions:

•Strategies to enhance the dissemination and implementation of valued interventions using networking strategies, following the framework developed by Bunger and Yousefi Nooraie, et al. (2023)

- Cyclic approach to intervention refinement

- A quick introduction to evaluation

•Approaches to assess network evolution, social activation, and resilience building, with an emphasis on mixed-methods analysis (Yousefi Nooraie et al., 2020)

With this unique three-pillar approach—Activate, Connect, and Transform—the ACT model aims to inform the design of interventions to build dynamic, resilient, and inclusive networks where individuals are engaged, networks are optimized for knowledge sharing and support, and dynamically respond to emergent needs.

Workshop length: 3 hours. Maximum number of attendees: 20

References:

Bunger, A. C., Yousefi-Nooraie, R., Warren, K., Cao, Q., Dadgostar, P., & Bustos, T. E. (2023). Developing a typology of network alteration strategies for implementation: a scoping review and iterative synthesis. *Implementation Science*, 18(1), 10.

Yousefi Nooraie, R., Mohile, S. G., Yilmaz, S., Bauer, J., & Epstein, R. M. (2021). Social networks of older patients with advanced cancer: Potential contributions of an integrated mixed methods network analysis. *Journal of geriatric oncology*, 12(5), 855-859.

Yousefi Nooraie, R., Sale, J. E., Marin, A., & Ross, L. E. (2020). Social network analysis: An example of fusion between quantitative and qualitative methods. *Journal of Mixed Methods Research*, 14(1), 110-124.

Yousefi Nooraie, R., Warren, K., Juckett, L. A., Cao, Q. A., Bunger, A. C., & Patak-Pietrafesa, M. A. (2021). Individual-and group-level network-building interventions to address social isolation and loneliness: a scoping review with implications for COVID19. *PLoS one*, 16(6), e0253734.

Discovering Blockmodeling: Hands-On Analysis with BlockmodelingGUI

Fabio Ashtar Telarico, Aleš Žiberna

Description

This three-hour workshop provides an in-depth introduction to BlockmodelingGUI, a cutting-edge R package designed to simplify and enhance blockmodelling techniques in network analysis. Blockmodelling is a powerful method for identifying and interpreting patterns in relational data, making it invaluable in fields such as sociology, political science, and organisational studies. By integrating an intuitive graphical interface with the robust analytical capabilities of R, BlockmodelingGUI empowers researchers to uncover structural insights without requiring extensive coding expertise.

Participants will engage in a combination of conceptual discussions and hands-on exercises, exploring the theoretical underpinnings of blockmodelling and applying these methods to real-world datasets. The workshop will cover essential workflows, from data preparation and model configuration to result interpretation and visualisation. Attendees will also discover advanced features of the package, including optimisation techniques and customisation options, enabling them to tailor analyses to their specific research questions.

This session is designed for researchers, data scientists, and professionals eager to enhance their understanding of network structures. By the end of the workshop, participants will have the practical skills to harness BlockmodelingGUI in their own projects and a deeper appreciation of how blockmodelling can illuminate hidden dynamics within complex systems. Whether you are a seasoned network analyst or a newcomer to the field, this workshop offers valuable insights and tools to elevate your analytical capabilities.

Detailed workplan

1. Introduction to Blockmodelling

- * Key concepts and applications in social network analysis.
- * Advantages of blockmodelling for understanding relational structures.

2. Getting Started with BlockmodelingGUI

- * Installing and setting up the package.
- * Overview of the graphical user interface.

3. Hands-On Analysis

- * Importing and preparing network data.
- * Building and customising blockmodels.
- * Interpreting results and generating visualisations.

4. Advanced Features

- * Optimisation techniques and parameter tuning.
- * Exporting and integrating results with other analyses.

5. Case Studies

- * Real-world examples demonstrating the package's capabilities.
- * Collaborative exercises to reinforce learning.

Format

- * Duration: [Specify, e.g., Half-day or Full-day workshop]
- * Structure: Introduction (20%) and hands-on practice (80%).
- * Materials: Participants will receive datasets/pre-configured R environments.

Requirements

- * Participants should bring laptops with R and RStudio pre-installed.
- * The workshop organisers will provide a detailed setup guide before the event.

Fluctuating Opinions in Social Networks: A Tutorial in Bayesian Learning Methods

Farhad Farokhi, Nicholas Kah Yean Low, Yutong Bu, Jarra Horstman, Andrew Melatos, Robin Evans, Yijun Chen, Julian Greentree

Theoretical studies of opinion formation and evolution in social networks often focus on convergence to a set of steady-state opinions, namely asymptotic learning (with or without consensus). This is often motivated by the desire to seek an 'equilibrium' according to various definitions from statistical physics, control engineering, or economics. In many real social settings, however, it is observed empirically that opinions do not converge to a steady state; instead, they fluctuate indefinitely. This interdisciplinary workshop has three goals: (i) to introduce attendees to fundamental theoretical tools based on Bayesian inference that are suitable for modelling opinions and their evolution; (ii) to highlight some counter-intuitive yet realistic social phenomena that emerge when applying these tools; and (iii) to bring together practitioners from different knowledge domains (e.g. media studies, political science, education, artificial intelligence, social sciences, complex systems, and network sciences), who aspire to apply the tools to real-life systems. Specifically, we begin with an introduction to Bayesian statistics and belief propagation over networks. This enables us to learn the underlying tools required for modelling and analysis of opinion evolution across social networks. At this stage, we will also review some results on asymptotic learning on social networks facilitated by Bayesian inference. We then delve into a new model of opinion formation and evolution by enmeshing Bayesian learning and peer interactions. As an illustrative example, we consider a scenario where networked agents form beliefs about the political bias of a media organisation through consumption of media products, and peer pressure from political allies and opponents. To capture the multi-modal nature of opinions (individuals can hold contradictory beliefs with different levels of certainty), we model the agents' beliefs as probability distribution functions. In certain network structures, numerical simulations reveal counter-intuitive predictions, such as wrong conclusions being reached quicker with more certainty, turbulent non-convergence (some agents cannot "make up their mind" and vacillate in their beliefs), and intermittency (agents' beliefs flip between stable eras, where their beliefs do not vary over many time steps, and turbulent eras, where their beliefs fluctuate from one time step to the next). We will also consider belief disruption by partisans, i.e. stubborn agents who do not change their beliefs. If time permits, attendees will receive practical, hands-on instruction in coding the methods covered during the workshop.

Workshop Length: 3 hours.

Maximum Attendees: 30.

Introduction to Social Network Data Collection with an Emphasis on Social Survey Methods.

David Benjamin Tindall

This workshop is intended for relative newcomers to social network analysis. The workshop will provide an introduction to social network data collection with an emphasis on social survey methods. The workshop will consider a variety of related methodological issues such as research design, measurement, sampling, data analysis, and ethics, as well as the linkage of these issues to data collection. Different types of data collection techniques will be illustrated such as the name generator, position generator, and name roster. The different opportunities and constraints associated with data collection for whole versus ego-networks will be considered. Some discussion of non-survey techniques may also be provided. Some attention may also be given to mixed methods.

Hyperlink Prediction on Hypergraphs Using Python

Moses Boudourides

Hyperlink prediction, a natural extension of link prediction in graphs, focuses on inferring missing hyperlinks in hypergraphs, where a hyperlink can connect more than two nodes. This technique has diverse applications across systems such as bibliometric networks, chemical reaction networks, social communication networks, and protein-protein interaction networks (among others).

In this workshop, we provide a systematic and comprehensive demonstration of hyperlink prediction using Python, primarily leveraging the PyTorch library. We will explore three structural similarity-based methods (Common Neighbors, Katz Index, and Resource Allocation), a probability-based method (Node2Vec, based on random walks), and a deep learning-based method (CHESHIRE: Chebyshev Spectral Hyperlink Predictor).

To evaluate the performance of hyperlink prediction, we will use a range of metrics, including F1 scores, ROC AUC, accuracy, precision, recall, log loss, and Matthews correlation coefficient—metrics widely utilized in machine learning. Additionally, we will discuss how hyperlink prediction extends to temporal hypergraphs. To compare, benchmark, and evaluate the hyperlink prediction methods, we will use a selection of well-known or randomly generated medium-sized networks.

This is a hands-on computational workshop, and participants should have some prior knowledge of Python. All computations will be performed in Jupyter Notebooks, which will be made available on GitHub before the workshop.

SNA Toolbox – Data Collection, Visualisation, Analysis and Rapid Reporting

Dean Lusher, Peng Wang

In this 3-hour workshop, you will get hands-on experience with SNA Toolbox – web-based software for the collection, visualisation, analysis and rapid reporting of social network data. SNA Toolbox is a comprehensive all-in-one network package that allows you to collect network data and have it instantly available in network-ready form for analysis (e.g., standard network metrics, indegree, clustering, etc...), with the ability to create a pipeline for online reports for research clients/partners/customers/participant groups that are securely accessible online.

Points covered include:

- System overview, including features, security, and user roles
- Using the survey designer to construct social network and standard attribute questions, as well as automated calculations of scale items.
- Network analysis packages that immediately utilise the data collected without the need for data transformation.
- Network visualisation tools, algorithms, nodal attributes, and selected node information
- General data visualisation tools (e.g., charts, graphics, etc...)
- Reporting: templates, pre-configurations, insights tools, and rapid reporting to clients on researcher-selected metrics.

No software is required. You will be supplied with login credentials for the web-based application for the workshop and beyond.

Family violence in network research

Tatjana Fabricius, Noreen Naranjos Velazquez, Matilde Heredia

Abstract for Session – Sunbelt 2025 Paris

Family violence in network research

Tatjana Fabricius, Noreen Naranjos Velazquez, Matilde Heredia

Family violence is frequently conceptualised and theoretically situated within systemic or socio-ecological paradigms, reflecting the frameworks associated with its analysis (Dutton 2006). Various disciplines explore and examine domestic violence using diverse network-analytical designs (Wassermann/Faust 1994). A multitude of dimensions emerge in this context, including intimate partner violence, intergenerational violence scenarios, or specific manifestations such as sexual, psychological, and physical abuse (Johnson 2008).

Adopting an interdisciplinary perspective generates diverse research questions, which this session aims to explore through exemplary network-analytical studies at global, societal, institutional, individual, or methodological levels. Key focal points include:

- How can family violence be addressed preventively?
- What dynamics underlie individual or co-occurring forms of domestic violence?
- To what extent is the institution of the family embedded in contexts that facilitate violence?
- What role do formal and/or informal support networks play?
- Which network perspectives can effectively inform prevention, intervention, therapy, and prosecution efforts?
- What long-term consequences can be identified for society and the state?

This session, with its open and inclusive nature, specifically invites scholars from various disciplines to submit their research findings on this topic, which is of critical importance across the entire lifespan. Consequently, the session is methodologically and thematically broad in scope, fostering a holistic exploration of family violence.

Keywords: abuse, domestic violence, network analysis

Literatur

Dutton, D. G. (2006). *Rethinking Domestic Violence*. UBC Press.

Johnson, M. P. (2008). *A typology of domestic violence: intimate terrorism, violent resistance, and situational couple violence*. Boston, Mass. [u.a.] : Northeastern Univ. Press.

Wassermann, S./Faust, K. (1994). *Social Network Analysis. Methods and Applications*. Cambridge University Press.

Introduction and demonstration of participatory social network mapping approaches for health equity

Darcy Freedman, Owusua Yamoah, Emily Suzanne Nelson

There have been calls for system-level interventions that target the redistribution of power within communities to achieve health equity. To develop and assess the effectiveness of these interventions, there is a need for approaches that engage multiple actors within the system to identify and evaluate who has different types of power, how power operates, and how power changes over time. Participatory social network mapping approaches can be used to map the landscape of power and social capital within communities while fostering reflections on how these dynamics shape opportunities to realize health equity. This workshop will review and provide demonstrations of two participatory social network mapping approaches applied within a community-based food systems change intervention and a coalition-based opioid fatality reduction intervention. The session will begin with an overview of the methods used to frame power dynamics within these two different interventions, including terminology applied to define different types of power influencing these two health equity interventions. Next, we will practice applying these methods using egocentric social network analysis to explore

connections to different sources of power among local food justice leaders and opioid-focused coalitions. We will examine how these power networks can be understood based on their trustworthiness, collaboration, and influence and how these dimensions of power influence intervention pace, equity, and efficiency. Participants will create their own power maps and explore how these can be analyzed in R. Finally, we will explore how these methods were used to guide food system changes focused on promoting nutrition equity and to inform sustainability of opioid fatality reduction strategies within diverse community settings.

Network Canvas: An introduction to the design, administration, and management of in-person and remote personal network studies.

Michelle Birkett, Patrick Janulis, Joshua Melville, Bernie Hogan, Gregory Phillips, Kate Banner

The goal of this workshop is to provide participants an orientation to conducting personal networks research within Network Canvas and the opportunity to master the skills necessary to apply these tools within their specific domain of interest. Network Canvas (<http://www.networkcanvas.com>) is a free and open-source software suite that facilitates the collection of self-reported social network data, comprised of applications to support both in-person interviewer-assisted environments as well as remote self-administered studies.

In this workshop, we will provide an overview of Architect, the Network Canvas visual survey builder, as well as Interviewer, the Network Canvas app used to collect data directly from participants within an in-person research design. We will also provide an overview of Fresco, the newest Network Canvas tool designed for remote network surveying. Finally, we will explore data export in Interviewer and Fresco, and a brief orientation to analysis.

Expect the opportunity to engage in hands-on exercises during the session with assistance from our team. When completed, you will acquire the skills to:

Design an egocentric or whole network survey

Deploy and manage a study, whether in-person or remote

Obtain study data in Interviewer and Fresco, and export it for analysis