COMPLEX NETWORKS

COMPLEX NETWORKS 2023

THE 12TH INTERNATIONAL CONFERENCE ON COMPLEX NETWORKS AND THEIR APPLICATIONS

November 28 - 30 , 2023
Menton, France

PROGRAM

Dear Colleagues and Friends,

With great enthusiasm, we warmly welcome you to the charming coastal town of Menton for the 12th edition of the International Conference on Complex Networks from November 28-30, 2023.

Menton, nestled along the azure shores, provides an exquisite backdrop for our gathering. The town, known for its beauty and cultural richness, offers a unique blend of history and contemporary allure. As we delve into the intricate web of complex networks, we invite you to explore the enchanting Old Town.

The Université Côte d'Azur, our gracious host for this edition, stands as a symbol of academic excellence and innovation. The university has been at the forefront of education, research, and international collaboration since its inception.

As we embark on this intellectual journey, we encourage you to engage in stimulating discussions, forge new connections, and immerse yourself in the rich program crafted for your benefit.

With its unique charm, Menton promises an intellectually enriching experience and opportunities for networking and cultural exploration. We hope you will take the time to discover the gems of Menton, from the vibrant local markets to the tranquility of the coastline.

We extend our heartfelt thanks to all participants, speakers, and contributors who made this conference a platform for knowledge exchange and collaboration. A special acknowledgment goes to our sponsors, whose generous support has made COMPLEX NETWORKS 2023 possible. This edition marks a significant milestone as the first sustainable event in the domain, reflecting our commitment to environmental responsibility.

In our efforts toward sustainability, we have implemented eco-friendly practices. We encourage all attendees to join us in this collective endeavor by minimizing their environmental footprint throughout the conference.

May the conference leave you with lasting memories, new insights, and a network of colleagues and friends while contributing to a more sustainable future through our collective efforts. Join us in making this event a catalyst for advancing knowledge and fostering environmental responsibility.

Welcome to Menton!

Hocine Cherifi
University of Burgundy

Luis M. Rocha
Binghamton University

Chantal Cherifi
The University of Lyon 2

Murat Donduran
Yildiz Technical University

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MONDAY, NOVEMBER 27, 2023

Tutorials

Maria LIAKATA

Queen Mary University of London, UK

M Maria is a Professor in Natural Language Processing (NLP) at Queen Mary, University of London. She is in receipt of an EPSRC/UKRI Turing AI fellowship award on Creating Time Sensitive Sensors from Language & Heterogeneous User-Generated Content (2019-2025) https://www.turing.ac.uk/research/research-projects/time-sensitive-sensing-language-and-user-generated-content. At the Alan Turing Institute she co-leads the NLP and data science for mental health interest groups and supervises PhD students. She is co-leading projects on Language sensing for dementia monitoring & diagnosis (https://www.dcs.warwick.ac.uk/langsensing/), Opinion summarisation from social media, an AI evidence based framework during pandemics (https://panacea2020.github.io/index.html). Maria has a DPhil from the University of Oxford on learning pragmatic knowledge from text. Her work has contributed to advances in knowledge discovery from corpora, automation of scientific experimentation and automatic extraction of information from the scientific literature. She has published widely both in NLP and interdisciplinary venues. Past awards include an IBM Faculty Award for work on emotion sensing from heterogeneous mobile phone data, being a co-investigator on the EU Project PHEME, which studied the spread of rumours in social media (2014-2017) and an Early Career Fellowship from the Leverhulme Trust (2010-2013) on reasoning with scientific articles.

Longitudinal language processing from user generated content

In most of the tasks and models that we have made great progress within NLP in recent years, there isn't a notion of time. However many tasks are sensitive to changes and temporality in real world data, especially when pertaining to individuals, their behaviour and their evolution over time, as is the case with user generated content and social media data. I will introduce a programme of work on longitudinal natural language processing. This consists in developing natural language processing methods to: (1) represent individuals over time from their language and other heterogenous content (2) capture changes in individuals' behaviour over time (3) generate and evaluate synthetic data from

individuals' content over time (4) summarise the progress of an individual over time, incorporating information about changes. I will discuss progress, methods and challenges this far with examples from recent publications and applications such as mental health monitoring, opinion summarisation and rumour verification.

Tiago DE PAULA PEIXOTO

CEU Vienna, Austria

I am an Associate Professor in the Department of Network and Data Science at the Central European University (CEU), Vienna, Austria. I have received my Habilitation in Theoretical Physics at the University of Bremen in 2017. Previously, I have been an Assistant Professor in Applied Mathematics at the University of Bath (2016-2019), External Researcher at the ISI Foundation (2015-2020), and post-doc researcher at the University of Bremen (2011-2016) and Technical University of Darmstadt (2008-2011). The research of my group lies at the interface between Statistical Physics, Complex Systems, Data Science, Applied Mathematics, and Machine Learning, with a special interest in the methodological foundations of Network Science.

Network Inference and Reconstruction

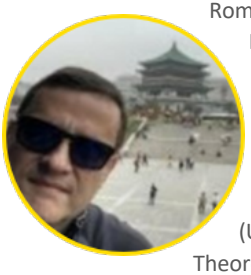
We will provide a concise introduction to principled techniques for the detection of patterns and formation mechanisms from network data, grounded in Bayesian statistical inference and information theory. We will learn how to distinguish structure from statistical noise, how to perform uncertainty quantification, and to compare different generative models. We will also see how these ideas can be extended to reconstruct networks; both when their structure is measured directly but unreliably, and also when the structure is not measured directly at all, and needs to be uncovered from time-series or other indirect non-network data.

TUESDAY, NOVEMBER 28, 2023

Keynote Speakers

Romualdo PASTOR-SATORRAS

Northwestern University, USA



Romualdo Pastor-Satorras is full Professor at the Universitat Politècnica de Catalunya; He received a Ph.D. in Condensed Matter Physics from the Universitat de Barcelona in 1995. He spent four years as a postdoctoral researcher at the Massachusetts Institute of Technology (1996-1998) and The Abdus Salam International Centre for Theoretical Physics, ICTP (1998-2000). He has been a visiting scientist at Yale University (USA), the University of Notre Dame (USA), the Kavli Institute for Theoretical Physics (USA), the Helsinki University of Technology TKK (Finland), Indiana University (USA), and the Institute for Scientific Interchange (ISI) Foundation (Italy). He has been awarded twice with the national "ICREA Academia Prize" by the Government of Catalonia. He has published in more than 180 peer-reviewed journals in statistical physics. The main topics he works on are 1) Topological and temporal properties of natural systems. 2) Dynamical processes and non-equilibrium phase transitions in disordered substrates. 3) Dynamics of social systems. 4) Human activity and dynamics. 5) Non-Markovian temporal networks. 6) Collective motion.

Opinion Depolarization in Interdependent Topics and the Effects of Heterogeneous Social Interactions

The presence of opinion polarization (i.e. two groups holding opposite and possibly extreme opinions in a population) has been extensively observed with respect to several controversial topics, ranging from religion to political ideology. Modeling the process of reducing opinion polarization among the population, or depolarization, has been the object of much recent work. In most cases, such efforts address the simplest case of one-dimensional opinions with respect to a single topic. However, the process of opinion formation may invest multiple topics at the same time, requiring a proper multidimensional modeling framework for opinion dynamics. Here we present an analytically tractable model of opinion dynamics in a space of two interdependent topics, the so-called "Social Compass Model" (SCM). In the SCM, opinions are represented in polar coordinates, where the angle represents the orientation and the radius the conviction of individuals. We postulate a dynamics inspired by the classic Friedkin-Johnsen, in which the orientation of individuals, subject to an initial, preferred orientation

and to social influence by peers, experience a depolarization phase transition for a sufficiently large social influence level. By means of a mean field analysis, we observe that the transition of the SCM is continuous for correlated initial opinions, while it has an discontinuous, explosive nature for uncorrelated initial opinions. These results are checked against numerical simulations using as initial opinions real data extracted form the American Nation Election Studies (ANES) surveys. Finally we discuss the effects of an heterogeneous pattern of contacts on the depolarization transition of the SCM model.

This keynote is sponsored by Entropy, MDPI

Manlio DE DOMENICO

University of Padua, Italy

Manlio De Domenico is an associate Professor of Applied Physics and Head of the Complex Multilayer Networks (CoMuNe) Lab at the Department of Physics and Astronomy 'Galileo Galilei' of the University of Padua. His research activity is at the edge of theoretical, experimental and computational aspects of statistical physics of complex systems, where theory is used to make hypothesis about empirical phenomena in biological, ecological, socio-technical and socio-ecological sciences, which are then validated on real (sometimes massive) data sets. To date, he has applied such tools to: a) the interactome of human and several other organisms, b) the human, macaque and C. Elegans connectomes, c) a variety of socio-ecological and socio-technical ecosystems, d) the Internet and the Dark Web, e) a variety of transportation infrastructures, including the global airport network, rail networks, road networks and multimodal urban transportation means. A (non-exhaustive) list of his current activities includes: a) the mathematical formulation of multiplex networks, the study of their structure and of dynamical processes on such systems, the study of their resilience to random or targeted pertubations, b) the formulation of an appropriate statistical physics/information theory of complex networks, c) the formulation of a geometry of network-driven processes, d) the application of advanced mathematical techniques to reduce the complexity of networked systems, e) he functional representation of a system from the measurement of signals produced by its units, with application to human brain, human interactome, climate change and social systems. He also finds enough time to investigate hidden structural and dynamical patterns in complex real and virtual time-varying networks, with particular attention to social, biological and economic systems. Indeed, he develops models and simulations for

human mobility, the spreading of epidemics and of information in real-world social networks.

An Emerging Framework for the Functional Analysis of Complex Interconnected Systems

Information exchange is crucial for the functioning of interconnected systems, influencing -- and being influenced by -- the interplay between the underlying structure and dynamical rules in action. Analyzing empirical complex networks is challenging due to this interdependence. I will present a framework -- combining statistical physics and information theory -- shifting from a structure-based approach to a functional analysis perspective. It has been successfully applied for inference problems and model selection, quantify the structural and functional (dis)similarity of networks, identify emergent functional modules, renormalize heterogeneous networks, cluster layers and reduce the dimensionality of multilayer systems. Specifically, I will focus on a few applications of practical interest: (i) reducing multilayer and high-order systems; (ii) identifying units critical for information propagation; (iii) showing that ubiquitous topological features, such as modularity and small-worldness, emerge to optimize a trade-off for middle- to large-scale information exchange between system's units. I will discuss how this framework can help us to enhance our understanding and design of biological, social and engineering systems.

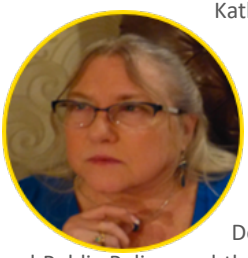
This keynote is sponsored by PLOS

WEDNESDAY, NOVEMBER 29, 2023

Keynote Speakers

Kathleen M. CARLEY

Carnegie Mellon University, USA



Kathleen M. Carley has a H.D. from the University of Zurich in Business, Economics and Informatics; a Ph.D. from Harvard University in Sociology; and two S.B.'s from Massachusetts Institute of Technology – one in Political Science and on in Economics. She is a professor of Societal Computing in the Software and Social Systems Department in the School of Computer Science with secondary appointments in the Departments of Electrical and Computer Engineering, Engineering and Public Policy, and the Social and Decision Sciences and in the Heinz School of Public Policy at Carnegie Mellon University. She is the director of two university wide centers: the Center for Computational Analysis of Social and Organizational Systems (CASOS) that focuses on the application of network science and other data science techniques to the study of complex issues such as diffusion and terrorism, and the Center for Informed Democracy and Social-cybersecurity (IDeaS) that focuses on online harms such as disinformation, hate-speech, and extremism. She is also the CEO of Netanomics.

Dr. Carley's research combines cognitive science, social networks and computer science to address complex social and organizational problems. Specific research areas are dynamic network analysis, computational social and organization theory, social adaptation and evolution, and social-cybersecurity. Carley and her students have developed infrastructure tools for analyzing large-scale dynamic networks and various agent-based simulation systems. The infrastructure tools include: ORA, a statistical toolkit for analyzing and visualizing high dimensional networks in general and through time and space. NetMapper - a text-mining system for extracting semantic networks from texts, sentiment, cognitive cues, and other content. Her simulation models include: Construct – which is a general model for information and belief diffusion within and across media, and OSIRIS – which is a simplified digital twin of an organization undergoing various types of cyber attacks.

Dr. Carley is an IEEE fellow. She has served on numerous national academies panels. In addition she has received multiple awards including the Simmel award from INSNA, the United States Geospatial Intelligence Foundation Academic Award.

Coupling in High Dimensional Networks

From an ecological perspective people and their networks adapt and link to other networks all of which co-evolve form dynamic high-dimensional networks. High dimensional networks are ones with one or more types of nodes (multi-modal) and one or more types of links (multi-plex) where there are a set of networks linked together by sharing at least one node. People are constrained and enabled by their position in these high dimensional systems, and are impacted by the whole not just by one network at a time. For example, in organizations people are embedded in both a social network of who knows who, a knowledge network of who knows what, an assignment network of who is doing what, a task requirements network of what knowledge is needed to do which task, and so forth. Today, high dimensional networks are easier to collect due to digital data and novel computational techniques for extracting networks from texts. Importantly, all these networks are coupled. As is classically the case for complex systems, a little coupling is valuable and a very high degree can lead to problems if not catastrophes. In this talk the power of high dimensional networks for addressing social issues and considerations that need to be addressed in new algorithms are discussed. It is argued that high dimensional networks often provide more explanatory power and enable prediction in cases where a social network alone does not, and that the co-evolution of the networks must be tracked to assess impact. New techniques that take such high dimensionality into account are described.

Michael BRONSTEIN

University of Oxford, UK

Michael Bronstein is the DeepMind Professor of AI at the University of Oxford and Head of Graph Learning Research at Twitter. He was previously a professor at Imperial College London and held visiting appointments at Stanford, MIT, and Harvard, and has also been affiliated with three Institutes for Advanced Study (at TUM as a Rudolf Diesel Fellow (2017-2019), at Harvard as a Radcliffe fellow (2017-2018), and at Princeton as a short-time scholar (2020)). Michael received his PhD from the Technion in 2007. He is the recipient of the Royal Society Wolfson Research Merit Award, Royal Academy of Engineering Silver Medal, five ERC grants, two Google Faculty Research Awards, and two Amazon AWS ML Research Awards. He is a Member of the Academia Europaea, Fellow of IEEE, IAPR, BCS, and ELLIS, ACM Distinguished Speaker, and World Economic Forum Young Scientist. In addition to his academic career, Michael is a

serial entrepreneur and founder of multiple startup companies, including Novafora, Invision (acquired by Intel in 2012), Videocites, and Fabula AI (acquired by Twitter in 2019).

Physics-inspired Graph Neural Networks

The message-passing paradigm has been the “battle horse” of deep learning on graphs for several years, making graph neural networks a big success in a wide range of applications, from particle physics to protein design. From a theoretical viewpoint, it established the link to the Weisfeiler-Lehman hierarchy, allowing to analyse the expressive power of GNNs. We argue that the very “node-and-edge”-centric mindset of current graph deep learning schemes may hinder future progress in the field. As an alternative, we propose physics-inspired “continuous” learning models that open up a new trove of tools from the fields of differential geometry, algebraic topology, and differential equations so far largely unexplored in graph ML.

This keynote is sponsored by Applied Network Science, Springer

THURSDAY, NOVEMBER 30, 2023

Keynote Speakers

Tao ZHOU

USTC China

Tao Zhou is the founding director of the Big Data Research Center at the University of Electronic Science and Technology of China. His main research interests include network science (e.g., link prediction, influential node identification, epidemic spreading, etc.) and computational socioeconomics. He has published many research articles in prestigious journals (e.g., Physics Reports, PNAS, Nature Communication, PRL, etc.), which received >34000 citations from Google Scholar, with H-index=86. His works have been reported by many academic medias as Nature News, PNAS News, MIT Technology Review, Sci. Am., PhysOrg.com, My Science, TG Daily, Dutch Science Magazine, Chinese Science News, etc.

Recent Debates in Link Prediction

Link prediction is a paradigmatic problem in network science, which aims at estimating the existence likelihoods of non-observed links, based on known topology. This talk will briefly introduce three recent debates on link prediction. (1) Do machine learning models, including ensemble learning techniques, performs better than mechanism algorithms? (2) Which metric(s) can best evaluate algorithm performance: AUC, AUPR, Precision or others? (3) Are the shorter paths more important in link prediction than longer paths? For example, do 2-hop-based indices perform better than 3-hop-based indices?

This keynote is sponsored by Applied Network Science, Springer

Danai KOUTRA

University of Michigan, USA

Danai Koutra is an Associate Professor in Computer Science and Engineering at the University of Michigan, where she leads the Graph Exploration and Mining at Scale (GEMS) Lab. She is also an Amazon Scholar. Her research focuses on principled, practical, and scalable methods for large-scale real networks, and her interests include graph learning, graph neural networks, graph summarization, knowledge graph mining, graph learning, similarity and alignment, and anomaly detection. She has won an NSF CAREER award, an ARO Young Investigator award, the 2020 SIGKDD Rising Star Award, research faculty awards from Google, Amazon, Facebook and Adobe, a Precision Health Investigator award, the 2016 ACM SIGKDD Dissertation award, and an honorable mention for the SCS Doctoral Dissertation Award (CMU). She holds a patent on bipartite graph alignment, and has multiple papers in top data mining conferences, including 9 award-winning papers and the 2022 IEEE ICDM Test-of-Time Award. She is Program co-Chair for ECML/PKDD 2023 and an Associate Editor of ACM TKDD. She was a track co-chair for The Web Conference 2022, a co-chair of the Deep Learning Day at KDD 2022, the Secretary of the new SIAG on Data Science in 2021, and has also routinely served in the organizing committees of all the major data mining conferences. She has worked at IBM, Microsoft Research, and Technicolor Research. She earned her Ph.D. and M.S. in Computer Science from CMU, and her diploma in Electrical and Computer Engineering at the National Technical University of Athens.

Advances in Graph Neural Networks: Heterophily and Beyond

Graph learning, which leverages the complex relationships between entities in non-Euclidean data, has a wide range of high-impact applications, including recommendation systems, bioinformatics, fraud detection, and more. Graph neural networks (GNNs) have become one of the most popular graph deep learning models, achieving state-of-the-art results for semi-supervised classification, in which the goal is to infer the unknown labels of the nodes given partially labeled networks with node features. While many different GNN models have been proposed, most of them perform best in graphs that exhibit the property of homophily, sometimes referred to as the idea that “birds of a feather flock together”, in which linked nodes often belong to the same class or have similar features. However, in the real world, there are also many settings where “opposites attract”, leading to networks that exhibit heterophily, in which linked nodes tend to be from different classes. Many of the most popular GNNs fail to generalize well to networks with heterophily (low homophily). In this talk, I will present my group’s work on identifying

effective GNN designs and introducing new architectures that can improve performance in heterophilous networks. I will also discuss connections between heterophily and other well-known challenges of GNNs, including oversmoothing, robustness, performance discrepancies across nodes, and scalability.

This keynote is sponsored by Entropy, MDPI

TUESDAY, NOVEMBER 28, 2023

Program at a Glance Day 1

08:00	**Registration**		
08:30	Opening		
08:45	Keynote Speaker: **Romualdo Pastor-Satorras** Chair: *Tiago De Paula Peixoto*		
09:25	Lighting L1: Higher-Order Interactions - Social Networks Chair: *Huijuan Wang*		
10:15	Poster P1: Network Analysis - Biological Networks - Mobility **Coffee Break**		
10:50	Oral O1A Community Structure Chair: *Stephen Eubank*	Oral O1B Machine Learning & Networks Chair: *Kanimozhi Uma*	Oral O1C Network Geometry Chair: *Ofer Biham*
12:50	**Lunch**		
14:15	Oral O2A Human Behavior Chair: *Alessandro Galeazzi*	Oral O2B Network Analysis Chair: *Fintan McGee*	Oral O2C Synchronization Chair: *Jan Treur*
15:45	Poster P2: Information Spreading in Social Media - Diffusion & Epidemics - Machine Learning & Networks **Coffee Break**		
16:20	Keynote Speaker: **Manlio De Domenico** Chair: *Luis M Rocha*		
17:00	Oral O3A Dynamics on/of Networks Chair: *Romualdo Pastor-Satorras*	Oral O3B Networks in Finance & Economics Chair: *Laura Ricci*	Oral O3C Multilayer/Multiplex Chair: *Davide Vega D'Aurelio*
19:30	**Welcome Reception**		

DETAILED PROGRAM **DAY 1**

08:00	Registration
08:30	Opening
08:45	**Romualdo Pastor-Satorras** **Opinion Depolarization in Interdependent Topics and the Effects of Heterogeneous Social Interactions** Chair: *Tiago De Paula Peixoto*
09:25	**Lighting L1: Higher-Order Interactions - Social Networks** Chair: *Huijuan Wang*
09:25	**Analyzing Temporal Influence of Burst Vertices in Growing Social Simplicial Complexes** Chikashi Takai, Masahito Kumano, Masahiro Kimura
09:30	**Topic-based Analysis of Structural Transitions of Temporal Hypergraphs Derived from Recipe Sharing Sites** Keisuke Uga, Masahito Kumano, Masahiro Kimura
09:35	**Compression-based inference of network motif sets** Alexis Bénichou, Jean-Baptiste Masson, Christian L Vestergaard
09:40	**Decoding Memes: A Comparative Study of Machine Learning Models for Template Identification** Levente Murgás, Kate Barnes, Roland Molontay
09:45	**Using word embeddings to assess ideological polarity within co-sharing networks of Facebook pages** Luigi Arminio, Luca Rossi
09:50	**A weighted social network model quantifies the role of attributes in the associations of spider monkeys** Roberto Carlock, Denis Boyer, Sandra Smith, Gabriel Ramos
09:55	**Analysis of Violence Patterns in Mexico: A Complex Temporal Networks Approach** Edwin Montes, Roman Anselmo Mora-Gutiérrez, Roberto Bernal-Jaquez, Daniela Aguirre Guerrero
10:00	**Unified Logic Maze Generation using Network Science** Johnathon Henke, Dinesh P Mehta
10:05	**An Analytical Approximation of Simplicial Complex Distributions in Communication Networks** Ke Shen, Mayank Kejriwal
10:15	**Poster P1: A[1 - 13] Network Analysis - B [14 - 19] Biological Networks – C [20 - 24] Mobility**

1	**INDoRI: Indian Dataset of Recipes and Ingredients and its Ingredient Network** Sandeep Khanna, Chiranjoy Chattopadhyay, Suman Kundu
2	**Community Detection on Dynamic Graphs with Edge Local Differential Privacy** Sudipta Paul, Julián Salas, Vicenç Torra
3	**Modeling Meta-Majors in Curriculum Graphs and Related Questions** Bonan Yang, Gunes Ercal, Efrosini Hortis
4	**Network Analysis of 21st-Century Korean Prose Poetry: Comparative Study of Literary and General Prose** Sungpil Wang, Juyong Park
5	**Cost-effective Network Disintegration through Targeted Enumeration** Zhigang Wang, Ye Deng, Jun Wu
6	**Predicting Nodal Spreading Influence via Iterative Metrics** Shilun Zhang, Huijuan Wang
7	**Influential Node Detection on Graph on Event Sequence** Zehao Lu, Shihan Wang, Xiao-Long Ren, Rodrigo Costas, Tamara Metze
8	**IS-PEW: Identifying Influential Spreaders using Potential Edge Weight in Complex Networks** Suman Nandi, Mariana Curado Malta, Giridhar Maji, Animesh Dutta
9	**Multi-layer Graph Attention Fusion Network for COVID-19 Prediction within Complex Social Interactions** Kayo Fujimoto, Lizhong Liu, Jacky Kuo, Armand Brown, Xi Luo, Justin Bahl
10	**I like you if you are like me: How the Italians' opinion on Twitter about migrants changed after the 2022 Russo-Ukrainian conflict** Giulio Cordova, Luca Palla, Martina Sustrico, Giulio Rossetti
11	**How provinces employ capabilities to specialize in agricultural production in China: a network-based approach** Shuhui Yang
12	**Graph based Approach for Galaxy Filament Extraction** Louis Hauseux, Konstantin Avrachenkov, Josiane Zerubia
13	**Resilience after decline: An agent-based model of agricultural expansion** Pedro Lopez-Merino, Paolo Zeppini
14	**Structures and Synergies of the Human Musculoskeletal System with Hypergraph Representation** Hiroko Yamano
15	**Building Networks of Cardiac Activation from Intracardiac Electrograms** Arthur S Bezerra, Robin Van Den Abeele, Sander Hendrickx, Eike Wuelfers, Bjorn Verstraeten, Arstanbek Okenov, Timur Nezlobinskii, Nele Vandersickel
16	**Optimizing Neonatal Respiratory Support through Network Modeling: A New Approach to Post-Birth Infant Care** Yassine Sebahi, Fakhra Jabeen, Jan Treur, H. Rob Taal, Peter H.M.P. Roelofsma
17	**Exploring selective edge pruning to integrate domain knowledge in biological networks**

	Vlad V Ungureanu, David Halliday, Jennifer Southgate, Stephen L Smith, Andrew Mason
18	**A Multi-Order Adaptive Network Model for Pathways of DNA Methylation and its Effects in Individuals Developing Post-Traumatic Stress Disorder** Iva Gunjača, Natalie Samhan, Jan Treur
19	**Population dynamics in food webs** N. Leticia Abrica-Jacinto, Verónica Zepeda, Mariana Benítez, Eugenio Azpeitia
20	**Reconstructing the dynamics of pollination network interactions** William J. Castillo, Carsten F. Dormann
21	**Towards human mobility pattern detection through sparse data** Daniel Maksimov
22	**Mapping Work-Home Connections in Germany: A Network Analysis** Christian Wolff, Markus Schaffert, Christophe Cruz, Hocine Cherifi
23	**Unveiling of Maritime Networks from the Differentiated Analysis of Vessel Traffic in the Caribbean** Clement Iphar, Coraline Soul, Iwan Le Berre, Manuel Sahuquet, Eric Foulquier, Aldo Napoli
24	**Evaluating Road-Related CO2 Emissions: Leveraging Probe Data through Geospatial Analysis** Lama Yaseen
10:50	**Oral O1A: Community Structure** Chair: *Stephen Eubank*
10:50	**Dual communities characterize structural patterns and robustness in leaf venation networks** Philipp C. Böttcher, Franz Kaiser, Henrik Ronellenfitsch, Vito Latora, Dirk Witthaut
11:05	**Entropic Detection of Chromatic Community Structures** Franck Delaplace
11:20	**Identifying Well Connected Communities in Real-World and Synthetic Networks** Minhyuk Park, Yasamin Tabatabaee, Vikram Ramavarapu, Baqiao Liu, Vidya Kamath Pailodi, Rajiv Ramachandran, Dmitriy Korobskiy, Fábio Ayres, George Chacko, Tandy Warnow
11:35	**Non-assortative community structures reveal new insights of complex networks** Xuanchi Liu, Tristram Alexander, Eduardo G Altmann
11:50	**The Erdős-Rényi Graph Conditioned on Every Component Being Fully Connected** Martijn M Gösgens, Lukas Lüchtrath, Elena Magnanini, Marc Noy, Élie De Panafieu
12:05	**Modularity-Based Community Detection in Hypergraphs** François Théberge, Bogumil Kaminski, Pawel Misiorek, Pawel Pralat
12:20	**Uncertainty in GNN Learning Evaluations: The Importance of a Consistent Benchmark for Community Detection.** William Leeney, Ryan Mcconville
12:35	**Classification Supported by Community-Aware Node Features**

	Bogumił Kamiński, Paweł Prałat, François Théberge, Sebastian Zając
10:50	***Oral O1B: Machine Learning & Networks*** *Chair: Kanimozhi Uma*
10:50	**Leveraging multi-omics integration and graph convolutional network modelling for a comprehensive characterization of the role of FMRP in neuronal physiology.** Silvia Bottini
11:05	**Economic and Health Burdens of HIV and COVID-19: Insights from a Survey of Underserved Communities in Semi-Urban and Rural Illinois** John D. Matta, Koushik Sinha, Cameron Woodard, Zachary Sappington, John Philbrick
11:20	**Statistically Validated Network approach for document clustering and topic modeling** Andrea Simonetti, Alessandro Albano
11:35	**Leveraging the power of Signatures for the construction of topological complexes for the analysis of multivariate complex dynamics** Stephane Chretien, Ben Gao, Astrid Thebault Guiochon, Remi Vaucher
11:50	**Deep Sets Are Viable Graph Learners** Gerrit Großmann
12:05	**A Consistent Diffusion-Based Algorithm for Semi-Supervised Graph Learning** Thomas Bonald, Nathan De Lara
12:20	**Visual Mesh Quality Assessment using Weighted Network Representation** Mohammed El Hassouni, Hocine Cherifi
12:35	**Training Matters: Unlocking Potentials of Deeper Graph Convolutional Neural Networks** Sitao Luan, Mingde Zhao, Xiao-Wen Chang, Doina Precup
10:50	**Oral O1C: Network Geometry** Chair: *Ofer Biham*
10:50	**Exploring the space of graphs with a fixed discrete curvature** Michelle Roost, Karel Devriendt, Giulio Zucal, Jürgen Jost
11:05	**Feature-enriched network geometry explains graph-structured data** Roya Aliakbarisani, M. Ángeles Serrano, Marián Boguñá
11:20	**Rewiring Networks for Graph Neural Network Training Using Discrete Geometry** Jakub Bober, Anthea Monod, Emil Saucan, Kevin Webster
11:35	**Modeling The Invisible Internet** Jacques Bou Abdo, Liaquat Hossain
11:50	**Metric invariants for networks' classification** Eldad Kronfeld, Emil Saucan
12:05	**Inference of triadic interactions** Anthony Baptista, Ginestra Bianconi, Ruben J Sanchez-Garcia
12:20	**Modeling the Dynamics of Bitcoin Overlay Network** Jacques Bou Abdo, Shuvalaxmi Dass, Basheer Qolomany, Liaquat Hossain

12:35	**Geometrical congruence, greedy navigability and myopic transfer in complex networks and brain connectomes** Carlo Vittorio Cannistraci
12:50	**Lunch**
14:15	**Oral O2A: Human Behavior** Chair: *Alessandro Galeazzi*
14:15	**Identification of writing preferences in Wikipedia** Jean-Baptiste A.R. Chaudron, Jean-Philippe Magué, Denis Vigier
14:30	**Influence of Virtual Tipping and Collection Rate in Social Live Streaming Services** Shintaro Ueki, Fujio Toriumi, Toshiharu Sugawara
14:45	**Estimating Diversity of Experiences in Urban Spaces Based on Restaurant Reviews** Shun Kishimoto, Hiroki Nakajima, Ichiro Sakata, Kimitaka Asatani
15:00	**Network assortativity to compare territorial biases in university rankings across disciplines, performance metrics and years** Loredana Bellantuono, Andrea Lo Sasso, Nicola Amoroso, Francesco De Nicolò, Alfonso Monaco, Sabina Tangaro, Roberto Bellotti
15:15	**Citation Distance Matters: Towards a New Metric for Evaluating Journal Quality** Kate Barnes, Levente Török, Roland Molontay
15:30	**Sentiment-Aware Network Extraction from News Corpus using LLMs: An Empirical Validation with Legislative Agreement** Naim Bro
14:15	**Oral O2B: Network Analysis** Chair: *Fintan McGee*
14:15	**Multiplex financial network regionalization scenarios as a result of re-globalization: does geographical proximity still matter?** Otilija Jurakovaite, Asta Gaigaliene
14:30	**Analysis and Characterization of ERC-20 Token Network Topologies** Matteo Loporchio, Damiano Di Francesco Maesa, Anna Bernasconi, Laura Ricci
14:45	**Modeling the association between physician risky-prescribing and the complex network structure of physician shared-patient relationships** Xin Ran, Ellen Meara, Nancy Morden, Erika Moen, Daniel Rockmore, James O'Malley
15:00	**Modeling Filtration through Random Pore Networks: Correlating Structure and Performance** Matt Illingworth, Binan Gu, Linda Cummings, Lou Kondic
15:15	**Characterizing growth in decentralized socio-economic networks through triadic closure-related network motifs** Cheick Tidiane Ba, Matteo Zignani, Sabrina Gaito
15:30	**Bowlership: Examining the Existence of Bowler Synergies in Cricket** Praharsh Nanavati, Amit A Nanavati

14:15	**Oral O2C: Synchronization** Chair*: Jan Treur*
14:15	**Hysteresis in coupled identical oscillators with generalized coupling function and coupling strength inhomogeneity** Hae Seong Lee, Jae Hyung Woo, Tae-Wook Ko, Joon-Young Moon
14:30	**Synchronization Verification for Complex Networked Systems under Directed Topology** Shuyuan Zhang, Lei Wang, Wei Wang
14:45	**Tolerance-Based Disruption-Tolerant Consensus in Directed Networks** Agathe Bouis, Christopher Lowe, Ruaridh Clark, Malcolm Macdonald
15:00	**Global synchronization measure applied to brain signals data** Xhilda Dhamo, Eglantina Kalluçi, Gerard Dray, Coralie Reveille, Arnisa Sokoli, Stefan Janaqi, Stephane Perrey, Gregoire Bosselut
15:15	**Heterogeneity and universality of power-grids** Geza Odor, Balint Hartmann, Istvan Papp, Kristof Benedek
15:30	**A dynamic Fitting Method for Hybrid Time-Delayed and Uncertain Internally-Coupled Complex Networks: From Kuramoto Model to Neural Mass Model** Zhengyang Jin
15:45	**Poster P2: A [1 - 12] Information Spreading in Social Media B [13 - 17] Diffusion & Epidemics - C [18-24] Machine Learning & Networks**
1	**Early prediction of cascade outbreaks based on network percolation** Xin Li, Xue Zhang, Chengli Zhao, Xiaojun Duan
2	**Two to Five Truths in Non-Negative Matrix Factorization** Neil Molino, John Conroy
3	**Finding polarised communities and tracking information diffusion on Twitter: The Irish Abortion Referendum** Caroline B Pena, Pádraig Maccarron, David Jp O'Sullivan
4	**Interpretable Cross-platform Coordination Detection on Social Networks** Emeric Auriant, Victor Chomel
5	**Topicality Boosts Popularity Online: A Comparative Analysis of NYT Articles and Reddit Memes** Kate Barnes, Péter Juhász, József Pintér, Marcell Nagy, Roland Molontay
6	**Time-dynamics of (mis)information spread on Social Networks: a COVID-19 case study** Zafer Duzen, Mirela Riveni, Mehmet Sıddık Aktaş
7	**Multilingual Hate Speech Detection using Semi-Supervised Generative Adversarial Network** Khouloud Mnassri, Reza Farahbakhsh, Noel Crespi
8	**Tell Me Who You Are and I Will Predict Your Vulnerability to Political Persuasion Techniques** Alessia Antelmi, Lucio La Cava, Arianna Pera
9	**Dynamic Residual Graph Convolutional Network for Information Cascade**

	Prediction Yijie Zhou, Dingguo Yu, Ke-Ke Shang, Yanqing Yan, Suiyu Zhang
10	**French Fake News propagation: the dual aspect of spurious information spreading online** Matthieu Bachelot, Romain Billot, Inna Lyubareva, Thomas Epalle, Raphaël-David Lasseri
11	**A Comparative Analysis of Information Cascade using Dynamic Heterogeneous and Homogeneous Graphs** Yiwen Wu
12	**Intervention Strategies to Minimize the Spread of Misinformation** Takumi Sakiyama, Kazuki Nakajima, Masaki Aida
13	**Modeling Cultural Evolution on Social Networks using Fractional Diffusion** Bart De Boer
14	**Evaluating Attitudes on Health-Seeking Behavior among a Network of People who Inject Drugs** Natallia V Katenka, Ayako Shimada, Ashley Buchanan, Ben Skov, Gabrielle Lemire, Stephen Kogut, Samuel Friedman
15	**Human Papillomavirus Co-Circulation on a Partially Vaccinated Partnership Network** Mélanie Bonneault, Maxime Flauder, Elisabeth Delarocque-Astagneau, Anne Cm Thiebaut, Lulla Opatowski
16	**Quantifying the Value of Early Warning System for Dengue Control in Vietnam: A Hybrid ODE-ABM Triple-Diffusion Approach** Phong Hong, Joseph H Eisenberg, Marc Choisy
17	**Vulnerablity of information transport on temporal networks to link removal** Li Zou, Huijuan Wang
18	**Made In Italy: Academic Collaboration Networks as a Tool to Capture the Scientific Research in Italian Design** Daniele Pretolesi, Andrea Vian, Marina Cuneo, Gianluca Carella, Francesco Zurlo, Annalisa Barla
19	**Efficient Approach for Patient Monitoring: ML-Enabled framework with Smart Connected Systems** Dheepak G
20	**Learned Approximate Distance Labels for Graphs** Allison I Gunby-Mann, Ikeoluwa F Abioye, Peter Chin, Xu Wang, Sarel Cohen
21	**Improving Low-latency Mono-channel Speech Enhancement By Compensation Windows In STFT Analysis** Minh N Bui, Dung Tran, Kazuhito Koishida, Trac Tran, Peter Chin
22	**FakEDAMR: Fake News Detection using Abstract Meaning Representation Network** Shubham Gupta, Narendra Yadav, Suman Kundu, Sainathreddy Sankepally
23	**Beyond Following: Augmenting Bot Detection with the Integration of Behavioral Patterns**

	Sebastian Reiche, Sarel Cohen, Kirill Simonov, Tobias Friedrich
24	**When Do We Need Graph Neural Networks for Node Classification?** Sitao Luan, Chenqing Hua, Qincheng Lu, Jiaqi Zhu, Xiao-Wen Chang, Doina Precup
16:20	**Manlio De Domenico** **An Emerging Framework for the Functional Analysis of Complex Interconnected Systems** Chair: *Luis M Rocha*
17:00	**Oral O3A: Dynamics on/of Networks** Chair: *Romualdo Pastor-Satorras*
17:00	**DynamicScore: a Novel Metric for Quantifying Graph Dynamics** Vincent Bridonneau, Frédéric Guinand, Yoann Pigné
17:15	**Network structure unveils factors impacting collective decision-making process that are irrelevant in well-mixed populations** Arkadiusz Jędrzejewski, Laura Hernandez
17:30	**The Cover Time of a Random Walk in Affiliation Networks** Jerzy Jaworski, Mindaugas Bloznelis, Katarzyna Rybarczyk
17:45	**The distribution of first passage times of random walks on random regular graphs** Ofer Biham, Ido Tishby, Eytan Katzav
18:00	**Farthest-First Traversal For Identifying Multiple Influential Spreaders** Madhvi Ramrakhiyani, Mukesh Tiwari, Sunitha Vadivelmurugan
18:15	**Turing instability in complex networks** Samana Pranesh, Devanand Jaiswal, Sayan Gupta
18:30	**Avalanche size distribution in complex networks** Amikam Patron
18:45	**Focal Structures Behavior in Dynamic Social Networks** Mustafa Alassad, Nitin Agarwal
17:00	**Oral O3B: Networks in Finance & Economics** Chair: *Laura Ricci*
17:00	**Detecting Anomalies on Cryptocurrency Markets Using Graph Algorithms** Agata Skorupka
17:15	**The network structure of smart contracts in Ethereum dApps** Sabrina Aufiero, Giacomo Ibba, Silvia Bartolucci, Giuseppe Destefanis, Rumyana Neykova, Marco Ortu
17:30	**Interactions within Complex Economic System** Daniela Cialfi
17:45	**Supply chain adjusted exposure of banks to climate policy relevant economic sectors.** Zlata Tabachová
18:00	**Rank Is All You Need: Robust Estimation of Complex Causal Networks** Cameron J Cornell, Lewis Mitchell, Matthew Roughan
18:15	**The significance of Board Interlocks on Corporate Governance**

	Davide Stocco, Emilio Barucci
18:30	**New Seeding Strategies for the Influence Maximization Problem** Seok-Hee Hong, Juan Pablo Bonilla Ataides, Rowena Kok, Amyra Meidiana, Kunsoo Park
18:45	**A Model and Structural Analysis of Networked Bitcoin Transaction Flows** Min-Hsueh Chiu, Mayank Kejriwal
17:00	**Oral O3C: Multilayer/Multiplex** Chair: Davide Vega D'Aurelio
17:00	**Eigenvector centrality for multilayer networks with dependent node importance** Hildreth Robert Frost
17:15	**Strategic energy flows in input-output relations: a temporal multilayer approach** Alessandra Cornaro, Gian Paolo Clemente, Rosanna Grassi, Giorgio Rizzini
17:30	**A Proposed Multilayer Network Approach to Anti Money Laundering** Fintan Mcgee, Pierrick Bruneau, Ankit Arora, Leonardo Longhi, Andrea Danielli
17:45	**Generalized adaptive synchronization in coupled phase oscillators** Dhrubajyoti Biswas, Sayan Gupta
18:00	**Efficient complex network representation using prime numbers** Konstantinos Bougatiotis, Paliouras Georgios
18:15	**Generalized Densest Subgraph in Multiplex Networks** Ali Behrouz, Farnoosh Hashemi
18:30	**How Information Spreads through Multi-Layer Networks: A Case Study of Rural Uganda** Jennifer Larson
18:45	**Classification of Following Intentions Using Multilayer Motif Analysis of Communication Density and Symmetry among Users** Takayasu Fushimi, Takumi Miyazaki
19:30	**Welcome Reception**

WEDNESDAY, NOVEMBER 29, 2023

Program at a Glance Day 2

08:15	**Registration**		
08:45	Keynote Speaker: **Kathleen M. Carley** Chair: *Zachary Neal*		
09:25	Lighting L2: Community Structure - Dynamics on/of Networks Chair: *Giuseppe Mangioni*		
10:15	Poster P3: Community Structure – Social Networks – Infrastructure Networks **Coffee Break**		
10:50	Oral O4A Information Spreading in Social Media Chair: *Marco Vivian*	Oral O4B Machine Learning & Networks Chair: *Mohammed El Hassounis*	Oral O4C Networks in Finance & Economics Chair: *Takayuki Mizuno*
12:50	**Lunch**		
14:15	Oral O5A Structural Network Measures Chair: *Konstantin Avrachenkov*	Oral O5B Infrastructure Networks Chair: *Mirko Degli Esposti*	Oral O5C Biological Networks Chair: *Pietro Hiram Guzzi*
15:45	Poster P4: Human Behavior – Link Analysis & Ranking – Dynamics on/of Networks **Coffee Break**		
16:20	Keynote Speaker: **Michael Bronstein** Chair: *Tomaso Aste*		
17:00	Oral O6A Diffusion & Epidemics Chair: *Brennan Klein*	Oral O6B Community Structure Chair: *François Théberge*	Oral O6C Temporal Networks Chair: *Carlo Vittorio Cannistraci*
19:00	**Sessions end!**		
20:00	**Dinner Banquet**		

DETAILED PROGRAM **DAY 2**

08:15	Registration
08:45	**Kathleen M. Carley** **Coupling in High Dimensional Networks** Chair: *Zachary Neal*
09:25	**Lighting L2: Community Structure - Dynamics on/of Networks** Chair: *Giuseppe Mangioni*
09:25	**Learning common structures in a collection of networks** Saint-Clair Chabert-Liddell
09:30	**Iterative spatial embedding of networks uncovers their community structure** Bianka Kovács, Gergely Palla
09:35	**Detecting Community Structures in Patients with Peripheral Nervous System Disorders** Morteza Hosseinioun, Ali Mohammad Afshin Hemmatyar, Saeid Ahmadifar, Hojjat Samiee, Amirali Ghahramani
09:40	**Longitudinal Modularity for Evaluating Community Structure in Link Streams** Victor Brabant, Angela Bonifati, Remy Cazabet
09:45	**ATEM: A Topic Evolution Model for the Detection of Emerging Topics in Scientific Archives** Hamed Rahimi, Bernd Amann, Hubert Naacke, Camelia Constantin
09:50	**Masking Language Model Mechanism with Event-driven Knowledge Graphs for Temporal Relations Extraction from Clinical Narratives** Kanimozhi Uma
09:55	**An Adaptive Network Model for Learning and Bonding During a Varying in Rhythm Synchronous Joint Action** Yelyzaveta Mukeriia, Jan Treur, Sophie C.F. Hendrikse
10:00	**Leveraging Directionality and Directness in the DeepLife Interactome** Sebastien Legare, Elie Hatem, Kevin Carvalho, Thomaz Dias, Jean-Baptiste Morlot
10:05	**Adopting Different Strategies for Improving Local Community Detection: A Comparative Study** Kostas Tsichlas, Konstantinos Christopoulos
10:40	**Poster P3: A [1 - 9] Community Structure – B [10 - 19] Social Networks – C [20 - 24] Infrastructure Networks**
1	**Detecting Strong Cliques in Co-authorship Networks** Lukas Papik, Eliska Ochodkova, Milos Kudelka
2	**Let's talk about love: use of explicit replies as coordination mechanisms in**

	online student debates Manuel Pita, Bruno D. Ferreira-Saraiva, J. P. Matos-Carvalho
3	**Tailoring Benchmark Graphs to Real-World Networks for Improved Prediction of Community Detection Performance** Catherine S Schwartz, Amanda Galante, Cetin Savkli, Wojciech Czaja
4	**Language Loss Simulation Based on Language and Country Bipartite Networks** Kazuho Nomura, Yuichi Ikeda
5	**The Hyperspherical Geometry of Community Detection: Modularity as a Distance** Martijn M Gösgens, Nelly Litvak, Remco Van Der Hofstad
6	**Enhanching Stability of Community Detection in Weighted Networks** Fabio Morea, Domenico De Stefano
7	**Network based methodology for characterizing interdisciplinary expertise in emerging research** Aditi Mallavarapu, Erin A Walker, Cassandra Kelley, Shari Gardner, Jeremy Roschelle, Stephen M Uzzo
8	**Effects of Null Model Choice on Modularity Maximization** George M Slota, Christopher Brissette, Ujwal Pandey
9	**Topological Community Detection: A Sheaf-Theoretic Approach** Arne Wolf, Anthea Monod
10	**Bayesian Hierarchical Network Autocorrelation Models for Modeling the Diffusion of Hospital-level Quality of Care** Guanqing Chen, James O'Malley
11	**Exploring Political Polarization in Contemporary Pakistan** Anees Baqir, Alessandro Galeazzi, Andrea Drocco, Fabiana Zollo
12	**Impact of Structural Changes in Networks induced by the Altered SIS Model on Online User Dynamics** Ryusei Yamamoto, Kazuki Nakajima, Masaki Aida
13	**Crossbred Method: A new method for identifying influential spreaders from directed networks** Nilanjana Saha
14	**Not my Fault: Studying the Necessity of the User Classification & Employment of Fine-level User-based Moderation Interventions in Social Networks** Sara Nasirian, Gianluca Nogara, Silvia Giordano
15	**Analyzing Blogs about Uyghur Discourse using Topic Induced Hyperlink Network** Stella O Mbila-Uma, Ifeanyichukwu Umoga, Mustafa Alassad, Nitin Agarwal
16	**Leveraging on Contextualized Focal Structure and Knowledge Graphs in A Multisource Social Networks** Abiola Akinnubi, Mustafa Alassad, Nitin Agarwal, Ridwan Amure
17	**Better Hide Communities: Benchmarking Community Deception Algorithms** Valeria Fionda
18	**Statistical mechanical model for structural balance theory on legislative**

	agreement networks Benjamin Edwards, Denisse Pastén, Víctor Muñoz
19	**Improved Change Detection in Longitudinal Social Network Measures Subject to Pattern-of-Life Variations** L. Richard Carley, Kathleen M. Carley
20	**A model for spatial networks emulating power grids** Alessandra Corso, Lucia Valentina Gambuzza, Mattia Frasca
21	**Revitalizing Cellular Networks: Satellite Integration and Robust Topological Strategies** Yingzhou Mou, Yukio Hayashi
22	**Disintegrating Spatial Networks Based on Region Centrality** Zhigang Wang, Ye Deng, Jun Wu
23	**On the Hierarchical Component Structure of the World Air Transport Network** Issa Moussa Diop, Cherif Diallo, Chantal Cherifi, Hocine Cherifi
10:50	**Oral O4A: Information Spreading in Social Media** Chair: *Marco Viviani*
10:50	**A mathematically tractable model for information diffusion between communities** David Jp O'Sullivan, Caroline B Pena, Alina Dubovskaya
11:05	**A Cross-Country Perspective on News and Misinformation Consumption in Europe** Anees Baqir, Alessandro Galeazzi, Fabiana Zollo
11:20	**Exploring the Power of Weak Ties on Serendipity in Recommender Systems** Wissam Al Jurdi, Jacques Bou Abdo, Jacques Demerjian, Abdallah Makhoul
11:35	**Incentivized Network Dynamics in Digital Job Recruitment** Blas Kolic, Iñaki Ucar, Manuel Cebrián, Rosa Lillo
11:50	**A Tale of Two Cities: Information Diffusion During Environmental Crises in Flint, Michigan and East Palestine, Ohio** Nicholas Rabb, Catherine E Knox, Nitya Nadgir, Shafiqul Islam
12:05	**A Time-Aware Misinformation Super-Spreaders Detection with Round Trip Time Delay** Enrico Verdolotti, Silvia Giordano, Luca Luceri
12:20	**GNNs and Node Entropy for Misinformation Spreader Detection on Twitter Network** Asep Maulana, Johannes Langguth
12:35	**Algorithmic Amplification of Politics and Engagement Maximization on Social Media** Paul Bouchaud
10:50	**Oral O4B: Machine Learning & Networks** Chair: *Mohammed El Hassouni*
10:50	**Analyzing Trendy Twitter Hashtags in the 2022 French Election** Aamir Mandviwalla, Boleslaw K Szymanski, Lake Yin

11:05	**Machine Learning for Developing Guidance to Improve Metaheuristic Algorithm** Bachtiar Herdianto, Romain Billot, Flavien Lucas, Marc Sevaux
11:20	**Maximum Likelihood Estimation on Stochastic Blockmodels for Directed Graph Clustering** Mihai Cucuringu, Xiaowen Dong, Ning Zhang
11:35	**Sparse Graph Neural Networks with Scikit-network** Simon Delarue, Thomas Bonald
11:50	**Network Design through Graph Neural Networks: Identifying Challenges and Improving Performance** Donald Loveland, Rajmonda S. Caceres
12:05	**Deep Distance Sensitivity Oracles** Davin Jeong, Allison I Gunby-Mann, Sarel Cohen, Maximilian Katzmann, Chau Pham, Arnav P Bhakta, Tobias Friedrich, Peter Chin
12:20	**Investigating Bias in YouTube Recommendations: Emotion, Morality, and Network Dynamics in China-Uyghur Content** Mert Can Cakmak, Obianuju Okeke, Ugochukwu Onyepunuka, Billy Spann, Nitin Agarwal
12:35	**Graph Completion through Local Pattern Generalization** Zhang Zhang, Ruyi Tao, Yongzai Tao, Mingze Qi, Jiang Zhang
10:50	**Oral O4C: Network Models** Chair: *Takayuki Mizuno*
10:50	**Dynamic Networks in real-time inter-industry transaction data** Johannes Lumma, Kerstin Hotte, Francois Lafond, Vasco Carvalho
11:05	**Assessing the Impact of Road Networks on Market Price Competition}** John Schoeneman, Lixia H Lambert, Marten Brienen, Dayton Lambert
11:20	**Multiplex Network Approach in Input Output Macroe-conomic Models with Both Demand Side and Supply Side Shocks: COVID-19 Impact on US Macro-economy** Sheri Markose, Semanur Soyyiğit, Simin Nie
11:35	**Demand Shocks and Export Surges in Trade Networks** John Schoeneman, Marten Brienen, Lixia H Lambert, Dayton Lambert, Violet Rebek
11:50	**The Wealth-Building Potential of Agents Through a Complex Network Supporting Socially Responsible Companies: An Agent-Based Modeling Explanatory Analysis.** Fischer Stefan Meira
12:05	**A Sanction Game on a Multilayer Network with Malicious Transshipment** Toby E Willis, Giuliano Punzo
12:20	**Exploiting network metrics to identify suspicious activity in financial transactions** Salvatore Vilella, Arthur Thomas Edward Capozzi Lupi, Giancarlo Ruffo
12:35	**Removing commodity cycles from a production network** Edwin De Jonge

12:50	**LUNCH**
14:15	**Oral O5A: Structural Network Measures** Chair: *Konstantin Avrachenkov*
14:15	**The distribution of shortest path lengths in subcritical Erdos-Renyi networks - exact results** Eytan Katzav, Ofer Biham, Barak Budnick
14:45	**Robustness of Centrality Measures under Incomplete Data** Natalia Meshcheryakova, Sergey Shvydun
14:45	**Characterizing Graph Datasets for Node Classification: Homophily-Heterophily Dichotomy and Beyond** Oleg Platonov, Denis Kuznedelev, Artem Babenko, Liudmila Prokhorenkova
15:00	**Score and Rank Semi-Monotonicity for Closeness, Betweenness and Harmonic Centrality** Paolo Boldi, Davide D'Ascenzo, Flavio Furia, Sebastiano Vigna
15:15	**Modular gateway-ness connectivity and structural core organization in maritime network science** Carlo Vittorio Cannistraci, Mengqiao Xu
15:30	**An Extended Uniform Placement of Alters on Spherical Surface (U-PASS) Method for Visualizing General Networks** Emily Chao-Hui Huang, Frederick Kin Hing Phoa
14:15	**Oral O5B: Infrastructure Networks** Chair: *Mirko Degli Esposti*
14:15	**Estimating Property Demand Using Network Diffusion from Employment Locations** Aaron L Bramson
14:30	**An Interaction-Dependent Model for Probabilistic Cascading Failure** Abdorasoul Ghasemi, Hermann De Meer, Holger Kantz
14:45	**Incremental versus Optimal Design of Water Distribution Networks - The Case of Tree Topologies** Vivek Anand, Aleksandar Pramov, Stelios Vrachimis, Marios Polycarpou, Constantine Dovrolis
15:00	**Revisitng graph neural networks for traffic forecasting** Weiheng Zhong, Hadi Meidani
15:15	**Detecting Critical Streets in Road Networks Based on Topological Representation** Masaki Saito, Masahito Kumano, Masahiro Kimura
15:30	**Universal properties of the congestion transition in simple transport systems** Mirko Degli Esposti, Armando Bazzani
14:15	**Oral O5C: Biological Networks** Chair: *Pietro Hiram Guzzi*
14:15	**Emergence of Modularity in Hierarchical Living Systems** Saul Huitzil, Cristian Huepe

14:30	**Optimal Reconstruction of Biological Graph Evolution History** Emre Sefer
14:45	**Digital reconstruction and analysis of the growing and branching mycelial network of the model filamentous fungus Podospora anserina** Thibault Chassereau, Florence Chapeland-Leclerc, Eric Herbert
15:00	**UNDERSTANDING ORGAN VASCULAR BEHAVIOR THROUGH THEIR ARCHITECTURE** Jérôme W Kowalski, Lorenzo Sala, Dirk Drasdo, Irene E Vignon-Clementel
15:15	**Redundancy in the Causal Logic of Interactions Shapes the Dynamics of Biochemical Networks** Luis M Rocha
15:30	**DFI-DGCF: A Graph-Based Recommendation Approach For Drug-Food Interactions** Sofia Bourhim
15:45	**Poster P4: A [1 - 8] Human Behavior – B [9-12] Link Analysis & Ranking – C [13 - 25] Dynamics on/of Networks**
1	**The Importance of Measuring Network Effects when Scaling Behavioral Interventions: Evidence from a Population-level Randomized Controlled Trial** John Ternovski, Sebastian Jilke, Florian Keppeler, Dominik Vogel
2	**An Adaptive Network Model for a Double Bias Perspective on Learning from Mistakes within Organizations** Mojgan Hosseini, Jan Treur, Wioleta Kucharska
3	**An Adaptive Network Model for the Emergence of Group Synchrony and Behavioral Adaptivity for Group Bonding** Francesco Mattera, Sophie C.F. Hendrikse, Jan Treur
4	**Predicting choices in a dyadic foraging task using gated recurrent networks** Neda Shahidi, Kacper Ksiezak, Fabian Sinz, René Burghardt, Alexander Gail
5	**Fine-Grained Emotion Knowledge Extraction in Human Values: An Interdisciplinary Analysis** Amir Reza Jafari, Praboda Rajapaksha, Reza Farahbakhsh, Guanlin Li, Noel Crespi
6	**On the definition of toxicity in NLP** Sergey A Berezin, Reza Farahbakhsh, Noel Crespi
7	**Agreement and disagreement on climate crisis: insights from Twitter during the Conferences of the Parties** Liliana Martirano, Andrea Tagarelli, Lucio La Cava
8	**RIGID CLUSTERS, FLEXIBLE NETWORKS** Gail Gilboa Freedman
9	**On the dynamics of the mobility behavior of the basic geo-static areas of the Greater Mexico City during the COVID-19 pandemic** Maribel Hernández Rosales, Erika Cruz, César A. Díaz
10	**A framework for empirically evaluating pretrained link prediction models** Emilio Sánchez Olivares, Hanjo Boekhout, Akrati Saxena, Frank Takes

11	**Authentic Performance in opposition networks** Pierrick Leroy, Marc Santolini
12	**AISM: A Novel Method for Node Importance Ranking in Complex Networks** Haotian Xie, Chen Zhang
13	**Community detection and Higher-order Link Prediction** Jelena Losic
14	**A Novel Method for Vertex Clustering in Dynamic Networks** Devavrat V Dabke, Olga Dorabiala
15	**Network Reconstruction via Sensitivity Analysis** Gerrit Großmann
16	**User behavior influences structural properties of growing networks** Diletta Goglia, Davide Vega
17	**Dynamics-based Reconstruction of the Multilayer Structure from an Aggregated Network** Aobo Zhang
18	**A complex systems model for the study of existential and global catastrophic risks** Arsene Pierrot, David Chavalarias, Luke Kemp
19	**Link-Limited Bypass Rewiring for Network Robustness** Masaki Chujyo, Fujio Toriumi
20	**Smart Contracts based Communication in Blockchain: A Decentralised Approach** Satya Bhushan Verma, Abhay Kr Yadav, Bineet Kumar Gupta
21	**Global Maritime Network Evolution: a Container-Ship Perspective** Frédéric Guinand
22	**Wishful Thinking About Consciousness** Peter Grindrod
23	**LINKING RATE-BASED AND SPIKING MODELS: A QUEST TOWARDS BIOLOGICALLY RELEVANT NEURAL SYSTEMS** Aiswarya Ps
24	**Multi-class classification performance improvements through high sparsity strategies** Lucia Cavallaro, Tommaso Serafin, Antonio Liotta
16:20	**Michael Bronstein** **Physics Inspired Graph Neural Networks** Chair: *Tomaso Aste*
17:00	**Oral O6A: Diffusion & Epidemics** Chair: *Brennan Klein*
17:00	**Small subset of high quality connections preserves disease spreading** David Soriano-Paños, Felipe X Costa, Luis M Rocha
17:15	**An Approach for Analysing the Impact of Data Integration on Complex Network Diffusion Models** James G Nevin, Paul Groth, Michael Lees

17:30	**A Novel Self-Adaptive SIS Model Based on the Mutual Interaction between a Graph and its Line Graph** Paolo Bartesaghi, Rosanna Grassi, Gian Paolo Clemente
17:45	**COVID-19 Incidence in the Republic of Ireland: A Case Study for Network Time Series Models** Stephanie Armbruster, Gesine D Reinert
18:00	**On the relation between replicator evolutionary dynamics and diffusive models on general networks** Rio Aurachman
18:15	**Travel time-aware metapopulation models for estimation and mitigating disease transmission through mobility networks** Henrik Zunker, Martin Kühn, Rene Schmieding, Alain Schengen, David Kerkmann
18:30	**A spatial-hybrid model for infectious disease dynamics** Julia Bicker, Martin Kühn, Rene Schmieding
18:45	**Travel Demand Models for Micro-Level Contact Network Modeling** Diaoulé Diallo, Jurij Schönfeld, Tobias Hecking
17:00	**Oral O6B: Community Structure** Chair: *François Théberge*
17:00	**Ultra-Small World Detection in Networks: Subgraphs with Prescribed Distance Distributions** Alexander Veremyev, Vladimir Boginski, Eduardo Pasiliao, Oleg Prokopyev
17:15	**Community Detection in Feature-rich Networks Using Gradient Descent Approach** Soroosh Shalileh, Boris Mirkin
17:30	**Does Isolating High-modularity Communities Prevent Cascading Failure?** Stephen Eubank
17:45	**Filtering communities in word co-occurrence networks to foster the emergence of meaning** Anna Béranger, Nicolas Dugué, Simon Guillot, Thibault Prouteau
18:00	**Unraveling the Key Drivers of Community Composition in the Agri-food Trade Network** Gian Paolo Clemente, Alessandra Cornaro, Francesco Della Corte
18:15	**Signature-Based Community Detection for Time Series** Marco Gregnanin, Johannes De Smedt, Giorgio Gnecco, Maurizio Parton
18:30	**Mosaic benchmark networks: Modular link streams for testing dynamic community detection algorithms** Yasaman Asgari, Pierre Borgnat, Remy Cazabet
18:45	**The Hidden-degree Geometric Block Model** Stefano Guarino, Enrico Mastrostefano, Davide Torre
17:00	**Oral O6C: Temporal Networks** Chair: *Carlo Vittorio Cannistraci*

17:00	**System Identification for Modelling Temporal Networks** Sergey Shvydun, Piet Van Mieghem
17:15	**Higher-Order Temporal Network Prediction** Mathieu Jung-Muller, Alberto Ceria, Huijuan Wang
17:30	**Temporal Hyperbolic Graphs as Null Models for Brain Dynamics** Aurora Rossi, Emanuele Natale, Samuel Deslauriers-Gauthier
17:45	**Uniform Generation of Temporal Graphs with Given Degrees** Daniel Allendorf
18:00	**Prosopography of Maximilian I (1459-1519) : dealing with complexity in historical archives** Marcella Tambuscio, Richard Hadden, Georg Vgoeler
18:15	**Decoding Digital Wildfires: Understanding Network Dynamics of the 5G-COVID-19 Conspiracy Theory in Complex Interaction Networks** Kaspara Skovli Gåsvær, Johannes Langguth, Pedro G. Lind, Daniel Thilo Schroeder
18:30	**Tensor Decomposition to Capture Spatiotemporal Patterns of Coupled Oscillator and Opinion Dynamics** Agam Goyal, Hanbaek Lyu
18:45	**Consumer behaviour timewise dependencies investigation by means of transition graph** Anton N Kovantsev
20:00	**Dinner Banquet Palais de l'Europe**

THURSDAY, NOVEMBER 30, 2023

Program at a Glance Day 3

08:00	**Registration**		
08:45	Keynote Speaker: **Tao Zhou** Chair: *Jean Loup Guillaume*		
09:25	Lighting L3: Community structure - Human Behavio Chair: *Matteo Zignani*		
10:15	Poster P5: Machine Learning & Networks - Biological Networks - Networks in Finance & Economics **Coffee Break**		
11:50	Oral O7A Social Networks Chair: *Alessandro Galeazzi*	Oral O7B Dynamics on/of Networks Chair: *Gerrit Großmann*	Oral O7C Networks Analysis Chair: *Jose Nacher*
12:35	**Lunch**		
14:00	Oral O8A Diffusion & Epidemics Chair: *James O'Malley*	Oral O8B Network Embedding Chair: *Milos Kudelka*	Oral O8C Resilience Chair: *Roberto Interdonato*
15:30	**Coffee Break**		
15:50	Keynote Speaker: **Danai Koutra** Chair: *Andrea Rapisarda*		
16:30	Oral O9A Link Analysis & Ranking Chair: *Akrati Saxena*	Oral O9B Ecological & Earth Science Networks Chair: *Gergely Palla*	Oral O9C Network Analysis Chair: *Marco Grassia*
17:45	**Closing**		

DETAILED PROGRAM **DAY 3**

08:00	**Registration**
08:45	**Tao Zhou** **Recent Debates in Link Prediction** Chair: *Jean Loup Guillaume*
09:25	**Lighting L3: Community structure - Human Behavior** Chair: *Matteo Zignani*
09:25	**To be exisitent is to be stable: detecting the optimal number of communities** Hiroshi Okamoto
09:30	**High modularity reduces robustness of connectivity even from the optimal case** Jaeho Kim, Yukio Hayashi
09:35	**Hierarchical overlapping community detection for weighted networks** Petr Prokop, Pavla Drazdilova, Jan Platos
09:40	**Finding Hidden Swingers in the 2022 Italian Elections Twitter Discourse** Alessia Antelmi, Lucio La Cava, Arianna Pera
09:45	**Dynamics of the Non-consensus Opinion Model** Xinhan Liu, Massimo Achterberg, Robert Kooij
09:50	**Opinion formation under global steering with application to social network data analysis** Ivan Conjeaud, Philipp Lorenz-Spreen, Argyris Kalogeratos
09:55	**Too Overloaded to Use: An Adaptive Network Model of Information Overload during Smartphone App Usage** Emerson Bracy, Henrik Lassila, Jan Treur
10:00	**Untangling Emotional Threads: Hallucination Networks of Large Language Models** Mahsa Goodarzi, Radhakrishnan Venkatakrishnan, M Abdullah Canbaz
10:20	**Poster P5: A [1 - 12] Machine Learning & Networks - B [13 - 17] Biological Networks - C [18 - 20] Networks in Finance & Economics**
1	**Heterophily-Based Graph Neural Network for Imbalanced Classification** Zirui Liang, Yuntao Y Li, Tianjin Huang, Akrati Saxena, Yulong Pei, Mykola Pechenizkiy
2	**L2G2G: a Scalable Local-to-Global Network Embedding with Graph Autoencoders** Ruikang Ouyang, Andrew Elliott, Stratis Limnios, Mihai Cucuringu, Gesine Reinert
3	**Enhancing Time Series Analysis with GNN Graph Classification Models** Alex Romanova
4	**Evaluating Network Embeddings through the Lens of Community Structure** Jason Barbour, Stephany Rajeh, Sara Najem, Hocine Cherifi
5	**A Comparative Study of Knowledge Graph-to-Text Generation Architectures in**

	the Context of Conversational Agents Hussam Ghanem, Christophe Cruz
6	**Homological Convolutional Neural Networks** Antonio Briola, Yuanrong Wang, Silvia Bartolucci, Tomaso Aste
7	**Exploring the Efficacy of Deep Learning Models in Capturing Non-Linearity and Structural Information in Graph Datasets** Keith M Smith, Hon Wah Yeung, Shivam Maurya
8	**Recall estimation of reference identification by Newton's cooling law** Yuji Fujita, Noritaka Usami, Fujii Toshiaki, Hiroaki Nagai
9	**Reconstructing networks from text using Large Language Models (LLMs)** Rathin Jeyaram, Robert Ward, Marc Santolini
10	**TimeGNN: Temporal Dynamic Graph Learning for Time Series Forecasting** Nancy Xu, Chrysoula Kosma, Michalis Vazirgiannis
11	**E-MIGAN: Tackling Cold-Start Challenges in Recommender Systems** Drif Ahlem, Hocine Cherifi
12	**On the definition of toxicity in NLP** Sergey A Berezin, Reza Farahbakhsh, Noel Crespi
13	**Simulating weak attacks in a new duplication-divergence model with gene loss** Ruihua Zhang, Gesine D Reinert
14	**Interaction networks of a complex bacterial community revealed that different species possess distinct ecological roles but one species concentrates antagonism capacity** Maribel Hernández Rosales, Diana Barceló, Marisol Navarro Miranda, Gabriela Olmedo
15	**A principled multilayer network construction for integrating multimodal data with applications from molecular biology to clinical outcomes** Piotr A Sliwa, Heather Harrington, Gesine D Reinert, Julian Knight
16	**Graph modeling of cellular porosity in dentin** Lucas Chatelain, Elsa Vennat, Nicolas Tremblay, David Rousseau, Aurélien Gourrier
17	**Non Parametric Differential Network Analysis for Biological Data** Prof. Pietro Hiram Guzzi U Magna Gracia Of Catanzaro Italy, Arkaprava Roy, Francesca Cortese, Pierangelo Veltri
18	**Properties of B2B invoice graphs and detection of structures for debt settlement** Joannes Guichon, Nazim Fatès, Sylvain Contassot-Vivier, Massimo Amato
19	**Finding an Optimal Retraining Policy for the Green Transition** Matthew Bone, Fabian Stephany
20	**The Flow of Corporate Control in the Global Ownership Network** Takayuki Mizuno, Shohei Doi, Shuhei Kurizaki
10:50	**Oral O7A: Social Networks** Chair: *Alessandro Galeazzi*

10:50	**Retweeting Twitter Hate Speech after Musk Acquisition** John D. Matta, Trevor Auten
11:05	**Pyramid as a Core Structure in Social Networks** Wenruo Lyu, Liang Zhao
11:20	**The Friendship Paradox and Social Network Participation** Ahmed Medhat, Shankar Iyer
11:35	**Dynamics of toxic behavior in the Covid-19 vaccination debate** Azza Bouleimen
11:50	**Unveiling the Privacy Risk: A Trade-off between User Behavior and Information Propagation in Social Media** Giovanni Livraga, Artjoms Olzojevs, Marco Viviani
12:05	**Examining Toxicity's Impact on Reddit Conversations** Nahiyan Bin Noor, Niloofar Yousefi, Billy Spann, Nitin Agarwal
12:20	**Uncovering Latent Influential Patterns and Interests on Twitter Using Contextual Focal Structure Analysis Design** Mustafa Alassad, Nitin Agarwal, Lotenna Nwana
10:50	**Oral O7B: Dynamics on/of Networks** Chair: *Gerrit Großmann*
10:50	**Defensive medicine and strategic interactions in physician–patient networks** Danilo Delpini, Paolo Russu
11:05	**Change-point detection for networks with time-varying edge weights** Anastasia Mantziou, Mihai Cucuringu, Alex Holmes, Victor Meirinhos, Andreina Naddeo, Gesine Reinert
11:20	**Statistically significant graph evolution rules in temporal networks** Alessia Galdeman, Matteo Zignani, Sabrina Gaito
11:35	**A graphon-based kinetic model for opinion formation** Jonathan Franceschi, Mattia Zanella
11:50	**Similar Minds: Modeling Opinion Dynamics with Similarity-Based Influence and Bounded Confidence** Valentina Pansanella, Salvatore Citraro, Giulio Rossetti
12:05	**Decentralized networks growth analysis: Instance dynamics on Mastodon** Eduard Sabo, Mirela Riveni, Dimka Karastoyanova
12:20	**A quadratic static game model for assessing the impact of climate change** Bouchra Mroué, Bouchra Mroué, Anthony Couthures, Samson Lasaulce, Irinel-Constantin Morărescu
10:50	**Oral O7C: Networks Analysis** Chair: *Jose Nacher*
10:50	**Randomized reference models for temporal networks** Christian L Vestergaard, Laetitia Gauvin, Mathieu Génois, Marton Karsai, Mikko Kivelä, Taro Takaguchi, Eugenio Valdano
11:05	**Orderliness of Navigation Patterns in Hyperbolic Complex Networks** Dániel Ficzere, Gergely Hollósi, Attila Frankó, Pál Varga, József Bíró

11:20	**Approximation algorithms for k-median problems on complex networks: theory and practice** Roldan Pozo
11:35	**The recoverability of network controllability with respect to node additions** Fenghua Wang, Robert Kooij
11:50	**On Centrality and Core in Weighted and Unweighted Air Transport Component Structures** Issa Moussa Diop, Cherif Diallo, Chantal Cherifi, Hocine Cherifi
12:05	**Assessing the fit of Erd\"os-R\'enyi Mixture Models** Anum Fatima, Gesine D Reinert
12:20	**Decentralized Control in Hypergraph Distributed Optimization** Ioannis Papastaikoudis
12:35	**Lunch Break**
14:00	**Oral O8A: Diffusion & Epidemics** Chair: *James O'Malley*
14:00	**Active learning for epidemic source detection** Martin Sterchi, Lorenz Hilfiker, Rolf Grütter, Abraham Bernstein
14:15	**Towards the building of a surveillance network for PPR-like diseases in Nigeria: identifying potential sentinel nodes in a partially-known network** Asma Mesdour, Andrea Apolloni, Eric Cardinale, Muhammed Bolajoko, Mathieu Andraud, Elena Arsevska, Mamadou Ciss, Sandra Ijioma
14:30	**Effects of Homophily in Epidemic Processes** Richard La
14:45	**Three-dimensional network visualization and animation with Blender and Python** Giovanni Strona
15:00	**A particle method for continuous Hegselmann-Krause opinion dynamics** Christoph Borgers, Natasa Dragovic, Arkadz Kirshtein, Anna Haensch
15:15	**A Simple and Efficient Method for Target Control Based on the Path Cover Problem** Jose Nacher, Tatsuya Akutsu, Wataru Someya
14:00	**Oral O8B: Network Embedding** Chair: *Milos Kudelka*
14:00	**Maximal modularity of PSO networks and its consequences on hyperbolic embedding** Sámuel G. Balogh, Gergely Palla, Bianka Kovács, Bendegúz Sulyok
14:15	**A Framework for Structural Representation of Nodes in Hyper Networks** Shu Liu, Cameron Lai, Fujio Toriumi
14:30	**Embedding networks into hyperbolic spaces by greedy routing optimization** Bendegúz Sulyok, Gergely Palla
14:45	**Network Embedding Based on DepDist Contraction** Emanuel Dopater, Eliska Ochodkova, Milos Kudelka

15:00	**Linear Stochastic Processes on Networks and Low Rank Graph Limits** Alexander H Dunyak, Peter Caines
15:15	**Empirical study of graph spectra and their limitations** Pierre Miasnikof
14:00	**Oral O8C: Dynamics on/of Networks** Chair: *Roberto Interdonato*
14:00	**Towards Evaluation & Mitigation of the Entropic Value at Systemic Risk in Networked Systems** Vladimir Marbukh
14:15	**Systemic Risk of Discontinuous Failures in Large-Scale Networks within Time Horizon: Work in Progress** Vladimir Marbukh
14:30	**Robustness and resilience of complex networks** Oriol Artime, Marco Grassia, Manlio De Domenico, James Gleeson, Hernan Makse, Giuseppe Mangioni, Matjaž Perc, Filippo Radicchi
14:45	**Decoding Crime Networks: Unsupervised Methods for Identifying Key Roles through Anomaly Detection** Alex Sander Oliveira Toledo, Antônio Scarpelli, Allbens Atman, Laura Carpi
15:00	**A Modular Network Exploration of Backbone Extraction Techniques** Ali Yassin, Hocine Cherifi, Hamida Seba, Olivier Togni
15:15	**Influence Robustness of Nodes in Multiplex Networks against Attacks** Boqian Ma, Hao Ren, Jiaojiao Jiang
15:30	**Coffee Break**
15:50	**Danai Koutra** **Advances in Graph Neural Networks: Heterophily and Beyond** Chair: *Andrea Rapisarda*
16:30	**Oral O9A: Link Analysis & Ranking** Chair: *Akrati Saxena*
16:30	**Minority representation and relative ranking in sampling attributed networks** Nelson Antunes, Sayan Banerjee, Shankar Bhamidi, Vladas Pipiras
16:45	**'Stealing fire or stacking knowledge' by machine intelligence to model link prediction in complex networks** Carlo Vittorio Cannistraci
17:00	**SPROUT - a Supervised Recommender System for Link Prediction in Bipartite Multilayer Networks** Pedro M. Campos, Helder Alves, Victor Malheiro
17:15	**Stochastic Degree Sequence Model with Edge Constraints (SDSM-EC) for Backbone Extraction** Zachary P Neal, Jennifer Watling Neal
17:30	**Correction of The Heuristic Algorithm MinimalFlipSet to Balance Unbalanced Graphs**

	Sukhamay Kundu, Amit A Nanavati
16:30	**Oral O9B: Ecological & Earth Science Networks** Chair: *Gergely Palla*
16:30	**Using ecological networks to understand persistence in empirical Plant-Pollinator communities** Virginia Domínguez-García
16:45	**Climate finance, ecological networks and pest diffusion** Rahul Kaushik
17:00	**Using climate and landscape satellite data to explore spatio-temporal patterns for assessing extreme urban heat through complex network analysis: the case study of Athens.** Avraam Charakopoulos, Theodoros E Karakasidis, Konstantinos Ziliaskopoulos, Chrysi Laspidou
17:15	**Transport Resilience and Adaptation to Climate Impacts – A Case Study on Agricultural Transport in Brazil** Mark Deinert
17:30	**Agent based simulation of a network of NGO: popularity and economic determinants of the network evolution.** Michelangelo Puliga, Milena Lopreite, Mauro Gallegati
16:30	**Oral O9C: Network Analysis** Chair: *Marco Grassia*
16:30	**Representing Edge Flows on Graphs via Sparse Cell Complexes** Josef Hoppe, Michael Schaub
16:45	**UnboundAttack : Generating Unbounded Adversarial Attacks to Graph Neural Networks** Sofiane Ennadir, Amr Alkhatib, Giannis Nikolentzos, Michalis Vazirgiannis, Henrik Bostrom
17:00	**Robust, high temporal-resolution EEG functional connectivity detects increased connectivity coinciding with P300 in visual short-term memory binding in both familial and sporadic prodromal Alzheimer's Disease** Om Roy, Yashar Moshfeghi, Keith M Smith, Mario Parra, Agustin Ibanez, Francisco Lopera
17:15	**Weighted and Unweighted Air Transportation Component Structure: Consistency and Differences** Issa Moussa Diop, Cherif Diallo, Chantal Cherifi, Hocine Cherifi
17:30	**Generalized Gromov Wasserstein Distance for Seed-Informed Network Alignment** Mengzhen Li, Mehmet Koyuturk
17:45	**Closing**

LUNCH & WELCOME RECEPTION

Palais de l'Europe

DINNER BANQUET

Palais de l’Europe

We're delighted to introduce you to the vibrant local cuisine curated for this event. Our culinary journey highlights the region's finest ingredients, from locally sourced greens to savory bone-in ham. Each dish represents a commitment to quality and ethical sourcing, reflecting the essence of the terroir. Immerse yourself in the season's flavors, as the ever-evolving menu ensures a unique gastronomic experience. We're proud to share that our culinary showcase aligns with our strong commitment to eco-responsibility, promoting sustainability in every aspect of our event.

Day 1 - NOVEMBER 28, 2023			
8:00 - 8:30	**Registration**		
8:30 - 8:45	**Opening**		
8:45 - 9:25	**Speaker 1: Romualdo Pastor-Satorras -** Opinion Depolarization in Interdependent Topics and the Effects of Heterogeneous Social Interactions		
9:25 - 10:15	**L1**: Higher-Order Interactions - Social Networks		
10:15 - 10:50	**P1:** A [1 - 13] Network Analysis - B [14 - 20] Biological Networks - C [21 - 24] Mobility (**Coffee Break**)		
10:50 - 12:50	**O1A:** Community Structure	**O1B:** Machine Learning & Networks	**O1C:** Network Geometry
12:50 - 14:15	**Lunch**		
14:15 - 15:45	**O2A:** Human Behavior	**O2B:** Network Analysis	**O2C:** Synchronization
15:45 - 16:20	**P2:** A [1 - 12] Information Spreading in Social Media B [13 - 17] Diffusion & Epidemics - C [18-24] Machine Learning & Networks - (**Coffee Break**)		
16:20 - 17:00	**Speaker 2: Manlio De Domenico –** An Emerging Framework for the Functional Analysis of Complex Interconnected Systems		
17: 00 - 19:00	**O3A:** Dynamics on/of Networks	**O3B:** Network in Finance & Economics	**O3C:** Multilayer/Multiplex
19: 00 - 19:30	Break		
19: 30 - 21:00	**Welcome Reception**		
Day 2 - NOVEMBER 29, 2023			
8:15 - 8:45	**Registration**		
8:45- 9:25	**Speaker 3: Kathleen M. Carley** – Coupling in High Dimensional Networks		
9:25- 10:15	**L2:** Community Structure - Dynamics on/of Networks		
10:15 - 10:50	**P3:** A [1 - 9] Community Structure – B [10 - 19] Social Networks – C [20 - 23] Infrastructure Networks (**Coffee Break**)		
10:50 - 12:50	**O4A:** Information Spreading in Social Media	**O4B:** Machine Learning & Networks	**O4C:** Networks in Finance & Economics
12:50 - 14:15	**Lunch**		
14:15 - 15:45	**O5A:** Structural Network Measures	**O5B:** Infrastructure Networks	**O5C:** Biological Networks
15:45- 16:20	**P4:** A [1 - 9] Human Behavior – B [10 -13] Link Analysis & Ranking – C [14 - 24] Dynamics on/of Networks (**Coffee Break**)		
16:20 - 17:00	**Speaker 4: Michael Bronstein** – Physics Inspired Graph Neural Networks		
17: 00 - 19:00	**O6A:** Diffusion & Epidemics	**O6B:** Community Structure	**O6C:** Temporal Networks
19: 00 - 20:00	Break		
20:00 - 22:00	**Dinner Banquet**		
Day 3 - NOVEMBER 30, 2023			
8:15 - 08:45	**Registration**		
8:45 - 09:25	**Speaker 5: Tao Zhou** – Recent Debates in Link Prediction		
9:25 - 10:15	**L3:** Community structure - Human Behavior		
10:15 - 10:50	**P5:** A [1 - 12] Machine Learning & Networks - B [13 - 17] Biological Networks - C [18 - 20] Networks in Finance & Economics - (**Coffee Break**)		
10:50 - 12:35	**O7A:** Social Networks	**O7B:** Dynamics on/of Networks	**O7C:** Networks Analysis
12:35 - 14:00	**Lunch**		
14:00 - 15:30	O8A: Diffusion & Epidemics	**O8B:** Network Embedding	**O8C:** Resilience
15:30 - 15:50	**Coffee Break**		
15:50 - 16:30	**Speaker 6: Danai Koutra** – Advances in Graph Neural Networks: Heterophily and Beyond		
16:30 - 17:45	**O9A:** Link Analysis & Ranking	O9B: Ecological & Earth Science Networks	**O9C:** Network Analysis
17: 45 - 18:00	**Closing**		

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