

PROFESSIONAL EXPERIENCE

- NORDITA, Stockholm University and KTH Royal Institute of Technology** Stockholm, Sweden
WINQ Research Fellow Sep 2023 –Current
– Group PI: Prof. John S. Wettlaufer and Prof. Frank Wilczek
- Indiana University** Bloomington, US
AccelNet/MultiNet Fellow Sep 2024 –Dec 2024
– Advisor: Prof. Filippo Radicchi

EDUCATION

- Queen Mary, University of London** London, United Kingdom
Ph.D. in Applied Mathematics, Advisor: Prof. Ginestra Bianconi Sep 2019 –Sep 2023
– Thesis: “Dynamic processes on networks and higher-order structures”
- Aston University** Birmingham, United Kingdom
Visiting student, Advisor: Prof. David Saad Jul 2018 –Aug 2018
- KTH Royal Institute of Technology** Stockholm, Sweden
Visiting student Jan 2018 –Jun 2018
- University of Chinese Academy of Sciences** Beijing, China
B.Sc. in Physics, Advisor: Prof. Pan Zhang Sep 2015 –Jul 2019
– Thesis: “Low rank approximation of tensor networks”

TALKS AND POSTER PRESENTATIONS

Conference presentations

- International Workshop “Higher-order interactions: mechanisms, behaviors, and networks” (Erice, Italy) Aug 2025
Invited plenary lecturer
- [Isaac Newton Institute Satellite Programme on “Hypergraphs: theory and applications”](#) (London, UK) Jul 2024
Invited talk. Title: *The dynamic nature of percolation on networks with triadic interactions*
- [1st British NetSci Symposium](#) (London, UK) May 2024
Contributing talk. Title: *“Triadic percolation induces dynamical topological patterns in higher-order networks”*
- [APS March meeting 2024](#) (Minneapolis, United States) Mar 2024
Contributed talk. Title: *“Network science Ising state of matter”*
- [CCS/Italy 2023](#) (Naples, Italy) Oct 2023
Contributed talk. Title: *“The dynamic nature of percolation on networks with triadic interactions”*
- [NetSci 2023](#) (Vienna, Austria) Jul 2023
Contributed talk. Title: *“The dynamic nature of percolation on networks with triadic interactions”*
- [Conference on Complex Systems 2022](#) (Palma de Mallorca, Spain) Oct 2022

- Contributed talk. Title: “Triadic interactions induce blinking and chaos in connectivity of higher-order networks”
- 4th IMA Conference on The Mathematical Challenges of Big Data (Oxford, United Kingdom) Sep 2022
Contributed talk. Title: “A message-passing approach to epidemic tracing and mitigation with apps”
- Satellite @ NetSci2022: Signed Networks and their Applications (Online) Jul 2022
Invited talk. Title: “Triadic interactions induce blinking and chaos in connectivity of higher-order networks”
- Satellite @ NetSci2022: Higher-Order Topology & Dynamics in Complex Networks (Online) Jul 2022
Contributed talk. Title: “Higher-order percolation processes on multiplex hypergraphs”
- Conference on Complex Systems 2021 (Lyon, France) Oct 2021
Contributed talk. Title: “Higher-order percolation processes on multiplex hypergraphs”
- Satellite @ NetSci 2021: TopoNet2021: Networks beyond pairwise interactions (Online) Jun 2021
Contributed talk. Title: “Higher-order percolation processes on multiplex hypergraphs”
- The 46th Conference of the Middle European Cooperation in Statistical Physics (Online) May 2021
Contributed talk. Title: “A message-passing approach to epidemic tracing and mitigation with apps”
- Conference on Complex Systems 2020 (Online) Dec 2020
Contributed talk. Title: “A message-passing approach to epidemic tracing and mitigation with apps”

Other presentations

- Group seminar, Carlos I Institute of Theoretical and Computational Physics, University of Granada Sep 2024
Invited talk. Title: Triadic percolation induces dynamical topological patterns in higher-order networks
- Workshop “Quantitative Methods for Dynamics on Networks”, Los Alamos National Laboratory Aug 2024
Invited talk. Title: The dynamic nature of percolation on networks with triadic interactions
- BrainNet+ 2024, KTH May 2024
Contributing talk. Title: “Triadic percolation induces dynamical topological patterns in higher-order networks”
- Applied CATS (Combinatorics, Algebra, Topology and Statistics) seminar, KTH Nov 2023
Invited talk. Title: “Network science Ising states of matter”
- Internal seminar, Institute of Theoretical Physics, Chinese Academy of Sciences Aug 2023
Invited talk. Title: “The dynamic nature of percolation on networks with triadic interactions”
- Internal seminar, Aston University Aug 2023
Invited talk. Title: “The dynamic nature of percolation on networks with triadic interactions”
- NetPLACE seminar Feb 2023
Invited talk. Title: “Message-passing approach to epidemic tracing and mitigation with apps”
- Networks and Time Workshop, Queen Mary University of London Jan 2023
Contributed talk. Title: “Triadic interactions induce blinking and chaos in connectivity of higher-order networks”
- Complex Systems Seminar, Queen Mary University of London Apr 2022
Invited talk. Title: “Mathematics in epidemic spreading: from containment measures to critical behaviours”
- Postgraduate Research Day 2022, Queen Mary University of London May 2022
Talk. Title: “Triadic interactions induce blinking and chaos in connectivity of higher-order networks”
- Internal seminar, Aston University Mar 2022
Invited talk. Title: “Mathematics in epidemic spreading: from containment measures to critical behaviours”
- Postgraduate Research Day 2021, Queen Mary University of London May 2021
Poster presentation. Title: “A message-passing approach to epidemic tracing and mitigation with apps”
- Queen Mary Internal Postgraduate Seminar (QuIPS) Nov 2020
Invited talk. Title: “A message-passing approach to epidemic tracing and mitigation with apps”

OTHER ACADEMIC ACTIVITIES

Organization of events

- Organiser of program [WINQ Program on Complex and Quantum Systems](#) at NORDITA, Stockholm Apr 2024
A program hosts a series of four workshops dedicated to the topics in complex systems and quantum systems
- Organiser of panel [NetPLACE@NetSciX 2024](#) at [NetSciX 2024](#), Venice Jan 2024
Panel discussion on scientific communication
- Organiser of panel [NetPLACE@NetSci](#) at [NetSci 2023](#), Vienna Jul 2023
A 2-day panel discussion on academic writing and mental well-being in academia
- Organiser of [DERI PhD forum](#) 2020-2023
A seminar at the Digital Environment Research Institute, Queen Mary University of London
- Organiser of [NetPLACE](#) community 2021-Current
An international community for early-career researchers to interact, to present new/interesting developments from their areas of interest in the complex systems and networks field, as well as their difficulties during the academic journey.

Attendance of other events

- [Lipari School Computational Complex and Social Systems](#), Lipari, Italy Jul 2022
DATA SCIENCE: Models, Algorithms, AI and Beyond

Referee and editorial service

- Reviewer for: [Nature Communication](#), [Nature Physics](#), [Physical Review E](#), [Physica A](#), [Communication Physics](#), [Scientific Reports](#), [New Journal of Physics](#), [Bioinformatics](#), [Chaos Solitons and Fractals](#), [IEEE Transactions on Network Science and Engineering](#), [Journal of Physics A](#), [Chaos: An Interdisciplinary Journal of Nonlinear Science](#), [Journal of Statistical Physics](#)
- Guest Editor Assistant of the Special Issue “[Models, Topology and Inference of Multilayer and Higher-Order Networks](#)” in *Entropy*.

TEACHING

- **Visiting lecturer** at University of Iceland Spring 2025
Statistical Methods in Data Analysis, Jan 2025-Apr 2025
- **Teaching Associate** at Queen Mary University of London 2019-2023
Calculus II, Level 4 module, Jan 2023-Apr 2023
Vectors and Matrices, Level 4 module, Jan 2023-Apr 2023
Calculus I, Level 4 module, Sep 2022-Dec 2022
Calculus I, Level 4 module, Sep 2021-Dec 2021
Machine Learning with Python, Level 7 module, Jun 2021-Aug 2021
Calculus II, Level 4 module, Jan 2021-Apr 2021
Calculus I, Level 4 module, Sep 2020-Dec 2020
Linear Algebra I, Level 5 module, Sep 2020-Dec 2020
Vectors and Matrices, Level 4 module, Jan 2020-Apr 2020
- **Demonstrator** at Queen Mary University of London 2019-2021
Introduction to Machine Learning, Level 6 module, Jan 2021-Mar 2021
Complex Networks, Level 6 module, Jan 2020 - Mar 2020
Electricity and Atomic Physics, Introductory module, Jan 2020-Mar 2020
- **Graduate Teaching Associate** at King's College London 2021-2022
Theory of Complex Networks, Level 7 module, Sep 2022-Dec 2022
Linear Algebra and Geometry II, Level 5 module, Jan 2022-Apr 2022
Calculus I, Level 4 module, Sep 2021-Dec 2021

SUPERVISION AND MENTORSHIP

I have supervised and co-supervised the following students:

- 2024 Ron Demjaha, Master project, Uppsala University
 - Project title: Epidemic spreading model on multiplex hypergraphs
- 2023 Yingshan Guo, Visiting Master student, Anqing Normal University (co-supervise with Prof. Bianconi)
 - Project title: Model of recursive simplicial complexes
- 2022 Efe Görgüner, Visiting high school student, Royal Grammar School Guildford (co-supervise with Prof. Bianconi)
 - Project title: The Robustness and Predictability of Networks

SKILLS

- **Programming skills:**
 - MATLAB, Python, Mathematica, Julia, C, \LaTeX
- **Languages:**
 - English: professional proficiency
 - Chinese: native speaker

SCHOLARSHIPS AND GRANTS

- 2024 AccelNet/MultiNet Fellow, AccelNet/MultiNet Exchange program, \$8000
- 2023 Scholarship for Events on Complex Systems (SECS), Young Researchers of the Complex Systems Society (yrCCS), €300
- 2023 INI Network Support funding, Isaac Newton Institute for Mathematical Sciences, £5000 (with Silvia Rognone, Gabriele Di Bona, Annalisa Caligiuri)
- 2022 Small Grant, The Institute of Mathematics and its applications, £600
- 2022 Student Grants, Conference on Complex Systems 2022, Fee waiver (equivalently €340)
- 2022 Postgraduate Research Fund (PGRF), QMUL, £1000
- 2021 Travel Grant Complex Systems & Networks Group, QMUL, £700
- 2020 Travel Grant Complex Systems & Networks Group, QMUL, £300

AWARDS AND ACHIEVEMENTS

- 2023 The article ‘The dynamic nature of percolation on networks with triadic interaction’ is featured in **Nature Communications Editors’ Highlight**
- 2022 Outstanding Teaching Assistant (Nomination), King’s College London
- 2021 [Press coverage](#): “*Competition and Collaboration: Understanding Interacting Epidemics Can Unlock Better Disease Forecasts*”, **Discover Magazine**
- 2021 [Press coverage](#): “*Competition and collaboration: Understanding interacting epidemics can unlock better disease forecasts*”, Los Alamos National Laboratory

PUBLICATIONS

- [Mil+24a] Ana P Millán, **Hanlin Sun**, Lorenzo Giambagli, Riccardo Muolo, Timoteo Carletti, Joaquín J. Torres, Filippo Radicchi, Jürgen Kurths, and Ginestra Bianconi. “Perspective article: Topology shapes dynamics on higher-order networks” (2024). accepted by Nature Physics.
- [Mil+24b] Ana P Millán*, **Hanlin Sun***, Joaquín J Torres, and Ginestra Bianconi. “Triadic percolation induces dynamical topological patterns in higher-order networks”. *PNAS Nexus* 3.7 (July 2024). * indicates equal contribution, pgae270. ISSN: 2752-6542.
- [SB24] **Hanlin Sun** and Ginestra Bianconi. “Higher-order triadic percolation on random hypergraphs” (2024). arXiv: [2407.14213 \[nlin.AO\]](#).
- [Sun+24] **Hanlin Sun**, Rajat Kumar Panda, Roberto Verdel, Alex Rodriguez, Marcello Dalmonte, and Ginestra Bianconi. “Network science: Ising states of matter”. *Phys. Rev. E* 109 (5 May 2024), p. 054305.
- [Pan+23] Rajat K Panda, Roberto Verdel, Alex Rodriguez, **Hanlin Sun**, Ginestra Bianconi, and Marcello Dalmonte. “Non-parametric learning critical behavior in Ising partition functions: PCA entropy and intrinsic dimension”. *SciPost Physics Core* 6.4 (2023), p. 086.
- [Sun+23] **Hanlin Sun**, Filippo Radicchi, Jürgen Kurths, and Ginestra Bianconi. “The dynamic nature of percolation on networks with triadic interactions”. *Nature Communications* 14.1 (Mar. 2023), p. 1308. ISSN: 2041-1723.
- [SKB22] **Hanlin Sun**, Ivan Kryven, and Ginestra Bianconi. “Critical time-dependent branching process modelling epidemic spreading with containment measures”. *Journal of Physics A: Mathematical and Theoretical* 55.22 (May 2022), p. 224006.
- [Bia+21] Ginestra Bianconi, **Hanlin Sun**, Giacomo Rapisardi, and Alex Arenas. “Message-passing approach to epidemic tracing and mitigation with apps”. *Phys. Rev. Research* 3 (1 Feb. 2021), p. L012014.
- [St+21] Guillaume St-Onge, **Hanlin Sun**, Antoine Allard, Laurent Hébert-Dufresne, and Ginestra Bianconi. “Universal Nonlinear Infection Kernel from Heterogeneous Exposure on Higher-Order Networks”. *Phys. Rev. Lett.* 127 (15 Oct. 2021), p. 158301.
- [SB21] **Hanlin Sun** and Ginestra Bianconi. “Higher-order percolation processes on multiplex hypergraphs”. *Phys. Rev. E* 104 (3 Sept. 2021), p. 034306.
- [SSL21] **Hanlin Sun**, David Saad, and Andrey Y. Lokhov. “Competition, Collaboration, and Optimization in Multiple Interacting Spreading Processes”. *Phys. Rev. X* 11 (1 Mar. 2021), p. 011048.
- [SZB20] **Hanlin Sun**, Robert M. Ziff, and Ginestra Bianconi. “Renormalization group theory of percolation on pseudofractal simplicial and cell complexes”. *Phys. Rev. E* 102 (1 July 2020), p. 012308.