

EDUCATION

Queen Mary, University of London

Ph.D. in Applied Mathematics, Advisor: Prof. Ginestra Bianconi

London, United Kingdom

Sep 2019 – Sep 2023

- Thesis: “Dynamic processes on networks and higher-order structures”

Aston University

Visiting student, Advisor: Prof. David Saad

Birmingham, United Kingdom

Jul 2018 – Aug 2018

KTH Royal Institute of Technology

Visiting student

Stockholm, Sweden

Jan 2018 – Jun 2018

University of Chinese Academy of Sciences

B.Sc. in Physics, Advisor: Prof. Pan Zhang

Beijing, China

Sep 2015 – Jul 2019

- Thesis: “Low rank approximation of tensor networks”

EXPERIENCE

Aston University

Advisor: Prof. David Saad

Birmingham, United Kingdom

Summer 2018

- Competition, collaboration, and optimization in multiple interacting spreading processes
- Using Dynamic Message-passing algorithm to predict and optimize the competing and collaborative spreading processes.

KTH Royal Institute of Technology

Advisor: Prof. Michael Hanke

Stockholm, Sweden

Spring 2018

- Project of Parallel Computation: Simulation of N-body problems
- Using Barnes-Hut Algorithm to simulate N-body problem and the example which we are implementing is to calculate the energy spectrum of electron beam.

KTH Royal Institute of Technology

Advisor: Prof. Josephine Sullivan

Stockholm, Sweden

Spring 2018

- Project of Deep Learning: End-to-End Text Detection and Recognition of Web Images
- Recognizing English and Chinese characters on web images.

Institute of Theoretical Physics, CAS

Advisor: Prof. Pan Zhang

Beijing, China

Summer 2017

- The application of Mean Field Approximation in neural network
- The purpose of this study is trying to construct (supervised and unsupervised) neural network learning algorithms using approximation method in statistical physics.

University of Chinese Academy of Sciences

Advisor: Prof. Xiaosong Chen

Beijing, China

Spring 2017

- Project of Statistics Physics: Computer Simulation of Kosterlitz-Thouless Phase Transition
- Using Monte Carlo method to simulate the Kosterlitz-Thouless Phase Transition on 2 dimensional XY model.

TEACHING

- **Teaching Associate** at Queen Mary University of London 2019-Current
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-Current
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-Current
Calculus II, Level 4 module, Jan 2023-Apr 2023
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

SKILLS

- **Programming skills:**
 - MATLAB, Python, Mathematica, Julia, L^AT_EX
 - Basic knowledge on TensorFlow and Pytorch
 - Basic knowledge on C and C++
- **Languages:**
 - English: very fluent
 - Chinese: native speaker

REVIEW SERVICE

- Physica A: Statistical Mechanics and its Applications
- Communication Physics
- Scientific Reports
- New Journal of Physics
- IEEE Transactions on Network Science and Engineering
- Bioinformatics
- Chaos, Solitons and Fractals
- Journal of Physics A: Mathematical and Theoretical

SCHOLARSHIPS AND GRANTS

- 2022 Small Grant, The Institute of Mathematics and its applications, £600
- 2022 Student Grants, Conference on Complex Systems 2022, Fee waiver (equivalently €340)
- 2022 Research Support Funding, QMUL, £1000
- 2021 Travel Grant Complex Systems & Networks Group, QMUL, £700
- 2020 Travel Grant Complex Systems & Networks Group, QMUL, £300

AWARDS AND ACHIEVEMENTS

- 2022 Outstanding Teaching Assistant (Nomination), King's College London
- 2021 [Press coverage](#): “*Competition and collaboration: Understanding interacting epidemics can unlock better disease forecasts*”, Los Alamos National Laboratory
- 2021 [Press coverage](#): “*Competition and Collaboration: Understanding Interacting Epidemics Can Unlock Better Disease Forecasts*”, *Discover Magazine*

RELEVANT EXTRACURRICULAR ACTIVITIES

Organization of events

- Organiser of [DERI PhD forum](#) 2020-Current
A seminar at the Digital Environment Research Institute, Queen Mary University of London
- Organiser of [NetPLACE](#) Seminar 2021-Current
A seminar of Network, Phd Life And ComplExity

Attendance of other events

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

TALKS AND POSTER PRESENTATIONS

Conference presentations

- Conference on Complex System 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"
- TopoNet2021: Networks beyond pairwise interactions, Satellite @ Networks 2021 (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

- [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 at 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"

PEER REVIEWED PUBLICATIONS

- [SKB22] **Hanlin Sun**, Ivan Kryven, and Ginestra Bianconi. “Critical time-dependent branching process modelling epidemic spreading with containment measures”. In: *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”. In: *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”. In: *Phys. Rev. Lett.* 127 (15 Oct. 2021), p. 158301.
- [SB21] **Hanlin Sun** and Ginestra Bianconi. “Higher-order percolation processes on multiplex hypergraphs”. In: *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”. In: *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”. In: *Phys. Rev. E* 102 (1 July 2020), p. 012308.

PREPRINTS

- [Sun+22] **Hanlin Sun**, Filippo Radicchi, Juergen Kurths, and Ginestra Bianconi. “The dynamic nature of percolation on networks with triadic interactions”. In: *arXiv preprint arXiv:2204.13067* (2022). (*submitted to Nat. Comm.*)