Hanlin Sun

Website: Hanlin Sun
Twitter: @sunhanlin151
Google Scholar:Hanlin Sun
Email: hanlin.sun@qmul.ac.uk
GitHub: github.com/hanlinsun97

Education

Queen Mary, University of London — London, United Kingdom
Ph.D. in Applied Mathematics, Advisor: Prof. Ginestra Bianconi — 2019–Current

Aston University — Birmingham, United Kingdom
Visiting student, Advisor: Prof. David Saad — 2018

KTH Royal Institute of Technology — Stockholm, Sweden
Visiting student — 2018

University of Chinese Academy of Sciences — Beijing, China
B.Sc. in Physics, Advisor: Prof. Pan Zhang — 2015–2019

- Thesis: "Low rank approximation of tensor networks"

Experience

Aston University — Birmingham, United Kingdom
Advisor: Prof. David Saad — Summer 2019

- Competition, collaboration, and optimization in multiple interacting spreading processes
- Using dynamic message passing algorithm to compute the interaction and optimization in competing and collaborative processes.

KTH Royal Institute of Technology — Stockholm, Sweden
Advisor: Prof. Michael Hanke — 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 — Stockholm, Sweden
Advisor: Prof. Josephine Sullivan — 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 — Beijing, China
Advisor: Prof. Pan Zhang — 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 — Beijing, China
Advisor: Prof. Xiaosong Chen — Spring 2017

- Project of Statistics Physics:Computer Simulation of Kosterlitz-Thousless 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 I
  Calculus II
  Vectors and Matrices
  Linear Algebra I
  Machine Learning with Python (Master Course)
- **Demonstrator** at Queen Mary University of London 2019-Current
  Complex Networks
  Electricity and Atomic Physics
- **Graduate Teaching Associate** at King's College London 2021-Current
  Calculus I
  Linear Algebra and Geometry II

Skills

- **Programming skills:**
  - MATLAB, Python, Mathematica, Julia, LaTeX
  - 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

Activities, Seminars and Conferences

- Co-organiser of DERI PhD forum 2020-Current
  A seminar at the Digital Enviroment Research Institute, Queen Mary University of London
- Co-organiser of NetPLACE Seminar 2021-Current
  A seminar of Network, Phd Life And ComplExity, Queen Mary University of London
- Complex Systems Seminar, Queen Mary University of London Apr 2021
  Oral presentation: Mathematics in epidemic spreading: from containment measures to critical behaviours
- Internal seminar at Aston University Mar 2021
  Oral presentation: Mathematics in epidemic spreading: from containment measures to critical behaviours
- Conference on Complex Systems 2021 Oct 2021
  Oral presentation: Higher-order percolation processes on multiplex hypergraphs
- TopoNet2021: Networks beyond pairwise interactions, Satellite @ Networks 2021 Jun 2021
  Oral presentation: Higher-order percolation processes on multiplex hypergraphs
- The 46th Conference of the Middle European Cooperation in Statistical Physics (MECO46) May 2021
  Oral presentation: A message-passing approach to epidemic tracing and mitigation with apps
- Conference on Complex Systems 2020 (CCS2020) Dec 2020
  Oral presentation: A message-passing approach to epidemic tracing and mitigation with apps
- Queen Mary Internal Postgraduate Seminar (QuIPS) Nov 2020
  Talk: A message-passing approach to epidemic tracing and mitigation with apps

Publications

[1] **H. Sun**, I. Kryven, and G. Bianconi, "Critical time-dependent branching process modelling epidemic spreading with containment measures", *Journal of Physics A: Mathematical and Theoretical*, 2022.

[2] **H. Sun**, F. Radicchi, J. Kurths, and G. Bianconi, *Triadic interactions induce blinking and chaos in the connectivity of higher-order networks*, 2022.

[3] G. Bianconi, **H. Sun**, G. Rapisardi, and A. Arenas, "Message-passing approach to epidemic tracing and mitigation with apps", *Phys. Rev. Research*, vol. 3, p. L012014, 1 Feb. 2021.

[4] G. St-Onge, **H. Sun**, A. Allard, L. Hébert-Dufresne, and G. Bianconi, "Universal nonlinear infection kernel from heterogeneous exposure on higher-order networks", *Phys. Rev. Lett.*, vol. 127, p. 158 301, 15 Oct. 2021.

[5] **H. Sun** and G. Bianconi, "Higher-order percolation processes on multiplex hypergraphs", *Phys. Rev. E*, vol. 104, p. 034 306, 3 Sep. 2021.

[6] **H. Sun**, D. Saad, and A. Y. Lokhov, "Competition, collaboration, and optimization in multiple interacting spreading processes", *Phys. Rev. X*, vol. 11, p. 011 048, 1 Mar. 2021.

[7] **H. Sun**, R. M. Ziff, and G. Bianconi, "Renormalization group theory of percolation on pseudofractal simplicial and cell complexes", *Phys. Rev. E*, vol. 102, p. 012 308, 1 Jul. 2020.