YU TIAN

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ACADEMIC POSITIONS

Nordita, Stockholm University and KTH Royal Institute of Technology **Stockholm, Sweden**
Wallenberg Initiative on Networks and Quantum information (WINQ) Fellow Oct. 2022-

- Research Interest: Complex Systems and Networks, including Dynamics on Networks, the Incorporation of Positive and Negative Signs (e.g. friend-foe relationships in social networks), and Community Detection.

EDUCATION

University of Oxford **Oxford, UK**
Ph.D. Mathematics Sep. 2018 - Oct. 2022
EPSRC Centre for Doctoral Training for Industrially Focused Mathematical Modelling (InFoMM CDT)

- Thesis: Role Extraction, Dynamics, and Optimisation on Networks; supervised by Prof. Renaud Lambiotte (Oxford), and industrial collaborators Dr. Alisdair Wallis, Dr. Sebastian Lautz (Tesco).

University of Manchester **Manchester, UK**
B.Sc. Mathematics and Statistics (2+2 Dual Degree) Sep. 2016 - Jun. 2018

- Final project: Model Selection versus Model Averaging in Gaussian Processes; supervised by Prof. Thomas House.

Beijing Institute of Technology **Beijing, China**
B.Sc. Mathematics (2+2 Dual Degree) Sep. 2014 - Jun. 2016

OTHER RESEARCH EXPERIENCE

University of Oxford **Oxford, UK**
InFoMM CDT Mini-Project: Inter-District Packaged Gas Optimisation. Jul. - Sep. 2019
Supervisors: Prof. Raphael Hauser (Oxford), Dr. Peter Connard, Dr. Harsida Jenkins (Air Products)

- Formulated the problem of both inventory management and transshipment of products as a mixed integer programming, and reviewed state-of-the-art techniques.
- Proposed several relaxation methods based on Lagrangian relaxation to improve solving efficiency.

InFoMM CDT Mini-Project: Halo Effect and Demand Transfer on Products. Apr. - Jun. 2019
Supervisors: Prof. Renaud Lambiotte (Oxford), Dr. Alisdair Wallis (Tesco).

- Devised a method combining Poisson processes with time series analysis to identify the product relationships from aggregated sales data quantitatively.
- Applied regression techniques, and proposed several validation methods with real data.

PUBLICATIONS AND PREPRINTS

2. **Y. Tian** and R. Lambiotte. *Unifying information propagation models on networks and influence maximisation.* Phys. Rev. E, 106, 034316, 2022.
1. **Y. Tian**, S. Lautz, A. Wallis and R. Lambiotte. *Extracting complements and substitutes from sales data: a network perspective.* EPJ Data Sci., 10:45, 2021.

ACADEMIC EVENTS

Selected Communications

- **The 4th IMA Conference on The Mathematical Challenges of Big Data**, University of Oxford, UK. (Sep. 2022)
  Contributed talk: Information propagation and influence maximisation on networks.

- **SIAM Workshop on Network Science**[1] (Virtual). (Sep. 2022)
  Contributed talk: Unifying information propagation models on networks and influence maximisation.
- **Conference on Network Sciences (NetSci)** (Virtual), Shanghai, China. (July. 2022)
  Contributed talk: Unifying information propagation models on networks and influence maximisation.
- **Industrial Mathematics in the 21st Century: A cornucopia of unsolved problems**, University of Oxford, UK. (June 2022)
  Talk: Open questions in information propagation on networks.
- **InFoMM Annual Meeting**, University of Oxford, UK. (June 2022)
  Talk: Demand dynamics of interrelated products and further optimisation.
- **SIAM UKIE National Student Chapter Conference**, Edinburgh, UK. (June 2022)
  Contributed talk: Unifying information propagation models on networks and influence maximisation.
- **WINQ Workshop on Complex Dynamical Networks**, Stockholm, Sweden. (June 2022)
- **The 13th International Conference on Complex Networks (CompleNet)** (Virtual), Exeter, UK. (May - June 2022)
  Contributed talk: Information propagation and influence maximisation on networks.
- **Seminar at Technical University of Munich** (Virtual), Munich, Germany. (May 2022)
  Invited talk: Dynamics and optimisation on networks.
- **Seminar at Dartmouth College** (Virtual), Hanover, US. (Jan. 2022)
  Invited talk: Role extraction, diffusion, and optimisation on networks.
- **The 10th International Conference on Complex Networks and their Applications (CNA)**, Madrid, Spain. (Nov. 2021)
  Contributed talk: A general class of diffusion model and its influence maximisation.
- **Conference on Complex Systems (CCS)**, Lyon, France. (Oct. 2021)
  Contributed talk: A network-based approach to extract complements and substitutes from sales data.
- **InFoMM Annual Meeting** (Virtual), University of Oxford, UK. (July 2021)
  Talk: Halo effect and demand transfer in retail.
- **Oxford Network Seminar** (Virtual), University of Oxford, UK. (May 2021)
  Invited talk: Extracting complements and substitutes from sales data: a network perspective.

Study Groups

- **SIAM-IMA Study Group with Industry**, Edinburgh, UK. (Jun. 2021)
  Worked on detecting abnormal performance of wind turbines by machine learning.
- **European Study Group with Industry (ESGI 162)**, Leeds, UK. (Jul. 2020)
  Worked on estimating customer lifetime value in the gaming industry using incomplete data.
- **European Study Group with Industry (ESGI 145)**, Cambridge, UK. (Apr. 2019)
  Worked on deep learning hardening techniques for image classifier.
- **InFoMM UK Graduate Modelling Camp**, Oxford, UK. (Apr. 2019)

TEACHING AND OTHER EXPERIENCE

University of Oxford **Oxford, UK**

Organiser Oct. 2021 - Oct. 2022

- Oxford Networks Seminar

Tutor Oct. 2021 - Dec. 2021

- Introduction to Statistics, Michaelmas Term 2021

Teaching Assistant Oct. 2019 - Apr. 2020

- Networks, Hilary Term 2020
- Graph Theory, Michaelmas Term 2019

HONOURS AND AWARDS

- EPSRC InFoMM CDT Studentship (fully-funded PhD studentship, 2018 – 2022)
- First Prize in China Undergraduate Mathematical Contest in Modelling (Beijing, 09/2016 & 09/2015)
- First-Class People's Scholarship (5% in academia, 2014-2016)
- National Scholarship (5% in academic, research and other activities, 2014-2015)

[1] Also help with the organisation.

TECHNOLOGY SKILLS

- **Programming:** Proficiency in Python (pandas, numpy, scipy, networkx, statsmodels, scikit-learn etc), MATLAB; Familiarity with R Language, C Language.
- **Optimisation:** MOSEK, Lingo.