

YU TIAN

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ACADEMIC POSITIONS

Nordita, Stockholm University and KTH Royal Institute of Technology **Stockholm, Sweden**
Research Fellow Oct. 2022-

- Funding: Wallenberg Initiative on Networks and Quantum information.
- Research Interest: Complex Systems and Networks, including more than positive weights (e.g., negative connections for enemy and complex weights for asymmetric communication in social networks), dynamics on 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).

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

5. **Y. Tian** and R. Lambiotte. *Structural balance and random walks on complex networks with complex weights*. preprint, arXiv:2212.01813, 2023.
4. **Y. Tian** and R. Lambiotte. *Spreading and structural balance on signed networks*. preprint, arXiv:2212.10158, 2022.
3. **Y. Tian**, Z. Lubberts and M. Weber. *Mixed-membership community detection via line graph curvature*. NeurIPS Symmetry and Geometry in Neural Representations, 2022.
2. **Y. Tian** and R. Lambiotte. *Unifying information propagation models on networks and influence maximization*. 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.

SELECTED COMMUNICATIONS

Invited talks

- **BrainNet workshop at KTH**, Stockholm, Sweden. (May, 2023)
- **SIAM Conference on Applications of Dynamical System**, Portland, US. (May 2023)
- **Seminar at Uppsala University**, Uppsala, Sweden. (May 2023)
- **Soft Matter Seminar at Nordita**, Stockholm, Sweden. (Oct. 2022)
- **Seminar at Technical University of Munich** (Virtual), Munich, Germany. (May 2022)

- **Seminar at Dartmouth College** (Virtual), Hanover, US. (Jan. 2022)
- **Oxford Network Seminar** (Virtual), University of Oxford, UK. (May 2021)

Contributed talks

- **WINQ Mini-Workshop at Nordita**, Stockholm, Sweden. (Feb. 2023)
- **The 4th IMA Conference on The Mathematical Challenges of Big Data**, University of Oxford, UK. (Sep. 2022)
- **SIAM Workshop on Network Science**¹ (Virtual). (Sep. 2022)
- **Conference on Network Sciences (NetSci)** (Virtual), Shanghai, China. (July. 2022)
- **Industrial Mathematics in the 21st Century: A cornucopia of unsolved problems**, University of Oxford, UK. (June 2022)
- **InFoMM Annual Meeting**, University of Oxford, UK. (June 2022)
- **SIAM UKIE National Student Chapter Conference**, Edinburgh, UK. (June 2022)
- **The 13th International Conference on Complex Networks (CompleNet)** (Virtual), Exeter, UK. (May - June 2022)
- **The 10th International Conference on Complex Networks and their Applications (CNA)**, Madrid, Spain. (Nov. 2021)
- **Conference on Complex Systems (CCS)**, Lyon, France. (Oct. 2021)
- **InFoMM Annual Meeting** (Virtual), University of Oxford, UK. (July 2021)

PROFESSIONAL EXPERIENCE

Invited Participant

- **WINQ Workshop on Complex Dynamical Networks**, Stockholm, Sweden. (June 2022)

Reviewers

- **Journal:** Science Advances, Physica A: Statistical Mechanics and its Applications.
- **Conference:** International AAAI Conference on Web and Social Media.

Organisers

- **Session at INFORMS 2023 Annual Meeting**, Phoenix Oct. 2023
- **WINQ Mini-Workshop**, Nordita Feb. 2023
- **WINQ Seminar**, Nordita Oct. 2022 - Present
- **Oxford Networks Seminar**, University of Oxford Oct. 2021 - June 2022

TEACHING EXPERIENCE

University of Oxford

Tutor

- Introduction to Statistics, Michaelmas Term 2021

Teaching Assistant

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

Oxford, UK

Oct. 2021 - Dec. 2021

Oct. 2019 - Apr. 2020

TECHNOLOGY SKILLS

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

MEMBERSHIPS

- Society for Industrial and Applied Mathematics (SIAM), Early Career Membership
- Institute of Mathematics and its Applications (IMA), Associate Member

¹Also help with the organisation.