

# YU TIAN

Nordita, Stockholm University and KTH Royal Institute of Technology E-mail: tianyueve1014@gmail.com

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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

6. **Y. Tian\***, Z. Lubberts\* and M. Weber. *Curvature-based Clustering on Graphs*. preprint, arXiv:2307.10155, 2023.
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

- **Seminar at Dartmouth College**, Hanover, US. (Oct. 2023)
- **Seminar at Linköping University**, Linköping, Sweden. (September 2023)
- **Seminar at Indiana University** (Virtual), Bloomington, US. (September 2023)

- **Seminar at Northwestern University** (Virtual), Chicago, US. (August 2023)
- **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**<sup>1</sup> (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

- **Journals:** Scientific Reports, 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

**Oxford, UK**

##### *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

### TECHNOLOGY SKILLS

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

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<sup>1</sup>Also help with the organisation.