Tao Wen

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(Last updated: July 22, 2024)

EDUCATION

Integrated PhD and MSc in *Data Analytics and Society* (funded by **ESRC Centre for Doctoral Training in Data Analytics and Society**) **2025**
Advisor: Prof. Yu-wang Chen and Associate Prof. Tahir Abbas Syed
University of Manchester, Manchester, UK

MEng. (Research) in *Science, Mathematics & Technology* (funded by **SUTD Fellowship**) **9/2021**
Advisor: Associate Prof. Kang Hao Cheong
Singapore University of Technology and Design (SUTD), Singapore

B. S. in *System Engineering* **6/2019**
Advisor: Prof. Yong Deng and Prof. Wen Jiang
Northwestern Polytechnical University (NWPU), Xi'an, China

RESEARCH INTERESTS

- AI & Machine Learning
- Game Theory
- Data Analytics on Misinformation
- Network Science
- Fractal Property
- Decision Science and Decision Analysis

TEACHING & SUPERVISION

- <u>Teaching Assistant</u>
  - AI and Machine Learning: Business Application (5K7V0024, MSc Level) Spring 2023
    Led by Dr. Ting Wu, Manchester Metropolitan University.
  - Programming in Python for Business Analytics (BMAN73701, MSc Level) Fall 2022
    Led by Prof. Richard Allmendinger & Associate Prof. Manuel Lopez-Ibanez, UoM.
  - Modelling Space and Systems (10.018, BSc Level) Spring 2020
    Led by Associate Prof. Kang Hao Cheong, SUTD.
- <u>MSc Dissertation Co-supervision</u>
  - Vania Faustanta, Dhruv Nilesh Kapadia, Frederick Ching Fung Ling 2024
  - Tony Mathew Abraham (MS student @ UoM → JLR, <u>Dean's Award</u>) 2023
  - Elena Narang (MS student @ UoM → IOM, UN Migration) 2023

SELECTED PUBLICATIONS (*: equal contributions)

See the full list in Google Scholar (***citation: 1000+, h-index: 18***)

[1] **Tao Wen**, Kang Hao Cheong (2024). Parrondo's Paradox Reveals Counterintuitive Wins in Biology and Decision Making in Society. In <u>*Physics of Life Reviews*</u>. (Accepted)

[2] **Tao Wen**, Yu-wang Chen, Tahir Abbas Syed, Ting Wu (2024). ERIUE: Evidential Reasoning-based Influential Users Evaluation in Social Networks. In *Omega* (<u>Grade 3 journal</u> in ABS list). [Link]

[3] **Tao Wen**, Jinde Cao, Kang Hao Cheong (2023). Gravity-based Community Vulnerability Evaluation Model in Social Networks: GBCVE. In *IEEE Transactions on Cybernetics* (<u>Grade 3 journal</u> in ABS list). [Link]

[4] **Tao Wen**, Kang Hao Cheong, Joel Weijia Lai, Jin Ming Koh, Eugene V. Koonin (2022). Extending the Lifespan of Multicellular Organisms via Periodic and Stochastic Intercellular Competition. In *Physical Review Letters* (<u>The Highest Impact Letter in Physics</u>). [Link, Code]

[5] Kang Hao Cheong*, **Tao Wen***, Sean Benler, Jin Ming Koh, Eugene V. Koonin (2022). Alternating Lysis and Lysogeny is a Winning Strategy in Bacteriophages due to Parrondo's Paradox. In *Proceedings of the National Academy of Sciences*. [Link, Code]

[6] **Tao Wen**, Qiuya Gao, Yu-wang Chen, Kang Hao Cheong (2022). Exploring the Vulnerability of Logistics Networks by Entropy: An Asia-Europe Maritime Transportation Network Case Study. In *Reliability Engineering & System Safety* (<u>Grade 3 journal</u> in ABS list). [Link]

[7] **Tao Wen**, Kang Hao Cheong (2021). The Fractal Dimension of Complex Networks: A Review. In *Information Fusion* (ESI 1% Highly Cited Paper 🏆). [Link, 150+ citations]

[8] Qiuya Gao, **Tao Wen**, Yong Deng (2021). Information Volume Fractal Dimension. In *Fractals* (ESI 0.1% Hot Paper 🔥 & ESI 1% Highly Cited Paper 🏆). [Link]

[9] **Tao Wen**, Yong Deng (2020). The Vulnerability of Community Structure in Complex Networks: An Entropy Approach. In *Reliability Engineering & System Safety* (ESI 1% Highly Cited Paper 🏆, Grade 3 journal in ABS list). [Link]

[10] **Tao Wen**, Yong Deng (2020). Identification of Influencers in Complex Network by Local Information Dimensionality. In *Information Sciences* (ESI 1% Highly Cited Paper 🏆). [Link, 100+ citations]

[11] Kang Hao Cheong, **Tao Wen**, Joel Weijia Lai (2020). "Relieving Cost of Epidemic by Parrondo's Paradox: A COVID-19 Case Study," In *Advanced Science*. [Link, Press]

Paper in the pipeline
[1] **Tao Wen**, Yu-wang Chen, Jie Zhao, Yong-Yeol Ahn, Kang Hao Cheong. Early-stage Localization of Information Propagation Sources via Generalized Bayesian Inference in Large-scale Social Networks. Submitted to *Nature Computational Science* under consideration.

[2] **Tao Wen**, Rui Zheng, Yu-wang Chen, Zeyi Liu, Ting Wu, Mi Zhou, Tahir Abbas Syed, Darminder Ghataoura. Formulating Opinion Dynamics from Belief Formation, Diffusion and Updating in Social Network Group Decision Making: A Holistic Framework. Submitted with invitation from Editor-in-chief to *European Journal of Operational Research* under consideration.

[3] **Tao Wen**, Yu-wang Chen, Renaud Lambiotte. Collective Effect of Self-learning and Social Learning on Language Dynamics: A Naming Game Approach in Social Networks. Submitted to *Journal of the Royal Society Interface* under consideration.

SELECTED FELLOWSHIP & AWARDS

▪ The Chinese Government Award for Outstanding Self-financed Students Abroad (**Highest** government award for overseas Chinese PhD students)	2024
▪ The Turing Scheme	2024
▪ **Enrichment Scheme Placement Award** at The Alan Turing Institute (**Up to 55 awardees** who are engaging in AI/ML across the UK)	2023
▪ Excellent Paper Award of 5th China and UK Forum of International Young Scholars in Manchester	2023
▪ **Turing Exchange Fellowship**	2022
▪ Excellent Paper Award of International Postgraduate Interdisciplinary Forum on Smart Shipping and Green Future	2022
▪ Decision and Cognitive Sciences Research Centre Support Fund	2022
▪ ESRC Funded Integrated PhD and MSc in Data Analytics and Society Scholarship	2021
▪ SUTD MEng (Research) Fellowship	2020
▪ The "Challenge Cup" National Undergraduate Extracurricular Academic Science and Technology Contest: **Special First Prize** (**Top 4%**)	2019
▪ **Outstanding Student Pacemaker** in NWPU (**TOP 0.1%, only 10 awardees** among more than 12,000 undergraduates)	2018
▪ **China National Scholarship**	2018

RESEACH EXPERIENCE

Data Analytics for Addressing Fake News and Deepfakes in Social Networks   9/2021 - Present
UoM (PhD project), Advisor: Prof. Yu-wang Chen and Associate Prof. Tahir Abbas Syed

Temporal dynamics of belief networks   7/2024 - 8/2024
Indiana University Bloomington (Funded by The Turing Scheme), Advisor: Prof. Yong-Yeol Ahn

Data-driven Modelling and Analysis of Opinion and Decision Dynamics   1/2024 - 7/2024
The Alan Turing Institute (2023 Enrichment Scheme)

Quantifying Impact of Social Influence on Language Dynamics   2/2023 - 1/2024
University of Oxford (Funded by Turing Exchange Fellowship), Advisor: Prof. Renaud Lambiotte

Studying Economic Growth and Environmental Sustainability through Cooperation   5/2022 - 9/2022
University of Manchester, Advisor: Prof. Yu-wang Chen and Dr. Ting Wu

Analyzing Parrondo's Paradox Phenomenon and its Applications   1/2020 - 9/2021
Singapore University of Technology and Design, Advisor: Associate Prof. Kang Hao Cheong

Finding Important Properties of Nodes and Communities in Complex Networks   6/2019 - 9/2019
University of Electronic Science and Technology of China, Advisor: Prof. Yong Deng

Exploring the Properties of Networks by Different Dimensions   5/2016 - 6/2019
Northwestern Polytechnical University, Advisor: Prof. Wen Jiang and Prof. Yong Deng

PRESENTATIONS

- Conference on Complex Systems 2024, Exeter, UK.   9/2024
  Oral – Early-stage Inference of Misinformation Propagation Sources.
- 29th International Conference on Automation and Computing, Sunderland, UK.   8/2024
  Oral – Forecasting Time Series through Motif Structure Analysis within Visibility Graph.
- NetSci 2024, Québec City, Canada.   6/2024
  Oral – Collective Effect of Social Behaviors on Language Dynamics in Social Networks.
- Networks and Time II, Northeastern University London, London, UK.   4/2024
  Oral – Collective Effect of Social Behaviors on Language Dynamics in Social Networks.
- Data Natives, City, University of London, London, UK.   4/2024
  Oral – Collective Effect of Social Behaviors on Language Dynamics in Social Networks.
- PhD Student Presentations and Networking, The Alan Turing Institute, London, UK.   3/2024
  Oral – Collective Effect of Social Behaviors on Language Dynamics in Social Networks.
- 5th China and UK Forum of International Young Scholars in Manchester, Manchester, UK.   6/2023
  Oral – Exploring the Vulnerability of Logistics Networks by Entropy.
- Postgraduate Summer Research Showcase, UoM, Manchester, UK.   6/2023
  Poster – Examining Communication Network Behaviors, Structure and Dynamics.
- Advances in Data Science and AI Conference, Manchester, UK.   6/2023
  Oral – Examining Communication Network Behaviors, Structure and Dynamics.
- Brown Bag Seminar on Fintech & Digital Transformation, UoM, Manchester, UK.   5/2023
  Talk – Examining Communication Network Behaviors, Structure and Dynamics.
- International Postgraduate Interdisciplinary Forum on Smart Shipping and Green Future.   9/2022
  Oral – Exploring the Vulnerability of Logistics Networks by Entropy.
- 4th China and UK Forum of International Young Scholars in Manchester, Manchester, UK.   6/2022
  Oral – Analysis of Fractal Characteristics of Complex Networks and Its Application.
- 26th International Conference on Multiple Criteria Decision Making, Portsmouth, UK.   6/2022
  Oral – Evidential Reasoning-based Influential Users Evaluation in Social Networks
- Oberseminar Dynamics Seminar, Technical University of Munich, Online.   5/2021
  Invited talk – Analysis of Fractal Properties of Complex Networks and Its Application.
- Ao Xiang Students Lecture, Northwestern Polytechnical University, Xi'an, China.   12/2019
  Invited talk – Analysis of Fractal Properties of Complex Networks and Its Application.
- 9th China Information Fusion Conference, Taiyuan, China.   7/2019
  Oral – Forecasting Time Series based on Visibility Graph and Relative Entropy.

SERVICES

- Assist in organizing Decision and Cognitive Sciences Research Centre seminars.
- **Special Issue Editor** on Mathematics (Data-driven Decision Making: Models, Methods and Applications).
- **Journal Reviewer**
  - *Communications Physics*
  - *Chaos: An Interdisciplinary Journal of Nonlinear Science*
  - *Humanities & Social Sciences Communications*
  - *IEEE Transactions on Neural Networks and Learning Systems*
  - *IEEE Transactions on Network Science and Engineering*
  - *IEEE Transactions on Signal and Information Processing over Networks*
  - *International Journal of Intelligent Systems*
  - *Journal of Computational Science*
  - *Physica A: Statistical Mechanics and Its Applications*
  - *Reliability Engineering & System Safety*
  - *Scientific Reports*
  - …

- **Program Committee Member**
  - 2024: NeurIPS, NetSci

SOCIAL ACTIVITIES

- Volunteer | International Conference on Intelligent Unmanned Systems   2018
- Volunteer | Northwestern Polytechnical University 80th Anniversary   2018

KEY SKILLS

Technology: Python, MATLAB, R language, C language, LaTeX, Gephi, Origin, UCINET, MPNet.
Languages: Mandarin, English.

REFERENCES

Prof. Dr. Yu-Wang Chen

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