

Tao WEN

✉ tao_wen@mymail.sutd.edu.sg 🏠 [Homepage](#) ☎ 86-18991912045

EDUCATIONAL BACKGROUND

Singapore University of Technology and Design

Singapore

MEng. (Research) in Science, Mathematics & Technology

09/2020-Expect 07/2021

Advisor: Professor Kang Hao Cheong

Northwestern Polytechnical University

Xi'an, China

B. Eng. in Detection, Guidance and Control Technology (System Engineering) GPA: 3.84/4.0

09/2015-07/2019

Advisor: Professor Wen Jiang & Yong Deng

Australian National University

Canberra, Australia

Summer Session

01/2019-02/2019

RESEARCH PAPERS [[Google Scholar](#)]

* Corresponding Author; † Contribute equally.

2020

1. K. H. Cheong*, **T. Wen**, J. W. Lai. "Relieving cost of epidemic by Parrondo's paradox: A COVID-19 case study," *Advanced Science*. Publish Online. DOI: 10.1002/advs.202002324 [\[PDF\]](#)
2. **T. Wen**, D. Pelus, Y. Deng*. "Vital Spreaders Identification in Complex Networks with Multi-Local Dimension," *Knowledge-Based Systems*. vol.195, p. 105717, 2020. [\[PDF\]](#)
3. **T. Wen**, Y. Deng*. "The vulnerability of community structure in complex networks: An entropy approach," *Reliability Engineering & System Safety*. vol.196, p. 106782, 2020. [\[PDF\]](#) (ESI Highly Cited Paper)
4. **T. Wen**, Y. Deng*. "Identification of influencers in complex network by local information dimensionality," *Information Sciences*. vol.512, pp. 549-562, 2020. [\[PDF\]](#) (ESI Highly Cited Paper)

2019

1. **T. Wen**, S. Duan, W. Jiang*. "Node similarity measuring in complex networks with relative entropy," *Communications in Nonlinear Science and Numerical Simulation*. vol. 78, p. 104867, 2019. [\[PDF\]](#)
2. **T. Wen**, W. Jiang*. "Identifying influential nodes based on fuzzy local dimension in complex networks," *Chaos, Solitons & Fractals*, vol. 119, pp. 332-342, 2019. [\[PDF\]](#)
3. **T. Wen**, W. Jiang*. "Measuring the complexity of complex network by Tsallis entropy," *Physica A: Statistical Mechanics and Its Applications*. vol. 526, p. 121054, 2019. [\[PDF\]](#)
4. S. Duan, **T. Wen**, W. Jiang*. "A new information dimension of complex network based on Rényi entropy," *Physica A: Statistical Mechanics and Its Applications*, vol. 516, pp. 529-542, 2019. [\[PDF\]](#)
5. **T. Wen**, S. Duan, W. Jiang*. "Forecasting time series based on visibility graph and relative entropy," *The Ninth Chinese Information Fusion Conference*, Taiyuan, Oct. 2019. (In Chinese).
6. S. Duan, **T. Wen**, X. Deng, W. Jiang*. "Identifying influential nodes based on Tsallis entropy and information dimension," *The Ninth Chinese Information Fusion Conference*, Taiyuan, Oct. 2019. (In Chinese).

2018

1. **T. Wen**, M. Song, W. Jiang*. "Evaluating topological vulnerability based on fuzzy fractal dimension," *International Journal of Fuzzy Systems*, vol. 20, no. 6, pp. 1956-1967, 2018. [\[PDF\]](#)
2. **T. Wen**, W. Jiang*. "An information dimension of weighted complex networks," *Physica A: Statistical Mechanics and Its Applications*, vol. 501, pp. 388-399, 2018. [\[PDF\]](#)
3. S. Xu, Z. He, **T. Wen**, W. Jiang*. "A Physarum-inspired Model for the Path Planning of Uninhabited Combat Air

Vehicle,” *The Eighth Chinese Information Fusion Conference*, Xi’an, July, 2018. (In Chinese).

Paper submitted to Journal

1. **T. Wen**, K. H. Cheong*, Eugene V. Koonin. “-----,” *Nature*. Prepare to submit.
2. **T. Wen**, K. H. Cheong*. “Gravity-based Community Vulnerability Evaluation Model in Social Networks: GBCVE,” *IEEE Transactions on Cybernetics*. Second Revision.
3. Z. Liu†, **T. Wen**†, Y. Deng*, H. Fujita. “Cooperation-guided Experts Importance Identification Model with Fuzzy Framework: A Network Design,” *IEEE Transactions on Cybernetics*. Under Review.
4. **T. Wen**, K. H. Cheong*. “The Fractal Dimension of Complex Networks: A Review,” *Nonlinear Dynamics*. Prepare to submit (Invited review paper).
5. **T. Wen**, Y. Deng*. “The Information Volume of Uncertain Information: (3) Information Fractal Dimension,” Prepare to submit.
6. **T. Wen**, Y. Deng*. “The Information Volume of Uncertain Information: (6) Information Multifractal Dimension,” Prepare to submit.
7. Y. Dai, G. Zhan, Y. Ye, W. Bao, **T. Wen**, K. H. Cheong*, N. Xie*. “Game dynamics of emotion evolution based on the Moran process,” *Chaos: An Interdisciplinary Journal of Nonlinear Science*. Under Review.

SOFTWARE COPYRIGHT

1. **T. Wen**, S. Duan, W. Jiang. User Similarity Detecting in Social Network Software based on MATLAB V1.0, 2019SR0858917.
2. **T. Wen**, S. Duan, W. Jiang. Critical Node Identifying in Information Network Software based on MATLAB V1.0, 2019SR0858914.
3. **T. Wen**, S. Liang, W. Jiang. Evaluating Topological Vulnerability Software based on MATLAB V1.0, 2018SR202109.
4. **T. Wen**, S. Liang, W. Jiang. Measuring Network Complexity Software based on MATLAB V1.0, 2018SR221765.
5. S. Duan, **T. Wen**, X. Deng, W. Jiang. Calculating Network Fractal Dimension Software based on Rényi Entropy V1.0, 2019SR0456722.
6. S. Duan, **T. Wen**, X. Liu, X. Deng, W. Jiang. Importance Node Identifying in Network based on Tsallis Entropy V1.0, 2019SR0858911.

RESEARCH EXPERIENCE

Analyzing the Parrondo’s paradox phenomenon in complex networks

Jan. 2020 – Now

Singapore University of Technology and Design

Graduate Research Assistant *Advisor: Professor Kang Hao Cheong*

- Explored the economic and health cost caused by different strategies (open community & lockdown) under the epidemic of COVID, and the Parrondo’s paradox phenomenon when taking alternating strategies based on time-based and result-based switching scheme.
- Assisted Prof. Kang Hao Cheong in reviewing the papers submitted for *IEEE Transactions on Systems, Man and Cybernetics: Systems*, *IEEE Transactions on Big Data*, *Information Fusion*, *BioEssays*, *Epidemiology and Infection*.

Finding Important Properties of Nodes and Communities in Complex Networks

June 2019 – Sep. 2019

University of Electronic Science and Technology of China

Undergraduate Research Assistant *Advisor: Professor Yong Deng*

- Proposed local information dimension to identify the influential spreaders in complex networks, which considered the quasi-local information of nodes and reduced the computational complexity.
- Combined the internal factors and external factors of community to measure the vulnerability of each community, and improved the recognition accuracy in real-world network applications.
- Assisted Prof. Yong Deng in reviewing the papers submitted for *IEEE Transactions on Industrial Informatics*, *Scientific Reports*, *Fractals*, *Complexity*, *IEEE Access*, *PLoS One*, *Physics A*, *Physics Letters A*, *Computer Science*, *Chinese*

Journal of Physics, Arabian Journal for Science and Engineering, International Journal of Modern Physics B, International Journal of Disaster Risk Reduction, etc.

Network mining: Exploring the Properties of Networks by Applying Different Dimension

May 2016 – June 2019

Northwestern Polytechnical University

Undergraduate Research Assistant Advisor: ***Professor Wen Jiang & Yong Deng***

- Promoted information dimension and Rényi dimension into weighted complex networks, and explored the fractal and self-similarity properties of complex networks.
- Developed several recognition models based on the local dimension and fractal dimension, and measured the complexity and vulnerability of complex networks, and the similarity and importance of nodes.
- Assisted Prof. Wen Jiang in reviewing the papers submitted for *Applied Intelligence* and *Defence Science Journal*, etc.

Evaluating Topological Vulnerability of Networks Based on Fuzzy Fractal Dimension

May 2017 – May 2018

Team Leader National Undergraduate Training Programs for Innovation and Entrepreneurship (¥ 20, 000)

- Collected a great deal of data about the American airline networks from Bureau of Transportation Statistics, and processed the network data.
- Proposed a novel method to evaluate the topological vulnerability of complex networks based on the fuzzy sets, fractal dimension, and average edge betweenness, and analyzed the vulnerability change of the American airline networks from 2005 to 2013.

An Autonomous Landing Scheme for Cargo Drone Based on Computer Vision

May 2017 – May 2018

Researcher National Undergraduate Training Programs for Innovation and Entrepreneurship (¥ 20, 000)

- Used Pixhawk as the flight control platform, and processed the images from pan-tilt-zoom (PTZ) camera through airborne computer card.
- Proposed a novel method based on Support Vector Machine (SVM) to identify the landing sign and estimate the cargo drone's pose to guide its autonomous landing.

Exploring the Composition and Future Scalability of Smart House

Jan. 2019 – Feb. 2019

Australian National University

Summer Session Course Project

- Explored the composition of subsystems in smart house based on the Canberra situation, and sought the relationship between different subsystems.
- Designed the detailed model of each subsystem, and obtained smart house model based on the trade-off between different components.

HONORS AND AWARDS

[Sep. 2020] Singapore University of Technology and Design MEng (Research) Fellowship (S\$ 1500 / month)

[Nov. 2019] The “Challenge Cup” National Undergraduate Extracurricular Academic Science and Technology Contest:

Special First Prize (Top 4%)

Highest award in the field of information science in natural science papers.

The “Challenge Cup” is the **highest academic science and technology competition** in China.

[May 2019] The “Challenge Cup” National Undergraduate Extracurricular Academic Science and Technology Contest in Shaanxi Area: **Outstanding Winner (TOP 5%)**

Best grade in the field of natural science papers in Northwestern Polytechnical University **so far**.

[Sep. 2018] **Outstanding Student Pacemaker in Northwestern Polytechnical University (TOP 0.1%)**

Only **10 undergraduates** are awarded among more than 12,000 undergraduates in NWPU in 2018.

[Sep. 2018] **China National Scholarship (Top 1%)**

Highest honor for students' year achievement in the School of Electronics and Information.

[Feb. 2018] Global Mathematical Contest in Modeling: **Meritorious Winner**
[Oct. 2017] Mathematical Contest in Modeling for Chinese Undergraduate Students in Shaanxi Area: **First Prize**
[Sep. 2017] Second Prize scholarship of AVIC Optronics Institute (**TOP 5%**)
[Sep. 2017] First Prize scholarship of Northwestern Polytechnical University (**TOP 10%**)
[Feb. 2017] Global Mathematical Contest in Modeling: **Honorable Mention**

ACADEMIC SERVICE

- Independent reviewer for *IEEE Transactions on Signal and Information Processing over Networks*.
- Assisted professors to review *IEEE Transactions on Industrial Informatics*, *IEEE Transactions on Systems, Man and Cybernetics: Systems*, *IEEE Transactions on Big Data*, *Information Fusion*, *Scientific Reports*, *Fractals*, *Complexity*, *PLoS One*, *Physics A*, etc.

EXTRACURRICULAR ACTIVITIES

- Volunteer of *International Conference on Intelligent Unmanned System* (2018)
- Volunteer of *Northwestern Polytechnical University 80th Anniversary*

SKILLS

Technical: MATLAB, Python, C language, LaTeX, Gephi, Origin, Visio.

Languages: Mandarin, English (TOEFL 98).

REFERENCES

Kang Hao Cheong

Science, Mathematics & Technology Cluster,
Singapore University of Technology and Design
Singapore

✉ kanghao_cheong@sutd.edu.sg

☎ 65-64994622

Yong Deng

Institute of Fundamental and Frontier Science,
University of Electronic Science and Technology of China
Chengdu, Sichuan, P. R. China

✉ dengentropy@uestc.edu.cn

☎ 86-028-61830858

Wen Jiang

School of Electronics and Information,
Northwestern Polytechnical University
Xi'an, Shaanxi, P. R. China

✉ jiangwen@nwpu.edu.cn

☎ 86-029-88431267