

# YUJIE ZENG

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## EDUCATION

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- Queen Mary University of London** Sep. 2024 –  
*Phd student of Computer science*
- University of Electronic Science and Technology of China** Sep. 2021 – Jun. 2024  
*Master of Computer science and Technology | Research with Prof. Linyuan Lü | GPA: 3.1/4.0*
- Chongqing University of Posts and Telecommunications** Sep. 2017 – Jun. 2021  
*Bachelor of Intelligence Science and Technology | Research with Prof. Xin Deng | GPA: 3.5/4.0, Rank: 2/140*
- A+ subjects: Mathematics, Mathematical Modeling, Fundamentals of Artificial Intelligence et al.

## RESEARCH PUBLICATIONS

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- [1] **Higher-order Graph Convolutional Network with Flower-Petals Laplacians on Simplicial Complexes**  
*Yiming Huang, Yujie Zeng (Joint first author), Qiang Wu, Linyuan Lü* AAAI 2024
- [2] **Identifying vital nodes through augmented random walks on higher-order networks**  
*Yujie Zeng, Yiming Huang, Xiao-Long Ren, Linyuan Lü* Information Sciences
- [3] **Influential Simplices Mining via Simplicial Convolutional Network**  
*Yujie Zeng, Yiming Huang, Qiang Wu, Linyuan Lü* Information Processing & Management
- [4] **Hyper-null models and their applications**  
*Yujie Zeng, Bo Liu, Fang Zhou, Linyuan Lü* Entropy
- [5] **Cooperative Network Learning for a Large-Scale and Decentralized Graph**  
*Qiang Wu, Yiming Huang, Yujie Zeng, Yijie Teng, Fang Zhou, Linyuan Lü* preprint arXiv:2311.02117
- [6] **Fundamental Statistics of higher-order networks: a survey (Chinese)**  
*Bo Liu, Yujie Zeng, Rongmei Yang, Linyuan Lü* Acta Physica Sinica
- [7] **Graph Machine Learning (Chinese)**  
*Linyuan Lü, Qiang Wu, Yiming Huang, Yujie Zeng (Subeditor)* Collaborate with Prof. Jure Leskovec

## RESEARCH EXPERIENCE

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- Higher-order GCN with Flower-Petals Laplacian on Simplicial Complexes** Jul. 2022 – Present  
*Aim: integrate higher-order structures into geometric and topological deep learning* USTC, Hefei
- It has been presented at the **NetSci2023** conference in oral and is accepted by *AAAI2024*.
  - Proposed a higher-order graph convolutional network (HiGCN), which achieves SOTA in various graph learning tasks.
  - Quantified the influence of higher-order structures in the network by the filter weight of HiGCN.
  - Extended HiGCN to cell complexes, a more general scenario, and distinguish the impact of different higher-order structures, such as simplex and cell, on graph learning.
- Influential Simplices Mining via Simplicial Convolutional Network** Dec. 2022 – Jun. 2023  
*Aim: identify influential simplices using topological deep learning methods.* UESTC-YDRI, Huzhou
- It has been presented at the **NetSci2023** conference in oral and is accepted by *Inform. Process. Manag.*
  - Detected the inconsistency between mining influential nodes and simplices, and formulated influential simplices mining task as graph learning problem for the first time.
  - Introduced an influential simplices mining neural network (ISMnet) model, and demonstrated its commendable performance in influential simplices mining issues through extensive experiments.
- HoRW: Augmented Random Walks on Higher-order Networks** Sep. 2021 – Jul. 2022  
*Aim: propose a higher-order structure-based model to address the shortcomings of the traditional models.* UESTC-YDRI, Huzhou

- It has been presented at the **NetSci2022** conference in oral and is accepted by *Inf. Sci.*
- Proposed a novel high-order representation and higher-order random walk (HoRW) model.
- Presented a novel HoRW-based influencer identification strategy that allows multiscale analysis according to the strength of higher-order effects. Demonstrated HoRW's effectiveness in epidemic spreading and network dismantling tasks.

### Hyper-null Models through Hyperedge Swapping and Their Applications

Sep. 2021 – Jun. 2022

*Aim: construct a unified null model framework for hypergraphs by swapping hyperedges.*

UESTC, Chengdu

- Published a Chinese review - Fundamental Statistics of higher-order networks: a survey, and the latest research has been published in *Entropy*.
- Defined a unified hyper-null model framework and the construction method of hyper-null models through hyperedge swapping.
- Verified the relationship between network structure and function and hyper-null models of different orders by epidemic spreading and network dismantling.

### Cooperative Network Learning for Large-Scale and Decentralized Graphs

Aug. 2022 – Jun. 2023

*Aim: establish a multi-party trusted, decentralized, and privacy-preserving graph learning framework.*

UESTC, Chengdu

- Published a Chinese monograph - Graph Machine Learning, and the research is under review in *IEEE T. Cybernetics*
- Introduced a Cooperative Network Learning (CNL) framework, which unifies the formulation of graph models with distributed data for various agencies.
- Utilized homomorphic encryption and relevant technologies to ensure data security of inter-organizational computing.
- Demonstrated the effectiveness, reliability, and security of CNL on multi-party graph learning tasks through various graph learning tasks, including contagion dynamics prediction, node classification, and link prediction.

### Online Classroom Face Fatigue Detection System

Dec. 2020 – Jun. 2021

*Aim: accurately detect fatigue students in the classroom and target treatment more effectively.*

CQUPT, Chongqing

- Detected multiple faces in the class by the improved dlib algorithm.
- Wrote a program to achieve an online fatigue detection system by Javascript and Python.
- Won the third prize in the national AI competition.

## OTHER EXPERIENCE

### Software Development Engineer

Apr. 2020 – Oct. 2020

*Aim: Solve the problem of slow App startup and excessive memory consumption.*

WeiXin Group (WXG), Tencent

- Design and optimize the entire WeRead App book subscription process.
- Design and develop optimization algorithm and framework for WeRead which automatically divided the image resources into blocks according to the community division, and the images in each block were scheduled by the optimization algorithm.
- Improve the startup and running efficiency of the entire App by 20%.

## AWARDS & HONORS

**Awards:** 6 national awards, more than 10 provincial and above awards; 1 software copyright; 4 patent; 2 provincial scientific research project, 2 school scientific research projects.

Academic scholarship in UESTC	2023
Chongqing Excellent Graduate thesis (Top 1%)	2021
Honor Graduate (Top 5%)	2021
MathorCup Mathematical Contest in Modeling - National First Prize	2020
China Graduate AI Innovation Competition - National Third Prize	2020
China International "Internet +" Innovation and Entrepreneurship Competition - Silver Prize	2019
Asia-Pacific Mathematical Contest in Modeling - Second Prize	2019

## ***SKILLS***

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**Programming Languages:** Python (proficient), Java (proficient), C (proficient), C++ (intermediate), Kotlin (intermediate), Matlab (beginner), Javascript (beginner).

**Languages:** Chinese (native), English (fluent), Japanese (beginner).

**Athletics:** Volleyball, Badminton (College runner-up), Jazz, Chinese classic dance and Cheerleading

**Music:** Chinese Lute (The highest level of amateur performance in China), Beat

**Painting:** Comic, Oil painting