# Yujie Zeng

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## *EDUCATION*

**University of Electronic Science and Technology of China (985 project colleges)** 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 PRESENTATIONS*

**[1] Higher-order Graph Convolutional Network with Flower-Petals Laplacians on Simplicial Complexes**
*Yiming Huang,* ***Yujie Zeng****, Qiang Wu and Linyuan Lü (Joint first author)* *Submitted to NeurIPS2023*

**[2] Identifying vital nodes through augmented random walks on higher-order networks**
***Yujie Zeng****, Yiming Huang, Xiao-Long Ren and Linyuan Lü* *preprint arXiv:2305.06898*

**[3] Influential Simplices Mining via Simplicial Convolutional Network**
***Yujie Zeng****, Yiming Huang, Qiang Wu and Linyuan Lü* *preprint arXiv:2307.05841*

**[4] Hyper-null models and their applications**
***Yujie Zeng****, Bo Liu and Linyuan Lü* *Under Review*

**[5] Cooperative Network Learning for a Large-Scale and Decentralized Graph**
*Qiang Wu, Yiming Huang,* ***Yujie Zeng****, Yijie Teng, Fang Zhou, and Linyuan Lü* *Under Review*

**[6] Fundamental Statistics of higher-order networks: a survey (Chinese)**
*Bo Liu,* ***Yujie Zeng****, Rongmei Yang and Linyuan Lü (Joint first author)* *Under Review*

**[7] Graph Machine Learning (Chinese Book)**
*Linyuan Lü, Qiang Wu, Yiming Huang,* ***Yujie Zeng*** *(Subeditor)* *Collaborate with Prof. Jure Leskovec*

## *RESEARCH EXPERIENCE*

**Higher-order GCN with Flower-Petals Laplacian** Jul. 2022 – Present
*Aim: analyze the influence of high-order structure on network structure and function by using machine learning.* *USTC, Hefei*

- This work will be oral presented at the **NetSci2023** conference.
- Proposed a higher-order graph convolutional network (HiGCN) which achieves SOTA in traditional machine learning tasks.
- Quantified the influence of higher-order structures in the network by the weight of HiGCN.
- Explored the impact of HiGCN on sociological tasks, such as finding important research communities (simplices).

**HoRW: Augmented Random Walks on Higher-order Networks** Sep. 2021 – Jul. 2022
*Aim: propose a model using higher-order structure to solve the shortcomings of the traditional models.* *UESTC ydri, Huzhou*

- This work has been oral presented at the **NetSci2022** conference.
- Proposed a novel representation and model HoRW based on Higher-order Random Walk for high-order networks.
- Presented a novel node ranking method based on HoRW that allows multiscale analysis according to the strength of higher-order effects.
- Demonstrated HoRW's effectiveness in vital node identification, along with significant performance gains in epidemic spreading and network dismantling experiments.

**Hyper-null Models through Hyperedge Swapping and Their Applications** Sep. 2021 – Jun. 2023
*Aim: explore the relationship between network dynamics and randomness by constructing null models.* *UESTC, Chengdu*

- Defined the construction of hyper-null models through hyperedge swapping.

- Verified the relationship between network structure and function and null models of different orders by epidemic spreading and network dismantling.
- Collected the indicators of high-order networks (simplicial complexes and hypergraphs) and wrote a review.

**Cooperative Network Learning for a Large-Scale and Decentralized Graph** Aug. 2022 – Jun. 2023

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

- Published a monograph - Graph Machine Learning (Chinese), and the latest research is under review in *Nat. Commun.*
- 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 implement an online fatigue monitoring system.* *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 too much cache and slow start of App.* *WeiXin Group (WXG), Tencent, Guangzhou*

- Wrote the entire WeRead APP book subscription process by Java and Kotlin.
- Wrote the WeRead Picture Library which can change the order in which images are loaded and can save the pictures to different caches by their kinds.

## *AWARDS & HONORS*

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

**Chongqing Excellent Graduate paper (Top 1%)** *2021*
**Honor Graduate (Top 10%)** *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*
**China Graduate AI Innovation Competition - National Third Prize** *2019*

## *SKILLS*

**Programming Languages**: Python (proficient), Java (proficient), C (proficient), C++ (intermediate), Kotlin (intermediate), Matlab (beginner), Javascript (beginner).
**Languages**: Chinese (native), English (IELTS: 6.5), 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