Kaichen Ouyang

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Education Background

2020.09 – 2024.06 **University of Science and Technology of China** **China**

- Degree: Bachelor
- Major: Mathematics and Applied Mathematics

2026.01 – 2027.07 (Expected) **Johns Hopkins University** **USA**

- Degree: Master
- Major: Applied Mathematics & Statistics
- Homepage: https://oykc1234.github.io/
- Research Interests: Artificial Intelligence | Complex Systems | Mathematics| Physics
- IELTS:7.0/9.0

Publications

- Ouyang, K., et al *Learn from Global Correlations: Enhancing Evolutionary Algorithm via Spectral GNN* The Fortieth AAAI Conference on Artificial Intelligence (AAAI 2026),Poster--**First Author**

- Ouyang, K., et al. *Dynamic Graph Neural Evolution:An Evolutionary Framework Integrating Graph Neura Networks with Adaptive Filtering.* 2025 IEEE Congress on Evolutionary Computation (CEC 2025),Oral--**First Author**

- Ouyang, K.,et al. *Escape: an optimization method based on crowd evacuation behaviors.* Artificial Intelligence Review. (JCR Q1, IF:13.9)--**First Author**

- Ouyang, K., et al *Beaver Behavior Optimizer: A Novel Metaheuristic Algorithm for Solar PV Parameter Identification and Engineering Problems* Journal of Advanced Research (JCR Q1, IF:13.0)--**First Author**

- Ouyang, K., et al *Multi-objective Red-billed Blue Magpie Optimizer: A Novel Algorithm for Multi-objective UAV Path Planning* Results in Engineering (JCR Q1, IF:7.9), --**First Author**

- Ouyang, K., et al *Graph Learning Metallic Glass Discovery from Wikipedia* AI for Science--**First Author**

- Ouyang, K., et al *Newton Downhill Optimizer for Global Optimization with Application to Breast Cancer Feature Selection* Biomedical Signal Processing and Control (JCR Q2, IF:4.9)--**Corresponding Author**

- Ouyang, K.,et al. *Multiple Objectives Escaping Bird Search Optimization and Its application in Stock Market Prediction Based on Transformer Model*. Scientific Reports. (JCR Q1, IF:3.9)--**Corresponding Author**

- Ouyang, K.,et al. *A Comprehensive Analysis of Digital Inclusive Finance's Influence on High Quality Enterprise Development through Fixed Effects and Deep Learning Frameworks*. Scientific Reports. (JCR Q1, IF:3.9)--**Corresponding Author**

- Ouyang, K., et al *A Generative Adversarial Network Based Investor Sentiment Indicator: Superior Predictability for the Stock Market* Mathematics (JCR Q1, IF:2.2)--**Corresponding Author**

- Ouyang, K., et al *Trend-Aware Mechanism for metaheuristic algorithms* Applied Soft Computing (JCR Q1, IF:6.6)--**Second Author**

- Ouyang, K., et al *MLLMs-MR: Multi-modal Recognition based on Multi-modal Large Language Models* Knowledge-Based Systems.(JCR Q1, IF: 7.2)-**Second Author**

- Ouyang, K., et al. *Study of nonequilibrium phase transitions mechanisms in exclusive network and node model of heterogeneous assignment based on real experimental data of KIF3AC and KIF3CC motors.* European Physical Journal Plus. (JCR Q2, IF:2.8)-**Co Author**

- Ouyang, K., et al. *Physical mechanisms of exit dynamics in microchannels of nonequilibrium transport systems*. International Journal of Modern Physics B. (JCR Q2, IF:2.6)-**Co Author**

- Ouyang, K.,et al *Twisted Convolutional Networks (TCNs): Enhancing Feature Interactions for Non-Spatial Data Classification* Neural Networks (JCR Q1,IF:6.3)-**Co Author**

- Ouyang, K *Wave Optics Optimizer: A novel meta-heuristic algorithm for engineering optimization* Communications In Nonlinear Science And Numerical Simulation(JCR Q1,IF:3.8)-**Co Author**

Preprints and Works under review

- Ouyang, K., et al *Stochastic Gradient-guided Adaptive Differential Evolution: Algorithm and Its Application in the Diagnosis of COVID-19, Influenza, and Bacterial Pneumonia* Artificial Intelligence In Medicine (JCR Q1, IF:6.1), *Under review*--**First Author**
- Ouyang, K., et al *Rethinking Over-Smoothing in Graph Neural Networks: A Perspective from Anderson Localization* (Arxiv)--**Sole First Author**
- Ouyang, K., et al *Consciousness as a Jamming Phase* (Arxiv)--**Sole First Author**
- Ouyang, K., et al *Why Flow Matching is Particle Swarm Optimization?* (Arxiv)--**Sole First Author**
- Ouyang, K., et al *Multi-Objective Mobile Damped Wave Algorithm (MOMDWA): A Novel Approach For Quantum System Control* (Arxiv)--**Corresponding Author**
- Ouyang, K.,et al *Multi-strategy improved dung beetle algorithm and its applications in engineering optimization and bankruptcy prediction* Neural Networks (JCR Q1,IF:6.3), *Under review*--**Corresponding Author**
- Ouyang, K *IKUN: A mean-field game theoretic KD-tree density guided mechanism for swarm optimization* Swarm and Evolutionary Computation (JCR Q1,IF:8.5), *Under review*-**Co Author**

Research Experience

- 2025.5 - Present, Data-Driven Multi-Objective Evolutionary Design of Battery Liquid Cooling Materials, USTC, RA
- 2024.2 - Present, Graph Neural Networks & Material Science, Songshan Lake Materials Laboratory, RA
- 2023.9 - 2024.4, Deep Neural Network-Based Control of Quantum Uncertain Systems, USTC,University Innovation Project
- 2023.5 - 2024.6, Intersection of Non-equilibrium Statistical Physics & Machine Learning, USTC, RA
- 2021.9 - Present, Evolutionary Algorithms & Machine Learning, Wenzhou University, RA
- 2021.3 - 2022.9, Non-equilibrium Statistical Physics & Complex Networks, USTC, RA

Conference Experience

- 5th Amorphous Physics and Materials Symposium 2024, Attendee
- IEEE Congress on Evolutionary Computation (CEC) 2025, Oral Presentation

Teaching Assistant Experience

- 2022, Mathematical Analysis B1, Teaching Assistant
- 2024, Mathematical Modeling, Teaching Assistant

Reviewer Experience

- 2024,Swarm and Evolutionary Computation (JCR Q1, IF: 8.2), Reviewer
- 2025,Knowledge-Based Systems,(JCR Q1, IF: 7.2), Reviewer
- 2025,International Joint Conference on Neural Networks (IJCNN),Reviewer
- 2025,International Conference on Intelligent Computing (ICIC),Reviewer
- 2025,AAAI 2026,Reviewer
- 2025,Computers and Electrical Engineering (JCR Q1, IF: 4.9), Reviewer
- 2025,International Journal of Computational Intelligence Systems (JCR Q2, IF: 3.116), Reviewer
- 2025,Information Sciences (JCR Q1, IF: 6.8), Reviewer
- 2025,Neurocomputing (JCR Q1, IF: 6.5), Reviewer
- 2025,Scientific Reports (JCR Q1, IF: 3.9), Reviewer
- 2025,Engineering Reports (JCR Q2, IF: 2.0), Reviewer
- 2025,Biomedical Signal Processing and Control (JCR Q2, IF: 4.9), Reviewer

- 2025,Engineering Computations (JCR Q2, IF: 1.9), Reviewer
- 2025,Cluster Computing (JCR Q1, IF: 4.1), Reviewer
- 2025,Control and Decision (Chinese Core Journals, IF:3.012), Reviewer
- 2025,ISPRS Journal of Photogrammetry and Remote Sensing (JCR Q1, IF: 12.2), Reviewer

Honours

- 2024, Second Prize(Honorable Mention), MCM/ICM
- 2023, First Prize (Meritorious), Huashu Cup International Mathematical Contest in Modeling
- 2023, First Prize,National College Students' Mathematics Competition
- 2022, International Second Prize, Asia-Pacific Mathematical Modeling Competition
- 2020-2021, Outstanding Student Gold Award, University of Science and Technology of China

Skills

- **Language skills**: Chinese (Native), English (Fluent)
- **Computer Skills**: Microsoft Office 365, Python, MATLAB, MySQL, Java,C/C++,Lammps