

## 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      GPA: 82.04/100      IELTS:7.0/9.0
- Homepage: <https://oykc1234.github.io/>
- Research Interests: Artificial Intelligence | Complex Systems | Mathematics| Physics

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

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#### **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

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#### **Conference Experience**

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

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#### **Teaching Assistant Experience**

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

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#### **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

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#### **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**

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