Jiahao Xie

302-476-1097 | jiahaox@udel.edu | www.linkedin.com/in/jh-xie | github.com/Jiahao-Xie-86

EDUCATION

University of Delaware | Newark, DE — Expected 2028
Ph.D. in Computer Science | *GPA*: 3.97/4

- **Relevant Courses:** Machine Learning, Artificial Intelligence, Algorithms, Computer Vision, Operating Systems, etc.
- **Research Interests:** Generative AI, Deep Learning, Combinatorial Optimization, Graph learning, Computer vision, etc.

Central South University | China — September 2018 – June 2022
B.Sc. in Electrical Engineering | *GPA*: 92.45/100
Honors: Dean's List and First-Class Scholarship (all semesters).

SKILLS

- **LLMs & GenAI:** Prompting, RAG, LoRA/QLoRA fine-tuning, RLHF/DPO, evals (hallucination/grounding).
- **ML & DL:** Transformers (e.g., BERT, Graphormer, ViTs), diffusion models, GANs, VAEs, PINNs, GNNs, CNNs, RNNs, classical ML (e.g., SVM, Decision Trees, Clustering), reinforcement learning (e.g., Q-learning).
- **Algorithms & Optimization:** Graph algorithms, dynamic programming, meta-heuristics (e.g., differential evolution).
- **Data Science & Statistical Analysis:** Statistical modeling (regression, hypothesis testing, causal inference), feature engineering, dimensionality reduction (PCA, t-SNE), data visualization, data pipelines, exploratory data analysis (EDA), predictive modeling.
- **Languages & Tools:** Python (e.g., PyTorch, TensorFlow, scikit-learn, NumPy, Pandas, Matplotlib), CUDA, C++, R, SQL, MATLAB (Simulink), Docker, Git, AWS, CMake, LaTeX, HTML.

RESEARCH EXPERIENCE

Graduate Research Assistant – Computational Data Science Lab (Advisor: Prof. Guangmo Tong)
University of Delaware — February 2024 – Present

- **Vision-based framework for graph property detection**
  - Reformulated graph property detection tasks (e.g., Hamiltonian cycle, planarity, claw-freeness, and tree detection) as image classification problems, proposing a new idea for this problem over traditional matrix-based methods.
  - Developed the first end-to-end vision-based framework by designing and integrating: generative models for adaptive layout generation, differentiable visualization modules for rendering layouts, and image classifiers for property detection.
  - Achieved state-of-the-art performance in experiments, outperforming leading matrix-based methods (e.g., Graphormer) in accuracy, runtime efficiency, and memory utilization.
- **Set function learning**
  - Conducted the first survey of set function learning, covering core theories, methods, applications, and relevant datasets.
  - Categorized key deep learning approaches (e.g., DeepSets and Set Transformer), and compared non-deep learning methods.
  - Explored various applications in point cloud processing, recommender systems, time series prediction, amortized inference, and multi-label classification, with the manuscript published in *ACM Computing Surveys*.

Research Assistant – Institute of Artificial Intelligence & Robotics (Advisor: Prof. Hui Liu)
Central South University — January 2022 – August 2023

- **Multi-objective optimization**
  - Reduced air resistance in high-speed train head-shape design using surrogate modeling and multi-objective optimization.
  - Applied OLHS sampling, FFD, and CFD to compute aerodynamic parameters and train predictive models.
  - Developed hybrid and double-layer differential evolution algorithms, reducing air resistance by 15.6% relative to baselines.
- **Robot-driven intelligent manufacturing of high-speed trains**
  - Designed a clustering-based combinatorial auction algorithm for multi-robot task allocation and a bidirectional A* algorithm for path planning, enhancing efficiency and coordination in robotic manufacturing.
  - Built a multi-robot simulation system using ROS and Gazebo to validate our proposed algorithms.
  - Awarded Excellent Bachelor's Thesis at Central South University.

- **Bioinformatics analysis** (Co-advised by Prof. Yunzhi Feng)
  - Applied bioinformatics algorithms, statistical modeling, and Mendelian randomization for disease-targeted drug research.
  - Conducted large-scale genomic data analysis to identify causal links between the gut microbiome and COVID-19 susceptibility, as well as between oxidative stress and chronic orofacial pain.
  - Published two peer-reviewed papers based on these findings in *Frontiers in Immunology* and *Journal of Oral Rehabilitation*.

Research Assistant – Digital Prototype and Digital Twin Lab (Advisor: Prof. Bing Yi)
Central South University February 2020 – April 2021

- Topology optimization method of high-speed train body structures
  - Studied structural topology optimization and lightweight design for high-speed train bodies.
  - Designed structural splitting algorithms (C++) and co-filed a patent.

PROJECT EXPERIENCE

- **Timing and Tasking – Intelligent Time & Task Management App** April 2021 – April 2022
  - Built a cross-platform intelligent scheduling and task management app with Flutter (frontend), RESTful (backend), MySQL (database), and cloud services for scalable deployment, helping users reduce procrastination and missed deadlines.
  - Implemented NLP-based parsing of QQ/WeChat messages for automatic task extraction and personalized notifications.
  - Applied big data analytics to model user behavior, delivering adaptive recommendations and task-tracking reports.
- **Wenku – Demand-Oriented Knowledge Integration Platform** March 2020 – March 2021
  - Built an academic resource integration platform centralizing materials for 100+ programs, improving retrieval efficiency.
  - Implemented full-stack features using Vue.js (frontend), Spring Boot (backend), and Redis (database), with data storage on Alibaba Cloud OSS; integrated Spring Mail for automated notifications and online document preview functionality.
  - Applied NLP (HanLP) and LDA topic modeling for automated categorization and improved recommendations.

PUBLICATIONS

- **Jiahao Xie**, Guangmo Tong. Advances in Set Function Learning: A Survey of Techniques and Applications. *ACM Computing Surveys (CSUR)*. 2025. (**Impact Factor: 28.0**).
- Siqi Wang, **Jiahao Xie**, Yifan Wang, Guangmo Tong. Data-driven Decision Making for Social Influence Risk Management. *Risk Sciences.* 2025.
- Siqi Wang, **Jiahao Xie**, Yifan Wang, Guangmo Tong. Query-Decision Regression for Misinformation Prevention in Social Networks. *The 13th International Conference on Computational Data and Social Networks.* 2024. (**Best Paper Award**).
- Mengmei Zhong[#], **Jiahao Xie**[#], Yao Feng, Shao-Hui Zhang, Jiangnan Xia, Li Tan, Ningxin Chen, Xiaolin Su, Qian Zhang, Yunzhi Feng*, Yue Guo*, Causal effects of the gut microbiome on COVID-19 susceptibility and severity: A two-sample Mendelian randomization study. *Frontiers in Immunology.* 2023. (co-first authors).
- Shaohui Zhang, Yao Feng, Mengmei Zhong, **Jiahao Xie***, Wei Xu*. Association between oxidative stress and chronic orofacial pain and potential druggable targets: Evidence from a Mendelian randomization study. *Journal of Oral Rehabilitation*. 2024.
- Xirui Chen, Hui Liu, Yamin Fang, Mengshuai Su, **Jiahao Xie**. Rotor Fault Feature Extraction Based on Low-frequency Sampling Vibration Signal. *In 7th CAA International Conference on Vehicular Control and Intelligence (CVCI). IEEE.* 2023.
- Hui Liu, Yanfei Li, **Jiahao Xie**, Jie Zhang, Xirui Chen. Train compartment air adjustment and control method and apparatus, storage medium, and program product. *U.S. Patent Application No. 18/267,450.* (**Gold Medal Award** in the 9th Macau International Innovation and Invention Exhibition.)

SERVICE

- Undergraduate research program, CDS Lab @ UD — Supervisor, 2024 – 2025
- CISC621 (Algorithm Design and Analysis), CISC320 (Introduction to Algorithms) — Teaching Assistant, 2024 – present
- IEEE Transactions on Neural Networks and Learning Systems (TNNLS) — Reviewer, 2025 – present
- Journal of Combinatorial Optimization (JOCO) — Reviewer, 2024 – present
- IJCAI 2025, IJCNN 2025, AAIM 2024–2025, CSoNet 2024, COCOON 2024 — Reviewer, 2024 – present
- Association for Computing Machinery (ACM) — Member, 2025 – present
- American Association for the Advancement of Science (AAAS) — Member, 2025 – present