Last Update: Sep. 2025

Haoxiang Lu

luhaoxiang24@mails.ucas.ac.cn 0009-0003-9688-9261
haoxiang.lu

Education

2024 – 2027
Beijing, China

University of Chinese Academy of Sciences
M.S. in Environmental Engineering, *GPA – 3.8/4.0* *Advisor: Prof. Zhi Qian*
Core Courses: **Data Analysis** in Environmental Engineering Practice, **Mathematical Models** of Environmental Engineering and MATLAB Application, Pattern Recognition and **Machine Learning**, **Optimization** for Data Science, Introduction to **LLMs**

2020 – 2024
Shanghai, China

East China University of Science and Technology
B.S. in Environmental Engineering, *GPA – 3.3/4.0* *Advisor: Prof. Juying Lei*
Outstanding Engineer Education and Training Program
Thesis: *Preparation of Ti_3C_2 MXene-based Composites for Photocatalytic CO_2 Reduction*

Research Publications

Journal Articles

1. **Haoxiang Lu**†, Xinhu Sun†, Guozhong Li, and Zhi Qian*, "An Interpretable Predictive Model for High-Gravity NO_x Oxidation-Absorption Driven by Physics-Informed Neural Networks," *Industrial & Engineering Chemistry Research (In Peer Review)*, 2025.
2. Xinhu Sun†, **Haoxiang Lu**†, and Zhi Qian*, "A Bayesian-State-ANFIS Model for H_2S Removal using a High-Gravity Reactor," *Chemical Engineering Science (In Peer Review)*, 2025.

Research Experience

Interpretable Physics-Informed Neural Networks for HiGee Systems [1] Mar. 2025 - Sep. 2025
University of Chinese Academy of Sciences *Advisor: Prof. Zhi Qian*
▷ Pioneered a multi-branch PINN with a hard parameter-sharing architecture, creating a physically-consistent alternative to "black-box" models for simulating high-gravity NO_x removal
▷ Achieved high-fidelity prediction ($R^2 = 0.931$) by embedding physical laws (mass transfer, reaction kinetics) into the model, enhancing convergence and generalization, especially with sparse or noisy datasets
▷ Leveraged SHAP to deliver model interpretability, identifying rotational speed as the key driver for process intensification and establishing a theoretical guide for industrial process optimization

Intelligent Modeling and Control with Bayesian State-ANFIS [2] Aug. 2024 - Aug. 2025
Weiqiao National Higher Technology Research Institute *Advisor: Prof. Zhi Qian*
▷ Developed a novel Bayesian-State ANFIS to automatically decouple complex multivariable interactions in industrial high-gravity H_2S removal processes
▷ Designed the system to automatically decouple input variables into "state" and "explanatory" subspaces, creating a transparent model with 243 interpretable IF-THEN fuzzy rules that achieved superior industrial performance ($R^2 = 0.974$)
▷ Applied the high-fidelity model to design a PSO-based optimization strategy and a fuzzy PID controller, establishing a framework for minimizing operational costs and improving robust dynamic control

Work Experience

Teaching

University of Chinese Academy of Sciences Sep. 2025 - Present
▷ **Teaching Assistant** in *Mathematical Models of Environmental Engineering and MATLAB Application*

East China University of Science and Technology Mar. 2021 - Jul. 2021
▷ **Teaching Assistant** in *Advanced Mathematics (II)*

Industry

Shandong Weiqiao Pioneering Co., Ltd. (*Fortune Global 500*) Aug. 2024 - Oct. 2025
Process Engineer
▷ Oversaw the end-to-end implementation of a high-gravity desulfurization system, from process design and CAD-based pipeline layout to on-site construction supervision for a $3000m^3/h$ unit
▷ Engineered and optimized the process parameters post-commissioning, achieving and sustaining an H_2S absorption efficiency of over 96%
▷ Developed and executed operational and monitoring protocols that ensured the system's stable, continuous operation for over a year, establishing a new benchmark for process reliability

Tongji Architecture Design Co., Ltd. Jul. 2023 - Sep. 2023
Research Intern *Advisor: Dr. Yuting Zhu*
▷ Identified key research trends and emerging technologies in activated carbon regeneration by conducting a comprehensive bibliometric analysis using *VOSviewer* and *CiteSpace*
▷ Synthesized findings into a detailed report that provided strategic insights and informed the research direction for the senior team

Skills

Coding	**Python**, R, MATLAB, Mathematica, LaTeX, SQL
AI & ML	**PyTorch**, **LLMs**, Scikit-Learn, XGBoost, CatBoost, Scikit-Fuzzy, Optuna
Software	SPSS, Jade, Adobe Illustrator, Fluent, Aspen Plus, VOSviewer, OpenLCA
Instruments	XRD, SEM, TEM, FTIR, Raman, XPS, UV-vis, EIS, EBS, TPC, EDS
Professional Skills	**Teaching**, Research Design, Technical Writing, Data Analysis, Presentation

Honors and Recognition

Awards and Honors

2024 **Gold Medal** (Team Member), 49th International Exhibition of Inventions Geneva, for "*High Gravity Selective Desulfurization Technology*"

Scholarships

2024 – 2026 **Graduate Academic Scholarship**, University of Chinese Academy of Sciences
2023 **Outstanding Undergraduate Scholarship**, University of Chinese Academy of Sciences
2020 – 2023 **Merit-based Scholarship** (Third Class), East China University of Science and Technology