

HAODONG LIU

✉ liuhaodong.seu@qq.com

☎ +86 13997991233

🌐 [liuhaodong9.github.io](https://github.com/liuhaodong9) in [linkedin.com/in/haodong-liu-147269301](https://www.linkedin.com/in/haodong-liu-147269301)  orcid.org/0009-0005-1896-9455

EDUCATION

Monash University

Melbourne, Australia

Joint PhD in Department of Biological and Chemical Engineering

September 2027 – September 2028

Southeast University

Nanjing, Jiangsu

PhD in Environmental Science and Engineering

September 2025 – June 2029

- Coursework: Advanced Topics in Atmospheric, Environment Theory and Technology of the Human-Built Environment, Artificial Intelligence and Engineering Practice

Monash Research Institute of Science and Technology

Suzhou, Jiangsu

Research Assistant

September 2024 – August 2025

North China University of Science and Technology

Tangshan, Hebei

M.Eng. in Chemical Engineering

September 2021 – June 2024

- Coursework: Advanced Organic Chemistry, Advanced Catalysis, Analytical Instrumentation, Materials Characterization Techniques, Coal Chemistry and Technology

Huazhong University of Science and Technology

Wuhan, Hubei

Graduate School Entrance Exam Preparation

July 2019 – August 2021

- Coursework: Calculus, Linear Algebra, Mathematical Statistics

College of Wenhua

Wuhan, Hubei

B.Eng. in Computer Science and Technology

September 2015 – June 2019

- Coursework: Data Structures and Algorithms, Computer Networks, Operating Systems, Computer Organization, Web Development, C/C++/Java/PHP/Python

RESEARCH EXPERIENCE

Monash University

PhD's Supervisor: Prof. Jianglong Yu / Prof. Sankar Bhattacharya

- Reinforcement learning-driven molecular structural evolution of coking coal during plastic layer formation
- Construction of coke molecular model using reinforcement learning
- Exploring structure-property relationships between carbon molecular evolution and coke quality using CNN-LSTM-Attention model
- An agentic AI framework for molecular-level generation, reasoning, and visualization of carbon structures during coking

Southeast University

PhD's Supervisor: Prof. Guangcan Zhu (September 2025 – June 2028)

- Molecular dynamics simulation of transmembrane proteins

Monash Research Institute of Science and Technology

Vice president: Prof. Jianglong Yu (September 2024 – August 2025)

- Led the design and development of a digital twin platform integrating process modeling, data visualization, and AI-assisted analysis for industrial coking operations.
- Developed a sandbox-based digital twin system for demonstrations on 2025 Suzhou AI expo.
- Designed and implemented an RAG and knowledge graph-based Q&A system for coking process.
- Designed a fully automated, integrated lift-type experimental coke oven system and coordinated

HAODONG LIU

✉ liuhaodong.seu@qq.com

☎ +86 13997991233

🌐 liuhaodong9.github.io in linkedin.com/in/haodong-liu-147269301  orcid.org/0009-0005-1896-9455

with equipment manufacturers to finalize technical drawings of the coke oven.

North China University of Science and Technology

Master's Supervisor: Prof. Guangyue Li (September 2021 – June 2024)

- Combined deep learning with molecular dynamics simulations to develop algorithms for constructing coal molecular models
- Applied density functional theory (DFT) to calculate optical properties for verification and optimization of the structural models
- Conducted molecular dynamic simulations using molecular models of coal

Wuhan Digital Company

Big Data Intern (July 2017 – August 2017)

- Conducted data collection, developed responsive dynamic web pages using JavaScript, led the team in developing a recommendation algorithm based on word frequency and text similarity

Wenhua College

Big Data Research Group, Prof. Fang Wang (September 2016 – June 2019)

- A parcel tracking system using Java (Led data cleaning and data analysis efforts for project development)
- Project team leader, responsible for managing a team and delivering results

Software Development Research Group, Prof. Huiya Cao (January 2019 – June 2019)

- Developed a student information management system, handling both front-end (HTML + CSS) and back-end (PHP) development
- Used Python to compare and evaluate the text similarity between thesis topics of graduates

HAODONG LIU

✉ liuhaodong.seu@qq.com

☎ +86 13997991233

🌐 [liuhaodong9.github.io](https://github.com/liuhaodong9) in [linkedin.com/in/haodong-liu-147269301](https://www.linkedin.com/in/haodong-liu-147269301)  orcid.org/0009-0005-1896-9455

PUBLICATIONS

Peer-Reviewed Journals

1. **Haodong Liu**, Hang Zhang, Jieping Wang, Jinxiao Dou, Rui Guo, Guangyue Li, Yinghua Liang, and Jianglong Yu, "Construction of macromolecular model of coal based on deep learning algorithm," *Energy* (2024), 294, 130856. (SCI Q1, IF=9)
2. Liang Lei, Zhang Sun, **Haodong Liu**, Jieping Wang, Guangyue Li, Yinghua Liang, "Theoretical insight into the competitive effect of CO₂ and additive H₂O in coke gasification," *Chemical Engineering Journal* (2023), 461, 142003. (SCI Q1, IF=15.1)
3. Cong Xu, **Haodong Liu**, Ting Lu, Rui Guo, Guang-Yue Li, Hang Zhang, "Construction of lignin model molecule based on deep learning and infrared spectroscopy," *Chemical Physics Letters*, 864 (2025), 141934. (SCI Q1, IF=3.8)
4. **Haodong Liu**, Bo Gong, Hang Zhang, Jieping Wang, Jinxiao Dou, Rui Guo, Guangyue Li, Yinghua Liang, "Prediction of structural evolution during coal pyrolysis with metropolis Monte Carlo and deep learning," *Combustion and Flame* (2026), 285: 114737. (SCI Q1 IF=6.2s)

Other

1. **Haodong Liu**, Hang Zhang, Jieping Wang, and Guangyue Li, "Rapid Construction of Molecular Model of Coal based on Deep Learning," *2023 International Symposium on Clean Energy and Advanced Materials*, 24th-26th July 2023, Suzhou, China. Hosted by Monash University, Pusan National University. (Third Prize for Best Paper).

SOFTWARE

Patents

1. Haodong Liu, "Method, Device, Electronic Equipment, and Storage Medium for Constructing Coal Molecular Structure," Chinese Patent ZL202310776616.7.

Contribution

2. GenCoal (2021 – Present): <https://github.com/GYLiGroup/GenCoal>

PRESENTATIONS

Speech

1. **Haodong Liu**, Hang Zhang, Jieping Wang, Guangyue Li, "Rapid Construction of Molecular Model of Coal based on Deep Learning," *2023 International Symposium on Clean Energy and Advanced Materials*, 24th-26th July 2023, Suzhou, China. Hosted by Monash University, Pusan National University. (Oral Presentation)

Poster

1. **Haodong Liu**, Hang Zhang, Jieping Wang, Guangyue Li, "Rapid Construction of Molecular Model of Coal based on Deep Learning," *2023 International Symposium on Clean Energy and Advanced Materials*, 24th-26th July 2023, Suzhou, China. Hosted by Monash University, Pusan National University. (Poster Presentation)

GRANTS

Graduate Research

1. **Haodong Liu**, "Construction of Coal Structure Model Based on Deep Learning," Graduate School-level Innovation Project, North China University of Science and Technology, 2023S02, January 1, 2023 - December 25, 2023. (Principal Investigator)

HAODONG LIU

✉ liuhaodong.seu@qq.com

☎ +86 13997991233

🌐 liuhaodong9.github.io in linkedin.com/in/haodong-liu-147269301  orcid.org/0009-0005-1896-9455

TEACHING EXPERIENCE AND PEDAGOGICAL TRAINING

Teaching Assistant

Engineering Practice Course (Course Code: 5005) at Monash University (Suzhou), responsible for developing first-year master's students' research skills and academic English presentation abilities (March 2025 – August 2025).

- The establishment of knowledge graph in coal blending for coking process
- Web-based 3D virtual modeling and intelligent control of smart-coking system

Private English Tutor

Provided one-on-one English tutoring for high school students (June 2019 – August 2021)

- Certified High School English Teacher (China)
- Focused on improving grammar, vocabulary, and reading comprehension
- Tutorials for Chinese college entrance exam (high school students) Martial Arts and Fitness Coach

Chinese Martial Arts Coach

Xiantao Martial Arts and Fitness Club (Summer camp, 2015 – 2019)

- Coached students aged 6 to 18 in martial arts and kickboxing
- Designed and led training programs to improve physical fitness, discipline, and self-defense skills
- Provided individual guidance to help students achieve personal and competitive goals

MENTORSHIP EXPERIENCE

Mentor for Fellow Student at Wenhua College (Fall 2019)

- Provided long-term mentorship in English language skills, helping the student prepare for both CET-4 and CET-6 exams
- Guided the students in preparation for their application to the graduate
- Supported the student through their academic and military service transitions

OTHER RELEVANT EXPERIENCE

North China University of Science and Technology Network Center

Intern (Sep 2022 – June 2024)

- Installed and configured server systems to support university network infrastructure
- Maintained and repaired laboratory computers, handling system updates and troubleshooting issues

HONORS AND AWARDS

- First, Second, and Third Prize, School Awards (2015, 2016, 2017, 2018, 2021)
- Third Prize, Hubei Province, Lanqiao Cup Java Software Competition (2017)
- Third Prize, Mathematical Modeling Competition (2018)
- Member of the Organizing Committee, Hubei Provincial Martial Art Association (2016)

SKILLS

Second Languages:

- Advanced (IELTS Reading: 7.5, IELTS Speaking: 7.0)
- Upper-Intermediate (IELTS Listening: 6.5, IELTS writing: 6.0)

Programming Languages:

HAODONG LIU

✉ liuhaodong.seu@qq.com

☎ +86 13997991233

🌐 liuhaodong9.github.io in linkedin.com/in/haodong-liu-147269301  orcid.org/0009-0005-1896-9455

- Python | Java | C++ | JavaScript | HTML/CSS

Data Science &

- Deep Learning: TensorFlow | PyTorch
- Big Data & Databases: MySQL | Hadoop

Computational Tools:

- Molecular Modeling & Simulation: ChemDraw | ORCA | LAMMPS | Gromacs
- 3D Modeling & Engineering Design: SolidWorks | Blender
- Scientific Visualization & Digital Twin: Unreal Engine 5 (UE5)