

HAODONG LIU

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EDUCATION

Southeast University	Nanjing, Jiangsu
PhD Student	September 2025 – June 2028
Monash Research Institute of Science and Technology	Suzhou, Jiangsu
Research Assistant	September 2024 – August 2025
Monash University (Suzhou campus)	Suzhou, Jiangsu
English Development Program	July 2024 – August 2024
North China University of Science and Technology	Tangshan, Hebei
M.Eng. in Chemical Engineering	September 2021 – June 2024
<ul style="list-style-type: none">• 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
<ul style="list-style-type: none">• Coursework: Calculus, Linear Algebra, Mathematical Statistics	
College of Wenhua	Wuhan, Hubei
B.Eng. in Computer Science and Technology	September 2015 – June 2019
<ul style="list-style-type: none">• Concentration in Materials Science and Engineering• Coursework: Data Structures and Algorithms, Computer Networks, Operating Systems, Computer Organization, Web Development, C/C++/Java/PHP/Python	

RESEARCH EXPERIENCE

Southeast University
PhD's Supervisor: Prof. Guangcan Zhu (September 2025 – June 2028)
<ul style="list-style-type: none">• Molecular Structure Evolution and Pollutant Dynamics, especially water pollution during coking process• Prediction for Coking Processes in a Digital Twin Framework in micro-perspective
Monash Research Institute of Science and Technology
Vice president: Prof. Jianglong Yu (September 2024 – August 2025)
<ul style="list-style-type: none">• Development of an Intelligent Coking Digital Twin System• Hardware and software control systems for fully automated coking equipment and a plastic layer sampler• Development of a Coking Large Language Model
North China University of Science and Technology
Master's Supervisor: Prof. Guangyue Li (September 2021 – June 2024)
<ul style="list-style-type: none">• 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)

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- 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

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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 molecular structural changes during coal pyrolysis using deep learning," *Fuel*, in press.

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 2023107766167. (under substantive examination)

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)

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TEACHING EXPERIENCE AND PEDAGOGICAL TRAINING

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:

- 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

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Operating Systems:

- Mac | Linux | Windows

Project Management: Agile | Kanban | Scrum

- Hardware-Software Integration for Automated facilities