

ZIANG LIU

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EDUCATION

Nanjing University (NJU)

Nanjing, China

B.E. in New Energy Science and Engineering

Sep 2021 – Jun 2025

- Overall Ranking: 1/25
- GPA: 4.60/5.0
- Core Classes: Foundations of Materials Science and Engineering (99), Polymeric Materials Science (99), Organic Chemistry (98), Mathematical Methods of Physics (98), Energy Conversion and Storage (97), Physical Chemistry (96.7), Electrochemical Methods (96)

Harvard University

Boston, USA

Visiting Undergraduate Research Intern

Jul 2024 – Dec 2024

- Selected for competitive research program under Prof. Xin Li
- Focus: Advanced Li-CO₂ Battery Systems

RESEARCH EXPERIENCE

Li-CO₂ Batteries

Jul 2024 – Dec 2024

Advisor: Associate Professor Xin Li, Harvard University

- Set up the first set of CO₂ battery equipment in the laboratory;
- Tested the new system under oxygen;
- Tried to improve the contact between the solid-state electrolyte and the gas diffusion layer;
- Synthesized Co₃O₄ in the presence of Li₂O.

Electrochemical Acid CO₂ Reduction

Oct 2023 – Jun 2024

Advisors: Professor Jia Zhu & Assistant Professor Xiaojun Wang, NJU

- Developed the drop-casting method of loading the catalyst ink, reducing preparation time (from 2+ hours to 0.5 hour) while improving performance and repeatability by controlling the degree of dispersant gasification;
- Analyzed and corrected the deviation of gas chromatography data;
- Normalized the processing of the data from gas chromatography and electrochemical workstations with codes to improve processing efficiency and data reliability;
- Discovered that increasing the gas pressure could improve selectivity and retrofitted the seal of the reactor, enabling the device to operate continuously for 50 hours at 3 atmospheres and withstand up to 7 atmospheres;
- Proposed the additional role of a new kind of cations in acidic CO₂ reduction compared to alkali cations, reducing the overpotential of the reaction (0.25V) comparing to the common K⁺ system by a non-catalytic method, which is more universal;
- Manuscript in preparation and submission is planned for early 2025.

Polarization Raman and Stress Regulation in MoCl₃ Semiconductors

Feb 2023 – Sep 2023

Advisor: Professor Hongtao Yuan, NJU

- Prepared MoCl₃ films which were mechanically exfoliated according to the weak interlayer force;
- Demonstrated the anisotropy of MoCl₃ through polarized Raman spectroscopy;
- Optimized the process to transfer the sample onto PET substrates and confirm the stretching direction;
- Measured Raman spectroscopy via accurate and continuous strain engineering;
- Research resulted in publication in *Nano Research* as co-first author.

PUBLICATION

1. Sun, Y.*, **Liu, Z.***, Li, Z.*, Qin, F., Huang, J., Qiu, C., & Yuan, H. (2024). Unravelling the anisotropic light-matter interaction in strain-engineered trihalide MoCl₃. *Nano Research*, 17(4), 2981-2987. (*equal contribution) [\[URL\]](#)

SELECTED AWARDS & HONORS

- Dongliang Scholarship (highest honor at NJU, 12 undergraduates, first in the major) 2024
- National Scholarship (highest nationwide honor, first in the class, top 0.2%) 2022
- Merit student of Jiangsu Province (top 0.067% among 2.62 million college students) 2024
- Outstanding Student Model (top 0.5% at NJU) 2024
- Outstanding Student (top 5% at NJU, twice) 2022, 2023
- Zhenggang Scholarship (30,000 China Yuan, 4,000+ USD equivalent) 2023
- 81 Physics Scholarship (the only one in the college) 2023
- Outstanding Student Organization Cadre 2023
- First Grade Award in the 26th Forum of Sciences & Arts (top 3% of ~400 participants) 2023
- First Place in the Jiangsu Orienteering Championship (best result in team history) 2022

LEADERSHIP

Academic Development Association

Co-founder

- Provided academic assistance to undergraduate students in the college, particularly those from disadvantaged backgrounds;
- In charge of the Engineering Workshop under the Association (Sep 2022 – Jun 2024), organizing 32 academic tutoring (80 hours) with over 800 total student attendances;
- Member of the Q&A Workshop under the Association (Sep 2022 – Jun 2024), providing Q&A service for students for more than 160 hours as a volunteer;
- Awarded *Student Organization Cadre* since the results of the work were significant and the number of academic alerts was reduced by about half compared to when the association had been founded.

Nanjing University Orienteering Team (a sport of running with a map)

Vice-captain (Sep 2022 – present)

- Organized the first orienteering competition of Nanjing University in 2023 and served as the starting judge in the competition, with 299 students participating;
- Participated in the 2022 Jiangsu Orienteering Championship as a main player and won several awards such as *the First Place in the Overall Team* and *the Second Place in the Team Competition*, breaking the team's historical best performance record.

SKILLS & INTERESTS

- **Computer Skills:** Python, Origin, SolidWorks, ChemDraw, Cinema 4D
- **Lab Skills:** gas chromatography, electrochemical workstation, drop-casting method, Raman, XRD, solvothermal method, tube furnace, battery assembly, battery testing systems
- **Research interests:** electrocatalysis, chemical synthesis, CO₂ conversion, energy storage, sustainable energy