Junyuan Lu

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Education

Bachelor of Engineering in Material Science and Engineering *Sep 2021 – Expected Jun 2025*
Bachelor's degree program *Shanghai Jiao Tong University*

Student of *Hsu Tzuyao* Honor Class in School of Material Science and Engineering (SMSE), taking most of the lectures of materials science in English.
GPA: 88.02/100 and 3.75/4.3, ranked 14/117 in college and 3/17 in class.

Summer School *Jun 2023 – Jul 2023*
2023 Zhi-Hong International Summer School of ISS-AM *Shanghai Jiao Tong University*

Participated in a two-week international summer school held by SMSE of SJTU. Listened to several lectures given by professors from Northwestern University, KTH, SJTU, etc. Completed group works and the final presentation with foreign graduate students from Singapore, Kazakhstan, Russia, etc.

Selected Publications

- Hu, Q.; Wang, W.; **Lu, J.**; Zhu, H.; Liu, Q.; Ren, Y.; Wang, H.; Hui, J. High-Throughput Screening of High Energy Density LiMn1-XFexPO4 via Active Learning. Chinese Chemical Letters 2024, 110344. https://doi.org/10.1016/j.cclet.2024.110344.
- Submitted (Co-first author): High-throughput Screening of Superlattice-like Ge-Sb-M (M = Sn, Se) Thin Films for Non-volatile Photonic Memories

Research and Project Experience

Measurement of the Electron Conductivity of LLZTO *Feb 2022 – Feb 2023*
An undergraduate research project supervised by Prof. Huanan Duan *SMSE of Shanghai Jiao Tong Univ.*

- Used a symmetric Hebb-Wagner polarization method to measure the electron conductivity of solid electrolytes, where Ag coated on both sides of the LLZTO sample as ion-blocking electrodes, and a bias voltage was applied to the sample, resulting in decreasing current with time and the stable current after adequate testing time was used to calculate the electron conductivity. EIS, XRD, SEM, and density measurements were also conducted.
- The method was proposed by *Guoyao Li* through computational simulation. My contributions include conducting the experiment, analyzing data, writing a report, and making a thesis defense.

High-throughput Screening of Combinatorial O-PCM Thin Films *Jun 2023 – Present*
Projects in Prof. Hong Wang's research group *SMSE of Shanghai Jiao Tong Univ.*

- Project 1: Optical properties and thermal stability of Ge-Sb-Se-Te optical phase change materials (O-PCM). Use ion beam deposition to combinatorial synthesize thin films. High-throughput XRD, ellipsometry, and XRF are used to characterize the thin films as-deposited and after heat treatment. This is a ZIRC-founded project and is expected to be completed in June 2025 with papers.
- Project 2: Cooperate with a PhD student *Hongjian Yuan* on a project about the thermal stability of Ge-Sb-Se/Sn thin films. I was in charge of high-throughput XRD data analysis and visualization of ternary structural map. Currently writing an invited paper as co-first author. Expected to submit on 19th Sep.
- Project 3: Work with a master student *Qingyun Hu* on high-throughput screening of high energy density LiMn1-xFexPO4. Published a journal paper as third author. Contributions include writing and reviewing.

Machine Learning Accelerated Phase Field Simulation *Jul 2024 – Present*
Research Assistant in Prof. Hong Liu's group *SMSE of Shanghai Jiao Tong Univ.*

- A graph neural network (GNN) based phase field method is used to simulate grain growth in laser-based additive manufactoring. In the GNN model, nodes represent grains and edges represent grain boundaries. The model is based on a previous work.
- Transferred the model's repo from Python to MATLAB and optimized the code for speed. Conducted a series of simulations to verify its accuracy and efficiency. Currently adding nucleation mechanisms into the model and correcting its anisotropy behavior. Aim to ultimately implant sharp interfaces to further increase its efficiency.
- The project is expected to be completed in June 2025 as my dissertation.

American Sign Language Detection Model *May 2023 – Jun 2023*
An A-level coursework *Shanghai Jiao Tong Univ.*

- Build a ANN model in Pytorch that can output alphabets from a given image of a hand gesture based on the definition of American sign language. The model was trained on a dataset from Kaggle and mediapipe was used to derive the hand landmarks from images, which were then fed into the model. It is able to recognize 26 alphabets in realtime with very high accuracy.
- The model along with a gui demo was available on my github.

Relevant Work Experience

Internship *Sep 2024*
A two-week internship at a lithium-ion battery incorperation *BatteroTech Co., Ltd.*

Learned about the production process of lithium-ion batteries, including the preparation of cathode and anode materials, the assembly of cells, and the testing of batteries. Also learned about the safety regulations and the quality control of the products. Worked with engineers to perform electrochemical tests on batteries.

Awards

Suzhou Industrial Park (SIP) Scholarship	Awarded by SIP Administrative Committee	2022
Huawei Scholarship	Awarded by Huawei Technologies Co. Ltd.	2023
The Third Prize Scholarship	Awarded by Shanghai Jiao Tong Univ.	2022, 2023

Extracurricular Activities

Debating *Sep 2021 – Present*
Core member of the college debate team *Shanghai Jiao Tong Univ.*

Participated in dozens of debate competitions. Won the champion in a university tournament. Huge amount of paper reading to prepare for each debate. Proficiency in improvisational expression and effective communication.

***Internet Plus* Innovation and Entrepreneurship Competition** *Feb 2023 – Sep 2023*
Team leader *Shanghai and Zhejiang, China*

Led a team of 5 to participate in the competition, where a novel Na-LTA product for dehumidification is presented in collaboration with Prof. Yao Li. Multiple minor competition related to the competition were also attended. The project won a silver prize in *The 24th Sheng Xuanhuai Cup* of Shanghai Jiao Tong University.

Technical Skills

Programming	Proficiency in *MATLAB* and *Python* for simulations, data analysis, plotting, machine learning, and software development. Have learned and used *C++*, *C#*, *lua*, and *Latex*.
Softwares	Familiar with *Microsoft Office*, *MDI Jade*, *Blender*, *Zotero*, *VS Code*, *Git*, *Photoshop*, etc. Have used *Solidworks*, *ABAQUS*, *LAMMPS*, *Linux*, and HPC.
Characterization	Familiar with XRD (0D, 2D, postprocess algorithums), SEM, and electrochemical workstation (EIS, CV, cell assembly). Have learned and used ellipsometry, TEM, mechanical tests, XRF, Hardness tests, DSC, BET, and TGA from courses and projects.
Language Proficiency	English (TOEFL 30/29/25/26), Mandarin (Native speaker).

Soft Skills

Cultural Competence	Have learned about the communication and socialization habits of several representative cultures in an intercultural communication course.
Volunteering	Have participated in over 30 hours of volunteering work in campus.
Love for Music	Have been playing the violin since 6. Passion for classical music.

References

Dr. Hong Wang

"Zhiyuan" Chair professor of Materials Science, and
Director, Materials Genome Initiative Center

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