

## Education

**Wuhan University, China (Project 985 university, ranked 8th in QS Mainland China University Ranking)** Sept. 2020 – June 2024  
Bachelor of Technology in Microelectronic Science and Engineering, Hongyi Honor College

**GPA: 3.87/4.0; Ranking: 2/22.**

**Relevant Coursework:** Solid State Physics (96), Nano Optics (96), Quantum Physics and Statistic Physics (87), Fundamentals of Materials Science and Engineering (91), Molecular Dynamics Simulation and Multi-scale Calculation (94), Principle & Application of Sensor (91), Analytical Mechanics (86), Engineering Mechanics (100), Thermodynamics of Engineering (94), Research Training (93), Semiconductor Physics and Devices (92).

## Projects

### Project 1 – N-type co-doped diamond semiconductor material (completed)

Jan. 2021 - June 2021

Advisors: Prof. Hui Li & Ph.D. Wei Shen, Wuhan University

- Learned about the properties of the diamond semiconductor material.
- Learned about the manufacturing processes and applications of the n-type co-doped diamond semiconductor material.
- Created a conceptual simulation model of MPCVD method to produce diamond semiconductor material in macroscopic, mesoscopic and microcosmic perspectives.
- Proposed multi-scale coupling simulation methods to select appropriate dopants for diamond semiconductor material.
- Completed the investigation and writing of an invention patent “Multi-scale coupling simulation method for preparing n-type co-doped diamond semiconductor material”, which has been authorized by the CNIPA (Patent No. ZL 2021 1 0646664.5).

### Project 2 – NV center in n-type doped diamond based on first principles (underway)

July 2022 - till now

Advisor: Asst. Prof. Wei Shen, Wuhan University

- Learned about properties of NV center in diamond for quantum applications.
- Learned about properties of density-functional theory based on first principles and its application in simulation of NV center, as well as relative software (VASP, PWmat).
- Created different kinds of crystal configurations and explored their influences on the electronic and optical properties of NV center, and proved the phosphorus donor could keep the functionality of NV center.
- Explored non-local excitation mechanism between the NV center and the phosphorus donor (both the one-photon and two-photon ways) and showed the phosphorus donor could enhance the stability of NV<sup>-</sup>, compared with nitrogen donor.
- Complete the simulation work and writing an academic paper “Influence of phosphorus donor on the NV center: A first-principles study”. This paper has been submitted to *Diamond and Related Materials*, which is now under review.

### Project 3 – Research on the diamond surface with NV centers (underway)

Mar. 2023 - till now

Advisor: Asst. Prof. Wei Shen, Wuhan University

- Learned about properties of the diamond surface used for creating NV center and enhancing performance in quantum applications.
- Repeated the work conducted by my adviser (Assoc. Prof. Wei Shen), collected and organized data for the paper: Shen, Wei, et al. "Fluorine-terminated diamond (110) surfaces for nitrogen-vacancy quantum sensors." *Carbon* 193 (2022): 17-25.
- Learned the migration of the vacancy towards the nitrogen when creating NV centers and figured out the energies in transition states to prove the mechanism of preparing the NV center with high temperature annealing (recent work).
- Proposed an idea about surface charge transfer doping method to create n-type diamond surface for quantum sensor based on the NV center. I am now establishing simulation models to verify my guess and finding possible breakthroughs for further research.

## Achievements

<b>Publication 1</b>	Multi-scale coupling simulation method for preparing n-type co-doped diamond semiconductor material, Patent No. ZL 2021 1 0646664.5, 4 <sup>th</sup> Author (1 <sup>st</sup> author in students)	Nov. 2021
<b>Publication 2</b>	Shen, Wei, et al. "Fluorine-terminated diamond (110) surfaces for nitrogen-vacancy quantum sensors." <i>Carbon</i> 193 (2022): 17-25, 7 <sup>th</sup> Author (3 <sup>rd</sup> author in students)	Feb. 2022
<b>Manuscript 1</b>	Influence of phosphorus donor on the NV center: A first-principles study, 1 <sup>st</sup> Author (has submitted to <i>Diamond and Related Materials</i> , under review)	Mar. 2023
<b>Competition 1</b>	First Prize in Hubei Province of the 13 <sup>th</sup> National Mathematics Competition for College Students	Dec. 2021
<b>Competition 2</b>	Third Prize in Hubei Province of the 14 <sup>th</sup> National Mathematics Competition for College Students	Dec. 2022
<b>Competition 3</b>	Second Prize of the 6 <sup>th</sup> National College student Art Festival	May 2021
<b>Competition 4</b>	First Prize of the 7 <sup>th</sup> College student Art Festival in Hubei Province	Dec. 2020
<b>Scholarship 1</b>	Second-order Scholarship in Wuhan University (5%~20%)	Dec. 2021
<b>Scholarship 2</b>	Second-order Academic Scholarship in Hongyi Honor College (5%~15%)	Mar. 2022
<b>Scholarship 3</b>	Second-order Scholarship in Wuhan University (5%~20%)	Dec. 2022
<b>Scholarship 4</b>	Second-order Academic Scholarship in Hongyi Honor College (5%~15%)	Mar. 2023

## Technical Skills

**Software & Programming:** VASP (most frequently), PWmat, Materials Studio, COMSOL; MATLAB, Python (PyCCE), C.  
**Language:** English (CET4: 623 CET6: 545).

## Positions of Responsibility

<b>Percussionist in Wuhan University Symphony Orchestra</b>	Sept. 2020 – till now
<b>Table Tennis Team Leader of Hongyi Honor College</b>	Sept. 2021 – June 2021
<b>Member of Wuhan University Cycling Club</b>	Sept. 2021 – till now