

Curriculum Vitae

PERSONAL INFORMATION

- ❖ **Name:** Zhican Zhou
- ❖ **Date of Birth:** 16/08/1997
- ❖ **Gender:** Male
- ❖ **Nationality:** China
- ❖ **Marital Status:** Unmarried
- ❖ **Address:** No.11 ZhongGuanCun BeiYiTiao, 100190 Beijing, P.R. China
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EDUCATION

- ❖ **M.S, Nankai University & National Center for Nanoscience and Technology (NCNST) of CAS**

Duration: 09/2019 – 06/2022 (Expected)

Supervisor: Prof. Qian Liu & Prof. Xinzheng Zhang

Major: Physics Photonic & Electronic technology *GPA Ranking:* Top 5%

Main courses: Advanced Quantum Mechanics, Semiconductor Physics, Semiconductor manufacturing technology, Principle and Application of Memory devices

- ❖ **B.S, Chongqing University**

Duration: 09/2015 – 06/2019

Major: Material Forming & Control Engineering *GPA Ranking:* Top 10%

Main course: Functional materials, Mechanical drawing, Material characterization technology, Mechanical manufacturing and automation control, electronics and electricians

RESEARCH INTERESTS

- ❖ Improvement for process on the development of novel multi-function optoelectronics hybrid chips
- ❖ Architecture designing for hardware realization for an optoelectronic computing system
- ❖ Development of specialized neural network algorithms optimized for hardware

RESEARCH EXPERIENCES

Fabrication and performance study of novel two-dimensional materials RRAM devices for in-memory computing, Master's project, CAS Key Laboratory of Nanosystem and Hierarchical Fabrication, NCNST, 09/2020 – now

- ❖ *Aim*

Utilizing self-developed Super-Resolution Laser Direct Writing (LDW) system (the minimum feature size can reach 5nm), we processed a variety of 2D material receptors in order to gain high-performance memristive devices.

❖ **Results**

- a) We successfully constructed various 2D material memristors (MoS_2 , WSe_2 , ReSe_2 , graphene) based on different resistance switching mechanisms (abrupt/continuous) and config structures, and the memristive window can be tuned by the doping degree and the shape of doping areas;
- b) We optimized the memristor SPICE model according to the real device data, and simulated the Boolean Logic computing (Logic Gate circuit);
- c) Based on the MLP and Pytorch framework, next step we will try to realize the simulation of memristor arrays for AI computing, taking MNIST as an example.

❖ **Abilities Gained**

- a) I have cleanroom processing experience, and have learned a complete set of Semiconductor micro/nanodevices preparation process including film preparation and material growth technology (CVD, ALD, PVD), micro/nanostructures processing technology (LDW, UVL, EBL) and characterization technology (SEM, AFM, Four-point probe) for testing and failure analysis, and so forth.
- b) As the project progresses, I gradually have a deep understanding for various memory devices, memristor switching mechanisms and principle of in-memory computing.
- c) I learned the SPICE simulation software, and attempted to simulate the combinational logic circuit. Besides, I also learned the elements of AI computing based on memristor, for instance, the Back Propagation (BP) algorithm memristor weight mapping methods.

Laser processing of MTMO (Metal and Transparent Metallic Oxide) grayscale masks and mechanism research,

Undergraduate thesis, CAS Key Laboratory of Nanosystem and Hierarchical Fabrication, NCNST, 02/2019 – 08/2019

❖ **Aim**

To develop a new type of grayscale mask with simple preparation process and high resolution, by using LDW system to precisely control the transparent (oxidation) degree of nano metal films.

❖ **Results**

- a) Through the LWD process, we prepared patterned MTMO grayscale masks with high performance on two kinds of nano metal films (Sn and In).
- b) Combining the finite-element numerical simulation and analog experiments of real laser processing, we elucidated the basic mechanism of MTMO grayscale masks.

❖ **Abilities Gained**

- a) I have conducted in-depth research on the lithography, including different type of masks, exposure processes and novel photo resistances (like Molecular glass and Metal oxide cage cluster).
- b) I have learned the basic operations of COMSOL, and carried out numerical simulation of temperature field.

Development of novel cotton fiber anti-poison textile mask loaded with titanium oxide nanotubes,

National innovation training program for College Students, Chongqing University, 01/2017 – 09/2019.

Study on novel gas sensor based on nano hollow spherical NiO and its sensitivity promotion mechanism,

2018 China (International) sensor innovation competition, Chongqing University, 06/2018 – 03/2019

ACADEMIC ACHIEVEMENTS

❖ Journal papers

- [1] **Zhican Zhou**[†], Fengyou Yang[†], Shu Wang[†], Lei Wang, Xiaofeng Wang, Cong Wang, Yong Xie, and Qian Liu, “Emerging of Two-dimensional Materials in Novel Memristor,” *Frontiers of Physics*, 17(2), 23204 (2022) DOI: 10.1007/s11467-021-1114-5.
- [2] Shu Wang[†], **Zhican Zhou**[†], Bo Li, Cong Wang and Qian Liu, “Progress on New-Ge LDW technique based on Laser-matter interaction,” *Materials Today Nano*, DOI: 10.1016/j.mtnano.2021.100142
- [3] Meng Wang[†], Xiaofeng Wang[†], **Zhican Zhou**[†], Feng Xia, Haoran Zhang, Artem Shelaev, Xinzheng Zhang, Chuanfei Guo, Jingjun Xu, Qian Liu, “Large-area Composition-analysis of Laser Scanned Grayscale Structures with Nanoscale Spatial Resolution,” *Nano letters* (Under revision).
- [4] **Zhican Zhou**[†], Shu Wang[†], Fengyou Yang[†], Cong Wang, and Qian Liu, “The realization of logic gates based on monolayer MoS₂ memristor,” *Advanced Electronic Materials* (Submitted).
- [5] Fengyou Yang[†], Shengyao Chen[†], Huimin Feng[†], Cong Wang, Xiaofeng Wang, Shu Wang, **Zhican Zhou**, Bo Li, Lijun Ma, Haiguang Yang, Yong Xie and Qian Liu, “High-performance optoelectronic memory based on bilayer MoS₂ grown by Au catalyst,” *Journal of Materials Chemistry C*, 8, no. 8 (2020): 2664-2668. DOI: 10.1039/C9TC06996H.
- [6] Xiaofeng Wang[†], Haiguang Yang[†], Huimin Feng[†], Lei Wang, Shengyao Chen, **Zhican Zhou**, Shu Wang and Qian Liu, “Shape-dependent close-edge 2D-MoS₂ nanobelts,” *RSC Advances*, 10, no. 55 (2020): 33544-33548. DOI: 10.1039/D0RA06440H.

❖ Conference Posters

- [1] **Zhican Zhou** and Qian Liu, “Constructing of two-dimensional MoS₂ memristor and its failure analysis,” *2021 the 23th China Semiconductor Physics Conference*, Xi'an, China. (in Chinese)
- [2] Shu Wang, **Zhican Zhou**, Xiaofeng Wang, Shengyao Chen and Qian Liu, “Controllable Nano-slit fabricated by crazing in Crystal,” *2021 the 10th International Symposium on Advanced Optical Manufacturing and Testing Technologies*, Chengdu, China.

HONORS & AWARDS

- ❖ Excellent Joint Training Students of NCNST, 2021.
- ❖ Freshman Scholarship of Nankai University, 2020.
- ❖ Excellent Graduate of Chongqing University, 2019.
- ❖ Advanced Individual in Innovation and Entrepreneurship, 2018.
- ❖ First prize of China (International) sensor innovation and Entrepreneurship Competition, 2018.
- ❖ First Prize Scholarship of Chongqing University, 2016-2019.

OTHERS

- ❖ **Computer skills:** MATLAB, Photoshop, 3DMax, C4D, Micro Office, Origin, etc.
- ❖ **Language ability:** English (Ielts 6.0), Chinese (Mother Language).
- ❖ **Hobby:** Photography (500px Community contract photographer)
- ❖ **Internship:** *Scientific American (Chinese version)*, Science editor, 03/2021 – 12/2020