

Fanhao Meng

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EDUCATION BACKGROUND

08/2018-11/2018	Department of Materials Science and Engineering Visiting Student Researcher	University of California, Berkeley, USA
09/2015-07/2019	School of Physics (Elite Program) Major GPA: 92.1/100, Ranking: 2/144 (1.4%) TOEFL: 110 (Listening: 30, Reading: 30, Speaking: 23, Writing: 27) GRE General: 326 + 3.5 (Verbal: 156, Quantitative: 170, Analytical Writing: 3.5) GRE Physics: 980 (93%)	Nanjing University, Nanjing, China

RESEARCH INTERESTS

Nanomaterials, Nanoelectronics, Nanophotonics, Physical device

PUBLICATION

- [1] Chenyu Wang[†], Cong Wang[†], **Fanhao Meng[†]**, Pengfei Wang, Shuang Wang, Shi-Jun Liang, Feng Miao*. ([†]**equal contribution**)
*Two dimensional materials in memristive devices. **Advanced Electronic Materials** (submit soon)*
- [2] Qian Xu, **Fanhao Meng**, Zheng Xie, Huijun Zhou*. *Research on computer generated holograms*, 2018 (1) 1-7,
Physics Experimentation (in Chinese) [[pdf](#)]

RESEARCH EXPERIENCES

- ◆ UC Berkeley, Department of Materials Science and Engineering
Advisor: Dr. Jie Yao
- Berkeley, USA
Aug.2018 - Present

➤ **Enhanced chiral response of twisted bilayer graphene by dielectric achiral nanophotonics**

Goal: Explore the optical response of chiral twisted bilayer graphene (tBLG) in relation to its band structure; Integrate tBLG into silicon-based nanophotonic structure to enhance its chiral optical signals.

Responsibilities:

- Device fabrication using mechanical exfoliation and transfer technique.
- Characterization of tBLG samples via Raman Spectroscopy, white light absorption measurement, etc.
- Analysis of experimental results to better study the interlayer coupling in the system.

Accomplishments:

- Designed a 2D material transfer system and successfully fabricated tBLG structure on SiO₂/Si substrates.
- Improved the stacking quality of tBLG samples by optimizing the fabrication process and achieved more accurate control of the twist angle, confirmed by Raman mapping and white-light absorption spectrum.
- Observed nonlinear optical resonance in tBLG related to its twist angle and proposed feasible physics explanation.
- Contributed to the fabrication of double-bar photonic structures in Si membrane transfer process.

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- ◆ Nanjing University, School of Physics, [Lab of Mesoscopic Physics and Quantum Devices](#)

Nanjing, China

FANHAO MENG Curriculum Vitae Updated to 11/27/2018

Advisor: Dr. Feng Miao

July.2017 – July.2018

➤ **Novel memristive architecture for neuromorphic computing**

Goal: build novel neuromorphic computing architecture based on memristors, explore promising applications.

Responsibilities:

- Fabrication technique, circuit integration and investigation of algorithms.

Accomplishments:

- Successfully fabricated memristive crossbar arrays in high yield using photolithography.
- Embedded the crossbar array into the [ArC ONE](#) Memristor Characterization Platform and managed to operate the system. Now working on the implementation of neural network algorithms in the arrays.
- Proposed to construct a dropout layer in neural networks utilizing the intrinsic variability of switching behavior in memristors. Combined experimental data with deep learning simulation and proved its efficiency to reduce overfitting.

➤ **Fabrication and characterization of memristors based on Transition metal oxide (TMO)**

Goal: fabricate TMO-based devices with resistive switching property and continuously tunable conductance

Responsibilities:

- Using sputtering deposition, e-beam evaporation and lithography to fabricate high-quality Ta/TaO_x memristive devices.

Accomplishments:

- Successfully fabricated Pd/TaO_x/Pd memristors, used AFM to characterize their roughness and thickness, used probe station to observe its memristive I-V hysteresis.
- Established suitable growth conditions and fabrication procedure to improve the yield and uniformity. Achieved non-volatile tunable resistance within 10^3 - $10^4 \Omega$, under electrical pulse sequences.

◆ Nanjing University, School of Physics, Basic Physics Laboratory

Nanjing, China

Advisor: Huijun Zhou

April.2017 - June.2017

➤ **Research on computer generated holograms**

- Reconstructed 2D and 3D images through computer generated holograms (CGH) on a liquid crystal light valve.
- Applied appropriate methods in CGH to make holograms of 3D objects and optimized their sharpness and clarity.

AWARDS/HONORS/SCHOLARSHIPS/MEMBERSHIP

11/2018	People's Scholarship Award (First Prize)	3000 CHY	5%
11/2017	1 st Elite Program Scholarship	8000 CHY	4%
10/2017	National Scholarship Award issued by Ministry of Education of China	8000 CHY	1%
11/2016	1 st Xing Quan Scholarship	5000 CHY	1%
12/2014	1 st Prize of Chinese Chemistry Olympiad (Provincial Competition Area)		<1%
09/2014	1 st Prize of Chinese Physics Olympiad (Provincial Competition Area)		<1%

PROFESSIONAL SKILLS

Programming Language: Experienced in Python

Experimental Skills: E-beam Evaporation, Sputtering Deposition, Raman Spectroscopy, atomic force microscope (AFM), Photolithography, Probe Station, 2D materials Preparation and Transfer, Wire Bonder, Semiconductor Measurement

Computing Software: MATLAB, Origin

Computing Methods: Methods of integration, Runge Kutta method, Monte Carlo methods, Numerical linear algebra