Xiaoyang Zheng

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Education

Beijing Normal University, Beijing, China *2021.09-Now*
- Undergraduate of Science in Physics, Liyun Elite Program (expected in 2026.07)
- Undergraduate of Business in Economics (expected in 2026.07)

University of California, Berkely, Berkeley, US *(2025.8-2025.12)*
- Berkely Physics International Education (BPIE) Program
- **Ranking:** 2/23 **GPA:** 3.7/4.0
- **Core courses:** Optics (93), Quantum Mechanics I&II (89), Computational Physics (95), Seminar on Optics (95), Mechanics (95), Electromagnetism (97), Electrodynamics (91), Solid-state Physics (82)
- **Language:** IELTS 7.5 (R:8.0, L:8.5, S:6.5, W:6.0); TOEFL 101 (R:30, L:28, S:20, W:23)
- **Scholarships:** Outstanding Freshman (2021), First-class Scholarship (2024, 2022), First-class Incentive Scholarship (2024, 2023, 2022)

Skills

- **Computer:** Python (PyTorch, SciPy), MatLab, C++
- **Lab Skills:** SEM and TEM for materials characterization and analysis

Research Experiences

Single-layer Diffractive Neural Network (D2NN) *2024.12-Now*
- Designed a single-layer D2NN to transfer neural network inference to the optical domain for **high-speed parallel computation**. Addressed output layer intensity loss in traditional multi-layer D2NNs by achieving similar performance using a single phase mask within a 4f optical system.
- Designed optical weights using a **Spatial Light Modulator (SLM)** in the Fourier plane; formulated the optical neural network transfer function based on diffraction principles; trained the D2NN with **PyTorch** on the MNIST dataset.
- Achieved **97%+ accuracy** on MNIST through optical simulation, demonstrating the potential of single-layer D2NNs for optical computing.

Self-calibrating Beam Shaping Based on Reflective SLM | Course Project
- Developed a **self-calibrating optical system** for real-time beam shaping and wavefront correction to compensate distortions and higher-order modes using a reflective SLM in a feedback control loop.
- Designed and constructed the optical system integrating a reflective SLM for phase modulation; incorporated a CCD camera with microlens array as wavefront sensor; developed **Python program** implementing optimization algorithms (SGD, simulated annealing) to minimize wavefront error.
- Successfully demonstrated **real-time wavefront correction** and generation of Gaussian and Laguerre-Gaussian beam profiles.

Micro and Nano Optics | Undergraduate Research Assistant *2022.4-2024.6*
- *Advisor: Jinwei Shi (Professor, Beijing Normal University) Funding: Beijing Undergraduate Research Training Program*
- Utilized **SEM** for nanoparticle characterization and **optical spectroscopy** for plasmon resonance analysis.
- Conducted **FDTD simulations** to study electromagnetic modes of gold nanorods excited by visible light and investigated effects of nanorod dimensions on absorption peaks in 2D materials.

Atomic Co-Magnetometry | Undergraduate Research Assistant *2023.06-2023.08*
- *Advisor: Dong Sheng (Professor, University of Science and Technology of China)*
- Developed knowledge of **atomic magnetometers and co-magnetometers** for precision measurements.
- Conducted **COMSOL thermal simulations** to optimize component thermal stability; participated in optical path construction and electronic circuit implementation for signal acquisition and noise reduction.

Work Experiences

BNUPA (Beijing Normal University Photographer Association) | Chairman *2023.09-2024.09*

– Organized **3 lectures and 2 interviews** with external experts, engaging approximately **200 students**.
– Delivered lecture series including *"Optical Concepts in Photography"* and *"Imaging System Quality from Photographic Equipment Perspective"*.

Homoludens Archive | Undergraduate Researcher & Archives Administrator *2022.09-2023.07*