Jiaju Wu

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Education

- **Sun Yat-sen University**

M.S. in Physics (Optics), School of Science (Recommended Admission) Sep 2025 – Present
- Grade: 91/100, supervisor: Assoc. Prof. Xiantao Jiang

B.S. in Physics, School of Physics and Astronomy Sep 2021 – Jun 2025
- GPA: 3.6/4.0, Rank: 28/113
- Outstanding Bachelor's Thesis (Top 7%)

Research Experience

Research areas: Structured-light speckle, OAM photonics, scattering imaging and quantitative phase microscopy

- **SYSU | Optics Imaging Lab** Feb 2025 – Present
  - **Project 1:** ***High-Order Orbital Angular Momentum Extraction from Vortex-Beam Speckles with Low Spatial Sampling***
    - Revealed the physical mechanism behind speckle correlation degradation for high-order OAM modes
    - Proposed a low-complexity topological charge-matching strategy to extend the accessible range of high-order OAM retrieval
    - Realized accurate OAM extraction with only 0.3% speckle pattern maintaining robustness against strong scattering
  - **Project 2:** ***Simulation and Measurement of the Point Spread Function of Laser Speckle Patterns*** (B.S. Thesis, Outstanding)
    - Simulated speckle formation and propagation using MATLAB
    - Measured speckle point-spread functions (PSF) and optical memory effect (OME) range experimentally
    - Developed speckle autocorrelation imaging using phase retrieval algorithms (GS, HIO-ER)
    - Implemented speckle PSF-deconvolution imaging with Lucy-Richardson and Wiener algorithms

  Supervisor: Assoc. Prof. Xiantao Jiang

- **SYSU | MOE Key Laboratory of TianQin Mission** Nov 2023 – Oct 2024
  - **Project 3:** ***Theoretical Modeling and Numerical Simulation of Multi-Beam Interference Based on the Astigmatic Gaussian Beam Model*** (Undergraduate Innovation Training Program, Project Leader)
    - Developed a multi-beam interference model including stray light to estimate noise levels for TianQin laser interferometry
    - Simulated stray light effects using MATLAB based on astigmatic Gaussian beam model
    - Investigated stray light suppression performance enabled by balanced detection

  Supervisor: Assoc. Prof. Huizong Duan

Publications

The first-author:

- ***Jiaju Wu***, Rui Cao, Shengqiang Zhong, Yuhan Liu, Kaibin Zeng, Rushi Yang, Li Yang, Xiantao Jiang. "High-Order Orbital Angular Momentum Extraction from Vortex-Beam Speckles with Low Spatial Sampling," *Under review at Optics & Laser Technology* .

Other:

- Kaibin Zeng, Weiyuan Li, Wenjun Zhang, Bin Liu, ***Jiaju Wu***, et al. "Precise characterization of optical constant of two dimensional WS2 using diffraction phase microscopy," *Optics & Laser Technology* 192, 114109 (2025). (JCR Q1, IF=5)

Honors & Awards

- **First-class Scholarship** of Sun Yat-sen University 2025
- **Second-class Scholarship** of Sun Yat-sen University 2024
- **Meritorious Winner** (Top 7%) in The Interdisciplinary Contest in Modeling (ICM) 2024
- **Project Leader** of Undergraduate Innovation Training Program Grant (Funded by SYSU) 2023
- **Third-class Scholarship** of Sun Yat-sen University 2023
- **Secondary Prize** of The Mathematics competition of Chinese College Students 2022
- **Secondary Prize** of The Asia and Pacific Mathematical Contest in Modeling 2022
- **Special Scholarship** of Sun Yat-sen University (Outstanding Conduct Award) 2022
- **First Prize** (Team Leader) of China Undergraduate Physics Tournament (CUPT, SYSU Selection) 2021

Skills

Languages: English (IELTS: 7, CET-6: 566), Mandarin Chinese (native)
Programming and Tools: MATLAB, Python (PyTorch, scikit-learn...), C++, Lumerical FDTD, COMSOL, Origin, LaTeX, Blender

Teaching / Mentorship

Teaching Assistant: *Probability and Statistics for Science and Engineering* (Autumn 2025)
Mentorship: Mentored an undergraduate research project on *Speckle Formation Mechanisms Using FDTD Simulations*.