

# Xinxun YANG

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## EDUCATION

Zhejiang University (ZJU), Hangzhou, CHN

- Master of Engineering in **Optical Engineering**
- Bachelor of Engineering in **Opto-Electronics Information Science and Engineering**

Sept 2018 – Present

Expected in Jun 2025

Awarded in Jul 2022

## RESEARCH EXPERTISE

- Focus Area:** Super-Resolution Microscopy, Adaptive Optics (AO), Aberration Correction, Computational Imaging
- Technical Skills:** Programming Languages - MATLAB, Python | Lab Techniques: LabVIEW

## PUBLICATIONS

- Xinxun Yang**, Hongfei Zhu, Yile Sun, Hanmeng Wu, Yubing Han, Xiang Hao, Renjie Zhou, Cuifang Kuang, Xu Liu, “Accurate 3D SMLM localization via Vectorial In-situ PSF Retrieval and Aberration Assessment,” Revised and accepted by *Photonics Research*. DOI: [10.1101/2023.11.03.565592](https://doi.org/10.1101/2023.11.03.565592)
- Yile Sun, Hongfei Zhu, **Xinxun Yang**, et al., “Fluorescence interference based polarized structured illumination microscopy for high axial resolution imaging of dipole orientations,” submitted to *Laser & Photonics Reviews*, currently under revision.
- Hanmeng Wu, Yueming Li, Yile Sun, Lu Yin, Weiyun Sun, Zitong Ye, **Xinxun Yang**, Hongfei Zhu, Mingwei Tang, Yubing Han, Cuifang Kuang, and Xu Liu, “Single-frame structured illumination microscopy for fast live-cell imaging,” *APL Photonics* 9, 036102 (2024). DOI: [10.1063/5.0180978](https://doi.org/10.1063/5.0180978)
- Yile Sun, Hongfei Zhu, Lu Yin, Hanmeng Wu, Mingxuan Cai, Weiyun Sun, Yueshu Xu, **Xinxun Yang**, Jiaxiao Han, Wenjie Liu, Yubing Han, Xiang Hao, Renjie Zhou, Cuifang Kuang, and Xu Liu, “Fluorescence interference structured illumination microscopy for 3D morphology imaging with high axial resolution,” *Advanced Photonics* 5, 056007 (2023). DOI: [10.1117/1.AP.5.5.056007](https://doi.org/10.1117/1.AP.5.5.056007)

## RESEARCH EXPERIENCE (Supervisor: Prof. Cuifang Kuang)

### Computational Adaptive Optics based on Neural Wavefront Representation

Feb 2024 – Present

*Collaborated with Assoc. Prof. Hongfei Zhu at The Chinese University of Hong Kong*

- Introduced neural wavefront AO (NeuAO), which is a method that integrates maximum likelihood estimation, measurement modulation, and neural signal representation; using deep learning techniques, it can fit both system and sample-induced aberrations under wide-field microscopy for live cell imaging
- Implemented the neural wavefront AO algorithm using PyTorch, designed the network structure, generated simulation data, and established the training workflow
- Tested the algorithm with simulated data, with currently biological testing still ongoing to make adjustments and ensure its reliability and accuracy

### Accurate 3D SMLM localization via Vectorial In-situ PSF Retrieval and Aberration Assessment

Jun 2023 – Jan 2024

- Introduced VISPR (Vectorial in-situ PSF retrieval) method to consider both system- and sample-induced aberrations in single-molecule localization microscopy (SMLM) for precise 3D super-resolution reconstruction in deep tissues
- Developed and implemented an algorithm based on the vectorial PSF model and maximum likelihood estimation (MLE) phase retrieval to accurately localize single molecules in complex imaging conditions
- Validated the VISPR method using simulation datasets and experimental studies, confirming its superior fitting ability with fluorescent bead samples and single-molecule images of Nup98-AF647 on the nuclear envelope in U-2 OS cells

### Image Quality Metrics-based Adaptive Optics for Aberration Correction in Super-Resolution Microscopy

Jan 2023 – May 2023

- Calibrated deformable mirrors (DM) by building interferometer system to achieve accurate modulation
- Designed an automatic aberration correction program based on metric-based AO; implemented in LabView to iteratively analyze and optimize the system's optical performance by correcting system-induced aberration.

### Control Software Development for 4Pi Modulated Illumination Super-Resolution Microscopy System

Sept 2022 – Present

- Designed a multimodal control system using LabVIEW, integrating multiple imaging modes: 2D Structured Illumination Microscopy (SIM), 3D SIM and 4Pi interference-based Single-Molecule Localization Microscopy (SMLM)
- Responsibilities included interface design, synchronization, and communication between different hardware components (e.g., laser, linear translation stage, sCMOS camera, Acousto-optic Tunable Filter (AOTF), and galvo scanning system), image signal acquisition, and multimodal function switching

## HONORS AND AWARDS

2nd Prize in 9th Opt-Sci-Tech Competition of Zhejiang University

Jun 2021

2nd Scholarship, Zhejiang University

Sept 2020

3rd Prize in Zhejiang Province College Students Physics Innovation Competition (Theoretical Part)

Sept 2019