Xinxun YANG

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EDUCATION

Zhejiang University (ZJU), Hangzhou, CHN — Sept 2018 – Present
- Master of Engineering in **Optical Engineering** — Expected in Jun 2025
- Bachelor of Engineering in **Opto-Electronics Information Science and Engineering** — 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 single-molecule localization via vectorial *in situ* point spread function retrieval and aberration assessment," Photon. Res. 12, 2447-2461 (2024). DOI: 10.1364/PRJ.520469
- 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
- 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

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 computational AO, 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 computational 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