Hao Sha

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Research Interests

I am a 4th year PhD student in the Department of Computer Science, **Harbin Institute of Technology (Shenzhen)**. My research interests lie primarily in **super-resolution imaging and single-molecule tracking**. During my study in HIT and SZBL, I developed a single molecule spectrum tracking system. With this system, we can track the spectrum of a single molecule at the spatiotemporal scale of millisecond-nanometers.

More details can be found on my homepage and github.

Education

University of Vienna & Vienna BioCenter *Sept 2024 – Now*
Joint Ph.D. student under CSC scholarship, Max Perutz Labs

- Research areas: Advanced Microscopy, Cellular Dynamics
- Supervisor: Prof. Jonas Ries

Harbin Institute of Technology (Shenzhen) *Sept 2021 – Now*
Ph.D. in Electronic Information, School of Computer Science and Technology

- Research areas: Computing Imaging, AI for Science
- Supervisor: Prof. Yongbing Zhang (National Excellent Young Scientists)

Shenzhen Bay Laboratory *Jan 2022 – Sept 2024*
Visiting student, Institute of Systems and Physical Biology

- Research areas: Single Molecule Tracking, Super-resolution Imaging, Spectrum Imaging
- Supervisor: Assistant Prof. Shangguo Hou

Central South University *Sept 2017 – June 2020*
MSc in Mechanical Engineering, School of Mechatronics Engineering

- Research areas: Intelligent Detection, Automation
- GPA: 3.6/4.0, Ranked 11 out of 168 students

Luoyang Institute of Technology *Sept 2013 – June 2017*
BSc in Mechanical Design and Automation, School of Mechanical Engineering

- GPA: 3.5/4.0, Ranked 1st totally

Experience

Software Engineer *Shenzhen, China*
ZTE Co., Ltd. *Aug 2020 – Aug 2021*

- Software development for the video player.

Publications

1. **H Sha**, Yu Wu, et al. Single-molecule spectrum dynamics imaging with 3D target-locking tracking. ***BioRxiv***. 2024. https://doi.org/10.1101/2024.09.25.614875. **(*Under review*)**

2. H. Zheng *, **H Sha*** et.al., Rational Development of Nile Red Derivatives with Significantly Improved Specificity and Photostability for Lipid Droplets Fluorescence Bioimaging. **(*Under review*) (*Co-first authors*)**

3. X Feng*, **H Sha***, et al. Reliable deep learning in anomalous diffusion against out-of-distribution dynamics. ***Nature Computational Science*** 4(2024). **(*Cover article*, IF=12.0) (*Co-first authors*)**

4. **H Sha**, H Li, Y Zhang, S Hou. Deep learning-enhanced single-molecule spectrum imaging. ***APL Photonics*** 8(2023). (JCR Q1, IF=5.4)

5. Y Jiang*, **H Sha***, et al. AutoUnmix: an autoencoder-based spectral unmixing method for multi-color fluorescence microscopy imaging. ***Biomedical Optics Express*** 14(2023). (JCR Q1, IF=2.9) **(*Co-first authors*)**

6. **H Sha**, Y Liu, Y Zhang. Fourier Ptychography Based on Deep Learning. ***Laser and Optoelectronics Progress*** 58(2021). (JCR Q3)

7. S Liu, W Zou, **H Sha**, et al. Deep learning-enhanced snapshot hyperspectral confocal microscopy imaging system. ***Optics Express*** 32(2024).

8. S Liu, B Chen, W Zou, **H Sha**, et al. Compressive confocal microscopy imaging at the single-photon level with ultra-low sampling ratios.***Communications Engineering*** 3(2024).

9. S Liu, P Li, **H Sha**, et al. Intensity and phase imaging through scattering media via deep despeckle complex neural networks. ***Optics and Lasers in Engineering*** 159(2022).

Honors and Awards

Shenzhen Bay Laboratory Distinguished Director Scholarship *2023*
- Shenzhen Bay Laboratory

Central South University Highpower Technology Scholarship *2019*
- Central South University

National Encouragement Scholarship *2016, 2015*
- Luoyang Institute of Technology

First prize of RoboCup Humanoid Robot Climbing Challenge *2015*
- China Association of Automation

First prize of Henan Province 12th Challenge Cup *2015*
- China Association for Science and Technology

First prize of iCAN International Contest of innovAtioN *2014*
- iCAN International Contest of innovAtioN

Projects

Key Technologies for Digital Pathological Imaging and Computing *2023 - 2028*
- Key Project of Natural Science Foundation of China (NSFC)
- 2,370,000 RMB
- Ongoing, Participant

Real-time Multidimensional Single Molecule Tracking Microscope *2023 - 2024*
- Concept Verification Fund of Shenzhen Bay Laboratory
- 3,000,000 RMB
- Ongoing, Participant

Research on Multi-scale Real-time 3D Dynamic Microscopic Imaging System *2023 - 2024*
- Optical Microscopy Imaging Technology Development Fund of Shenzhen Bay Laboratory
- 400,000 RMB
- Ongoing, Participant

3D Active Feedback Single Particle Tracking Imaging based on Depolarization Scattering Signal Detection *2022 - 2025*
- Young Scientists Fund of Natural Science Foundation of China (NSFC)
- 300,000 RMB
- Ongoing, Participant

Image acquisition and processing *2020 - 2022*
- Excellent Young Scientists Fund of Natural Science Foundation of China (NSFC)
- 1,200,000 RMB
- Finished, Participant