

## Education

★ Hefei University of Technology	School of Computer and Information	Hefei, CHINA
Doctor of Philosophy Student in Information and Communication Engineering		Jun. 2022 – Present
★ Zhejiang University of Technology	College of Information Engineering	Hangzhou, CHINA
Master of Engineering in Control Science and Engineering		Jul. 2019 – May. 2022
★ Henan University of Urban Construction	School of Electrical and Control Engineering	Pingdingshan, CHINA
Bachelor of Engineering in Automation		Sep. 2015 – Jun. 2019

## Research Interests

My recent endeavor focuses on **Polarization Scattering Imaging**, with the goal of reconstructing objects concealed within scattering media. Concurrently, I am conducting research on Scene Confusing-Discovery, using **Polarization Information** to mine the Camouflaged/Confusing/Special yet meaningful object/region in the scene. I am working toward exploring useful cues and effective AI methods for **Optical Imaging Detection**. Additionally, my early work focused on **Computational Biology**, specifically identifying biochemical properties and functions of Proteins/RNA/DNA.

## Research Publications

Published **22** SCI-indexed academic papers, including **10** First-Authored papers. Granted **11** National Invention Patents and obtained **4** Software Copyright Registrations. **3** First-Authored Manuscripts currently under Peer Review

### ★ First-Author Publications

- (1) **Xueqiang Fan**, et al. “Joint intensity-spectral polarization hierarchical fusion guided efficient transparent object detection.” *Optics & Laser Technology* 192 (2025): 113429. (SCI, JCR Q1, IF=5.0)
- (2) **Xueqiang Fan**, Bing Lin, Zhongyi Guo. “Infrared polarization-empowered full-time road detection via lightweight multi-pathway collaborative 2D/3D convolutional networks.” *IEEE Transactions on Intelligent Transportation Systems* 2024; 25(9):12762-75. (SCI, JCR Q1, IF=8.5)
- (3) **Xueqiang Fan**, et al. “Meta-DNET-UPI: Efficient Underwater Polarization Imaging Combining Deformable Convolutional Networks and Meta-learning.” *Optics & Laser Technology* 181 (2025) 111664. (SCI, JCR Q1, IF=5.0)
- (4) **Xueqiang Fan**, et al., “Improved polarization scattering imaging using local-global context polarization feature learning framework.” *Optics and Lasers in Engineering* 178 (2024):108194. (SCI, JCR Q1, IF=3.7)
- (5) **Xueqiang Fan**, et al. “Ense-i6mA: Identification of DNA N<sup>6</sup>-Methyladenine Sites Using XGB-RFE Feature Selection and Ensemble Machine Learning.” *IEEE/ACM Transactions on Computational Biology and Bioinformatics* 2024; 21 (6): 1842-1854. (SCI, JCR Q1, IF=3.4)
- (6) **Xueqiang Fan**, et al. “I-DNAN6mA: Accurate Identification of DNA N<sup>6</sup>-Methyladenine Sites Using the Base-Pairing Map and Deep Learning.” *Journal of Chemical Information and Modeling* 2023; 63 (3): 1076-86. (SCI, JCR Q1, IF=5.3)
- (7) **Xueqiang Fan**, et al. “TSMPN-PSI: high-performance polarization scattering imaging based on three-stage multi-pipeline networks.” *Optics Express*, 2023; 31 (23): 38097-113. (SCI, JCR Q2, IF=3.3)
- (8) **Xueqiang Fan**, et al. “Full-space metasurface in mid-infrared based on phase change material of VO<sub>2</sub>.” *Journal of Optics* 52 (2022): 1336-1344. (SCI, JCR Q3, IF=2.5)
- (9) **Xueqiang Fan**, et al. “Predicting RNA solvent accessibility from multi-scale context feature via multi-shot neural network.” *Analytical Biochemistry* 654 (2022):114802. (SCI, JCR Q2, IF=2.5)
- (10) **Xueqiang Fan**, et al. “Improved protein relative solvent accessibility prediction using deep multi-view feature learning framework.” *Analytical Biochemistry* 631 (2021): 114358. (SCI, JCR Q2, IF=2.5)

### ★ Three First-Author Manuscripts Currently Under Review

- (11) **Xueqiang Fan**, et al. LSTSM: Towards a General-Purpose Framework for Multi-Modality Polarization Scattering Imaging. (Manuscript Submitted ID: TIP-34020-2024)
- (12) **Xueqiang Fan**, et al. Model-Informed Semi-Supervised and Explainable Framework for Underwater Polarization Imaging. (Manuscript Submitted ID: TGRS-2025-05898)
- (13) Longyu Qiao <sup>†</sup>, **Xueqiang Fan** <sup>†</sup>, et al. “A Dual-Scale Parallel Network with TaylorFormer-CNN for Underwater Polarization Imaging.” (Co-First author) (Manuscript Submitted ID: OLEN-D-25-02470)

### ★ Cooperative Publications (Partial)

- (14) Xiaopeng Gao, **Xueqiang Fan**, et al. “Identifying Targets in Turbid Media Based on the  $P\Delta$  Metric and Enhanced IPPs” *Optics & Laser Technology*. (2025), In press. (SCI, JCR Q1, IF=5.0)
- (15) Haojie Ding, Xiaopeng Gao, **Xueqiang Fan**, et al. “Polarimetric Observable-based Analysis of Spontaneous Emission in Heterogeneous Layered Scattering Environments.” *Opt. Lasers Eng.* 189 (2025): 108916. (SCI, JCR Q1, IF=3.7)

(16) Bing Lin, Longyu Qiao, **Xueqiang Fan**, *et al.* "Large-range Polarization Scattering Imaging with an Unsupervised Multi-task Dynamic-modulated Framework." *Optics Letters* (2025). (SCI, JCR Q2, IF=3.3)

(17) Bing Lin, Weiyun Chen, **Xueqiang Fan**, *et al.* "Transformer-based improved U-net for high-performance underwater polarization imaging." *Optics & Laser Technology* 181 (2025) 111664. (SCI, IF=5.0, JCR Q1)

(18) Bing Lin, **Xueqiang Fan**, *et al.* "Self-attention module in multi-scale improved U-net (SAM-MIU-net) motivating high-performance polarization scattering imaging." *Optics Express* 31 (2023), 3046-3058. (SCI, JCR Q2, IF=3.3)

(19) Bing Lin, **Xueqiang Fan**, *et al.* "Dynamic polarization fusion network (DPFN) for imaging in different scattering systems." *Optics Express* 32 (2024), 511-525. (SCI, JCR Q2, IF=3.3)

### ★ Granted 11 National Patents (*Partial*)

(1) Protein solvent accessibility prediction method via multi-perspective learning. China Patent, ZL202110558859.4

(2) Prediction method for protein-protein interactions using recurrent networks. China Patent, ZL202110086831.5

(3) Protein solvent accessibility prediction method via iterative search strategy. China Patent, ZL202011030157.0

(4) DNA binding residue prediction method via convolutional neural networks. China Patent, ZL202010918314.5

### ★ Granted 4 Software Copyright Registration (*Partial*)

(1) Jun Hu, **Xueqiang Fan**. Protein structure alignment system V1.0. Registration No. 2020SR1186669

(2) Jun Hu, **Xueqiang Fan**. Protein docking system V1.0. Registration No. 2020SR1243909

## Research Experience

### ★ Research on Polarization Scattering Imaging

2022 - 2025

- **Motived:** The development of *one model capable of simultaneous imaging through both surface and volume scattering media* has received limited attention.
- **Solutions:** Established the **first** AI-based polarization feature-driven multimodal scattering imaging framework *LSTM*. Developed a new AI-based polarization feature-driven **semi-supervised underwater imaging framework**  $S^2UPiP^2N^2$ .
- **Outcome:** Published one paper in *Opt. Express*, one paper in *Opt. Lasers Eng.*, one paper in *Opt. Laser Technol.* Two Manuscripts currently under *Peer Review*

### ★ Research on Polarization Object Detection

2023 - 2025

- **Motived:** The joint analysis among multiple polarization characteristics, sparse inter-channel information (along the z-axis), and dense intra-channel information (inside the x-y plane), have not been considered.
- **Solutions:** Proposed an **infrared polarization-empowered full-time road detector** based on lightweight multi-pathway **collaborative 2D/3D convolutional networks**. Constructed a joint **intensity-spectral polarization-enhanced transparent object detector**.
- **Outcome:** Published one paper in *IEEE Trans. Intell. Transp. Syst.*, one paper in *Opt. Laser Technol.*

### ★ Research on Computational Intelligence & Computational Biology

2019 - 2023

- **Motived:** Using wet-lab experimental technologies to Identify Protein/RNA/DNA's function is cost-intensive and time-consuming, which cannot meet the current demand for functional determination of a large number of sequences.
- **Solutions:** Proposed **Proteins/RNA solvent accessibility prediction methods** and **DNA N<sup>6</sup>-Methyladenine Sites Identification methods** by designing **sequenced-based feature representations** and developing **Deep-Learning framework**
- **Outcome:** Published one paper in *J. Chem. Inf. Model.*, one paper in *IEEE/ACM Trans. Comput. Biol. Bioinf.*, two paper in *Anal. Biochem.*

## Projects

(1) **Key Investigator**, National Defense Science and Technology Project: Bionic Polarization Vision Infrared Target Recognition Technology (B). October 2022 to October 2024

## Academic Conferences & Part-time Engagements

★ **Oral Presentation:** **Xueqiang Fan**. "Polarization Feature-Intelligent Driven Scattering Imaging and Target Detection Technology" Photonics and Modern Physics Innovation Symposium (PMPIS), August 7, 2024, Harbin Institute of Technology

★ **Journal Reviewer:** Served as a reviewer for journals including *IEEE T-ITS*, *Infrared Physics and Technology*, *Journal of Supercomputing*, *BioData Mining*, *Scientific Reports*, and *Photonics*, *et al.*

## Honors & Awards

- National Scholarship, Awarded by Ministry of Education (Award Rate: 0.2% nation-wide), China, 2024
- The Scholarship for a Doctor's degree (First-Class), Awarded by Hefei University of Technology, 2022-2025
- The Scholarship for a Master's degree (First-Class), Awarded by Zhejiang University of Technology, 2019-2022

## Research Skills

- Language: Mandarin (Native); English (Keep learning)
- Skills: Python, C, MATLAB, LINUX, PyTorch
- Interests: Running, Road Cycling, (Folk) Music, and Movies