Yixuan Li

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Research Interests

Nanophotonics, Quantum Optics, Plasmonics, Metamaterials

Education

Zhejiang University (ZJU) — Sept 2020–Jul 2024 (expected)
B.E. in Electronic Engineering — Hangzhou, Zhejiang, China
Morningside Cultural China Scholar

- **Overall GPA: 3.93/4.0**, **Ranking: 1/93**
- **Coursework**: Electromagnetic Fields & Waves (93), Fundamentals of Optoelectronics (96), Quantum Mechanics (95), RF Circuits and Systems (96), Numerical Analysis (95)

Publications

- S. Zheng*, **Y. Li***, Z. Yu, B. Yu, S.-Y. Cao, L. Luo, and H.-L. Shen, "I2P-Rec: Recognizing Images on Large-Scale Point Cloud Maps through Bird's-Eye View Projections," 2023 IEEE/RSJ International Conference on Intelligent Robots and Systems (**IROS**), Detroit, USA, 2023. **Oral Presentation**. [PDF]
- L. Luo, S. Zheng, **Y. Li**, Y. Fa, B. Yu, S. Cao, and H. Shen, "BEVPlace: Learning Lidar-Based Place Recognition Using Bird's-Eye View Images," 2023 IEEE/CVF International Conference on Computer Vision (**ICCV**), Paris, France, 2023. [PDF]

Honors and Awards

- National Scholarship (Top 0.2% nationwide) (2 Times) — Dec 2021 & Dec 2022
- Zhejiang University Scholarship–First Prize (Top 3%) (2 Times) — Dec 2021 & Dec 2022
- Second place, ICRA 2022 General Place Recognition Competition (Co-hosted by Carnegie Mellon University) — Oct 2022

Research Experience

Student Researcher at Fejer Group, Stanford University — Advisor: Professor Martin Fejer
Multilayer Structure for Dispersion-Engineered Nonlinear Waveguide — Oct 2023–Present

- Working on a current final-year project in nonlinear optics to implement a multilayer structured waveguide based on $LiNbO_3$ to control the group velocity dispersion in nonlinear interactions.
- Planned to carry out by inverse design.

Student Researcher at Optoelectronics Group, ZJU — Advisor: Professor Zongyin Yang
Metasurface-Based Microspectrometer — Apr 2023–Jun 2023

- Proposed a new method to enhance the orthogonality of response functions in computational miniaturized optical spectrometers using multilayer metasurface, potentially advancing miniaturization capabilities.
- Performed COMSOL and MATLAB simulations to analyze spectral response, aiming to achieve higher resolution and larger bandwidth.

Student Researcher at Interdisciplinary Center for Quantum Information, State Key Laboratory of Modern Optical Instrumentation, ZJU — Advisor: Professor Haoliang Qian
Tunable Nonlinear Edge Detection — Aug 2022–Dec 2022

- Aimed to design a metasurface to perform edge detection via spatial differentiation, enabling high-speed parallel operation and offering superior integration capacity compared to traditional bulky systems.

- Proposed a multilayer structured thin film consisting of TiN-Al_2O_3 metallic quantum wells and an Al_2O_3 cavity, enabling tunable edge detection responsive to varying pump light intensity.
- Simulated the effect based on Fresnel diffraction under coherent and incoherent incident light.
- Realized optical edge-detection under both coherent and incoherent incident light and achieved 1st and 2nd-order optical differentiation under coherent p-polarized light.

Anti-scattering Optical Image Transmission Based on *K*-Space Manipulation May 2022–Jul 2022

- Simulated *k*-space compression methods and assessed their impact on image scattering resistance.
- Combined optical neural network techniques to create a versatile device.
- Conducted numerical simulations of scattering effects on Gaussian beams.

Research Assistant at Image & Vision Laboratory, ZJU Advisor: Professor Huiliang Shen

Image-to-Point Cloud Cross-Modal Localization Dec 2022–Mar 2023

- Suggested a novel framework for cross-modal localization between LiDAR (point cloud) and camera (image).
- Implemented the overall pipeline, including monocular and stereo depth estimation, point cloud generation, bird's-eye view projection, and feature extraction.
- Delivered oral presentation and presented poster at the IROS 2023 conference in Detroit, USA.

BEVPlace: LiDAR-Based Localization Open-source at GitHub BEVPlace, ☆104 Jun 2022–Dec 2022

- Proposed a rotation-invariant network for LiDAR-based localization problems in autonomous driving.
- Developed a position estimation method by mapping the feature distance to the geometric space.
- Outperforms the state-of-the-art methods, is robust to view variation, and generalizes well to previously unseen environments. Benefits various applications, including global localization and SLAM.

LEADERSHIP ACTIVITIES

Co-organizer, the Morningside Scholars' Academic Visit to the U.S. Aug–Sept 2023
Visited 50+ guests from academic and political sectors, including Presidents of MIT, Harvard, Yale, AAAS, etc.

Second Place, Zhejiang University badminton competition women's single May 2022
Involved actively in many sports activities, including orienteering, soccer, badminton, etc.

Volunteer, Volunteer Teaching Program in Zhejiang University Jun 2021
Taught math and literature courses to elementary school students in Gansu Province.

Major Participant, Electrical Volunteer Association in Zhejiang University Oct 2020–Present
Offered free computer repair services for all school faculty and students.

SKILLS

Language: TOEFL 107

Tools: PyTorch, OpenCV, Linux shell, COMSOL, LaTeX

Programming Languages: Python, MATLAB, C, Java, Verilog