Xueqing Gao

xqgao_tj@outlook.com Tel : +86 15277123469 **Languages:** Chinese, English, German

Education

Tongji University (*Global Rank: 153, U.S. News*) Shanghai, China

Major GPA – 90.4/95.0 (Rank: 3/46), Overall GPA – 87.2/95.0

B.E. in Mechatronic Engineering Sep. 2021 – Jul. 2022

B.E. in Optoelectronic Information Science and Engineering Sep. 2022 – Jul. 2025

Research Interest

I'm particularly interested in **Physics-based Vision**, which aim to jointly design optics and algorithms for perceiving the physical world beyond conventional limits. With a background in optoelectronics and experience in deep learning, I'm eager to build interpretable, human-centered systems that tightly couple physical modeling with intelligent computation.

Selected Publications

- **[Oral Presentation]** "UFO-3: Unsupervised three-compartment learning for rapid fiber orientation distribution function estimation from diffusion MRI," **Xueqing Gao**†, Rizhong Lin†, Jianhui Feng, Yonggang Shi, Yuchuan Qiao. Accepted to the 28th *International Conference on Medical Image Computing and Computer Assisted Intervention* (MICCAI 2025, acceptance rate: 29%), a top-tier conference in medical imaging.

- "Empowering Biomedical Research with Foundation Models in Computational Microscopy: A Systematic Review," Di Ding†, Tianliang Yao†, Genyi Feng, **Xueqing Gao**, Rong Luo, Xusen Sun. *Advanced Intelligent Systems* (IF: 6.8), accepted for publication.

Selected Project Experience

Envelope Occlusion Simulation and Recovery using Diffusion Models **April 2025 - Present**

Team Leader, supervised by Prof. Haibin Ling *Stony Brook University*

- Developed a synthetic data pipeline leveraging Stable Diffusion and ControlNet to simulate envelope occlusion on clean document images, enabling supervised learning for occlusion-aware restoration.
- Fine-tuned diffusion models to generate envelope-covered variants from arbitrary inputs.

Monocular Depth Estimation with Monodepth2 and DepthAnything **Dec. 2024**

Course project, supervised by Prof. Xiong Dun *Tongji University*

- Fine-tuned `DepthAnything` model and re-implemented `Monodepth2` for monocular camera depth estimation.
- Tested fine-tuned models on real-world images captured on Tongji campus and benchmark datasets (KITTI/NYUv2), observing qualitatively similar visual performance to original paper despite differences in input domains.

Deep Learning for Diffusion MRI Microstructure Estimation **July 2023 – Feb. 2025**

Team Leader, supervised by Prof. Yuchuan Qiao and Prof. Yonggang Shi *Fudan University & USC (CA, USA)*

- Developed physiscs-based deep learning methods (UFO-3, FoCUS) for reconstructing fiber orientation distributions (FOD) from highly limited diffusion MRI data.
- Combined biophysical modeling, spherical harmonics, and optimization-based constraints to improve interpretability, accuracy, and generalizability across populations and acquisition protocols.
- Achieved sub-second inference and strong performance on CHCP, HCP, and simulated datasets, outperforming conventional model-based and recent learning-based methods.

Technical Blog & Open Resources

Awesome Computational Imaging *Author and Maintainer*

https://tensor2023.github.io/Awesome-Computational-Imaging/index.html

Curated a learning and implementation series on modern computational imaging, covering implicit neural representations (SIREN, NeRF, FFN), Gaussian Splatting, diffusion models for inverse problems, and plug-and-play methods. Includes hands-on code, theoretical insights, and applications in scientific imaging. Designed to help researchers bridge physical models and deep learning frameworks.

Awards

- **Zhuiyuan Scholarship** (awarded for excellence in optical research; funded by Prof. Zhanshan Wang), 2024.
- **Outstanding Undergraduate Scholarship, Tongji University** (awarded to undergraduates based on academic performance), 2022–2024.

Miscellaneous

- **Programming Languages:** Python, MATLAB, Julia, C/C++.
- **Frameworks/Libraries:** PyTorch, TensorFlow, OpenCV.
- **Software Tools:** Zemax, SolidWorks, COMSOL, Origin, OpenMX, Keil (uVision), STM32CubeIDE.

Last updated: July 25, 2025.