

# Tianyi Ye

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Page: <https://tianyiye98.github.io/page/>

## EDUCATION

### Johns Hopkins University

*MSE in Biomedical Engineering*

GPA: 3.73/4.0

**Baltimore, MD, US**

*Sept 2021-May 2023*

### Sichuan University

*BSc in Nuclear Engineering and Technology*

Major GPA: 3.64/4.0

Overall GPA: 3.64/4.0

Rank: 9/90

**Chengdu, China**

*09/2016-05/2020*

*Excellent Graduate with bachelor's degree 10/2019*

*1st-class Individual Scholarship 10/2019*

*"Outstanding Student" 12/2018*

*1st-class University-level Comprehensive Scholarship 11/2018*

*3rd-class University-level Comprehensive Scholarship 11/2017*

## PUBLICATIONS

- (Preprint) Tianyi Ye, Jingyu Wang, Ji Yi. "Simultaneous Noise Reduction and Layer Segmentation for Visible Light Optical Coherence Tomography in Human Retina", [bioRxiv 2022.11.25.518000](https://doi.org/10.1101/2022.11.25.518000).

## RESEARCH EXPERIENCES

### Johns Hopkins University (Supervisor: Prof. Ji Yi)

**Baltimore, MD, US**

*Project: Simultaneous Denoising and Segmentation for Retina Visible Light OCT(VIS-OCT) Images 11/2021-now*

- Created dataset with Matlab-preprocessed raw VIS-OCT volume, annotated retinal surfaces with clinical collaborators via ImageJ and Python and published the first VIS-OCT dataset for data-driven denoising and segmentation research
- Adopted and compared supervised noise-to-label strategy, unsupervised noise-to-noise strategy and self-supervised noise-to-void strategy with UNet to reduce the speckle noise of VIS-OCT image
- Proposed an efficient jointly self-denoising and retinal layer segmentation framework for retina VIS-OCT images that significantly improved Dice coefficient for certain retinal layers (GCL, IPL and INL) with only 25% annotation

### Tsinghua University (Supervisor: Prof. Yanan Sui)

**Beijing, China**

*Project: AutoEncoder Based Deepfake for Parkinson's Disease (PD) Patient Privacy Protection and Face Information Preservation 03-07/2021*

- Preprocessed video used for PD diagnosis provided by our cooperative hospital through face detection (dlib), data cleaning and augmentation, to create training data
- Implemented and compared several deepfake frameworks: DeepFaceLab, FaceSwap and FSGAN for model selection
- Evaluated the regenerated video via video naturalness, face recognition, expert evaluation conducted by human, object key point similarity (OKS) and eye/mouth dynamics conducted by supervision by registration (SBR) algorithm
- Developed a batch processing program with SBR algorithm to detect all frames of subjects for landmark detection and calculation of Eye Aspect Ratio (EAR) and Mouth Aspect Ratio (MAR), thereby conducting automatic data cleaning and eye/mouth dynamics analysis

### Shanghai Jiao Tong University (Supervisor: Prof. Qiu Huang)

**Shanghai, China**

*Project: Unsupervised Sparse View CT Artifacts Disentanglement based on CycleGAN 09/2020-01/2021*

- Classified, evaluated, and preprocessed CT datasets
- Implemented CycleGAN to perform unsupervised artifacts disentanglement of sparse view CT images
- Compared UNet and ResNet for supervised sparse view CT artifacts reduction

**Institute of Nuclear Science and Technology, Sichuan University** (Supervisor: Prof. Ning Huang) **Chengdu, China**

*Project: Development of Large-area Multi-feature X-ray photoelectron spectroscopy (XPS) Surface Analysis Apparatus*

02/2019-05/2020

- Simulated the energy deposition of photons in Si slices after photons passing through the Be window via Geant4
- Developed signal and data processing program with Python code for imaging and elemental composition analysis in PyMca (Python)

## **COURSE PROJECTS**

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### **Retinal Vessel Segmentation Using Different Attention Mechanisms**

**03-05/2022**

- Combined UNet with Spatial-wise attention mechanism, channel-wise attention mechanism, and their combination, to adjust the weight of the feature maps extracted by the encoders in UNet and focus on those of tiny vessels in the retina
- Compared Dice/Precision/Recall score of the aforementioned 3 methods and carried out visualization

### **Automatic Segmentation of Cone-beam CT (CBCT) Image in Distal Tibiofibular Joints Injury Analysis**

**03-05/2022**

- Used the square version dice loss to replace the original cross entropy loss in UNet
- Develop an attention block in U-Net that combines spatial and channel-wise relationships of the feature maps on different levels
- Created thickened CBCT dataset and adopted 3-D UNet, to leverage the information of neighboring slices in 3D volume and increase the precision of segmentation

### **Cervical Cell Classification via Traditional Machine Learning (SVM/KNN) and Deep Learning Methods**

**10-12/2021**

- Implemented SVM and KNN in Matlab for Cervical Cell Classification
- Compared the classification accuracy with SVM, KNN and VGG16 with attention blocks

## **COMPUTER SKILLS**

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Python, Matlab, Pytorch, TensorFlow