# LIXUAN CHEN

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## EDUCATION

**ShanghaiTech University** Sep. 2021 - Exp July 2024
*M.S.E in Computer Science*, GPA 3.63/4 (Major: 3.73/4); Advisor: Prof. Yuyao Zhang
Core Course: Deep learning, Medical image processing and analysis, Digital Image Processing

**ShanghaiTech University** Sep. 2017 - July 2021
*B.E. Computer Science and Technology*, GPA 3.39/4

## RESEARCH INTEREST

• My research interests lie in the field of **computer vision** and **medical image processing**, from the perspective of **implicit neural representation**, **fetal brain reconstruction**, and **weakly/semi-supervised segmentation**.

## PROJECTS

• **Longitudinal Brain Atlases Construction via implicit neural representation.**[1][4] July 2021 - present

- Existing longitudinal atlas construction methods averaged brain images on discrete time points independently, leading to temporal inconsistency issue.
- Modeled the time inconsistency issue as a 4D image denoising task, and use implicit neural representation to construct continuous and noise-free longitudinal brain atlases.
- Evaluated on two modalities of brain atlases (QSM and fetus atlases), and significantly improves temporal consistency while maintaining accurate representation of brain structures.
- Extended to generate finer (i.g. 0.5-week interval) 4D atlases with higher spatial and temporal resolution.

• **Robust Self-supervised Volume Reconstruction for Fetal Brain MRI.**[2] July 2021 - present

- Due to slice misalignment and motion artifacts, the fetal brain MRI reconstruction is often corrupted.
- Combined a comprehensive forward model and under-parameterized deep decoder structure to reduce network overfitting and image artifacts caused by slice misalignment and motion.
- Outperformed SOTA methods (SVRTK, NiftyMIC, and SSGNN) by achieving superior results across five matrices (i.g. 24% improvement in PSNR) on both simulated and real clinical data.

• **Self-supervised Slice-to-Volume Registration Despite Fetal Motion.**[3] July 2021 - present

- Slice-to-volume registration (SVR), which corrects the slice misalignment, is essential for subsequent 3D volume reconstruction.
- Incorporated the MRI acquisition model into the SVR network to accurately predict the spatial transformation aligning 2D slices to 3D volumes.
- Achieved better SVR performance (i.e. lower MAE and RMSE value), and benefited the existing fetal brain MRI reconstruction methods.

• **Longitudinal Infant Brain MRI Segmentation.** March 2021 - May 2021

- Investigated different segmentation model designs and extend DenseNet to 3D volumetric data to to perform 3D volumetric segmentation.
- Achieved dice similarity coefficient (DSC) of 90.325% of three brain tissues across five time points.

## PUBLICATIONS

[1] **Continuous longitudinal fetus brain atlas construction via implicit neural representation** [Paper]
***Lixuan Chen****, Jiangjie Wu, Qing Wu, Hongjiang Wei, Yuyao Zhang*
• Accepted by *MICCAI workshop PIPPI 2022* **(Best Paper Honorable Mention)**

[2] **ASSURED: A Self-supervised Deep Decoder Network for Fetus Brain MRI Reconstruction**
*Jiangjie Wu, **Lixuan Chen**, Zhenghao Li, Lihui Wang, Rongpin Wang, Hongjiang Wei, Yuyao Zhang*
• Accepted by *IEEE ISBI 2023*

[3] **ALIGNER: A Self-supervised Slice-to-Volume Registration Network for Fetal Brain MRI Reconstruction**
*Jiangjie Wu, **Lixuan Chen**, Zhenghao Li, Lihui Wang, Rongpin Wang, Hongjiang Wei, Yuyao Zhang*
• Submitted to *MICCAI 2023*

[4] **COLLATOR: Consistent Spatial-Temporal Longitudinal Atlas Construction via Implicit Neural Representation**
***Lixuan Chen**, Jiangjie Wu, Qing Wu, Guoyan Lao, Hongjiang Wei, Yuyao Zhang*
• Submitted to *NeuroImage*

## EXPERIENCE

**Bell Labs** Dec. 2020 - June 2021
*Research Internship (Part-time); Supervisor: Dr. Chenhui Ye, Dr. Wenyi Xu, Dr. Fei Gao* *Shanghai, China*

- Proposed a behavior recognition method based on meta-learning using WiFi channel state information(CSI).
- Enabled the model to rapidly adapt to new environments, as demonstrated through its performance on two public datasets and real-world data, in comparison to traditional supervised learning.

## TEACHING

**CS270: Digital Image Processing** 2021 Fall

## ADDITIONAL

- Programming: Python, C++, C, MATLAB, html, LaTeX
- Languages: Chinese (Native), English (Fluent)
- Framework: PyTorch