

# XIANGXIANG CUI

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## 🎓 EDUCATION

**Beijing Normal University**, Beijing, China Sep. 2022 – Present

*Ph.D.* in Cognitive Neuroscience. Advisor: Jing Sui

*Thesis Topic:* Research on neuroimaging classification algorithm for psychiatric disorders based on multicenter deep learning

**Xi'an Jiaotong University**, Xi'an, China Sep. 2019 – June 2022

*M.E.* in Software Engineering, Advisor: Zhongyu Li

*Thesis Topic:* Research on benign and malignant diagnosis and robustness evaluation method of deep model for dynamic ultrasound.

## ⚙️ EMPLOYMENT

**Frontline Intelligent Technology**, Xi'an, China Dec. 2020 – Dec. 2021

Intern. Analysis of dynamic ultrasound video.

**Keya Medical Technology**, Shenzhen, China June 2020 – Dec. 2020

Intern. Coronary Segmentation & Head and Neck Segmentation.

**Lobon Technology**, Shenzhen, China Jan. 2018 – June 2018

Intern. Embedded Software Development.

## ♥️ RESEARCH INTEREST

- **Model Robustness:** Adversarial Attack, Model Robustness Evaluation
- **Medical Informatics:** Medical Image Analysis, Neuroimaging Analysis
- **Artificial intelligence:** Machine Learning, Deep Learning, GAN, Self-Supervised Learning

## 📖 PUBLICATIONS

# *These authors contributed equally to the work.*

- **Xiangxiang Cui**, Min Zhao, Dongmei Zhi, et al. "Multi-Scale Learning Framework Integrating Brain Functional Connectivity and Activity." *Will be submitted to IEEE Transactions on Medical Imaging 2024 (SCI, JCR Q1, CAS Q1)*
- **Xiangxiang Cui**#, Min Zhao#, et al. "An End-to-End Cross-Feature Mutual Learning Framework Integrating Brain Functional MRI Connectivity and Activity." *Medical Image Analysis 2024, Status: Under Review (SCI, JCR Q1, CAS Q1)*
- **Xiangxiang Cui**#, Xueying Yang#, et al. "A StarGAN and Transformer-Based Hybrid Classification-Regression Model for Multi-institution VMAT Patient-Specific Quality Assurance." *Medical physics 2024 (SCI, JCR Q1, CAS Q2)*
- **Xiangxiang Cui**, Dongmei Zhi, et al. "CGDM-GAN: An Adversarial Network Approach with Self-supervised Learning for Site Effect Removal." *EMBC 2024 (CCF B)*.
- Yi Cui, Zhiyuan Ye, Chenxin Ding, Jun Xiong, **Xiangxiang Cui**. "Information transmission through light-induced scattering in photorefractive crystal." *submitted to Optics Letters 2024, Status: Under Review (SCI, JCR Q2, CAS Q2)*.
- **Xiangxiang Cui**, Dongmei Zhi, et al. "Multi-Scale Analysis Framework Integrating Brain Functional Connectivity and Activity." *Annual Meeting of the organization for Human Brain Mapping OHBM 2024 (Abstract)*.

- **Xiangxiang Cui**, Dongmei Zhi, et al. "CGDM-GAN: An Adversarial Network Approach with Self-Supervised for Removing Site Effects." *Annual Meeting of the organization for Human Brain Mapping OHBM 2023 (Abatract)*.
- **Xiangxiang Cui**, Zhongyu Li, Xiayue Fan, et al. "Variable-frame CNNLSTM for Breast Nodule Classification using Ultrasound Videos." *Preprint 2023 (Preprint)*.
- Yichen Wang, Zhongyu Li, **Xiangxiang Cui**, et al. "Key-frame Guided Network for Thyroid Nodule Recognition using Ultrasound Videos." *MICCAI 2022 (EI)*.
- **Xiangxiang Cui**#, Shi Chang#, Chen Li, Bin Kong, Lihua Tian, Hongqiang Wang, Peng Huang, Meng Yang, Yenan Wu, Zhongyu Li. "DEAttack: A differential evolution based attack method for the robustness evaluation of medical image segmentation." *Neurocomputing 2021 (SCI, JCR Q1, CAS Q2)*.

## RESEARCH PROJECTS

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### Ultrasound Video Image Classification

Mar. 2021 – 2022

**Role:** Leader of computational methods, finished in Frontline Intelligent Technology.

- Feature extraction of multiple consecutive video frames based on CNN and LSTM.
- The verification accuracy of video-based(Our) classification is higher than single-frame classification.

### Adversarial Attack and Model Robustness Evaluation

Jan. 2020 – Jan. 2021

**Role:** Project Leader, cooperated with Prof. Zhongyu li and other professors, finished in Xi'an Jiaotong University.

- We proposed the evaluation method of the segmentation model robustness based on the differential evolution.
- Implemented Adversarial Attack approach including FGSM, PGD, ASMA, in four medical datasets for compare experiments.
- Does not require additional target network information. Attack the medical image segmentation model while perturbing only a tiny fraction of the image pixels. For the robustness evaluation of different segmentation models under adversarial attacking by comparing the numbers of perturbation points.

### Head and Neck Segmentation

Oct. 2020 – Dec. 2020

**Role:** Leader of computational methods, finished in Keya Medical Technology.

- Label Data Preparation: using regional growth and optical flow to generate pre-segmentation. The Label specialists manually revised pre-segmentation.
- Deep Learning: using label data and 3D CNN to generate smooth segmentation results.

### Coronary Segmentation

June 2020 – Oct. 2020

**Role:** Leader of aorta segmentation, participate in coronary segmentation full process, finished in Keya Medical Technology.

- Using CNN to segment the aorta, analyse the aorta segmentation results and then adjust algorithmic to adapt to different hospital datasets.
- Participating in the refinement of coronary segmentation, including vessel broken, vein removal.
- Develop vessel segmentation results evaluation tools to improve iterative efficiency.

### The embedded car

Oct. 2017 – Mar. 2018

**Role:** Developers.

- The whole system is completed by using microsystem STM32, Cortex-A8 and C language.
- Using KNN to identify direction(turn to left or right) based on the Opencv library.
- Using PID algorithm and sensor to control the travel stability of the embedded car.

### Web online compiler

June 2017 – Sep. 2017

**Role:** Developers.

- The whole system is completed by using Html, Javascript, Php, Linux shell, Mysql.
- Support languages: C, C++, C#, Java, Html, Javascript, Php.
- As a sub-module of the online video and live programming learning website, we embed the online compiler into the learning website to assist computer science students in completing programming languages.

## ⚙️ SKILLS & EXPERTISE

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- Proficient with deep learning and computer vision algorithms, proficient with Pytorch framework, proficient with state-of-the-art deep neural networks.
- Proficient with multiple Image processing open source library, including ITK, SimpleITK, Scikit-Image, VTK, VMTK, Opencv. Proficient with format and processing of 2D and 3D medical images. Such as DICOM, NIFTI.
- Proficient with multiple programming languages, including Python, C, C++, PHP, Java, HTML, Javascript, Linux shell. Proficient with Network Socket Programming, Multi-process communication, Docker container.
- Proficient with microcomputer system, including MSC-51, STM32, Cortex-A8.
- Leading engineer experience in Websites, Web Server, Embedded Internet of Things, Android APP and so on.
- Deep learning cluster server operations, such as Slurm cluster.
- Extensive experience in cooperation with researchers with multidisciplinary and different engineer backgrounds.

## ♡ HONORS & AWARDS

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<i>Excellent master's thesis</i>	June. 2022
<i>Excellent graduate student, Rank: Top 1%</i>	2021 2022
<i>Assem scholarships, Rank: Top 2%</i>	2021 2022
<i>Intelligent Algorithm Contest of China, Rank: 13/600</i>	Nov. 2019
<i>Double Excellent Graduate, Anhui Province</i>	July 2018
<i>Top scholarships, Rank: Top 1%, Undergraduate</i>	July 2018
<i>Top scholarships, Rank: Top 1%, Undergraduate</i>	July 2017
<i>President of the Computer Association, Undergraduate</i>	Sep. 2016
<i>National scholarships, Rank: 1/800, Undergraduate</i>	July 2016
<i>Top scholarships, Rank: Top 1%, Undergraduate</i>	July 2016
<i>Top scholarships, Rank: Top 1%, Undergraduate</i>	July 2015
<i>The ACM-ICPC Asia Regional Contest, Honorable mention</i>	2015