

# Yu Zhao

homepage Scholar

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## EDUCATION

- **The University of Georgia** Athens, GA  
*Ph. D. - Computer Science; GPA: 3.95* Aug 2013 - Dec 2018  
*Thesis: Deep learning frameworks for functional and structural medical image analysis*
- **Huazhong University of Science and Technology** Wuhan, China  
*B. E. - Control Science and Engineering; GPA: 89.01/100, Rank: 11/223* Aug 2009 - Jun 2013  
*Thesis: Simultaneous Multi-frame Super-resolution Restoration (image processing)*

## EXPERIENCE

- **Siemens Healthineers** Malvern, PA  
*Staff AI ML scientist (Machine Learning, Deep Learning, Medical Images, NLP)* Sept 2022 - present  
*Senior Research Scientist/AI ML scientist* Oct 2018 - Sept 2022
  - **Technical Lead for MR Business Line Funded Projects:**
    - \* **Computer Vision:** 3D medical image (mostly MR images) analysis, including landmark detection, image registration, classification, segmentation and generative algorithms. Designed/Implemented both traditional machine learning models for industrial products and state-of-the-art AI models for cutting-edge research projects.
    - \* **Text Analytics:** Domain specific text (MR series descriptions) analytics, including language modeling/pretraining, and downstream tasks based on domain specific pretrained model. Utilized/Implemented state-of-the-art models in scale, e.g., BERT, GPT, etc.
    - \* **Multi-Modality:** Medical data analysis based on images along with corresponding unstructured text and structured parameters. Designed/Implemented contrastive language and image pretraining algorithms. Designed medical image captioning system for MR series identification.
    - \* **Scalable System for medical data recommendation/identification:** Various state-of-the-art unsupervised learning, contrastive learning, zero-shot learning. Designed/Implemented self-supervised multi-modality pretraining (clustering, contrastive Learning, multi-modal fusion) on large scale unannotated data. Cross-modality retrieval/recommendation, Zero-shot series identification task through image-text pretraining.
  - **Responsible Products/Projects:** Scanner Automation Algorithms, Similar Image Retrieval Systems
    - \* **MR AutoAlign/AutoViews:** Designed/Implemented automatic scanning products in MR scanner through 3D image detection/segmentation algorithm (AdaBoost, fRCNN, etc) to achieve automatic alignment of MR images of various anatomies or region of interest extraction.
    - \* **MR Protocol Recommendation/Identification:** Designed/Implemented scalable medical data recommendation/identification algorithm for MR images. Utilized self-supervised learning, contrastive learning and image-text pretraining for zero-shot tasks, on multi-modality large scale unannotated MR data
    - \* **Radiotherapy Treatment Planning:** Maintained/Improved algorithms for image generation/synthesis product for scanner automation, e.g., image registration, segmentation algorithms (including statistical model and deep learning models) to generate/synthesize attenuation maps from MR images
- **Siemens Healthineers** Malvern, PA  
*Research Intern* May 2017 - Aug 2017
  - **Project:** Cross modality synthesis (MRI to CT) using deep learning nets
- **Siemens Healthineers** Malvern, PA  
*Research Intern* May 2018 - Aug 2018
  - **Projects:** Landmark detection using deep reinforcement learning; MR auto-alignment.

## SKILLS SUMMARY

- **Expertise:** Machine Learning, Deep Learning, Medical Images, Computer Vision
- **Programming:** Python, C++, JAVA, Matlab, Bash
- **Tools:** Docker, GIT, MySQL
- **Framework APIs:** Pytorch, TensorFlow, Keras, Flask, Spark
- **Soft Skills:** Dedication, Research, Communication, Event Management

## SELECTED FIRST-AUTHORED PUBLICATIONS

- **Journals**
  - **Yu Zhao, et al.:** Deep Learning Solution for Medical Image Localization and Orientation Detection. Medical image analysis(2022). 81, 102529.
  - **Yu Zhao, et al.:** 4D modeling of fMRI data via spatio-temporal convolutional neural networks (ST-CNN). IEEE transactions on cognitive and developmental systems(2020) 12 (3), 451
  - **Yu Zhao, et al.:** Automatic recognition of fMRI-derived functional networks using 3-D convolutional neural networks. IEEE Transactions on Biomedical Engineering(2017) 65 (9), 1975-1984
  - **Yu Zhao, et al.:** Constructing fine-granularity functional brain network atlases via deep convolutional autoencoder. Medical image analysis(2017) 42, 200-211
  - **Yu Zhao, et al.:** Automatic recognition of holistic functional brain networks using iteratively optimized convolutional neural networks (IO-CNN) with weak label initialization. Medical image analysis(2018) 47, 111-126

- **Yu Zhao, et al.:** Connectome-scale group-wise consistent resting-state network analysis in autism spectrum disorder. *NeuroImage: Clinical*(2016) 12, 23-33
- **Conferences**
  - **Yu Zhao, et al.:** Towards MR-only radiotherapy treatment planning: synthetic CT generation using multi-view deep convolutional neural networks. *International Conference on Medical Image Computing and Computer-Assisted Intervention (MICCAI)* 2018
  - **Yu Zhao, et al.:** 3D Deep Convolutional Neural Network Revealed the Value of Brain Network Overlap in Differentiating Autism Spectrum Disorder from Healthy Controls. *MICCAI* 2018
  - **Yu Zhao, et al.:** Modeling 4D fMRI Data via Spatio-Temporal Convolutional Neural Networks (ST-CNN). *MICCAI* 2018
  - **Yu Zhao, et al.:** Two-stage spatial temporal deep learning framework for functional brain network modeling. *IEEE 16th International Symposium on Biomedical Imaging (ISBI)*, 2019
  - **Yu Zhao, et al.:** Template-guided Functional Network Identification via Supervised Dictionary Learning. *ISBI* 2017
  - **Yu Zhao, et al.:** Inter-subject fMRI registration based on functional networks. *ISBI* 2017
  - **Dehua Ren\*, Yu Zhao\*, et al.:** 3-D functional brain network classification using convolutional neural networks. *ISBI* 2017

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## SELECTED PATENTS

- **Yu Zhao, Yimo Guo, Shu Liao, et al.** Cross-modality image synthesis. US Patent 10,803,354
- **Yu Zhao, Pameet Bhatia, Ke Zeng, et al.** Medical image data, US Patent App. 17/109,505
- **Pameet Bhatia, Yimo Guo, Gerardo Valadez, Zhigang Peng, Yu Zhao** Method and system for detecting landmarks in medical images. US Patent App. 17/190,674

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## PROFESSIONAL SERVICES

- **Active Peer Reviewer for journals** *Human Brain Mapping*, *IEEE Transactions on Pattern Analysis and Machine Intelligence*, *IEEE/ACM Transactions on Computational Biology and Bioinformatics*, *IEEE Transactions on Automation Science and Engineering*, *IEEE Signal Processing Letters*, *IEEE Journal of Biomedical and Health Informatics*, *Public Library of Science (PLOS) ONE*, etc.
- **Active Peer Reviewer for Conferences** *International Conference on Medical Image Computing and Computer-Assisted Intervention*, *IEEE International Symposium on Biomedical Imaging*, etc.