

# ZHEYUN (HUGHES) ZHAO

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Interest Fields: Medical Image Analysis; Large Language Model; Vision-Language Model; Agentic AI

## EDUCATION

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**University of Florida, United States**

Aug 2024 - Present

Doctor's Degree

GPA: 3.83/4.0

Biomedical Engineering, School of Engineering

**Xiamen University, China**

Sep 2021 - Jun 2024

Master's Degree

GPA: 3.5/4.0

Artificial Intelligence, School of Informatics

**Jiangnan University, China**

Sep 2017 - Jun 2021

Bachelor's Degree

GPA: 3.4/4.0

Major: Computer Science and Technology, School of Internet

Minor: Finance, School of Business

## ARTICLES

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- Junfu Cheng, Skylar E. Stolte, **Zeyun Zhao**, Andrew O'Shea, Aprinda Indahlastari, Adam J. Woods, and Ruogu Fang\*. Machine Learning and Individual Variability in Electrical Field Characteristics Predict tDCS Treatment Response for Late-Life Anxiety in the ACT Trial. *Under Review for Brain Stimulation 2025*.
- **Zeyun Zhao**, Junfu Cheng, Wasif Khan, Lei Xing, Ruogu Fang\*. A Survey of Recent Advances in Computational Models and Machine Learning Applications in Neurostimulation. *Under Review for IEEE Journal of Biomedical and Health Informatics (JBHI 2025)*.
- Zhimin Zong, Junjie Zhang, Lin Gu, Shenghan Su, Ziteng Cui, Yan Pu, **Zeyun Zhao**, Jing Lu, Daisuke Kojima, Tatsuya Harada, Ruogu Fang\*. Paleoinspired Vision: From Exploring Colour Vision Evolution to Inspiring Camera Design. *Under Review for Conference on Neural Information Processing Systems (NeurIPS 2025)*.
- **Zeyun Zhao**, Rong Wang, Jianzhe Gao, Zhiming Luo\*, Shaozi Li. Mask Matching Network for Self-supervised Few-Shot Medical Image Segmentation. *Accepted by IEEE International Conference on Multimedia & Expo (ICME 2024)*.
- **Zeyun Zhao**, Zhiming Luo\*, Jianzhe Gao, Shaozi Li. CPNet: Cross Prototype for Few-shot Medical Image Segmentation. *Accepted by Chinese Conference on Pattern Recognition and Computer Vision (PRCV 2024)*.
- Rong Wang, **Zeyun Zhao**, Yuliang Tang, Zhiming Luo\*, Shaozi Li. Mask Refinement With Reverse Attention for Few-Shot Medical Image Segmentation. *Accepted by IEEE Ubiquitous Intelligence and Computing (UIC 2024)*.
- Fan Sun, Zhiming Luo\*, **Zeyun Zhao**, Jianzhe Gao, Shaozi Li. Few-shot Medical Image Segmentation with Guidance of Prior Information. *Under Review for IEEE BSPC, 2025*.
- Jianzhe Gao, **Zeyun Zhao**, Zhiming Luo\*, Shaozi Li. ICFormer: Transformer with Inverse-Attention and Contrastive Learning for Polyp Segmentation. *Under Review for IEEE JBHI, 2025*.

## WORKING EXPERIENCE

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- Research Assistant (2024 - Present)
- Graduate Teaching Assistant (Feb 2023 - Jun 2023)
- Undergraduate Teaching Assistant (Apr 2021 - Oct 2021)

## ACADEMIC WORKING EXPERIENCE

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- Undergraduate Research Mentor for DeepPrep robustness projects (Jan 2025 - Present)
- Graduate Research Mentor for few-shot medical image segmentation projects (2022 - 2024)
- Duke and Chen Institute Joint Boot Camp for AI and AI Accelerated Medical Research (2025)
- Working as a Reviewer in ICCV (2025)
- Working as a Reviewer in ICME (2024 - 2026)
- Working as a Reviewer in PRCV (2024)

## PROJECTS

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- PETFounder: A PET Foundation Model for Amyloid and Tau-Aware Alzheimer's Diagnosis and Disease Trajectory Forecasting (Under Going)
- Head MEDSAM2: A PET Foundation Model for Amyloid and Tau-Aware Alzheimer's Diagnosis and Disease Trajectory Forecasting (Under Going)
- BRAIN AI: An agentic system for fMRI-based mental illness treatment guidance (Under Going)
- CEREBRA: An agentic system for Dementia Diagnosis and report generation (Under Going)
- Precision tDCS Compared to Fixed tDCS: How Cognitive Enhancement Differs Between Older Men and Women (Aug 2025 - Jan 2026)
- ACT: Applied machine learning (ML) to select anxiety patients and predict response to tDCS using fMRI and EHR data. (Jan 2025 - Nov 2025)
- PROACT: Applied ML to select knee osteoarthritis patients and predict response to combined medication and tDCS using fMRI and EHR data. (Jun 2025 - Sep 2025)
- Few-shot Learning for Medical Image Segmentation (2021-2024)
- AI Sports Testing System for Primary and Secondary Schools (2022)
- Analysis System for Stock Connect (Northbound) Shareholding (2021)

## SKILLS

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- **Retrieval-Augmented Generation (RAG), Medical Image Analysis, Large Language Model, Foundation Model, Agentic AI, Distributed Computing in HPC**

## AWARDS AND SCHOLARSHIPS

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- 3-minute Thesis Competition in 2025 Biomedical Engineering Society (BMES) Annual Meeting (2025) **Third Place**
- The 2nd China Graduate Financial Technology Innovation Competition (2023) **National First Prize ( <3%)**

- The 2nd Xiamen University AI Financial Technology Innovation Competition  
(2023) **Grand Prize** (TOP 1)
- The 19th China Graduate Mathematical Modeling Competition  
(2022) **National Second Prize** (<13%)
- The 17th College Student Extracurricular Academic and Technological Works Competition  
(2021) **Provincial Second Prize** (<20%)
- The 17th College Student Extracurricular Academic and Technological Works Competition (Black Science and Technology Special Competition)  
(2021) **Provincial Third Prize** (<25%)
- The 9th Asia and Pacific Mathematical Modeling Competition  
(2019) **Second Prize** (<15%)
- Academic Scholarship  
(2019) **School Second Prize** (<10%)
- Academic Scholarship  
(2018) **School Third Prize** (<12%)

## LANGUAGES

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- **Chinese** Native
- **English** Professional Working Proficiency

## DESCRIPTION ABOUT ARTICLES

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- **Mask Matching Network for Self-supervised Few-Shot Medical Image Segmentation**

In this work, instead of generating predictions on pixel level as previous works, we treat this segmentation task as a mask matching problem and divide this task into two subtasks: **1)** how to automatically generate high quality proposal masks for query images; **2)** how to compute the final predictions from these proposal masks. Firstly, we utilize QNet to locate Regions of Interest (RoI) as prompts for the SAM, allowing for the automatic generation of masks without relying on manual prompts. Secondly, we propose a new Mask Matching Module (MMM), which considers both feature similarity and volume similarity as guidance to collaboratively mine the final segmentation from proposal masks. Combine them together, we propose a new network, Mask Matching Network (MMNet), which achieves SOTA performance with remarkable improvements of **4.86%** and **10.04%** under setting 1 and setting 2, respectively. On CMR under setting 1, MMNet exhibits an improvement of **4.24%**.

- **Cross Prototype for Few-shot Medical Image Segmentation.**

In this paper, we propose two novel modules, *i.e.*, Multi-Support Prototype Generator (MSPG) and Cross-Prototype Generator (CPG), for adaptively extracting multiple prototypes and leveraging query information. Specifically, MSPG is a training-free approach that extracts more representative prototypes for organs with different scales. CPG fuse support and query information to generate cross prototypes that guide the prediction of query masks. By integrating MSPG and CPG, we propose the Cross Prototype Network (CPNet), which leverages the information of support and query images to mitigate distribution shifts between the query image and the support set. In particular, CPNet achieves state-of-the-art performance with higher accuracy of **2.13%** and **4.60%** under setting 1 and setting 2, respectively. On CMR under setting 1, MMNet exhibits an improvement of **1.58%**.

- **Few-shot Medical Image Segmentation with Guidance of Prior Information.**

In this work, we propose using the prior information and contrastive learning to improve the accuracy. Specifically, we first introduce the shape prior into the model based on a boundary prototype, which aims

to extract the shape information from support to guide the query segmentation. Second, we leverage contrastive learning to enlarge the feature distance between the foreground region and its neighboring tissues. Additionally, the Boundary Difference over Union Loss is utilized for enhancing the boundary representation. In particular, our method achieves state-of-the-art performance with higher accuracy of **2.95%** and **4.92%** under setting 1 and setting 2, respectively. On CMR under setting 1, MMNet exhibits an improvement of **1.43%**.