

Heqin Zhu

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RESEARCH INTERESTS

My research centers on AI for Science (AI4S), with specific focus on fundamental challenges in **computational biology**. I aim to integrate physical priors with deep learning [I.6] to address the scarcity of high-resolution structural data, thereby establishing robust **sequence-structure-function** mappings through **multimodal biological data fusion**. These approaches decipher RNA's dynamic structures and diverse functionalities, targeting:

- Systematic annotation of functional RNA motifs within non-coding genomic regions.
- AI-driven drug discovery via RNA-ligand interaction modeling.

Previously, I worked on medical imaging computing, where I developed universal models [I.1, I.2] and few-shot learning methods [I.5] for localizing anatomical landmarks, aiming at bridging domain gaps and enhancing model adaptability for clinical diagnostics.

EDUCATION

- **University of Science and Technology of China (USTC)** Sept. 2023 - present
Ph.D. student, Biomedical Engineering
Suzhou, China
 - Advisor: **S. Kevin Zhou**(Fellow of IEEE, AIMBE, NAI)
- **Institute of Computing Technology (ICT), Chinese Academy of Sciences (CAS)** Sept. 2020 - Jun. 2023
M.S., Computer Applications
Beijing, China
 - Advisor: **S. Kevin Zhou**(Fellow of IEEE, AIMBE, NAI)
- **University of Chinese Academy of Sciences (UCAS)** Sept. 2020 - Jun. 2023
M.S., Computer Applications
Beijing, China
 - Advisor: **S. Kevin Zhou**(Fellow of IEEE, AIMBE, NAI)
- **University of Science and Technology of China (USTC)** Sept. 2016 - Jun. 2020
B.S., Computer Science and Technology
Hefei, China
 - Hua Xia Talent Program in Computer Science and Technology

HONORS AND AWARDS

- **Suzhou Industrial Park Scholarship, USTC** 2025
- **First Class Scholarship, USTC** 2024-2025
- **First Class Scholarship, UCAS & ICT** 2020-2023
- **Merit Student Award, UCAS & ICT** 2023
- **Outstanding Student Award, USTC** 2018-2019
- **Institute of Chemistry Excellence Scholarship, USTC** 2017

PROFESSIONAL EXPERIENCE

- **Tencent, JAVIS Lab** Jul. 2021 - Nov. 2021
Research Intern
Shenzhen, China
 - Depth-supervised salient object detection.

PROFESSIONAL SERVICES

- **Conference reviewer:** MICCAI
- **Journal reviewer:** TCSVT

TEACHING & VOLUNTEER EXPERIENCES

- **Volunteer:** Medical Augmented Reality Summer School, Suzhou 2024
- **TA:** Electronic information openness practices, USTC Fall 2023
- **Volunteer:** Dushu Lake Forum Dushu Lake Symposium on Medical Image Computing, Suzhou 2023

PUBLICATIONS

Selected publications, # denotes co-first author and * denotes co-corresponding author. For full list, please refer to [Google Scholar](#).

Representative Papers

- [I.6] **Heqin Zhu**, Fenghe Tang, Quan Quan, Ke Chen, Peng Xiong*, and S. Kevin Zhou*. "Deep generalizable prediction of RNA secondary structure via base pair motif energy." *bioRxiv* (2024): 2024-10. [[Paper](#); [Code](#)]
- [I.5] **Heqin Zhu**, Quan Quan, Qingsong Yao, Zaiyi Liu, and S. Kevin Zhou. "Uod: Universal one-shot detection of anatomical landmarks." In *International Conference on Medical Image Computing and Computer-Assisted Intervention*, pp. 24-34. Cham: Springer Nature Switzerland, 2023. [[Paper](#); [Code](#)]
- [I.4] **Heqin Zhu**, Qingsong Yao, and S. Kevin Zhou. "Datr: Domain-adaptive transformer for multi-domain landmark detection." *arxiv preprint arxiv:2203.06433* (2022). [[Paper](#); [Code](#)]
- [I.3] **Heqin Zhu**, Xu Sun, Yuexiang Li, Kai Ma, S. Kevin Zhou*, and Yefeng Zheng*. "DFTR: Depth-supervised fusion transformer for salient object detection." *arxiv preprint arxiv:2203.06429* (2022). [[Paper](#); [Code](#)]
- [I.2] **Heqin Zhu**, Qingsong Yao, Li Xiao, and S. Kevin Zhou. "Learning to Localize Cross-Anatomy Landmarks in X-Ray Images with a Universal Model." *BME Frontiers* 2022 (2022): 9765095-9765095. [[Paper](#); [Code](#)]
- [I.1] **Heqin Zhu**, Qingsong Yao, Li xiao, and S. Kevin Zhou. "You only learn once: Universal anatomical landmark detection." In *Medical Image Computing and Computer Assisted Intervention*, pp. 85-95. Springer International Publishing, 2021. [[Paper](#); [Code](#)]

Journal Papers

- [J.4] Quan Quan#, Qingsong Yao#, **Heqin Zhu**, and S. Kevin Zhou. "IGU-Aug: Information-guided unsupervised augmentation and pixel-wise contrastive learning for medical image analysis." *IEEE Transactions on Medical Imaging* (2024).
- [J.3] Quan Quan#, Qingsong Yao#, **Heqin Zhu**, Qiyuan Wang, and S. Kevin Zhou. "Which images to label for few-shot medical image analysis?." *Medical Image Analysis* 96 (2024): 103200.
- [J.2] Huang Zhen#, Han Li#, Shitong Shao, **Heqin Zhu**, Huijie Hu, Zhiwei Cheng, Jianji Wang, and S. Kevin Zhou. "PELE scores: pelvic X-ray landmark detection with pelvis extraction and enhancement." *International Journal of Computer Assisted Radiology and Surgery* 19, no. 5 (2024): 939-950.
- [J.1] Pengbo Liu, Hu Han, Yuanqi Du, **Heqin Zhu**, Yinhao Li, Feng Gu et al. "Deep learning to segment pelvic bones: large-scale CT datasets and baseline models." *International Journal of Computer Assisted Radiology and Surgery* 16 (2021): 749-756.

Conference Papers

- [C.4] Xinyi Wang, Zikang Xu, **Heqin Zhu**, Qingsong Yao, Yiyong Sun, and S. Kevin Zhou. "SIX-Net: Spatial-Context Information miX-up for Electrode Landmark Detection." In *International Conference on Medical Image Computing and Computer-Assisted Intervention*, pp. 338-348. Cham: Springer Nature Switzerland, 2024.
- [C.3] Fenghe Tang, Ronghao Xu, Qingsong Yao, Xueming Fu, Quan Quan, **Heqin Zhu**, Zaiyi Liu, and S. Kevin Zhou. "Hyspark: Hybrid sparse masking for large scale medical image pre-training." In *International Conference on Medical Image Computing and Computer-Assisted Intervention*, pp. 330-340. Cham: Springer Nature Switzerland, 2024.
- [C.2] Quan Quan, Fenghe Tang, Zikang Xu, **Heqin Zhu**, and S. Kevin Zhou. "Slide-SAM: Medical SAM Meets Sliding Window." In *Medical Imaging with Deep Learning*, pp. 1179-1195. PMLR, 2024.
- [C.1] Yuanyuan Lyu, Haofu Liao, **Heqin Zhu**, and S. Kevin Zhou. "A 3 DSegNet: anatomy-aware artifact disentanglement and segmentation network for unpaired segmentation, artifact reduction, and modality translation." In *International Conference on Information Processing in Medical Imaging*, pp. 360-372. Cham: Springer International Publishing, 2021.