

Yibing Fu

Curriculum Vitae

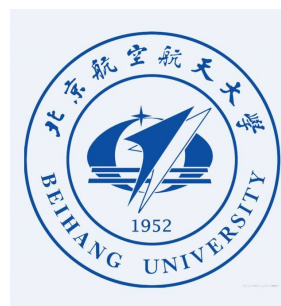
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<https://fyb99.github.io/>

Final-year Master student



BIOGRAPHY

- 2021.9– **Master**, *Dept. of Electronic Information Engineering, Beihang University, C.N.*
Present
 - Group: Multimedia Computing Towards Communications (MC2) Lab ([See Home Page](#))
 - Advisor: Prof. Mai Xu ([See Scholar Page](#)) and Postdoc. Lai Jiang ([See Scholar Page](#)).
 - GPA: 3.73/4.0 Average Grade : 90.5/100 Rank: 2/268
- 2017.9– **Bachelor**, *Dept. of Electronic Information Engineering, Beihang University, C.N.*
2021.7
 - GPA: 3.71/4.0 Average Grade : 89.2/100 Rank: 3/186

RESEARCH INTERESTS

Medical Image Analysis, Computer Vision, Machine Learning

PUBLICATIONS

- [1] **Yibing Fu**, Lai Jiang, Sai Pan, Pu Chen, *et al.* *Deep Multi-task Learning for Nephropathy Diagnosis on Immunofluorescence Images.* Computer Methods and Programs in Biomedicine (**CMPB**, IF=6.1), 2023. ([Paper](#))
- [2] Sai Pan[†], **Yibing Fu**[†], Pu Chen, Jiaona Liu, *et al.* *Multi-task learning-based immunofluorescence classification of kidney disease.* International Journal of Environmental Research and Public Health (**IJERPH**), 2021. [†]Contribute equally as the co-first author. ([Paper](#))
- [3] **Yibing Fu**, Lai Jiang, Sai Pan, Mai Xu, *et al.* *Coding tree unit partition guided two-stream framework for renal histopathology identification.* Big Task Small Data, 1001-AI, MICCAI 2023 Workshop (**BTSD**), 2023.
- [4] Ning Dai, Lai Jiang, **Yibing Fu**, Sai Pan, *et al.* *Recruiting the best teacher modality: A customized knowledge distillation method for IF based nephropathy diagnosis.* International Conference on Medical Image Computing and Computer Assisted Intervention (**MICCAI**), 2023.
- [5] Jingyi Xu, Xin Deng, **Yibing Fu**, Shengxi Li, *et al.* *MD-CSC: Exploring Discriminative Convolutional Sparse Coding for Multi-modal Classification.* Under review at Conference and Workshop on Neural Information Processing Systems (**NeurIPS**), 2023.
- [6] Sai Pan[†], **Yibing Fu**[†], Lai Jiang[†], Jiaona Liu, *et al.* *A deep sequential neural network for IgA nephropathy histopathology identification and Oxford classification.* Under review at **Science Translational Medicine** (IF=17.1). [†]Contribute equally as the co-first author.

[7] Zheyi Dong, Xiaofei Wang, Sai Pan, Taohan Weng, ..., **Yibing Fu**, Haimei Cheng, *et al.* *Multimodal transformer system for diabetic nephropathy diagnosis based on fundus images*. Under review at Nature Machine Intelligence (**NMI**, IF=23.8).

[8] Lai Jiang[†], **Yibing Fu**[†], Ning Dai, Sai Pan, *et al.* *Explainable Deep Learning for Fine-grained Nephropathy Diagnosis on Immunofluorescence Images*. In preparation to Nature Machine Intelligence (**NMI**, IF=23.8). [†]Contribute equally as the co-first author.

RESEARCHES

2022.11– **Attention mechanism-based Fine-grained Medical Image Classification**^[7].

Present – *Supervised by Prof. Mai Xu and Postdoc. Lai Jiang*

- Established a large scale database of 6,381 immunofluorescence images for handling the task of distinguishing fine-grained types for nephropathy with the primary/secondary nature.
- Collected attended regions and markers of immunofluorescence sequence during diagnosis via a mouse-contingent experiment.
- Developed an explainable marker-aware attention module to highlight the key pathological areas and markers for diagnosis, which explicitly incorporated the real-world attention from the nephrologists.
- Developed a dual-branch nephropathy diagnosis network and nature-aware contrastive learning strategy, for better distinguishing the primary or secondary nature of the nephropathy.
- Extensive experiments and visualization results demonstrated the superiority and explainability of the proposed method.

2022.3– **Sequential Pipeline for Medical Image Segmentation and Classification based on histopathological images** ^{[3][6]}.

Present – *Supervised by Prof. Mai Xu and Postdoc. Lai Jiang*

- Established a large scale database of 296 whole slide images, with 28,970 annotated lesions covering 16 types of fine-grained renal pathological lesions including all types of lesions for gloden Oxford classification evaluation.
- Developed a sequential pipeline, consisting of the lesion segmentation, fine-grained glomerulus classification and multi-label Oxford classification assessment subnets for precisely identifying IgA nephropathy pathological lesions and evaluate the lesions coexisted in the glomeruli in accordance with Oxford classification standard.
- Extensive experiments and visualization results demonstrated the superiority, explainability and generalization ability of the proposed pipeline.
- Attempted to leverage multimedia codec-related information (coding tree unit partition) for boosting renal histopathology identification performance, which provides a new scope of leveraging cross-disciplinary knowledge^[3]. Preparing to submit an extended version to IEEE Transactions on Medical Imaging (IEEE TMI).

2020.11– **Joint Learning of Multi-level Tasks for Medical Image Analysis**^{[1][2]}.

2022.3 – *Supervised by Prof. Mai Xu and Postdoc. Lai Jiang*

- Established two immunofluorescence image databases with real-world and synthetic blurs and analyze the correlation among multiple tasks.
- The first attempt to solve the problem of disease diagnosis on clinical blurred immunofluorescence images, with a hierarchical multi-task learning framework for the main task of nephropathy diagnosis and the auxiliary tasks of both image quality assessment and de-blurring.
- Developed task-aware losses to build a feedback information flow from the high-level to the low-level tasks, which further boost the diagnosis performance.

SCHOLARSHIP

2019	National Scholarship	1 time
2020	National Encouragement Scholarship	1 time
2022	Academic Scholarship of Beihang University for master student	2 times 1st Prize
2022	HaiXin Scholarship	1 recipient per grade
2018–2020	Academic Scholarship of Beihang University	1 time 1st Prize & 2 times 2nd Prize

2019-2020	Academic Competition Scholarship of Beihang University	2 times 1st Prize
2018-2020	Social Work Scholarship of Beihang University	2 times 1st Prize & 1 time 2nd Prize

HONORS & AWARDS

2021	Outstanding Graduate of Beijing City	
2018-2022	Merit Student of Beihang University	4 times
2019	The 11 th National College Mathematics Competition	1st Prize
2019	The 30 th Beijing College Mathematics Competition	1st Prize
2018	The 35 th National College Physics Competition Competition	2nd Prize
2018	Beijing Area of the National College Mathematical Modeling Competition	2nd Prize
2020	"Fengru Cup" Innovation and Entrepreneurship Competition <i>Top innovation competition in Beihang University</i>	1st Prize
2020	Beijing Area of National "Internet plus" Innovation Competition	3rd Prize

TEACHING

2021.03– **Digital Image Processing**, *Electronic Information Engineering*, Beihang University, China.

2021.07

- o Role: Teaching Assistant
- o Lecturers: Prof. Mai Xu

SOFTWARE SKILLS

Programming: Python, Matlab, C, Verilog(Basically)

Platform: Pytorch, OpenCV, Linux, Git, Arduino(Basically), FPGA(Basically)

Doc processing: LaTeX, Microsoft Office

English skills: IELTS 6.5