

Kechun Liu

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Education

- 2019 – present ♦ **Ph.D. student**, Computer Science & Engineering, University of Washington.
Advisor: Linda Shapiro
- 2019 – 2021 ♦ **M.S.**, Computer Science & Engineering, University of Washington.
Overall GPA: 3.87/4.0
- 2015 – 2019 ♦ **B.Eng.**, Electronic Engineering, Tsinghua University.
Overall GPA: 3.73/4.0 (Rank 20/216)

Publications

- 1 **Liu, K.**, Mokhtari, M., Li, B., Nofallah, S., May, C., Chang, O., ... Shapiro, L. (2021). Learning melanocytic proliferation segmentation in histopathology images from imperfect annotations. In *Proceedings of the IEEE/CVF conference on computer vision and pattern recognition* (pp. 3766–3775).
- 2 Zong, Z., Feng, J., **Liu, K.**, Shi, H., & Li, Y. (2019). Deepdpm: Dynamic population mapping via deep neural network. In *Proceedings of the AAAI conference on artificial intelligence* (Vol. 33, pp. 1294–1301).

Research Experience

Ongoing Research

- 2019.7 – present ♦ **Applying AI to Assess Histologic Features to Improve Melanoma Diagnosis**
Paul G. Allen School of Computer Science and Engineering, Advisor: Linda Shapiro
In-depth knowledge curating medical image dataset including histological image registration and data annotation based on medical knowledge. Two year experience working with dermatopathologists from 4 institutions¹. Held weekly meetings on building efficient data annotation protocols and improving dataset quality. I'm currently pursuing 3 directions:
- **Melanocyte Detection in Skin Histopathological Images**: Propose a GAN-based model for virtual staining on whole slide images to detect melanocytes.
 - **Segmenting Melanocytic Proliferations on Skin Biopsy Images**: Propose a melanocytic proliferation segmentation framework by leveraging noisy and sparse labels. Achieved state-of-the-art performance on this specific task. [\[paper\]](#)^[1]
 - **Cell Feature Analysis with Computer-assisted Morphometry**: Analyze morphological features of melanocytes and non-melanocytes to aid melanoma diagnosis.

Previous Research

- 2020.7 – 2020.9 ♦ **Sedeen Viewer Plugins for Cancer Diagnosis**
Paul G. Allen School of Computer Science and Engineering, Advisor: Linda Shapiro
Built plugins in Sedeen Viewer, a whole slide image viewer, for cancer diagnosis. The backend and frontend are Python and C++ respectively. [\[website\]](#) [\[github\]](#)
- 2018.11 – 2019.5 ♦ **Unsupervised Multimodal MRI Segmentation of Stroke Lesion**
MMDP Lab, Advisor: Weibei Dou
Proposed an unsupervised segmentation method based on multimodal brain magnetic resonance images (MRI) of chronic stroke patients to segment stroke lesions including both ischemic and chronic stroke.

¹Pathology Associates, Dermatopathology Northwest, VA Puget Sound, and Isfahan University of Medical Sciences

Research Experience (continued)

- 2018.7 – 2018.9 ◇ **Coronary Calcium Segmentation on Dual Energy CT Images**
The Li Laboratory at Cedars-Sinai and UCLA, Advisor: Debiao Li, and Yibin Xie
Worked on the segmentation and sub-voxel resolution algorithms to extract coronary calcified plaques in dual-energy CT images.
- 2017.11 – 2018.7 ◇ **DeepDPM: Dynamic Population Mapping via Deep Neural Network**
The FIB Lab at Tsinghua University, Advisor: Yong Li
Proposed the idea to generate dynamic population distributions in full-time series. Designed DeepDPM, an overall model that describes both spatial and temporal patterns based on coarse data and point of interest information. [\[paper\]](#)^[2]

Teaching Experience

- 2021 ◇ **CSE 576 Computer Vision**, TA, University of Washington, Seattle

Awards

- 2019 ◇ **Excellent Honors Graduate**, Tsinghua University.
- 2018 ◇ **Outstanding Student Award**, Electronic Engineering, Tsinghua University.
 ◇ **ICBC Scholarship**, Industrial and Commercial Bank of China.
- 2017 ◇ **Jiang Nanxiang Scholarship**, Tsinghua University.
- 2016 ◇ **National Scholarship**, the government of China.

Skills

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|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Languages | ◇ English, Mandarin Chinese. |
| Programing | ◇ Python, C/C++, MATLAB, shell scripts, JavaScript, R, Verilog |
| Technology | ◇ PyTorch, LaTeX, Tensorflow, OpenCV |
| Relevant Coursework | ◇ Computer Vision, Deep Learning, Image Processing, Data Visualization, Statistical Learning, Data Structure, Stochastic Modeling, Machine Learning, Probability, Linear Algebra, Calculus. |