

# 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 institutions<sup>1</sup>. 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. [\[paper\]](#)<sup>[1]</sup>
  - **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 Plugin 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.

<sup>1</sup>Pathology Associates, Dermatopathology Northwest, VA Puget Sound, and Isfahan University of Medical Sciences

## Research Experience (continued)

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- 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. [\[paper\]](#)<sup>[2]</sup>

## Teaching Experience

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

## Awards

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- 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. |