

SHIHAO ZHANG

Email: zhang.shihao@u.nus.edu; Phone: +65 86155531; Personal Page: <https://needylove.github.io>

Education

Computer Science National University of Singapore	2021.08 – 2025.05 (expected)
<i>Ph.D.</i>	
Software Engineering South China University of Technology	2017.09–2020.07
<i>Master of Science</i>	
Mathematics and Applied Mathematics South China University of Technology	2012.09–2016.07
<i>Bachelor of Science</i>	

Research and Work Experience

(Summary) My PhD research focuses on **regression representation learning**, using information theory and topology as tools with a theoretical emphasis. In contrast, my master's research was more application-oriented, concentrating on **medical image segmentation**.

National University of Singapore (PhD student, advisor: [Angela Yao](#)) **2021.08-Present**

- Regression Representation Learning [1, 2, 3]: Exploring the differences between classification (with categorical targets) and regression representations (with continuous targets), providing a deeper understanding of both. The insights gained **benefit a wide range of regression tasks**, e.g., depth estimation, super-resolution, pose estimation, and age estimation.

Singapore National Eye Center (Research Associate, advisor: [Daniel SW Ting](#)) **2020.09-2021.08**

- Diabetic Retinopathy (DR) Incidence and Progression [7]: Developed predictive models to assess the likelihood of DR development and identified key features influencing DR incidence.

- Small Incision Lenticule Extraction: Automated and optimized machine parameters to replace manually set values, improving surgical precision and outcomes.

CVTE Research (Full-time Intern, advisor: [Yanwu Xu](#) & [Huazhu Fu](#) & [Qingyao Wu](#)) **2018.06-2019.08**

- AS-OCT Data Processing and Retinal Image Segmentation [5, 6]: Developed a grading index to assess cataract severity based on the density of segmented tissue layers.

South China University of Technology (Master student, advisor: [Mingkui Tan](#)) **2017.09–2020.07**

- Mainly focus on medical image segmentation [4, 5, 6], with additional research in Click-Through Rate prediction and super-resolution during the early stages of my master's studies.

Selected Publications

[1] S. Zhang, Y. Yan, and A. Yao. Improving Deep Regression with Tightness. **ICLR 2025**

(https://github.com/needylove/Regression_tightness)

[2] S. Zhang, K. Kawaguchi, and A. Yao. Deep Regression Representation with Topology. **ICML 2024**

(<https://github.com/needylove/PH-Reg>)

- [3] **S. Zhang**, L. Yang, M. Bi Mi, X. Zheng, and A. Yao. Improving Deep Regression with Ordinal Entropy. **ICLR. 2023** (<https://github.com/needyllove/OrdinalEntropy>)
- [4] **S. Zhang**, H. Fu, Y. Xu, Y. Liu, and M. Tan. Retinal Image Segmentation with Structure-Texture Demixing Network. **MICCAI. 2020**
- [5] **S. Zhang**, H. Fu, Y. Yan, Y. Zhang, Q. Wu, M. Yang, M. Tan, and Y. Xu. Attention Guided Network for Retinal Image Segmentation. **MICCAI. 2019** (<https://github.com/HzFu/AGNet>)
- [6] **S. Zhang**, Y. Yan, et al. Guided M-Net for High-resolution Biomedical Image Segmentation with Weak Boundaries and Noise. **OMIA. 2019 (best paper)**
- [7] WY Ng, **S. Zhang**, et al. Updates in Deep Learning Research in Ophthalmology. **Clinical Science. 2021**

Awards & Honors

- National scholarship. Rank: 1/55, award to top 1% of students, 2019.
- 2019 Best Paper Award. 6th MICCAI Workshop on Ophthalmic Medical Image Analysis.
- PALM 2019. Rank second in the classification (<https://palm.grand-challenge.org/Home/>).
- AGE 2019. Rank first in the localization and rank second in the classification (<https://age.grand-challenge.org/Home/>).