Xupeng Chen

Life Science · Tsinghua University

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Education

School of Life Science, Tsinghua University — *Beijing, China*

B.S. in Life Science — *Sept. 2014 - June. 2019*

- **Minor in Statistics**
- **XueTang program** 2015-2019
- **XinYa College**
- **Related Courses:** • Mathematical Modelling • System and Computational Neuroscience • Biostatistics • Bioinformatics • Pattern Recognition • Artificial Neural Networks • Neuroscience and AI • Machine Learning and Brain Inspired Intelligence • Fundamental Neuroscience

Honors & Awards

2015-2018	**Scholarship**, XueTang scholarship	*University*
2017	**Second prize**, The First National College Students' Brain Computation and Application Competition	*International*
2017	**First Prize**, eMaize Challenge: Machine learning in breeding	*National*
2018	**Meritorious Winner**, Mathematical Contest in Modeling (MCM) **[Paper Link]**	*International*
2015	**Golden Prize**, Social practice award	*University*
2015	**Grand Prize & best captain**, Return to Alma mater activity	*University*
2016-2018	**Xuetang Research Funding**, $10,000 for Research in Lu lab	*University*
2016-2018	**Research Promotion Program Funding**, $8,000 for Research in Applied Deep learning in Biomedical Image analysis	*University*

Skills

Computer Science
- Programming skills: Python, C++, Julia, MATLAB, R.
- Familiar with Machine Learning, Deep Learning (Tensorflow, Keras, Pytorch) and Computer Vision.
- Familiar with Linux, MacOS, Windows

Language
- CET-6, TOEFL (110)

Research Experience

Cardiacai: a deep learning model for cardiac disease detection [Paper Link] — *Tsinghua University*

Supervisor: **Hongliang Yu** — *2017*

- Use Deep learning models to analyze X-ray chest image
- Design new models to classify disease & design a website
- Win the second prize in the contest

eMaize: Develop a machine learning method to predict quantitative traits of maize [Paper Link] *Lu Lab, Tsinghua University*

SUPERVISOR: **ZHI LU** *2017-2018*

- Develop a new linear mixed model to predict traits of 36,000 hybrids samples using SNP data to find heterosis
- Develop a non-parameter model to solve small sample training problems

Deepshape: Develop a deep learning method to predict the structure of RNA and find MOTIF *Lu Lab, Tsinghua University*

SUPERVISOR: **ZHI LU** *2017-2018*

- Process icSHAPE data to train machine learning and deep learning model
- Transform structure data to image form and develop a modified U-net model to predict
- Use unsupervised model (VAE) and attention model to classify motif and find its position
- Use adaptive graph convolution neural networks to learn meaningful stuctural motif

exRNA: Detection of early-stage liver cancer using extracellular RNA as biomarker *Lu Lab, Tsinghua University*

SUPERVISOR: **ZHI LU** *2017-2018*

- Develop a fast method for testing different mapping order of various kinds of RNAs
- Use statistical methods for sample QC, feature imputation and normalization
- Develop robust feature selection and machine learning methods to classify stages of liver cancer and identify novel RNA biomarker

Reconstruction of neural muscular junction connectomic EM data [Report Link] *Lichtman Lab, Harvard University*

SUPERVISOR: **JEFF LICHTMAN** *2018 Summer*

- Generate 3D masks for alignment
- Use 3D U-net for membrane prediction and z-watershed for axon segmentation
- Automatic segmenting and tracing
- 3D reconstruction of axons and NMJs and statistical analysis

Synapse prediction and synaptic partner identification [Report Link] *Visual Computing Group, Harvard University*

SUPERVISOR: **HANSPETER PFISTER** *2018 Summer*

- 3D U-net for synapse detection in CREMI and JWR data
- 3D U-net and 3D-CNN for pre and post synaptic partner identification
- Synapse structure and type analysis

Mixture density network for Localization Using NLOS TOAs or TDOAs *NYU wireless, New York University*

SUPERVISOR: **I-TAI LU** *2017-2018*

- Mixture density network for jointly predicting x, y and z coordinates
- Mixture density network for uncertainty estimation to identify confusing points

Medical data Analysis: Student research training project [Paper Link] *Tsinghua University*

SUPERVISOR: **XUEGONG ZHANG** *2016-2017*

- Use Deep learning models to analyze medical images
- Collect X-ray and CT images to detect lung diseases. Use 3D and 2D deep learning model
- Use customized equipment to record individuals long time EGG data and anaylze.