Xupeng **Chen**

Life Science · Tsinghua University

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Education

School of Life Science, Tsinghua University

Beijing, China

B.S. in Life Science GPA: 3.6 *Sept. 2014 - June. 2019*

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

Publications

2018	**3D synapse detection and polarity identification**, Conference on Computer Vision and Pattern Recognition	*Submitted*
2018	**exSeek: Robust exRNA Analysis Tool for Noninvasive Biomarker**, Nucleic Acids Research	*Ready to Submit*
2018	**DeepShape: Detection of Sequence and Structural Motif using Deep Learning**, Biology Forum in Tsinghua	*Poster*

Research Experience

DeepShape: Detection of Sequence and Structural Motif using Deep Learning

Lu Lab, Tsinghua University

Supervisor: **Zhi Lu** *2017-2018*

- Process structure probing data for 1D and 2D deep learning model in structure prediction
- Use unsupervised deep learning model (VAE) and attention model for Motif detection and localization.
- Use graph convolution neural networks to learn meaningful stuctural motif.

exSeek: Robust exRNA Analysis Tool for Noninvasive Biomarker

Lu Lab, Tsinghua University

Supervisor: **Zhi Lu** *2017-2018*

- Develop a complete pipeline for exRNA analysis. Includes mapping, counts, matrix processing, robust feature selection and evaluation
- Use statistical and machine learning model for imputation, normalization, batch removal and feature selection.
- Package all functions into software. Validate on published and own dataset.

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.

Reconstruction of neural muscular junction connectomic EM data [Report Link]

Lichtman Lab, Harvard University

Supervisor: **Jeff Lichtman** *2018 Summer*

- Use 3D U-net for membrane prediction and tracing.
- 3D reconstruction of 13 NMJs (largest ever).
- Quantify the linear correlation of axonal diameter and synaptic area by statistical analysis.

Synapse prediction and synaptic partner identification [Report Link]

Visual Computing Group, Harvard University

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

- Construct a powerful 3D U-net for synapse detection in CREMI dataset. Rank top 1 in CREMI contest.
- Construct 3D U-net and 3D-CNN for synaptic polarity identification. Use VAE to cluster synapses for proofreading
- Apply models to predict on JWR dataset with 1 million synapses. Submit a paper to Conference on Computer Vision and Pattern Recognition

Mixture density network for Localization Using NLOS TOAs or TDOAs

NYU wireless, New York University

COLLABORATOR: **JUN LI** *2017-2018*

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

Cardiacai: a deep learning model for cardiac disease detection [Report Link]

Tsinghua University

SUPERVISOR: **HONGLIANG YU** *2017*

- Use Deep learning models to analyze 3,000 X-ray chest image for heart disease classification.
- Utilize a U-net for heart region attention and a VGG-net for classification.
- Win the second prize in the contest.

Medical data Analysis: Student research training project [Report 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 U-net for nodes detection.

Activities&Awards

2018	**Teaching Assistant in Bioinformatics Basic Course**, Contribute to **teaching book**	*University*
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**: Built a platform with overall 440,000 reads, Published a book with 5,000 copies.	*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 Biomedical Image analysis	*University*

Skills

- **Programming skills:** Python, MATLAB, C++, R.
- **Familiar with:** Machine Learning, Deep Learning (Tensorflow, Keras, Pytorch) and Computer Vision.
- **Familiar with:** Linux, MacOS, Windows
- **Language:** TOEFL (110), GRE(321)