



School of Data Science

香港城市大學  
City University of Hong Kong

# Towards Understanding Biomolecular Structure and Function with Deep Learning

Date: 19 May 2020 (Tuesday)

Time: 3:30pm - 4:30pm

Zoom Details: <https://cityu.zoom.us/j/98851968066>



## ABSTRACT

Biomolecules, existing in high-order structural forms, are indispensable for the normal functioning of our bodies. To demystify those critical biological processes, we need to investigate biomolecular structures and functions. In this talk, we showcase our efforts in that research direction using deep learning. First, we proposed a deep learning guarded Bayesian inference framework for reconstructing super-resolved structure images from the super-resolved fluorescence microscopy data. This framework enables us to observe the overall biomolecular structures in living cells with super-resolution in almost real-time. Then, we zoom in on a particular biomolecule, RNA, predicting its secondary structure. For this one of the oldest problems in bioinformatics, we proposed an unrolled deep learning method, which can bring us with 20% performance improvement, regarding the F1 score. Finally, by leveraging the physiochemical features and deep learning, we proposed the first-of-its-kind framework to investigate the interaction between RNA and RNA-binding proteins (RBP). This framework can provide us with both the interaction details and high-throughput binding prediction results. Extensive in vitro and in vivo biological experiments demonstrate the effectiveness of the proposed method.



## Mr. Yu Li

### GUEST SPEAKER'S PROFILE

Mr. Yu Li is a PhD student at KAUST in Saudi Arabia, majoring in Computer Science, under the supervision of Prof. Xin Gao. He is a member of Computational Bioscience Research Center (CBRC) at KAUST. His main research interest is developing novel and new machine learning methods, mainly deep learning methods, for solving the computational problems in biology and understanding the principles behind the bio-world. He obtained MS degree in CS from KAUST at 2016. Before that, he got the Bachelor degree in Biosciences from University of Science and Technology of China (USTC)

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**All are welcome**