

## **Title: Robust Pattern Recognition in Open World**

Existing pattern recognition methods mostly concern the classification accuracy, but ignore the rejection and robustness in open world. In recent years, deep learning methods achieved huge successes in pattern recognition, but the popular deep neural networks show poor robustness to noise and outlier in open world. In this talk, I first explain the robustness of pattern recognition, list the related research issues of robust pattern recognition, and introduce some methods for improving the robustness for open set recognition, which needs to both classify within-class patterns and reject outlier. The rejection methods fall in two categories: ambiguity rejection and outlier rejection, which are based on different models and learning methods. I will give the formulations of two rejection modes and introduce some methods. Last, I will introduce a newly proposed deep learning method for robust recognition: convolutional prototype network (CPN). The CPN uses a prototype classifier for classification, and learns convolutional feature space and prototypes jointly to yield high accuracy for both classification and outlier rejection. The CPN also shows potential in domain adaptation, online learning, novel class discovery, and so on.