



# CoCo Seminar Series Spring 2021

## Learning Feature Representations Using Graphlets for Temporal Networks

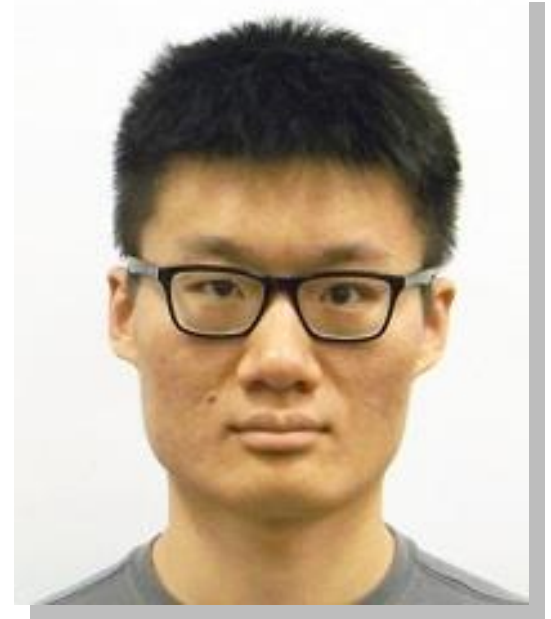
**Dr. Jian Li**

**Assistant Professor, Electrical and Computer  
Engineering, Binghamton University**

**Wednesday April 21, 2021 11:00am-12:00pm**

**Online (Zoom meeting link available on**

**<http://coco.binghamton.edu/>)**



Networks are fundamental to the study of complex systems, ranging from social contacts and message transactions, to biological regulations and economic networks. In many realistic applications, these networks may vary over time. Modeling and analyzing such temporal properties are of additional interest as it can provide a richer characterization of relations between nodes in networks. We explore the role of graphlets in network classification for both static and temporal networks. Graphlets are small non-isomorphic induced subgraphs representing connected patterns in a network and their frequency can be used to assess network structures. We show that graphlet features, which are not captured by state-of-the-art methods, play a significant role in enhancing the performance of network classification. To that end, we propose two novel graphlet-based techniques, gl2vec for network embedding, and gl-DCNN for diffusion-convolutional neural networks. We demonstrate the efficacy and usability of gl2vec and gl-DCNN through extensive experiments using several real-world static and temporal networks. We find that features learned from graphlets can bring notable performance increases to state-of-the-art methods in network analysis.

Dr. Jian Li is an Assistant Professor of Computer Engineering with the Department of Electrical and Computer Engineering at Binghamton University. He was a postdoc with the College of Information and Computer Sciences, University of Massachusetts Amherst from 2017 to 2019. He received the Ph.D. degree in Computer Engineering from Texas A&M University in December 2016, and B.E. degree from Shanghai Jiao Tong University in June 2012. His current research interests lie in the areas of reinforcement learning, network optimization, online algorithms and their applications in large scale networked systems.

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