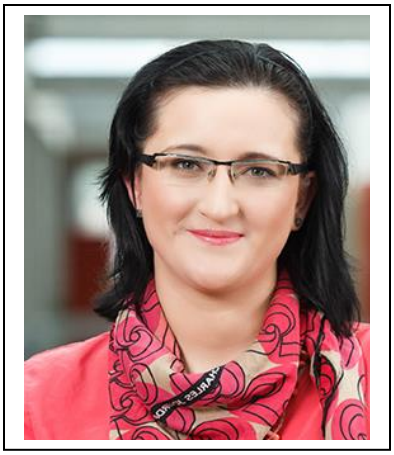
Department of Biostatistics and Medical Informatics Seminar



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Friday, October 14, 2022
12:00-1:00 pm
Biotech Center Auditorium *or* via Zoom Link
https://uwmadison.zoom.us/j/93537526468?pwd=dEpkUGxTMjRzRjZ0QmtMOUNvVTdYdz09

Graph AI to Enable Precision Medicine

Abstract:
Graph representation learning leverages knowledge, geometry, and structure to develop powerful machine learning methods. First, I will introduce Shepherd, a graph neural network for personalized diagnosis of patients with rare genetic diseases. Diagnostic delay is pervasive in patients with rare genetic conditions. It can lead to numerous problems, including redundant testing and unnecessary procedures, delays in obtaining disease-appropriate management and therapies, and even irreversible disease progression. Shepherd uses knowledge-guided geometric deep learning to gather information from different parts of a knowledge graph and logically connect a patient's clinical-genomic information to the region in the knowledge graph relevant to diagnosis. Evaluation of patients from the Undiagnosed Diseases Network shows that Shepherd accurately identifies causal disease genes, finds other patients with the same causal gene and disease, and provides interpretable characterizations of novel diseases. Second, I will describe applications of graph neural networks in drug discovery. These are available through Therapeutics Data Commons (https://tdcommons.ai), an initiative to access and evaluate AI capability across therapeutic modalities and stages of drug discovery. The Commons supports the development of machine learning methods, with a strong bent towards developing the foundations for which methods are most suitable for drug discovery and why.

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