# COLLOQUIUM

## Challenges in analyzing spectroscopic data and the potentia of machine learning to accelerate bioanalysis with spectroscopy

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Neckers 156 - Time: 3:00-4:00 pm

Reception immediately following in the math library.

Abstract:

Analyzing spectroscopic data can be tedious that can stretch weeks or months, depending on the sample. Especially, prompt identification of biochemical changes associated with cancer cells from spectra almost impossible using conventional spectral analysis techniques. Machine learning has the potential that could facilitate to detect minute changes in enormous spectroscopy information and to speed up the spectral analysis.

In this talk, I will discuss the application of high-resolution Raman spectroscopy to detect abnormal pancreatic cancer cells by exploiting the alteration of chemical signatures in the cells based on the vibrational signatures and address the challenges of reproducibility and replicability with Raman in bioanalysis. Raman spectroscopy provides molecular signatures and structural composition of the samples. Raman shows promising results in identifying and distinguishing biomolecules such as nucleic acids, lipids, and proteins and cells. The spectra of cancer cells are analyzed through combinations of data-preprocessing, various dimension reduction protocols, and machine learning classification algorithms Preliminary investigation of pancreatic Mia PaCa-2 cancer cells lines versus parental cell lines based on combing spectroscopic data with machine learning techniques shows a promising result.