



# ***Mathematical Biology Seminar***

**Monday, April 8, 2023**

**3 pm MDT - 457 CAB (in person)**

**Join Zoom Meeting**

<https://ualberta-ca.zoom.us/j/98497695684?pwd=SG5pcUVR50xucW5xd0xBTm1VVcUeU09>

Meeting ID: 984 9769 5684

Passcode: 32123



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## **Determining the significance of air quality and meteorological parameters in predicting methane levels**

Methane's short lifespan, high Global Warming Potential, and high anthropogenic emissions level make it the most potent greenhouse gas in terms of rapidly reducing global warming. The oil and gas sector is the most significant contributor to methane emissions in Canada. However, there are strong arguments that reported methane emissions from the oil and gas sector might be underestimated by 1.5 to 2 times. To address the accuracy of methane estimations, we study methane concentration dependence on various air quality and meteorological parameters. In our study, we use air quality and meteorological data from air monitoring stations managed by the Wood Buffalo Environmental Association (WBEA) supplemented with satellite land cover data, cloud coverage from airport stations managed by NOAA, and other weather parameters. We use machine learning to analyze the correlation between methane concentration and related parameters and predict methane levels. We provide a variable importance study, compare the performance of several machine learning models, provide Shapley value analysis, and study dependence of Shapley values on some of the parameters.

***COLLABORATIVE MATHEMATICAL BIOLOGY GROUP***

***MATHEMATICAL & STATISTICAL SCIENCES  
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