**EVM LAB**

**FINAL REPORT**

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**Abstract**

This “challenge” aims to build a predictive model to forecast the response of the LUX operon in *E- coli* to DNT exposure. The LUX operon, responsible for luminescence, serves as a reporter system. Using luminescence data from various genetic variants of *E. coli* exposed to DNT, we trained a machine learning model. The predictor's accuracy was validated with a test dataset. This model offers a robust tool for predicting biological responses, with applications in biosensing, environmental monitoring, and synthetic biology.

In synthetic biology, the development of predictive models is crucial for understanding and manipulating biological systems.

This project aims to construct a robust predictor to forecast the response of the LUX operon in Escherichia coli to the presence of 2,4-dinitrotoluene (DNT) in the environment. The LUX operon, responsible for luminescence, acts as a reporter system, allowing researchers to monitor cellular responses to environmental changes. To achieve this, we will leverage a comprehensive dataset comprising various genetic variants of E. coli. These variants will be exposed to DNT, and their luminescence responses will be recorded. Using this data, we will train a machine learning predictor to accurately forecast the LUX operon's response to DNT.