

## MATH RESEARCH AT UNC CHARLOTTE 2024

**Project 5:** Health issues due to Air pollution in Ulaanbaatar, Mongolia.

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**Project description.** Air pollution is a significant concern in Ulaanbaatar, Mongolia, and has been linked to numerous health issues in the last decade. The city experiences severe air pollution during winter when residents burn coal or other harmful materials to keep warm. This has led to increased levels of particulate matter, sulfur dioxide, and nitrogen dioxide in the air, which can cause respiratory problems, cardiovascular disease, cancers, and other health issues. The ger (yurt) district in Ulaanbaatar, which is made up of traditional nomadic-style woolen and wood structure homes, contributes to the air pollution problem in the city. These homes often use coal or other harmful materials for heating and cooking, which releases detrimental matter and other pollutants into the air. This is just one of the many factors; air pollution in Ulaanbaatar is very complex and challenging.

This project aims to investigate the health concerns and mortality rates due to air pollution in Ulaanbaatar, Mongolia. School-age children's tuberculosis rate is how it is correlated or linked to air pollution. By analyzing and creating mathematical models on existing data on air pollution levels and health outcomes, we hope to better understand the impact of air pollution on public health, identify significant risk factors, and hopefully suggest potential strategies for reducing air pollution and improving public health in Ulaanbaatar, Mongolia.

We will introduce mathematical modeling using Random Gaussian vectors and multi-dimensional regression analysis in existing data. Also, we will learn and test machine learning models using our new models. We will use government data and other research data.