

**MICHIGAN STATE UNIVERSITY**  
Department of Statistics and Probability

# **COLLOQUIUM**

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## **Spatio-temporal models with space-time interaction and their applications to air pollution data**

**Thursday, January 25, 2018**  
**10:20 AM - 11:10 AM**  
**Refreshments 10:00 AM**  
**C405 Wells Hall**

### **Abstract**

It is important to have a clear understanding of the status of air pollution and to provide forecasts and insights about the air quality to the general public and researchers in environmental studies. Previous studies of spatio-temporal models showed that even a short-term exposure to high concentrations of atmospheric fine particulate matters can be hazardous. In this study, we develop a spatio-temporal model with space-time interaction for air pollution data. The main contribution of this work is three fold. First, the proposed model uses a parametric space-time interaction component along with the spatial and temporal components in the mean structure, and introduces a random-effects component specified in the form of zero-mean spatio-temporal processes. This specification provides a powerful method to test for the existence of the space-time interaction. Second, we include heteroskedasticity in the model to address different seasonal variation in the data. And third, a weighted least squares approach in the implementation helps us identify factors contributing to higher pollution. As a real life application, we analyze ten years' air pollution data from 66 monitoring stations across Taiwan.

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