



Climate Program Opening Workshop August 21-25, 2017

Lecture: A Multivariate Dynamic Spatial Factor Model for Speciated Pollutants and Adverse Birth Outcomes

Speaker: Montse Fuentes

Abstract:

Evidence suggests that exposure to elevated concentrations of air pollution during pregnancy may increase risks of birth defects and other adverse birth outcomes. While current regulations put limits on total PM_{2.5} concentrations, there are many speciated pollutants within this size class that likely have distinct effects on perinatal health. However, due to correlations between these speciated pollutants it can be difficult to decipher their effects in a model for birth outcomes. To combat this difficulty we develop a new multivariate spatio-temporal Bayesian model for speciated particulate matter using dynamic spatial factors. These spatial factors can then be interpolated to the pregnant women's homes to be used in a birth outcomes model. The model for birth outcomes allows the impact of pollutants to vary across different weeks of the pregnancy in order to identify susceptible periods. The proposed innovative methodology is implemented using pollutant monitoring data from the Environmental Protection Agency and birth records from the National Birth Defect Prevention Study.

Work in collaboration with Kimberly Kaufeld, Brian Reich, Amy Herring, Gary Shaw and Maria Terres.