

Department of Applied Mathematics and Statistics  
The Johns Hopkins University

**THE INAUGURAL JOHN C. AND SUSAN S. G. WIERMAN LECTURE**

Philip K. Hopke  
Center for Air Resources Engineering & Science  
& Department of Chemical Engineering  
Clarkson University

**Friday, October 15, 2004**  
**110 Maryland Hall**  
Lecture: **11:00 a.m.**  
Reception to follow  
in 304 Whitehead Hall

**ADVANCED FACTOR ANALYSIS METHODS  
FOR RECEPTOR MODELING**

ABSTRACT

Various forms of factor analysis have been applied to airborne particle compositional data since the late 1960s. Over the past several years, new approaches have been developed specifically to examine the receptor modeling problem. The objective of receptor modeling is to resolve the number, compositions, and mass concentration contributions of sources of airborne particulate matter. One approach, Positive Matrix Factorization (PMF), uses an explicit least-squares formalism. This method then permits better treatment of the errors in the data, below-detection-limit and missing values, and easier imposition of constraints. In addition, the least-squares formulation permits building more complex expanded models that can bring additional information such as wind direction and speed into the analysis. In this seminar, an introduction to the receptor modeling problem will be presented and the use of PMF will be illustrated with its application to data from Washington, DC. We have analyzed a set of data in several ways to show how the choice of variables changes the information that can be extracted from the data as well as the application of expanded modeling to the data.

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