

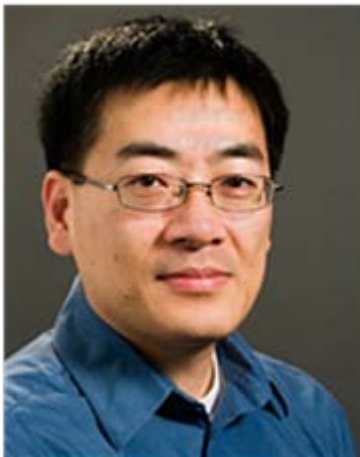


## **Numerical Modeling in Fire Safety Engineering**

**Dr. Kai Kang**

**Senior Project Engineer  
Jacobs Engineering, New York**

Numerical modeling in fire safety engineering encompasses fluid flow, heat transfer, combustion and chemical reaction, and structure and material behavior. Applications of numerical analysis are routinely being used as part of the engineering to ensure fire life safety and to minimize property loss. This presentation will give an overview of fire safety engineering practice and the various areas of applications, such as smoke management, fire modeling, and egress analysis. Examples of fire and smoke control will be presented, including subway stations, tunnels, atria, and airport. A number of case studies on validation and verification of CFD will also be discussed. The case studies include a compartment fire, a model for prediction of window glass breakage due to fire exposure, and the performance of numerical models in predicting water mist cooling in an enclosed chamber under cross ventilation. After the discussion of these examples, a performance-based assessment of a typical design fire scenario in a subway station will be presented to demonstrate how the various modeling techniques may be used together for a better understanding of fire life safety and emergency management



**Dr. Kai Kang** is a senior project engineer at Jacobs Engineering and a registered professional engineer in New York. Since graduating with his Masters and Doctors degrees from Columbia University, Kai has been practicing in fire safety engineering and tunnel ventilation. In particular, he is interested in advancing numerical modeling techniques such as computational fluid dynamics (CFD) in engineering applications. Dr. Kang is a member of National Fire Protection Association (NFPA), Society of Fire Protection Engineers (SFPE) and the International Association of Fire Safety Science (IAFSS). Kai currently serves as program sub-committee Chair for ASHRAE technical committee on “Enclosed Vehicular Facilities” and is Secretary for the committee on “Control of Fire and Smoke”.

**Friday, October 24, 2008  
11:00-12:00pm Room 227 Mudd  
Lunch served at 12:00pm in ME lobby**