



**DEPARTMENT OF PHYSICS AND PHYSICAL
OCEANOGRAPHY COLLOQUIUM**

**“A Mathematical Model for Inhaled
Radioactive Gases”**

Inseok Baek

**Nuclear/Thermal-Hydraulic Methods Engineer
GE-Hitachi Nuclear Energy**

Mathematical simulation models have been used to study transport of insoluble and nonreactive gases for more than twenty years. However, gas and vapor transport and uptake still are not well understood (ICRP 1994) and a mathematical model for slightly soluble and nonreactive gas transport and uptake still has not been developed. This work describes the development of a mathematical model of diffusion, convection, lateral transport into the airway wall, and alveolar absorption for inhaled radioactive gases in human conductive and respiratory airways. The model is based on a single-path trumpet-bell model developed by Scherer et al. (1972). Sensitivity studies were conducted to ascertain the influence on the final model of the functional residual capacity, the tidal volume and diffusivity and solubility. Results obtained with this model are presented for HT gas exposure and are compared to those of Peterman (1982) and the experimental results of Peterman et al (1985). In general, the results obtained in this research are in good agreement with the mean experimental results of Peterman et al (1985).

**Friday, January 30, 2009
2:00 PM
DeLoach Hall, Room 212**

Refreshments will be served at 1:45 PM

