Innovative Design of Kitchen Range Hood

Zechao Lu (Ph.D. Candidate, ME)
Principal Investigators: Jun Chen & Qingyan Chen
Contact: lu500@purdue.edu

Project Description

- Develop innovative concepts for kitchen range hood design to improve the particle capture performance
- Improve the kitchen indoor environment and air quality based on high performance range hood and air supply system

Approach

- Develop CFD simulations of the flow fields induced by a range hood in a model kitchen to evaluate the particle deposition rate on different parts of range hood
- Perform experiments in a model kitchen to study the contaminant transport phenomenon by tracing the diffusion of tracer gas released from the cooktop

Discussion

- 46% percent of the particles are intercepted by the ventilator blades.
- The baseline range hood has similar capture efficiency at high power level and low power level.

Results

Flow field inside the baseline range hood model

Measured capture efficiency

Particle deposition rate on different parts