1. Problem and Objectives
- Exposure to contaminants in the air such as wood dust can cause health problems such as:
  - Dermatitis
  - Allergic respiratory effects
  - Reduction in lung function
  - Nasal cancer
- Socio-economic burden of respiratory diseases accounts for almost six million visits to the GP per year and costs more than A$150 million in direct cost.
- To improve workplace safety through the development of accurate preventative measures such as:
  - Occupational Exposure Limits
  - Ventilation Designs
  - Room Layout and Fresh Air Exchange

2. Integrated Research Strategy
- Experimental Measurements
  - Wood Type/Process
  - Ventilation Designs and Room Layout
  - Particle Dispersions and Airflow Patterns
- Computational Modelling
  - Predictive Model for Innovative Room and Ventilation Designs
  - Evaluation and Recommendations

3. Experimental Measurements
- Measurement of local flow field and particle dispersion using laser technology.
- Field measurements to capture the effects of ventilation systems on the dispersion of harmful dust in the work environment.

4. Computational Modelling
- Human Breathing Patterns
  - Airflow and Deposition in Nasal Cavity
  - Airflow and Deposition in Lungs
  - Exposure Level and Preventative Recommendations
- CAD model creation
- Investigate airflow distribution in a ventilated room
- Determine the inhalation index caused by exposure to dust contaminants.

5. Health Effects
- Chief Investigators
  - Professor Jiyuan Tu (2008 Fulbright Senior Scholar)
  - Dr. Kiao Inthavong (Australian Post-Doctoral Fellow)
- Collaborators and Partner Organisations
  - Purdue University, USA
  - CSIRO
  - D&E Air Conditioning
  - Peninsula Woodturners Guild
  - Airlinx
- Sponsored by
  - Australian Government
  - Australian Research Council

- Computer simulation predicting dust particle deposition in the nasal cavity.
- Inhalation of particles in the respiratory system
- Computer simulation predicting dust particle deposition in the lung airway that causes breathing problems.