GCC Workshop: High school Science Fair Ideas

Dr. David Cocker
dcocker@engr.ucr.edu
Research – Aerosol Formation
Idea 1

- Estimate the (g/mile)/ton of emissions from various modes of transport using the federal transportation database and combining with our emission estimates.
Idea 2

- Improve the emission estimates of any source (jet, ship, truck, etc.) or collection of them by surveying literature and then estimating the impact in Riverside.
Idea 3

- Evaluate physical characteristics of wood smoke or diesel exhaust (conventional or biodiesel).
- This could include particle density and/or morphology (shape)
Idea 4

- Evaluate chemical characteristics of wood smoke or diesel exhaust (or any other source)
Other Ideas

- Chamber projects would include starting compounds from either
  - agricultural precursors (amines)
  - aromatic precursors
    - m-xylene
    - Trimethylbenzene
    - ethylbenzene
  - biogenic (a-pinene, isoprene)
Other Ideas

- Measure/report for/on agricultural compounds present in the atmosphere using high resolution mass spectrometry
Characterization of particles

- Use advanced chamber instrumentation to evaluate fine particle formation
- Evaluate particle aging by investigating changing
  - volatility
  - hygroscopicity (water uptake)
  - particle density
  - chemical composition
- Evaluate particle growth using scanning mobility particle sizer