Towards a Scientific Understanding of Air Quality and Climate

Connecting sources and transformations to health and climate effects

**Transformations**

**Primary Emissions**
- Gas phase: CO, CO\textsubscript{2}, CH\textsubscript{4}, NO\textsubscript{x}, SO\textsubscript{x}, NH\textsubscript{3}, VOC's
- Particles: Mineral dust, Sea spray, Black / brown carbon

**Secondary Sources**
- Gas phase: Ozone, OH radical
- Particles: Secondary organic aerosol
- Aerosol gas and particle phase chemistry

**Impacts**
- Cloud formation and effects
- Human health interactions
- Global transport

**Sources**
- Oil industry
- Sea-spray aerosol
- Urban emissions
- Biogenic emissions
- Wind-blown dust

**CNAS Environmental Faculty**

Laboratory Research
- Bahreini • Davies • Lin • Zhang • Zhang

Climate and AQ Modelling
- Allen • Li • Porter

Field Observations
- Hopkins • Bahreini • Lin • J. Zhang

CNAS faculty work across the full range of length and timescales to develop a broad understanding of the complexity of the atmosphere.

**Multiphase and multiscale processes in the atmosphere**

**Fundamental Interactions**
- J. Zhang (Chemistry)
- Davies (Chemistry)

**Ensemble Dynamics**
- Bahreini (Env. Sc.
- H. Zhang (Chemistry)
- Lin (Env. Sc.

**Environmental Interactions**
- Porter (Env. Sc.
- Hopkins (Env. Sc.
- Li (Env. Sc.
- Allen (Earth Sc.

**Increasing length scale and complexity**

**Marlan and Rosemary Bourns College of Engineering**

Campus-wide collaborative effort to explore air quality and climate from molecular to global scales