Possible Topics for the Chem 245 Term Paper

**Measurements**
- Use of proton-transfer reaction mass spectrometry (PTR-MS) for on-line measurements of oxygenated volatile organic compounds (VOCs) in urban and remote atmospheres.
- Use of aerosol mass spectrometry (AMS) for on-line measurements of particulate matter (PM) organics in urban environments.
- Overview of single particle mass-spectrometry methods and their applications covering tropospheric and stratospheric chemistry.
- Applications of high-resolution (resolving power > 30000) mass spectrometric methods to critical atmospheric chemistry problems.
- Current state-of-the-art instrumentation for measurements of criteria pollutant X (where X is the criteria pollutant of choice) and its future development.
- Techniques for measuring HNO₃ and H₂SO₄ in the atmosphere.
- Measurements of speciated and total amount of alkyl nitrates (RONO₂) in the atmosphere.
- Overview of methods for measurements of OH and HO₂ concentrations in air.
- Overview of methods for quantifying light-absorption by aerosol particles.
- Methods for characterization of soot.

**Atmospheric Chemistry**
- Review of the current state of knowledge on lifetimes of RO₂ radicals.
- Review of chemistry of isoprene oxidation.
- Reactive uptake of ozone by organic surfaces serving as proxies for organic aerosols.
- Photochemical processes occurring in the Arctic snow packs resulting in a release of halogens such as Cl₂ and BrCl in the atmosphere.
- Processes leading to the formation of HONO and the role of HONO in atmospheric photochemistry.
- Hydroxyl radical (OH) production from ozonolysis of unsaturated hydrocarbons in gas phase.
- Reactive uptake of OH and HO₂ by surfaces of atmospheric interest.
- Unique photochemistry of atmospheric weakly-bound complexes.
- Sources and sinks of N₂O in the stratosphere.
- Wavelength dependent quantum yields in photodissociation of formaldehyde.
- Chemical processes occurring on Sahara mineral dust particles.
- Review of photochemical processes occurring in fog and rain droplets.
- Atmospheric chemistry of mercury.

**Field and Remote Measurements**
- Field measurements of NOₓ partitioning in the Amazon forest.
- Atmospheric lifetimes and fates of halons.
- Chemistry and origins of iodine containing molecules in coastal air.
- Trends in UV at the Earths’ surface and their relationship to trends in stratospheric O₃.
• The role of isotope studies in constraining sources and sinks of CO₂ in the atmosphere.
• Remote sensing of global distribution of methylglyoxal from space.
• DOAS measurements from space.

Health Effects of Air Pollutants
• Occurrence and health effects of nitro-PAHs in the greater Los Angeles area.
• Peroxides, quinones, or any of your favorite classes of molecules as major contributors to the health effects of air pollution.

Other
• Any other topic relevant to atmospheric chemistry you find interesting.