

# AirUCI Summer 2009 Schedule

## Monday, June 22

### **9 am to 10 am: Room Rowland Hall 390**

- Brief welcome by **Prof. Barbara Finlayson-Pitts**
- Entrance evaluations

### **10 am to 11.30 am: Room RH 390**

- Lecture by **Prof. J. Mickey Laux**
  - Overview of the atmosphere: Regions (p. 28), pressure and temperature (p. 29), inversions (p. 29, 41) and composition (p. 28, 29, 59, 91–97, 218, 219 & 239)
  - Free radicals (p. 48, 92, 176 & 177) and Sinks (p. 77 & 178)
  - Overview of common public environmental concerns
  - Mathematics in chemistry review (p. 93 & 94 “Box 3–1”)

### **11.30 am to 12.30 pm: Lunch with AirUCI faculty and researchers (provided)**

- Introductions of the AirUCI faculty and associates (starting at noon)
- Administrative notes by Prof. Sergey Nizkorodov

### **12.30 pm to 2.30 pm: Room RH 390**

- Mickey Laux’s lecture – continued
- Using Microsoft Excel for plotting on laptops
- Discussion of lab safety issues
- Distribution of safety attire
- Forming lab groups of 4 people (20 attendees divided into 5 experiments) and setting up rotation schedule amongst the wet lab experiments

### **2.30 pm to 4 pm: Room RH 481**

- Overview of wet labs by **Prof. S. Nizkorodov and Prof. J. Mickey Laux**
  1. Determination of PAH in cigarette smoke by HPLC
  2. Determination of MTBE and benzene in gasoline by GC/MS
  3. MTBE in gasoline and ethanol in vodka / mouthwash measured by FTIR
  4. Ability of catalytic converters to reduce air pollution
  5. Laser-Induced Breakdown Spectroscopy (LIBS) of common metals
- Common lab techniques: pipetting, measuring volumes, mixing solvents, using syringes

## Tuesday, June 23

### **9 am to 10 am: Room Rowland Hall 390**

- Lecture by **Prof. Sergey Nizkorodov**
  - The use of light in analytical chemistry
  - Absorption of specific wavelengths by molecules and Beer's Law (p. 30, 31, 217, 218, 229, 242 & 245)
  - Fluorescence (p. 199–201)
  - Overview of the optical instrumentation used in the labs

### **10 am to 11 am: Room Rowland Hall 390**

- Lecture by **Prof. J. Mickey Laux**
  - Fundamentals of Chromatography (p.398–401, 540–543 & 657–660)
  - An “inside view” of chromatographic instruments and a mass spectrometer

### **11 am to 12 pm: Lunch with AirUCI faculty and researchers (provided)**

### **12 pm to 4 pm: Rooms RH 481**

- Each team does their first wet lab experiment

## **Wednesday, June 24**

**9 am to 11 am: Room Rowland Hall 390**

- Lecture by **Prof. Barbara Finlayson-Pitts**
  - Interaction of light with matter and environmental photochemistry (p. 30 & 37–40)
  - Applications to the Chapman reactions (p. 40–43), CFC's (p. 55, 77–85 & 244), and Ozone Depletion (p. 27, 32–36, 47, 48, 50–55, & 59–76)
  - Chemistry of NO<sub>x</sub> (p. 75 & 100), Photochemical Smog and Tropospheric Ozone (p. 97–109, 156–160, 179–181, 185–191 & 245)

**11 am to 12 pm:** Lunch with AirUCI faculty and researchers (provided)

- Special lunch presentation by Bosa Njelic

**12 pm to 4 pm: Rooms RH 481**

- Continue with the second wet lab experiment

## **Thursday, June 25**

**10 am to 12 pm: Room Rowland Hall 390**

(shifted by 1 hour because of the PC lab availability issues)

- Lecture by **Prof. Doug Tobias**
  - Molecular structure and vibrations (p. 214–217)
  - Fundamentals of molecular dynamics
  - Review of computational chemistry

**12 pm to 1 pm:** Lunch with AirUCI faculty and researchers (provided)

**1 pm to 5 pm: Room MSTB 226B**

- **Computer Lab: Chemistry on the computer**

## **Friday, June 26**

**10 am to 12 pm: Room Rowland Hall 390**

(shifted by 1 hour because of the PC lab availability issues)

- Lecture by **Prof. Donald Dabdub**
  - Basics of computer modeling and simulations
  - Specific applications to LA basin (p. 97–109 on LA Smog)
  - Global Circulation Models and Predictions (p. 254 & 255)

**12 pm to 1 pm:** Lunch with AirUCI faculty and researchers (provided)

**1 pm to 5 pm: Room MSTB 226B**

- **Computer Lab: Simulations of air pollution in the LA basin**

## **Monday, June 29**

### **9 am to 11 am: Room Rowland Hall 390**

- Lecture by **Prof. John Hemminger**
  - Fundamentals of surface science and environmental concerns at surface interfaces
  - Catalysts and catalytic converters (p. 18 & 109–114)
  - Sea salt aerosols
  - Heterogeneous SO<sub>2</sub> oxidation (p. 126–128) and PSC's (p. 64 & 65)

**11 am to 12 pm:** Lunch with AirUCI faculty and researchers (provided)

### **12 pm to 4 pm: Rooms RH 481**

- Continue with the third wet lab experiment

## **Tuesday, June 30**

### **9 am to 11 am: Room Rowland Hall 390**

- Lecture by **Prof. Sergey Nizkorodov**
  - Particulate matter (PM<sub>10</sub> and PM<sub>2.5</sub>) (p. 132–140)
  - Health risks of particulate matter (p. 155, 156 & 160–163)
  - Light interaction with particulates (p. 146, 246 & 247)
  - Aerosols: Composition and Effects on Global Warming (p. 133, & 246–251)
  - VOC's (p. 97) and Polycyclic Aromatic Hydrocarbons, PAH (p. 507–517)
  - Fuels: Fossil Fuels (p. 261–269), H<sub>2</sub> (p. 272–274 & 350–363), Coal (p. 124, 125, 129–132, 270 & 271), Petroleum and Gasoline (p. 274–281), Diesel (p.114 & 115)
  - Alcohols as Fuel (p. 333–345), MTBE (p. 345 & 346)

**11 am to 12 pm:** Lunch discussion of applications of material to their teaching (provided)

### **12 pm to 4 pm: Rooms RH 481**

- Continue with the fourth wet lab experiment

## **Wednesday, July 1**

### **9 am to 11 am: Room Rowland Hall 390**

- Lecture by **Prof. Benny Gerber**
  - The Hydrogen Bond in Chemistry (p. AP. 10 in the Appendix)

**11 am to 12 pm:** Lunch with AirUCI faculty and researchers (provided)

### **12 pm to 4 pm: Rooms RH 481**

- Continue with the fifth wet lab experiment

## **Thursday, July 2**

### **9 am to 1.00 pm: Room Rowland Hall 390 (initially)**

- Exit evaluations
- Guided tours of research labs of AirUCI Professors (split into small groups of 5 people)

**1.00 pm to 3.00 pm:** Lunch with AirUCI faculty and researchers (provided)

- Discussion of lab results
- Early dismissal at 2:30 pm.