

# AirUCI Summer 2010 Schedule

## Monday, June 28

### **9 am to 9:45 am: Room Rowland Hall 390**

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

### **9:45 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), sources and sinks (p. 77 & 178)
  - Overview of common public environmental concerns

### **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 issues

### **12:30 pm to 2:30 pm: Room RH 390**

- Lecture by **Prof. J. Mickey Laux - continued**
  - Mathematics in chemistry review (p. 93 & 94 “Box 3–1”)
  - Using Microsoft Excel for plotting on laptops
- Safety by **Prof. Sergey Nizkorodov**
  - Discussion of laser and lab safety
  - Distribution of safety attire
  - Forming lab groups (20 attendees divided into 5 groups of 4 people)

### **2:30 pm to 4 pm: Room RH 481**

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

## Tuesday, June 29

### **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)
  - Emission and fluorescence (p. 199–201)
  - Overview of selected lab experiments: catalytic converters; LIBS.

### **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 30**

**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)

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

- Continue with the second wet lab experiment

## **Thursday, July 1**

**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 with examples pertaining to atmospheric chemistry research
  - Overview 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 – Spartan lab

## **Friday, July 2**

**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)
  - Solar energy research and photovoltaics [p. 312, 316 (Fig. 8-2), 319 (Fig 8-4) and 325-333]
  - Sea salt aerosols

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

- **Short presentation by Prof. John Hemminger on the energy science policy and the importance of basic research in dealing with the combined energy/environment issues.**

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

- Continue with the third wet lab experiment

## **Saturday, July 3 to Monday, July 5: Independence Day Break**

## **Tuesday, July 6**

### **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)
  - Indoor air pollutants
  - 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), Alcohols (p. 333–345), MTBE (p. 345 & 346)

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

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

- Continue with the fourth wet lab experiment

## **Wednesday, July 7**

### **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)

- **Historical perspectives on air pollution research and regulation by Prof. Jim Pitts.**

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

- Computer Lab: Simulations of air pollution in the LA basin – PSE lab

## **Thursday, July 8**

### **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

## **Friday, July 9**

### **9 am to 1 pm: Room Rowland Hall 390 (initially)**

- Guided tours of research labs of AirUCI Professors (split into 3 groups of 6-7 people)
- Exit evaluations
- Discussion of lab results

**1 pm to 3 pm:** Special lunch with AirUCI faculty and researchers (provided)