

AirUCI Summer Institute 2011 Schedule

Monday, June 27

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)
 - VOC's (p. 97) and Polycyclic Aromatic Hydrocarbons, PAH (p. 507–517)
 - 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
 - Forming lab groups (20 attendees divided into 5 groups of 4 people)
- Safety by **Prof. Sergey Nizkorodov**
 - Discussion of laser and lab safety
 - Distribution of safety attire

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 28

9 am to 10 am: Room Rowland Hall 390

- Lecture by **Prof. Sergey Nizkorodov**
 - The use of light in analytical chemistry
 - Absorption of light and Beer's Law (p. 30, 31, 217, 218, 229, 242 & 245)
 - Emission and fluorescence (p. 199–201)
 - Lasers; Overview of the LIBS lab.

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 (see handout on website or in email)

Wednesday, June 29

9 am to 11 am: Room Rowland Hall 390

- Lecture by **Prof. Barbara Finlayson-Pitts**
 - Light and Photochemistry (p. 30 & 37–40)
 - 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_x (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, June 30

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)

Special lunch talk by Prof. **Eric Saltzman** on ice cores analysis. (p. 218–220)

1 pm to 5 pm: Room MSTB 226B

- Computer Lab: Chemistry on the computer – Spartan lab

Friday, July 1

9 am to 11 am: Room Rowland Hall 390

- Lecture by **Prof. Filipp Furche**
 - Overview of electronic structures and calculations
 - Electronically excited states applied to the atmospheric (HONO, O*, etc.) (pp.: 38, 42, 95, 167, 189–191 and 235)

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

Saturday, July 2 to Monday, July 4: Independence Day Break

Tuesday, July 5

9 am to 10 am: Room Rowland Hall 390

- Lecture by **Prof. Sergey Nizkorodov**
 - Particulate matter (PM₁₀ and PM_{2.5}) (p. 132–140)
 - Light interaction with particulates (p. 146, 246 & 247)
 - Aerosols: Composition and Effects on Global Warming (p. 133, & 246–251)

10 am to 11 am: Room Rowland Hall 390

- Lecture by **Prof. Mike Kleinman**
 - The health effects of particulate matter (p. 155, 156 & 160–163)

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 6

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 climate prediction viability (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 – PSE lab

Thursday, July 7

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)
 - Photovoltaic cells [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)

- Lunch 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 fifth wet lab experiment

Friday, July 8

9 am to 1:00 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

1:00 pm to 3:00 pm: Special lunch with AirUCI faculty and researchers (provided)