AirUCI Summer Institute 2012 Schedule

Monday, June 25

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, pressure and temperature (p. 4–5), inversions (p. 4, 17–18) and composition (p.5, 37–38, 69–70, 179–180, 189–191 and 274–275)
  - Free radicals (p. 21, 755–761), sources and sinks (p. 54, 758)
  - VOC's (p. 77–78) and Polycyclic Aromatic Hydrocarbons, PAH (p. 663–672)
  - Overview of common public environmental concerns
  - Overview of Organic Chemistry (online at: www.whfreeman.com/envchem5e)

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. 71–72, "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 26

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.6–9, 177–179, 184–186, 193 and 197)
  - Emission and fluorescence
  - Lasers; Overview of the LIBS lab.

10 am to 11 am: Room Rowland Hall 390

- Lecture by **Prof. J. Mickey Laux**
  - Fundamentals of Chromatography; Overview of HPLC and GCMS Labs

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 27

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

- Lecture by **Prof. Barbara Finlayson–Pitts**
  - Light and Photochemistry (p. 6–7 and 13–16)
  - The Chapman reactions (p. 16–20), CFC's (p. 29, 55–63 and 195–196), and Ozone Depletion (p. 3, 8–12, 18–30 and 37–56)
  - Chemistry of NO_x (p. 23 and 83), Photochemical Smog and Tropospheric Ozone (p. 76–87, 149–150 and 764–771)

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 28

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. 175–177)
  - 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. 179–181)

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

- Computer Lab: Chemistry on the computer – Spartan lab (Greenhouse Gases)

Friday, 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. 91–98)
  - Photovoltaic cells (p. 361–367)
  - Sea salt aerosols (p. 445)

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 third wet lab experiment

Monday, July 2

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.: 15, 18–19, 73, 156, 187 and 769)

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

Tuesday, July 3

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. 76–87 on LA Smog)
  - Global Circulation Models and climate prediction viability (p. 206–207)

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

Wednesday, July 4: Independence Day Break

Thursday, July 5

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

- Lecture by **Prof. Sergey Nizkorodov**
  - Particulate matter (PM_{10} and $PM_{2.5}$) (p. 118–122 and 126–130)
  - Light interaction with particulates (p. 136 and 197–200)
  - Aerosols: Composition and Effects on Global Warming (p. 200–202)

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

- Lecture by **Prof. Mike Kleinman**
  - The health effects of particulate matter (p. 145–152)

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 6

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)