

## ASU Winter School 2009

### Outline of Labs (Syllabus)

#### A. Image and Diffractogram Analysis

Instructor: **Moon Kim** and **Joe McKeown**

Location: Visualization lab in Goldwater, GWC B16

Aim: To show how defocus astigmatism and spherical aberration can be measured from a micrograph of an amorphous specimen and how periodicities of small particles in amorphous or crystalline matrices can be analyzed.

#### B. Image Simulation

Instructor: **Paul Perkes**

Location: PSB 152

Aim: To show how images are calculated using the multi-slice algorithm and to explore effects of defocus and thickness.

#### C. Diffraction and HREM I

Instructor: **JM Zuo** and **Tom Sharp**

Location: Topcon, 154C

Aim: To demonstrate electron diffraction and high resolution microscopy of a crystalline specimen, effects of crystal tilt, focusing, stigmatism.

#### D. HREM II - 4000 Au on carbon

Instructor: **Renu Sharma**

Location: JEOL 4000, PSB 54F

Aim: Fine tuning for HREM, especially adjustment of beam tilt – coma free.

#### E. STEM I

Instructor: **Karl Weiss** and **Lin Zhou**

Location: CM 200, PSB 54B

Aim: To demonstrate small probe formation in the scanning transmission electron microscope, and image acquisition using the high angle annular dark-field technique (Z-contrast imaging).

#### F. STEM II

Instructor: **Jingyue Liu** and **David Cullen**

Location: JEOL 2010, Goldwater GW B22B

Aim: Fine tuning for atomic resolution STEM, especially adjustment of rhonchigram.

#### G. EELS

Instructor: **Rolf Erni** and **Nan Jiang**

Location: Tecnai, PSB 159

Aim: To demonstrate the acquisition of EELS. To show how the various operating modes of the microscope should be used in the acquisition of EELS. (Operation of GIF?)

#### H. EDX

Instructor: **Masashi Watanabe** and **Zhen Liu**

Location: JEOL 2000, GWC B22A

Aim: To demonstrate the acquisition of EDX. To show how the various operating modes of the microscope should be used in the acquisition of EDX.