

# **AEP 661: NANOCARACTERIZATION**

**FALL 2006**

## **Course Topics:**

1. Introduction
  - i. The Scale of Things
  - ii. Acronyms and Comparison Charts
2. Physical Probe Microscopy
  - i. Atomic Force Microscopy
  - ii. Contact vs Tapping Mode
  - iii. Scanning Tunneling Microscopy
  - iv. STM Tip Artifacts
  - v. NSOM, MFM, MRFM
3. Charged Particle Optics and Scattering
  - i. Vacuum Technology
  - ii. Constants and Wavelengths
  - iii. Scattering Theory, elastic and inelastic, RBS
  - iv. Total and Partial Cross Sections
  - v. Electron Mean Free Path
  - vi. Multiple Scattering
  - vii. Beam Spreading
4. Scanning Electron Microscopy
  - i. Secondary Electron Yields
  - ii. Sample Charging and Electron mirrors
  - iii. Secondary Electron Images
  - iv. Backscattered Electron Physics and Images
  - v. EBSD: Orientational Imaging using backscatter diffraction
5. Energy-Dispersive X-Ray Analysis
  - i. X-ray Mass absorption coefficients
  - ii. EDX Detectors
6. Transmission Electron Microscopy
  - i. Electron Sources
  - ii. Resolution and Brightness
  - iii. Electron Energy Loss spectroscopy
  - iv. STEM, TEM and EFTEM
  - v. EELS fine structure