

Course Outline

Scanning Probe Microscopy: from Fundamentals to Advanced Applications

June 9-12, 2008

5:00-8:00	Sunday, June 8 (evening) Registration (Whitaker Lobby)
Day One 8:45-9:00 9:00-10:30 10:30-10:45 10:45-12:00 12:00 1:15-3:00 3:00-3:15 3:15-5:25 5:15 7:15-8:00 8:00-10:00	Monday, June 9 Welcome and Introduction Introduction to Principles of SPM: Scanning Tunneling Microscopy and Atomic Force Microscopy Break General Introduction to Principles of Scanning Probes II Lunch Touching the Surface Without Breaking Something Break Choosing a Probe Shape Dinner Implementing STM Lab 1: Overview of Instrumentation for Ambient, Vacuum and Solution Analysis
Day Two 8:30-10:30 10:30-10:45 10:45-12:00 12:00 1:15-3:00 3:00-3:15 3:15-5:15 5:30 7:15-9:15	Tuesday, June 10 Implementing SPM: Contact, Non-contact, Amplitude and Phase Imaging, MFM, EFM Break Lab 2: Operation of AFM and Imaging Modes I Practical Aspects of Getting a Stable Image Lunch Topography Data Analysis: From Atomic Structure to Macroscopic Roughness Break Lab 3: Data Acquisition and Basic Image Processing Dinner Atomic Resolution AFM, Dynamic Force Microscopy

Day Three 8:30-10:00 10:00-10:15 10:15-12:00 12:00 1:15-3:15 3:15-3:30 3:30-5:00 6:30	Wednesday, June 11 Advanced SPM: Accessing a Wide Range of Properties (Imaging Electronic Properties: <i>Surface Potential, Scanning Capacitance, Spreading Resistance, Scanning Gate Microscopy, Scanning Conductance Microscopy, Tunneling as a Transport Probe</i> Break Lab 4: Operation of SPM and Imaging Modes II Advanced SPM Techniques: MFM, EFM, SSPM Lunch More Advanced SPM: Accessing a Wide Range of Properties—Emerging Techniques Based on Multiple Modulation: <i>Piezo Force Microscopy, Second Harmonic PFM, Nano Impedance Microscopy, Microwave Dielectric Microscopy</i> Break Lab 5: Special Applications • Junction Properties in Semiconductors • Imaging current flow in electronic ceramic device • Electrochemistry in water: corrosion • Fracture surface analysis • Defects in a computer hard drive Banquet
Day Four 8:30-10:00 10:00-10:15 10:15-11:00 11:00-12:00 12:00 1:15-2:30 2:30-3:00 3:15-5:00 7:15-9:15	Thursday, June 12 Mechanical Properties: Concepts and Techniques Break Mechanical Properties: Indentation Lab 6: Nanoindentation with Hysitron Equipment Lunch SPM in Liquids: Local Chemistry and Biological Applications Student Application Issues and Questions Optional Instrument Use by Appointment with Vendors

Note: All classes and labs will be held in Whitaker Lab.

Disclaimer: The organizers reserve the right to change the instrumentation or sequence of lecture topics and to cancel lectures or substitute lecturers if necessitated by circumstances beyond their control. Updated 9/18/07