

Syllabus

Lecture	Subject	Lecturer
1. Introduction		
Lecture 1 (Tue 9/3)	Introduction: Part I <ul style="list-style-type: none"> • Neutron properties • Fermi pseudo-potential • The scattering cross section • The born approximation • Coherent and incoherent scattering 	Sunil Sinha (UCSD)
Lecture 2 (Thu 9/5)	Introduction: Part II <ul style="list-style-type: none"> • Structure factors and pair distribution functions • Small angle scattering and surface scattering 	
Lecture 3 (Tue 9/10)	Introduction: Part III <ul style="list-style-type: none"> • Inelastic scattering and dynamical structure factors 	
Lecture 4 (Thu 9/12)	Inelastic Scattering (continued) & Formal Theory of Scattering	
2. Experimental methods for probing the structural/dynamical properties at different spatial/temporal regions of soft matter		
Lecture 5 (Tue 9/17)	Neutron Sources & Instrumentation	Bill Hamilton (ORNL)
Lecture 6 (Thu 9/19)	Small Angle Neutron Scattering	
Lecture 7 (Tue 9/24)	Static Light Scattering & X-Ray Scattering: Part I	Benjamin Chu (Stony Brook U)
Lecture 8 (Thu 9/26)	Static Light Scattering & X-Ray Scattering: Part II	
Lecture 9 (Tue 10/1)	Neutron Reflectometry	Chuck Majkrzak (NIST)
Lecture 10 (Thu 10/3)	Polarized Neutrons	
Lecture 11 (Tue 10/8)	Quasi-elastic Neutron Scattering	Ken Herwig (ORNL)
Lecture 12 (Thu 10/10)	Neutron Spin Echo Applications to Soft Matter: Macromolecular Dynamics	Dieter Richter (Jülich Center for Neutron

		Science)
Lecture 13 (Tue 10/15)	Applications of X-ray Photon Correlation Spectroscopy to Soft Condensed Matter	Simon Mochrie (Yale U)
Lecture 14 (Thu 10/17)	Atomic Scale Structure Using Neutrons <ul style="list-style-type: none"> • Background and theory • Pharmaceuticals and polymers • Water and solvation studies 	Simon Billinge, (Columbia U/BNL)
Lecture 15 (Tue 10/22)	Colloids & Confocal Microscopy: Part I	David Weitz (Harvard U)
3. Applications		
Lecture 16 (Thu 10/24)	Colloids & Confocal Microscopy: Part II	David Weitz (Harvard U)
Lecture 17 (Tue 10/29)	Application of Small-Angle Neutron Scattering to Polymers: Part I	Tim Lodge (U Minnesota)
Lecture 18 (Thu 10/31)	Application of Small-Angle Neutron Scattering to Polymers: Part II	
Lecture 19 (Tue 11/5)	Biological Applications: Part I	Jeremy Smith (UTK/ ORNL)
Lecture 20 (Thu 11/7)	Biological Applications: Part II	
Lecture 21 (Tue 11/12)	Gels: <ul style="list-style-type: none"> • Micellar Gels • Fibrillar Gels 	Bradley Olsen (MIT)
Lecture 22 (Thu 11/14)	Self-assembly: <ul style="list-style-type: none"> • Lipids • Block Copolymers 	
Lecture 23 (Tue 11/19)	Importance of Water to Soft Matter Systems	Eugene Stanley (Boston U)
Lecture 24 (Thu 11/21)	Supercooled Liquids and Glass Transition	Yang Zhang (UIUC)
11/25 to 29	Thanksgiving Break	
Lecture 25 (Tue 12/3)	Rheology and Small Angle Neutron Scattering	Norm Wagner (U Delaware)
Lecture 26 (Thu 12/5)	Computer Simulation and Quasi-elastic Neutron Scattering	Juan Colmenero (U of Basque Country)

Advisors:

Sow-Hsin Chen, USA
Takeji Hashimoto, Japan
Dieter Richter, Germany
John White, Australia

Organizing Committee:

Meiyun Chang-Smith (ORNL), Coordinator
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Sow-Hsin Chen (MIT)
Sunil Sinha (UCSD)