

The nmRC Seminar Series – Autumn 2019

Run with Graduate School:

	10:00-13:00	13:00-16:00
Wed. Oct 30 th		1: EM: Introduction to SEM and SEM Sample Prep
Wed. Nov 6 th		2: EM: Introduction to TEM and TEM Sample Prep
Wed. Nov 13 th	3: Light Scattering: Nanoparticle Analysis I (10:00-12:00)	3: Light Scattering: Raman Spectroscopy I (14:00-16:00)
Wed. Nov 20 th	4: XPS & ToF SIMS – 1 (10:00-11:30) nmRC	4: XPS & ToF SIMS (13:00-14:30) nmRC

nmRC

	13:00-14:30	
Tues. Nov 5 th	5: EM: Image processing & simulation	
Thurs. Nov 7 th	6: EM: Spectroscopy	
Tues. Nov 12 th	7: ESEM	
Thurs. Nov 14 th	8: EM: WDS & MLA-SEM	
Tues. Nov 19 th	9: Light Scattering: Nanoparticle Analysis II	
Tues. Nov 26 th	10: Light Scattering: Raman Spectroscopy II	
Thurs. Nov 28 th	11: EM: Biological Sample Prep & Intro to Cryo-EM	
Tues. Dec 3 rd	12: EM: <i>in situ</i> techniques	
Thurs. Dec 5 th	13: EBL	
Thurs. Dec 12 th	14: EM: FIB-SEM	

1: Electron Microscopy: Introduction to Scanning Electron Microscopy (SEM) and SEM Sample Preparation

Wednesday 30th October 2019 13:00-16:00

Location: C15 Chemistry Building

Course convenor: Dr. Beth Steer and Prof. Paul D Brown

This course is designed for electron microscopy users at the nmRC and is suited ideally for novice users or those wanting refresher training. This course will cover:

- Introduction to the nmRC
- Introduction to scanning electron microscopy (SEM)
- Overview of SEM instrumentation
- Introduction to sample preparation for SEM
- Strategies for handling bulk, thick/thin film (plan-view/cross-section) and particulate materials
- Strategies for handling hard, soft and temperature sensitive materials
- Tripod polishing; dimpling; ion beam thinning; cleaning protocols/plasma cleaning

Max. places = 50

2: Electron Microscopy: Introduction to Transmission Electron Microscopy (TEM) and TEM Sample Preparation

Wednesday 6th November 2019 13:00-16:00

Location: C15 Chemistry Building

Course convenor: Dr. Beth Steer and Prof. Paul D Brown

This course is designed for electron microscopy users at the nmRC and is suited ideally for novice users or those wanting refresher training. This course will cover:

- Introduction to nmRC
- Introduction to transmission electron microscopy (TEM)
- Overview of TEM instrumentation
- Introduction to sample preparation for TEM
- Strategies for handling bulk, thick/thin film (plan-view/cross-section) and particulate materials
- Strategies for handling hard, soft and temperature sensitive materials
- Tripod polishing; dimpling; ion beam thinning; cleaning protocols/plasma cleaning

Max. places = 50

3: Light Scattering: Nanoparticle Analysis and Raman Spectroscopy I

Wednesday 13th November 2019 10:00 – 12:00 and 14:00-16:00

Location: B23 or C29 Physics Building 10:00-12:00, C04 Physics Building 14:00-16:00.

Course convenor: Dr. Graham Rance

This lecture is designed for novice users of the particle sizing and micro Raman spectroscopy facilities at the nmRC or those wanting refresher training. This lecture will cover:

- Introduction to the light scattering techniques used for materials characterisation
- Introduction to elastic light scattering, including applications in dynamic and electrophoretic light scattering (DLS and ELS, respectively) and nanoparticle tracking analysis (NTA)
- Introduction to inelastic light scattering, including applications in micro Raman spectroscopy (μ RS)

Max. places = 40

4: XPS & ToF SIMS: Surface analysis with X-ray Photoelectron Spectroscopy (XPS) and Time of flight Secondary Ion Mass Spectrometry (ToF SIMS)

Wednesday 20th November 2019 10:00-11:30 (XPS) and 13:00-14:30.(ToF SIMS)

Location: A05 nmRC (Cripps South Building) both sessions.

Course convenor: Dr. Emily Smith and Dr David Scurr

This course provides an introduction to the two principle surface analysis instruments available in nmRC, X-ray Photoelectron Spectroscopy (XPS) and Time of flight Secondary Ion Mass Spectrometry (ToF SIMS) and is intended for novice users of this instrumentation. The course will cover:

Part 1

- Introduction to XPS theory and instrumentation (basics & capabilities)
- Example analysis of XPS data for 'real' samples.

Part 2

- Introduction to ToF SIMS and 3D OrbiSIMS theory and instrumentation (basics & capabilities)

Max. places = 25

5: Electron Microscopy: Introduction to Image processing & simulation

Tuesday 5th November 2019 13:00 – 14:30

Location: A05 nmRC (Cripps South Building)

Course convenor: Dr. Mike W Fay

This course is designed for electron microscopy users at the nmRC and is suited ideally for novice users or those wanting refresher training. This course will cover:

- Introduction to digital images and image processing
- Introduction to image simulation

Max. places = 25

6: Electron Microscopy: Spectroscopy

Thursday 7th November 2019 13:00-14:30

Location: A05 nmRC (Cripps South Building)

Course convenor: Dr. Mike W. Fay

This course is designed for electron microscopy users at the nmRC and is suited ideally for novice users or those wanting refresher training. This course will cover:

- Introduction to spectrometry – principles and applications within electron microscopy.
- An overview of the spectroscopy techniques of EDS and WDS in SEM; and EDS and EELS in TEM.

Max. places = 25

7: Electron Microscopy: Environmental Scanning Electron Microscopy (ESEM)

Tuesday 12th November 2019 13:00 – 14:30

Location: A05 nmRC (Cripps South Building)

Course convenor: Nikki Weston

This course provides an introduction to Environmental Scanning Electron Microscopy (ESEM) and is intended for novice users of this instrumentation. The course will cover:

- Introduction to ESEM instrumentation (basics & capabilities) and sample handling

Max. places = 25

8: Electron Microscopy: Advanced X-ray analysis for trace elements in inorganic samples: Wave Dispersive Spectrometers, electron microprobes and an introduction to Mineral Liberation Analysis

Thursday 14th November 2019 13:00 – 14:30

Location: A05 nmRC (Cripps South Building)

Course convenor: Dr. Beth Steer

This course provides an introduction to wave dispersive spectrometers (WDS) and their uses in SEM and in electron microprobes (EPMA). An introduction to electron microprobes will also be covered. The course will also introduce the technique of mineral liberation analysis SEM (MLA-SEM) for phase analysis.

- Introduction to EPMA theory and instrumentation (basics & capabilities)
- Introduction to MLA-SEM theory and instrumentation (basics & capabilities)

Max. places = 25

9: Light Scattering: Nanoparticle Analysis II

Tuesday 19th November 2019 13:00 – 15:00

Location: A05 nmRC (Cripps South Building)

Course convenor: Dr. Graham Rance

This seminar is explicitly designed for current users of the particle sizing facilities at the nmRC. The seminar will cover:

- In-depth consideration of nanoparticle analysis instrumentation
- Development of best measurement practice

Max. places = 25

10: Light Scattering: Raman Spectroscopy II

Tuesday 26th November 2019 13:00 – 15:00

Location: A05 nmRC (Cripps South Building)

Course convenor: Dr. Graham Rance

This seminar is explicitly designed for current users of the particle sizing facilities at the nmRC. The seminar will cover:

- In-depth consideration of Raman spectroscopy instrumentation
- Development of best measurement practice

Max. places = 25

11: Electron Microscopy: Biological sample preparation & Introduction to Cryo-EM

Thursday 28th November 2019 13:00 – 14:30

Location: A05 nmRC (Cripps South Building)

Course convenor: Dr. Julie Watts

This course provides an introduction to Cryogenic Electron Microscopy (Cryo-EM) and is designed for people wishing to image tissues or cells and includes:

- Introduction to Cryo-EM instrumentation (basics & capabilities) and sample handling
- An overview of fixation techniques including cryo
- An overview of staining techniques
- An overview of trimming considerations
- An overview of imaging considerations
- Correlation with other techniques

Max. places = 25

12: Electron Microscopy: *In situ* techniques for SEM and TEM

Tuesday 3rd December 2019 13:00 – 14:30

Location: A05 nmRC (Cripps South Building)

Course convenor: Prof. Paul D Brown

This course is designed for electron microscopy users at the nmRC and is suited ideally for novice users or those wanting refresher training. This course will cover:

- Introduction to *in situ* techniques for SEM - including strain-stage, hot-stage, EBSD

- Introduction to *in situ* techniques for TEM - including hot-stage, cold-stage, tomography, gas-cell, electrical-contact...

Max. places = 25

13: Further uses of Electron beam lithography (EBL)

Thursday 5th December 2019 13:00 – 14:30 Location: A05 nmRC (Cripps South Building)

Course convenor: Dr. Richard Cousins

This course will look at what is possible with EBL, in particular it will look at areas where EBL is not commonly used such as in pharmacy. It is aimed at all potential new users. It will cover:

- Basic introduction to EBL
- Using EBL to create complex and one-off microfluidic devices
- Use of EBL with bio-relevant materials such as SAMs
- Equipment that can be used to characterise samples prepared with EBL e.g. imaging ellipsometry.

Max. places = 25

14: Electron Microscopy: Focused Ion Beam Scanning Electron Microscopy (FIB-SEM)

Thursday 12th December 2019 13:00 – 14:30

Location: A05 nmRC (Cripps South Building)

Course convenor: Dr. Chris Parmenter

This course provides an introduction to Focused Ion Beam Scanning Electron Microscopy (FIBSEM) is intended for novice users of this instrumentation. The course will cover:

- Introduction to FIBSEM instrumentation (basics & capabilities)
- Sample handling

Max. places = 25