

# 2019 FACTS Short courses

## **Introduction to X-ray Diffraction and Analysis**

**Date/Time:** 26 Sep 2019 (Thu), 14:30 - 17:30  
**Location:** Lecture Theatre at The Arc (LHN-LT)  
**Speaker:** Dr. Samuel A. Morris

This introductory course to X-ray Diffraction will cover the basics of the crystalline state, the theory of how X-rays interact with crystalline matter and how to run an X-ray diffraction experiment with a few tips and tricks.

The talk will be split up into two 45-minute sessions, by the end of which you will be able to take your crystalline powder, obtain an X-ray diffraction pattern and understand the basics of how to analyse it.

### **Registration:**

[https://wis.ntu.edu.sg/pls/webexe/REGISTER\\_NTU.REGISTER?EVENT\\_ID=OA19091316491310](https://wis.ntu.edu.sg/pls/webexe/REGISTER_NTU.REGISTER?EVENT_ID=OA19091316491310)

## **Introduction to Scanning Electron Microscopy (SEM)**

**Date/Time:** Thursday 10 October 2019, 13:00 - 15:00

**Location:** Lecture Theatre at The Arc (LHN-LT)

**Speaker:** Dr. Derrick Ang

This short course aims to introduce potential users to the basics of SEM, its capabilities, and its limitations.

By developing a theoretical understanding of the technique, it is hoped that new users will learn more quickly, work more efficiently, and maximize the capabilities of these instruments to excel further in their research.

### **Registration:**

[https://wis.ntu.edu.sg/pls/webexe/REGISTER\\_NTU.REGISTER?EVENT\\_ID=OA19091317004580](https://wis.ntu.edu.sg/pls/webexe/REGISTER_NTU.REGISTER?EVENT_ID=OA19091317004580)

## **Introduction to Transmission Electron Microscopy (TEM)**

**Date/Time:** Thursday 10 October 2019, 15:30 – 17:30

**Location:** Lecture Theatre at The Arc (LHN-LT)

**Speaker:** Dr. Chris Boothroyd

Transmission Electron Microscopy made simple.

This introductory TEM course contains essential knowledge for new users and offers a valuable recap for existing users.

**Registration:**

[https://wis.ntu.edu.sg/pls/webexe/REGISTER\\_NTU.REGISTER?EVENT\\_ID=OA19091316544985](https://wis.ntu.edu.sg/pls/webexe/REGISTER_NTU.REGISTER?EVENT_ID=OA19091316544985)

## **An introduction to SEM-based X-ray microanalysis (EDS and WDS)**

Date: 12 March 2019

Time: 2-4pm

Instructor: Jason Herrin (Dr)

Location: FACTS ABN

In scanning electron microscopes, X-ray microanalysis can be performed by bombarding a specimen with a focused electron beam and analyzing the emitted X-rays in order to determine the chemical composition of a specific region of interest. Both qualitative and quantitative analyses are possible, as is chemical mapping of specimens. Energy-dispersive spectroscopy (EDS) and wavelength-dispersive spectroscopy are two related X-ray analytical techniques available to FACTS users, and we will discuss both of these methods.

**[Register now](https://wis.ntu.edu.sg/pls/webexe/REGISTER_NTU.REGISTER?EVENT_ID=OA19020117212963)**

**[https://wis.ntu.edu.sg/pls/webexe/REGISTER\\_NTU.REGISTER?EVENT\\_ID=OA19020117212963](https://wis.ntu.edu.sg/pls/webexe/REGISTER_NTU.REGISTER?EVENT_ID=OA19020117212963)**

## **X-ray diffraction analysis of thin films and surfaces: i) GIXRD and ii) Residual stress analysis**

**Date/Time:** 5 March 2019 (Tuesday), 13:30 -16:00

**Location:** TELS room at AToM@FACTS ABN

**Speaker:** Pio John Buenconsejo (Dr)

This is part of a series of short courses on X-ray scattering and diffraction analysis of thin films and surfaces. The selected topics are primarily focused on the available techniques and capabilities of FACTS.

In this course i) grazing/glancing XRD (GIXRD) and ii) residual stress analysis (RSA) will be discussed. GIXRD is a technique used to probe thin films and surfaces by controlling the depth of X-ray penetration to carry out scattering and diffraction analysis. The collected data contains depth sensitive information on phase ID, structure and microstructure. RSA is a technique used to non-destructively investigate the residual stresses in thin films and surfaces. The state of stress in the material strongly influences the mechanical and functional properties. Conventional diffraction stress analysis and thin film focused stress analysis will be discussed.

Note: Attendees should have at least a basic background knowledge of X-ray diffraction analysis

**[Register now](https://wis.ntu.edu.sg/pls/webexe/REGISTER_NTU.REGISTER?EVENT_ID=OA19012514155872)**

[https://wis.ntu.edu.sg/pls/webexe/REGISTER\\_NTU.REGISTER?EVENT\\_ID=OA19012514155872](https://wis.ntu.edu.sg/pls/webexe/REGISTER_NTU.REGISTER?EVENT_ID=OA19012514155872)

## **EPMA Refresher: Analysis of natural silicate glasses**

**Date:** 14 February

**Time:** 10am onward

**Instructor:** Jason Herrin (Dr)

**Location:** EPMA facility at FACTS

**Participation:** Limited to 5 participants

**Abstract:**

This is a follow up session for participants of our October EPMA course. The focus of this session will be analysis of beam-sensitive natural silicate glasses at low current. Hands-on training will include modelling of bremsstrahlung background by mean atomic number, time-dependent intensity correction, defocused beam analysis, optimization of counting times, and consideration of appropriate primary and secondary reference materials. Participants are encouraged to share difficulties that they've faced in a supportive environment.

**[Register now](https://wis.ntu.edu.sg/pls/webexe/REGISTER_NTU.REGISTER?EVENT_ID=OA19012514061749)**

**[https://wis.ntu.edu.sg/pls/webexe/REGISTER\\_NTU.REGISTER?EVENT\\_ID=OA19012514061749](https://wis.ntu.edu.sg/pls/webexe/REGISTER_NTU.REGISTER?EVENT_ID=OA19012514061749)**

# 2018 FACTS Short courses

## **FACTS Short Course: Introduction to Scanning Electron Microscopy (SEM)**

Date/Time: 10 October 2018 (Wed), 14:00 -16:00

Location: Lecture Theatre at The Arc (LHN-LT)

Speaker: Dr. Derrick Ang

This short course aims to introduce potential users to the basics of SEM, its capabilities, and its limitations. By developing a theoretical understanding of the technique, it is hoped that new users will learn more quickly, work more efficiently, and maximize the capabilities of these instruments to excel further in their research.

**[Register now](https://wis.ntu.edu.sg/pls/webexe/REGISTER_NTU.REGISTER?EVENT_ID=OA18082911514742)**

**[https://wis.ntu.edu.sg/pls/webexe/REGISTER\\_NTU.REGISTER?EVENT\\_ID=OA18082911514742](https://wis.ntu.edu.sg/pls/webexe/REGISTER_NTU.REGISTER?EVENT_ID=OA18082911514742)**

## **FACTS Short Course: EPMA applications for Geoscience**

Date/Time: 9 October 2018 (Tuesday), 10:00 am - 5:00 pm

Location: N1.1-B2-01e (ASE Lecture Room 4) and N4.1-B4-10

Speaker: Dr. Jason Herrin

This course covers common uses of EPMA in Geoscience with an applied, how-to-approach.

**[Register now](https://wis.ntu.edu.sg/pls/webexe/REGISTER_NTU.REGISTER?EVENT_ID=OA18100513402816)**

**([https://wis.ntu.edu.sg/pls/webexe/REGISTER\\_NTU.REGISTER?EVENT\\_ID=OA18100513402816](https://wis.ntu.edu.sg/pls/webexe/REGISTER_NTU.REGISTER?EVENT_ID=OA18100513402816))**

## **FACTS Short Course: Introduction to X-ray Diffraction and Analysis**

Date/Time: 8 October 2018 (Mon), 10:00 -12:00

Location: Lecture Theatre at The Arc (LHN-LT)

Speaker: Dr. Samuel A. Morris

This introductory course to X-ray Diffraction will cover the basics of the crystalline state, the theory of how X-rays interact with crystalline matter and how to run an X-ray diffraction experiment with a few tips and tricks. The talk will be split up into two 45-minute sessions, by the end of which you will be able to take your crystalline powder, obtain an X-ray diffraction pattern and understand the basics of how to analyse it.

This talk will be given by Dr. Samuel A. Morris, who currently runs the single-crystal diffractometer in FACTS while researching novel applications and structures of porous materials, focusing on variable temperature, -gaseous environments and –electric potential in-situ cells for diffraction techniques.

**[Register now](https://wis.ntu.edu.sg/pls/webexe/REGISTER_NTU.REGISTER?EVENT_ID=OA18082912030041)**

**[https://wis.ntu.edu.sg/pls/webexe/REGISTER\\_NTU.REGISTER?EVENT\\_ID=OA18082912030041](https://wis.ntu.edu.sg/pls/webexe/REGISTER_NTU.REGISTER?EVENT_ID=OA18082912030041)**

## **FACTS Short Course: Introduction to Transmission Electron Microscopy (TEM)**

Date/Time: 8 October 2018 (Mon), 13:30 -15:30

Location: Lecture Theatre at The Arc (LHN-LT)

Speaker: Dr.Chris Boothroyd

Transmission Electron Microscopy made simple. This introductory TEM course contains essential knowledge for new users and offers a valuable recap for existing users.

**[Register now](https://wis.ntu.edu.sg/pls/webexe/REGISTER_NTU.REGISTER?EVENT_ID=OA18082911595012)**

**[https://wis.ntu.edu.sg/pls/webexe/REGISTER\\_NTU.REGISTER?EVENT\\_ID=OA18082911595012](https://wis.ntu.edu.sg/pls/webexe/REGISTER_NTU.REGISTER?EVENT_ID=OA18082911595012)**

# 2017 FACTS Short courses

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## **FACTS Short Course: Introduction to Transmission Electron Microscopy (TEM)**

**Date/Time:** 13 October 2017, 14:00 - 16:00

**Location:** [LT16 Block NS1 NS1-04-05](#)

**Speaker:** Dr. Chris Boothroyd

### **Description:**

Transmission Electron Microscopy made simple. This introductory TEM course contains essential knowledge for new users and offers a valuable recap for existing users.

Registration URL:

[https://wis.ntu.edu.sg/pls/webexe/REGISTER\\_NTU.REGISTER?EVENT\\_ID=OA17083118092633](https://wis.ntu.edu.sg/pls/webexe/REGISTER_NTU.REGISTER?EVENT_ID=OA17083118092633)

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## **FACTS Short Course: Introduction to X-ray Diffraction and Analysis**

**Date/Time:** 10 October 2017, 10:00 - 12:00

**Location:** [LT18 Block NS1 NS1-04-01](#)

**Speaker:** Dr. Samuel A. Morris

### **Description:**

This introductory course to X-ray Diffraction will cover the basics of the crystalline state, the theory of how X-rays interact with crystalline matter and how to run an X-ray diffraction experiment with a few tips and tricks. The talk will be split up into two 45-minute sessions, by the end of which you will be able to take your crystalline powder, obtain an X-ray diffraction pattern and understand the basics of how to analyse it.

This talk will be given by Dr. Samuel A. Morris, who currently runs the single-crystal diffractometer in FACTS while researching novel applications and structures of porous materials, focusing on variable-temperature, -gaseous environments and –electric potential in-situ cells for diffraction techniques.

Registration URL:

[https://wis.ntu.edu.sg/pls/webexe/REGISTER\\_NTU.REGISTER?EVENT\\_ID=OA17081114423474](https://wis.ntu.edu.sg/pls/webexe/REGISTER_NTU.REGISTER?EVENT_ID=OA17081114423474)

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## **FACTS Short Course: Introduction to Scanning Electron Microscopy (SEM)**

**Date/Time:** 9 October 2017, 14:00 - 16:00

**Location:** MSE E-Learning Studio (N4.1-B2-02)

**Speaker:** Dr. Derrick Ang

### **Description:**

This short course aims to introduce potential users to the basics of SEM, its capabilities and limitations. With these basic background knowledge, it is hoped that users will have an EEE (Easier, Enjoyable & Enlightening) time during the practical hands-on training.

Target Audience: Potential users who do not have any knowledge about electron microscopy

Registration URL:

[https://wis.ntu.edu.sg/pls/webexe/REGISTER\\_NTU.REGISTER?EVENT\\_ID=OA17081111365920](https://wis.ntu.edu.sg/pls/webexe/REGISTER_NTU.REGISTER?EVENT_ID=OA17081111365920)

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# 2016 FACTS Short courses

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## **EPMA for Geoscientists**

**Date / Time:** 5 (Mon) to 7 (Wed) Dec. 2016, 13:00 - 17:00

**Location:** FACTS ([Location Map](#))

**Speaker:** Jason Scott Herrin <[jsherrin@ntu.edu.sg](mailto:jsherrin@ntu.edu.sg)>

### **Description:**

This course offers a hands-on user experience for earth scientists looking to gain proficiency in the use of EPMA and ProbeSoftware, as well as an overview of theory applicable to the technique.

Click here to register:

[https://wis.ntu.edu.sg/pls/webexe/REGISTER\\_NTU.REGISTER?EVENT\\_ID=OA16100410310070](https://wis.ntu.edu.sg/pls/webexe/REGISTER_NTU.REGISTER?EVENT_ID=OA16100410310070)

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## **SEM-based microanalysis using EDS and WDS**

**Date / Time:** 11 October 2016, 15:00 – 18:00

**Location:** MSE Conference Room (N4.1-02-02)

**Speaker:** Jason Scott Herrin <[jsherrin@ntu.edu.sg](mailto:jsherrin@ntu.edu.sg)>

### **Description:**

Microanalysis is the determination of the composition of a specimen on a microscopic scale. With SEM-based techniques, we are able to achieve this by irradiating an area of interest with electrons and measuring the energy of the signals (X-rays or electrons) emitted. Qualitative and semi-quantitative analyses of concentrations down to one weight percent are relatively routine. Quantitative analysis and detection of lower concentrations is more difficult and requires an understanding of the processes involved.

Click here to register:

[https://wis.ntu.edu.sg/pls/webexe/REGISTER\\_NTU.REGISTER?EVENT\\_ID=OA16082218225834](https://wis.ntu.edu.sg/pls/webexe/REGISTER_NTU.REGISTER?EVENT_ID=OA16082218225834)

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## **Short Course: Introduction to X-Ray Diffraction and Analysis**

**Date / Time:** 20 September 2016, 10:00 – 12:00

**Location:** MSE E-Learning Studio (N4.1-B2-02)

**Speaker:** Pio John Buenconsejo <pbuenconsejo@ntu.edu.sg>

### **Description:**

This short course aims to introduce potential users to the basics of X-ray diffraction analysis and its application as a materials characterization tool. The course will cover background knowledge on X-ray diffraction, instrumentation and data analysis.

Target Audience: Potential users who have no or limited knowledge about X-ray diffraction and analysis.

Click here to register:

[https://wis.ntu.edu.sg/pls/webexe/REGISTER\\_NTU.REGISTER?EVENT\\_ID=OA16082210472515](https://wis.ntu.edu.sg/pls/webexe/REGISTER_NTU.REGISTER?EVENT_ID=OA16082210472515)

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## **Short Course: Stepping into the World of Electron Microscopy (SEM & TEM):**

**Date / Time:** 20 September 2016, 13:30 – 16:30

**Location:** MSE E-Learning Studio (N4.1-B2-02)

**Speaker:** Ang Derrick (Dr) <DAng@ntu.edu.sg>; Tay Yee Yan (Dr) <YYTAY@ntu.edu.sg>

This is a 2 part short course on scanning electron microscopy and transmission electron microscopy:

> Basic Introduction to Scanning Electron Microscopy (SEM)

This short course aims to introduce potential users to the basics of SEM, its capabilities and limitations. With these basic background knowledge, it is hoped that users will have an EEE (Easier, Enjoyable & Enlightening) time during the practical hands-on training.

Target Audience: Potential users who do not have any knowledge about electron microscopy

> Introduction to the Transmission Electron Microscope (TEM)

- A Chronology of Milestone Events of the Development of the TEM and its Related Attachments

This short course is a teaser, actually aimed to allow users to appreciate the development of the TEM since its invention in 1931. These development underline the challenges faced by the scientists and influence the evolution of the modern TEM

Target Audience: All users who are interested in TEM and its related techniques

Click here to register for this short course:

[https://wis.ntu.edu.sg/pls/webexe/REGISTER\\_NTU.REGISTER?EVENT\\_ID=OA16082211235370](https://wis.ntu.edu.sg/pls/webexe/REGISTER_NTU.REGISTER?EVENT_ID=OA16082211235370)

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## **Short course: Introduction to X-Ray Diffraction**

**Date / Time:** 1st Feb 2016, 10 am – 12 pm

**Location:** MSE E-Studio (N4.1-B2-02)

**Speaker:** Zviad Tsakadze (Dr) <Zviad@ntu.edu.sg>

### **Description:**

This short course discusses about the X-ray Diffraction as one of the fundamental analytical method to study and analyze the materials. It will also give the users a brief introduction to crystal structure, crystal systems, symmetry.

Target Audience: Users who do not have any knowledge (or just very basic knowledge) about X-ray Diffraction.

Click here to register for this short course:

[https://wis.ntu.edu.sg/pls/webexe/REGISTER\\_NTU.REGISTER?EVENT\\_ID=OA16011811212610](https://wis.ntu.edu.sg/pls/webexe/REGISTER_NTU.REGISTER?EVENT_ID=OA16011811212610)

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## **Short course: Stepping into the World of Electron Microscopy (SEM & TEM):**

**Date / Time:** 15th Feb 2016, 10 am – 12 pm

**Location:** MSE E-Studio (N4.1-B2-02)

**Speaker:** Ang Derrick (Dr) <DAng@ntu.edu.sg>; Tay Yee Yan (Dr) <YYTAY@ntu.edu.sg>

### **Description:**

This is a 2 part short course on scanning electron microscopy and transmission electron microscopy:

> Basic Introduction to Scanning Electron Microscopy (SEM)

This short course aims to introduce potential users to the basics of SEM, its capabilities and limitations. With these basic background knowledge, it is hoped that users will have an EEE (Easier, Enjoyable & Enlightening) time during the practical hands-on training.

Target Audience: Potential users who do not have any knowledge about electron microscopy

> Introduction to the Transmission Electron Microscope (TEM)

- A Chronology of Milestone Events of the Development of the TEM and its Related Attachments

This short course is a teaser, actually aims to allow users to appreciate the development of the TEM since its invention in 1931. These development underline the challenges faced by the scientists and influence the evolution of the modern TEM

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