



David Cockayne Centre for Electron Microscopy

Facility for
TEM, SEM & FIB

e: emaccess@materials.ox.ac.uk
w: www-em.materials.ox.ac.uk

Dr Neil Young

Manager, David Cockayne Centre

Graduate Induction

Oxford – 5th October 2020



www.ox.ac.uk



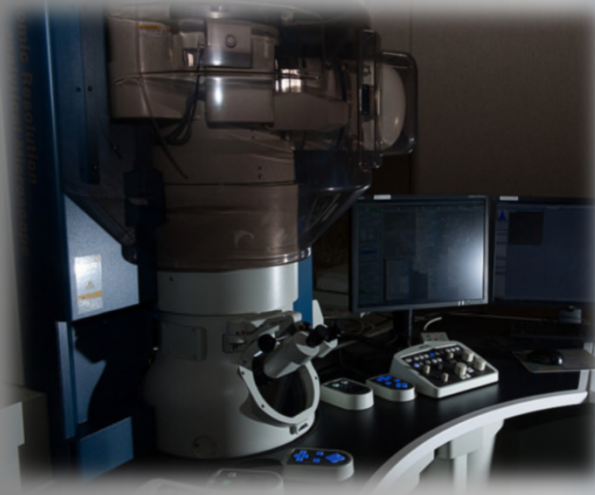
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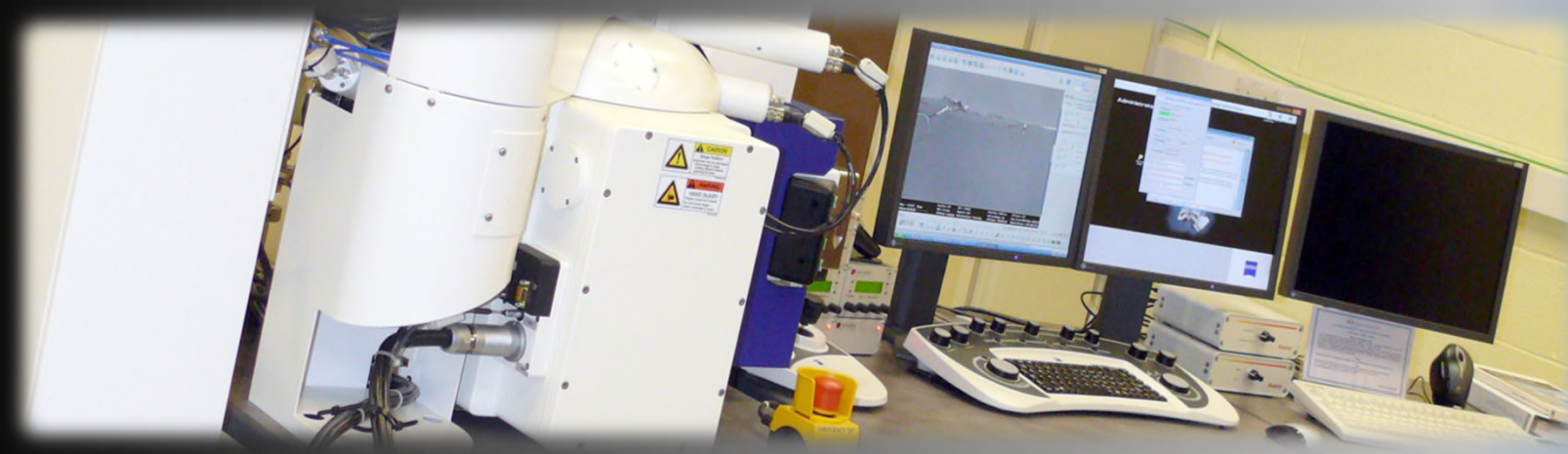
DAVID COCKAYNE CENTRE FOR ELECTRON MICROSCOPY

- The David Cockayne Centre for Electron Microscopy supports characterisation via SEM, TEM, FIB and related techniques within the Department of Materials
- The centre acts as a hub for characterisation in the physical sciences across the University of Oxford. It is supported by 3 research support scientists (specialisms in FIB, SEM and a-c STEM respectively), a senior facility manager (also supports TEM users) and an EM technician.



<http://www-em.materials.ox.ac.uk>

- Primarily we seek to train researchers to become experienced practitioners of electron microscopy, operating instruments and performing their own analyses where possible. Practical training is supported by an extensive postgraduate lecture course syllabus. Access by other HEI's and industry is also encouraged
- Currently >200 trained independent users + ~25 using as a service. ~40 new users trained per year.
- Instrumentation portfolio includes 3 TEM's, 4 FIB's and 5 SEM's – essential a split between Zeiss for SEM / FIB-SEM and Jeol for TEM / aberration-corrected STEM



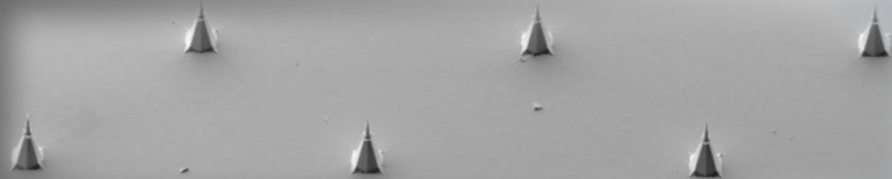
Equipment available:

Transmission Electron Microscopy:

- LaB₆ Analytical TEM/STEM with EDX
- 200kV HRTEM with STEM
- Aberration-corrected STEM with EELS and EDX
- + sample preparation facilities for TEM prep...
mechanical polishing, grinding, Ar ion thinning.

Scanning Electron Microscopy:

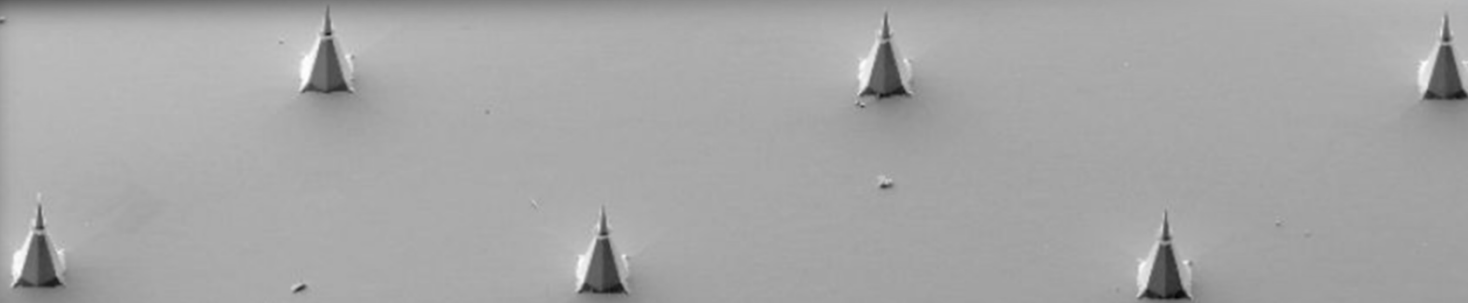
- Entry level analytical SEM with EDX, EBSD capability
- Intermediate level FE-SEM for imaging and analysis
- High-resolution FE-SEM's with full range of capabilities; STEM, EBSD, EDX, LV
- + sample prep, polishing + coating facilities



Equipment available:

Focused Ion Beam:

- In-Situ and Ex-Situ TEM specimen preparation
- Atom probe specimen preparation
- Micro and Nano fabrication
- Patterning
- Analytical FIB-SEM with 3D EDX/EBSD
- Xe Plasma FIB with SIMS and vacuum transfer





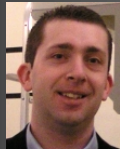
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DAVID COCKAYNE CENTRE FOR ELECTRON MICROSCOPY

TEM



Neil Young
EM Facility Manager
TEM Support



Ian Griffiths
Research Support Scientist
(Aberration-corrected STEM)

SEM



Jennifer Holter
Research Support Scientist (SEM)

FIB



Gareth Hughes
Research Support Scientist (FIB)



Graham Wyatt
EM Technician

EM Access request Process

1. Your Supervisor must complete and return an Access Request for each project
2. EM Support Scientists discuss the best way to deal with each project, return updated summary to student and supervisor and give dates for training.
3. Student receives training and access to facility instrumentation required for project.

REQUEST FOR ACCESS TO ELECTRON MICROSCOPES

Supervisors should use this form to request access to departmental electron microscope facilities (SEM, TEM, EMPA, etc). Please fill in electronically and return to emaccess@materials.ox.ac.uk well in advance of the project start date.

Name of Research Project	
Date of application	
Supervisor	
E-mail	
Researcher requiring EM	
Exp/DPhil/Exp/Doc/Visitor	Leaving date (approx)

1. Briefly describe the research project. What are the scientific goals of the project?

2. What role does EM play in the project? What specific EM data is sought and what are the priorities for the experiments?

3. How heavy is the demand in EM expected to be (occasional, one or two images or spectra, or heavy continued usage)?

4. How many sessions (e.g. per month) are requested and how long will the project run?

See the website:
www-em.materials.ox.ac.uk

Only forms received from Supervisors will be accepted

Forms must contain sufficient detail to enable staff to plan training/access. Forms may be returned so that more detail may be added.

The waiting list for training on specific instruments will be made public.

This year in response to COVID we are all finding new ways of working. The majority of EM training will be completed via remote means. This will provide new challenges for both students and staff. We are optimistic that the quality of training will continue to be high. There will be impacts on throughput.

All group leaders are aware of the situation and have been asked to prioritise training requests - for those who were halted in March and also the 2020 DPhil intake.

Options exist for 'service work' where data is taken for you by DCCEM staff or your group members so that you have data to work on.

Some groups may be able to provide members to help train new users.

**EM training has two parts: (i) Post-graduate level lecture courses
(ii) Practical instrument & technique training**

You will be advised on which post-graduate lectures to attend, and of course anyone can attend any lectures that interest them. You will also be invited to practical training sessions and modules with the EM research support staff as appropriate.

All of the information will be covered by the EM access request form/ training summary, which you will receive once submitted/processed...

Relevant post-graduate Lectures:

‘Foundation Topics for Electron Microscopy’ *Dr Young /Dr Hughes/ Prof Nellist)*

(Covers basic science and mathematics underpinning all EM work)

– Starts Wednesday Week 1

‘Microscopy and Analysis of Surfaces’ *Dr Allen*

(Lectures 1-3 cover essential theoretical background for SEM training)

- Starts Week 3