



Society of Electron Microscope Technology

([Http://www.semt.org.uk](http://www.semt.org.uk))

Hon. Secretary:

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SEM HALF- DAY MEETING

Wednesday 29th October 2003

The School of Pharmacy, 29-39 Brunswick Square, London WC1N 1AX

- 12.30 p.m. **Registration**, including a *Buffet Lunch*.
- 2.00 p.m. **Introduction**: Chair, Heather Davies.
- 2.05 p.m. **Electron Microscopy and other techniques in diagnosis of Soft Tissue Sarcomas**
Prof. Cyril Fisher, Pathology Dept. Royal Marsden Hospital, London.
- 2.40 p.m. **“On the trail of Dinosaurs - with the help of Scanning Electron Microscopy”**
Paul Ensom, Head of Curation, Palaeontology Dept. Natural History Museum.
- 3.15 p.m. Tea, Coffee.
- 3.45 p.m. **Putting Fungi Under Pressure**
Sally and John Paul Cassella, Biological Sciences Dept. University of Derby.
- 4.20 p.m. **Emerging 3-D Dual Beam Imaging and its potential Applications.**
Lloyd Peto, FIB Applications Laboratory, FEI company, Bristol.
- 4.55 p.m. **Annual General Meeting.**
- 5.30 p.m. **Wine Reception.**
- 6.30 p.m. **Conference Dinner.**

For **FREE registration** complete the attached form and send to the Secretary (address above).

On the Trail of Dinosaurs - with SEM

Paul Enson

Paleontology Dept., Natural History Museum, London

Dinosaur footprints have been found on the Isle of Purbeck, Dorset, at Lulworth Cove, & Durlston Bay, Swanage. Upland footprints disappear rapidly; lowland footprints may be preserved; coastal ones are washed out.

1986 Sunnydown Farm - 34 tons of limestone were moved; many crocodile teeth and remains of lizard, fish, mammal & dinosaur were found.

Many more species have been discovered recently, with more care in excavation; there are probably more to come! Most Purbeck beds yield fragments of eggshell, even if there are no bones or tracks. The fragments found are very thin (although we would expect them to be thick). Crocodiles are very abundant - shells and teeth.

Putting Fungi under Pressure

Sally & John Paul Cassella

Dept. of Biological Sciences, Univ. of Derby

Athlete's foot affects 85% of USA students, 15 - 40% of the population. It can be treated with Mycil or Daktarin, or tea tree oil; systemically with Terbinafine (Lamisil), but this has side effects.

Aspergillus can be difficult to treat, & penetrates deeply; it can be treated with neem leaf oil, and lemon grass (better), as can also Trichophyton.

Many possible oils can be used, varying with the species of fungus, temperature, & concentration of spores / chemical. Molkosan is obtained from cow whey fermentation.

Aspergillus fumigatus - LV SEM shows the chains of spores, which are often lost in conventional methods. Similarly A. niger; with spilanthes treatment, the beginning of the conidiophoresis seen but not the mature spores. Fungi grow between the layers of nails.

LV SEM allows images of larger specimens; it is rapid, user-friendly. It gives a "truer" image of delicate specimens; we should re-examine the "accepted ultrastructure" obtained by conventional SEM. Samples can be grown on after being in the LV SEM if they have not been fixed.

They are trying numerous variations on kV, specimen distance, back-scattered / secondary electron images, etc.

3-D Dual Beam Imaging & its applications

Lloyd Peto

FIB Applications Laboratory, FEI Co., Bristol

Focussed Ion Beam = scanning ion microscopy

Dual Beam = FIB + EDX etc.

A fast technique; secondary electron, with no back-scatter; ions don't penetrate, so we are getting true surface information. The resolution can be 5 nm; there is strong materials contrast; good direct conductivity information; strong metallic grain info. There is a small inter-active volume, so to the true surface.

Secondary electrons & secondary ions = SE and BSE in SEM

The surface can be modified by milling, depositing, etc. Metallic crystal grains can be analysed.

20,000 cu.u of material can be removed to make cross-sections for a vertical plane image in a few minutes (as a staircase). This is done in the microscope, so it is site-specific, giving an immediate image, grain & elemental analysis, without artefacts. Cross-sections can be made fo different layers.

Pollen grains can be cross-sectioned and tilted.

Gun-shot residue particle.

Wood - propeller shaft - had structural damage & fungal infection, shown under low beam current & low magnification. With conventional SEM cryo-fracture, we lose some of the smaple. FIB sections are more like cryo-sections, but we can progressively slice through - but this destroys the particle.

FIB / Dual Beam foil preparation can be used on many materials - paint, polymers, LED. A foil can be cut out vertically from a slab.

Indium antimonite - indium liquefies under the ebam.

Biological material can be examined only if frozen.

Name	Organisation
David McCarthy	Sch. Pharmacy
Barry Dowsett	CAMR
Trish Lovell	Royal Marsden Hosp.
Derrick Lovell	Guy's Hosp.
Doug Lock	PGT
Chris Jones	NHM
Paul Enson	NHM
Anne Drewe	London
Steve Cham	Leica
Hillary McPhail	Sch. Pharmacy
Graham McPhail	Barts.
David Khan	Sch. Pharmacy
Andy Constanti	Sch. Pharmacy
Hvi Gong	Royal Brompton Hosp.
Jie Zhu	Royal Brompton Hosp.
Tony Brain	Kings College
Ian Francis	GSK
Paul McGill	GSK
Rosemary Suswillow	Royal Vet College
Tania Hopcroft	Royal Vet College
Claire Martin	Sch. Pharmacy
Brian Kyte	I.S.S. Ltd.
Heather Davies	O.U.
Nicky Morden	Eastman Dental Hosp.
Ann Dewar	Royal Brompton Hosp.
David Robertson	Breakthrough Cancer
Terry Cooper	Taab Labs. Ltd.
Jill Lewis	London
Cyril Fisher	Royal Brompton Hosp.
Lloyd Peto	FEI Company, Bristol.
Sally Cassella	Derby University.
John Paul Cassella	Derby University.
John Bredl	Royal Vet College
Don Ashcroft	SEM-Tech Ltd
Clive Downing	SEM-Tech Ltd
Kate Johnson	Sch. Pharmacy
Janet Tyas	Kodak Ltd.
Sheila Davis	Kodak Ltd.
Alice Warley	Kings College.
Chris Walker	Jeol Uk Ltd.
Bill Hanks	Oxford
Ken Brady	Guy's Hosp.
Louise Collins	National Heart & Lung Inst.
Theresa Wodehouse	National Heart & Lung Inst.
Andrew Rogers	National Heart & Lung Inst.
Kevin Meade	Oxford Instruments
Allister McBride	Leo Electron Microscopy
Edwin Eardley	Leo Electron Microscopy
Stephen Fuzeland	Nottingham Trent Univ.
Bill Clarke	Agar Scientific
Clare Ashton	Royal Vet College
Anna Tong	Royal Vet college
Jeremy Rees	FEI/Philips UK Ltd.
Jill Webb	Reading Scientific Services Ltd.
Sam Stanton	Sch. Of Biological Science, Portsmouth.