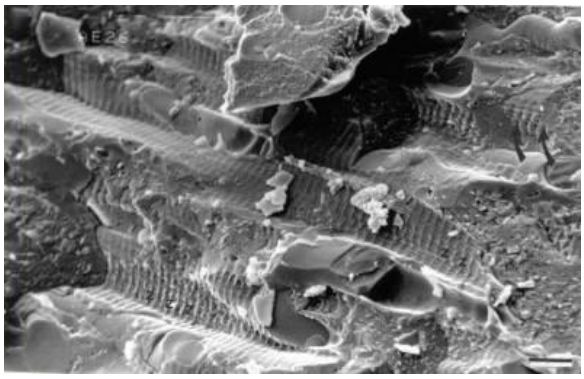
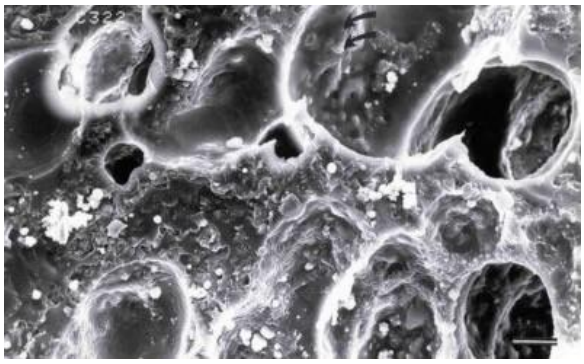
EMS MICROSCOPY ACADEMY
CRYO SEM WORKSHOP

Examples of the endless possibilities when doing Cryo SEM

Vertebrates - Tissues

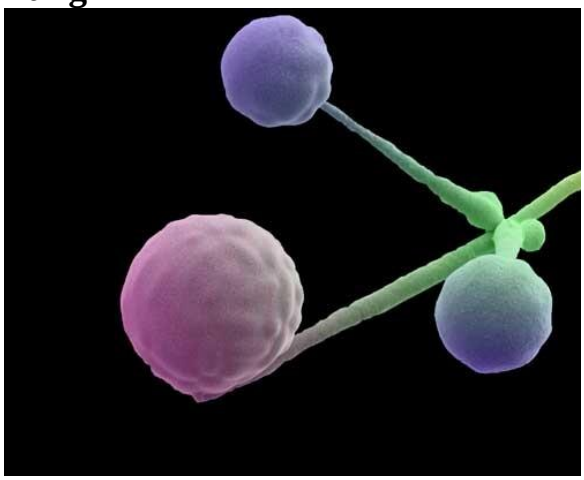


Fractures through the myocardium
Small pieces of heart have been mixed, washed in buffer then cryo-protected with 30% glycerol. Contracted myofibrils can be seen in longitudinal aspect. The fracture in places has occurred along the sarcolemma and the positions of the Z-lines (marked by 'z') and the T-tubules (marked by arrows) are clearly visible in places. The intimate relationship between the capillaries and the myofibrils can be appreciated from this preparation. The contents of the capillary have a smooth appearance due to the presence of glycerol. Bar: 5µm



Frozen hydrated mouse lung
Low-temperature SEM retains all of the cellular and extra-cellular fluids in the lung tissue. Consequently, the micrograph clearly illustrates that the bronchioles are covered with a thin layer of mucus (marked by arrows). None of the alveoli show any collapse. Bar: 5µm

Fungi

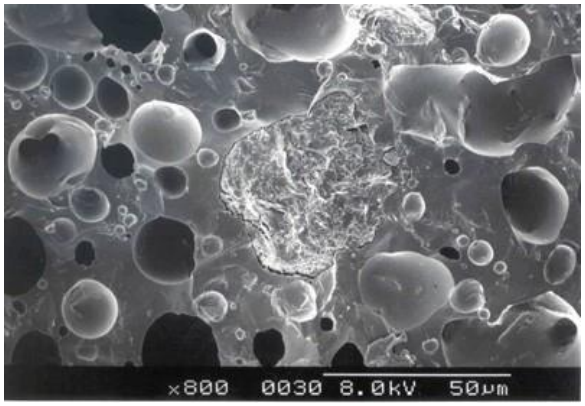


Fungal spore sac
Spore sac of a fungus. The sacs tend to burst open as soon as they are exposed to moisture, so the only way to visualise them is to use cryo-SEM. Image courtesy of Miranda Waldron at the Electron Microscope Unit at the University of Cape Town, South Africa

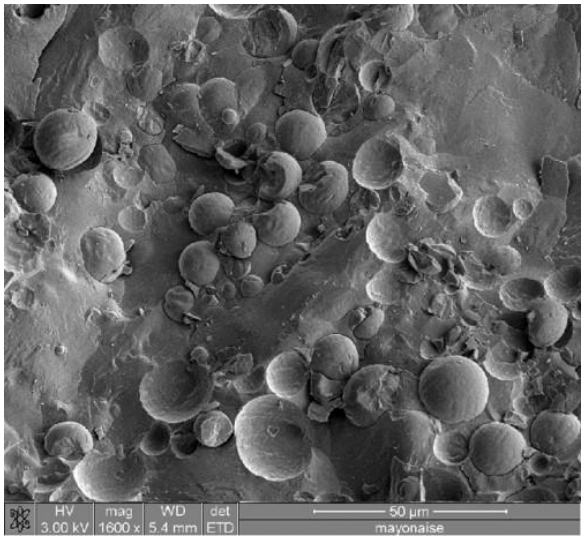
Carnivorous Plants

Sundew leaf and insect
A small fly trapped on a carnivorous South African sundew plant. The whole plant is about 3cm across and has sticky hairs on its leaves to capture small insects. Image courtesy of Miranda Waldron at the Electron Microscope Unit at the University of Cape Town, South Africa

Foodstuffs - Various



Chocolate Bar



Mayonaisse – Fractured

Image courtesy of FEI Company

EMS MICROSCOPY ACADEMY
CRYO SEM WORKSHOP

Details

Tuesday - Thursday
March 24 - 26, 2020
8:30 a.m. - 4:30 p.m.
Hatfield, Pennsylvania, USA

Targeted Participants

Individuals who are new to the field of cryo SEM or desire a technical refresh to maintain current skills or just those that want to see and learn all of the possibilities of the technology.

Scope of Class

This course will cover the process of rapid freezing, fracturing, coating and imaging of a variety of samples.

Many types of samples such as ice cream, pastes, paints, and gels do not lend themselves to routine SEM sample preparation methods such as critical point drying or freeze drying due to the morphologic changes caused by desiccation. To avoid these artifacts it is necessary to image the hydrated or natural state. This requires that the sample be rapidly frozen, to reduce ice crystal damage, and fractured to reveal their physical / functional sub-surface morphology. These samples are applied to the stub, immersed in liquid nitrogen slush loaded into the Cryo fracturing and coating chamber, and finally the SEM. This final preparation takes place in a high vacuum environment thus minimizing the possibility of frost contamination. Within the SEM, while viewing, the sample temperature can be maintained at -130° or warmed slightly to facilitate sublimation of the surface. The selection of accelerating voltage (kV), for surface detail, and spot size for resolution and charging are critical and will be covered in detail.

Parameters such as working distance which affects depth of field (Dfi) and resolution, plus tilt and raster rotate will be examined for proper image collection.

The EMS Microscopy Academy

Located in Hatfield, Pennsylvania, the Academy provides electron microscopy classes, workshops and training sessions for all fields of microscopy, including materials science and biological science.

Format

Lecture, demonstration, and hands-on practice, as well as round table tips and tricks discussions. Participants are encouraged to bring their own samples, if possible.

EMS MICROSCOPY ACADEMY
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Main Curriculum

Theory and overview of cryo SEM
Mounting and adhering
Freezing, loading and fracturing
Insitu coating
Operation of SEM
Cryo face-off Leica UC 7 Crion
Specific techniques of Cryo SEM imaging

Equipment

Hitachi S3500 SEM	**Leica UC7 Ultramicrotome**	**PP3010 Cryo Preparation System**
COXEM SEM EM-30N	**Leica Crion Cryomicrotome**	

Faculty

1. **Al Coritz** has been doing Electron Microscopy for 38 years, beginning at the Yale School of Medicine and ending up on the commercial side with several key EM companies. His specialty is Cryo-techniques and Thin Film Technology: i.e. Freeze Fracture/Rotary Shadowing, High Pressure Freezing, and more He is currently with Electron Microscopy Sciences where he has been the Technical Director for over 20 years.

2. **Michael Kostrna** was the program director of the Electron Microscopy Technician program at Madison Area Technical College and has more than more than 35 years in EM technical education and research experience. He has been training EM students for 29 years and has developed curricula and lab exercises for TEM, SEM, OLM, lab safety, introductory and advanced biological EM, EM, maintenance, and x-Ray microanalysis. He has worked with companies such as SC Johnson Polymer, Dow Chemicals, Io Genetics, Virent Technologies, ABS Global, NanoOnocology, and Microscopy Innovations, and in the process gained insight to the various applications of EM.

EMS MICROSCOPY ACADEMY
CRYO SEM WORKSHOP

Schedule

Tuesday, March 24, 2020

8:30-9:00	Introductions of staff and participants
9:00-10:15	SEM theory
10:15-10:30	Coffee break
10:30-12:00	Demonstration of Hitachi S3500 SEM operation
12:00-12:30	Provided lunch
12:30-1:30	Cryo theory
1:30-4:30	Demonstration of cryo fracturing, coating and imaging
6:00	Hosted dinner

Wednesday, March 25, 2020

8:30-9:00	Debriefing of previous day's activities
9:00-9:30	Participant's sample assessment
9:30-12:15	PP3010T cryo fracturing/coating to Hitachi S3500 SEM
12:15-12:45	Provided lunch
12:45-4:45	P3010

Thursday, March 26, 2020

8:30-9:00	Debriefing of previous day's activities
9:00-12:30	Hands-on cryo prep, fracturing, coating and SEM operation and evaluation
12:30-1:00	Provided lunch
1:30-4:30	Hands-on coating and SEM observation of cryo faced off samples and workshop assessment

Schedule subject to change

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Registration Fee: $1,200.00 Includes

- Workshop syllabus
- All supplies
- Reagents and solutions
- Lunches
- Coffee
- Tea
- Dinner on the first evening of the workshop

Lodging

Participants are responsible for making their own hotel reservations.

The following hotel has been designated as the host hotel:

Homewood Suites
1200 Pennbrook Parkway
Lansdale, PA 19446
Phone: 215-362-6400

The special rate is $119.00 per night (plus tax) which includes a hot breakfast and a light dinner in the evening.

Please make your reservations and mention you are participating in the EMS Workshop.
GROUP CODE: EMS WORKSHOP

Everyone should plan to arrive the night before class begins.

Enrollment Note

Registration will be limited to a maximum of 15 participants.
EMS will provide samples to those who prefer not to bring their own.

EMS MICROSCOPY ACADEMY
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Printable Registration Form

_____ M / F
Name / Title

_____
Institution

_____
Department

_____
Mailing address

_____
City / Zip

_____
Country

_____
Telephone / Fax

_____
Email:

_____

Will you bring your own specimens? Yes__ / No__ (See Note on prior page)
What Samples are you bringing and most interested in?

_____

All registrations must include payment.
Rate $1,200.00 per Person
Number of Participants _____
Total $_____

Pay by check: make payable to EMS and reference "Cryo SEM Workshop Mar20".
Pay by credit card: Credit Card Type _____
Credit Card Number _____
Expiration Date _____ 3 Digit Code _____

_____
Signature / Date

Return your registration to:
Stacie Kirsch
1560 Industry Road
Hatfield, PA 19440 USA
Phone: 215-412-8402
E-Mail: info@emsdiasum.com or Fax: 215-412-8452

TO REGISTER ONLINE, CLICK HERE.