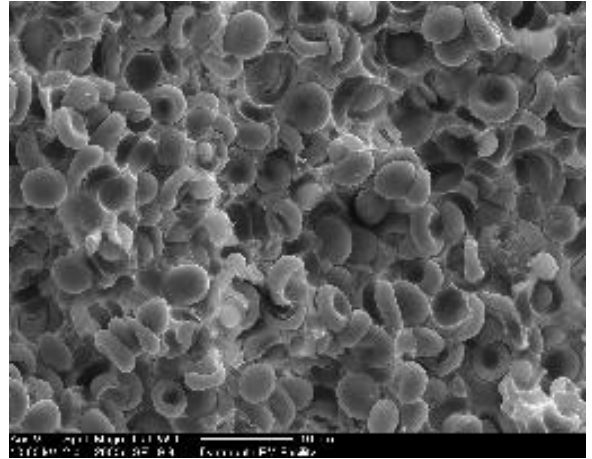


**EMS MICROSCOPY ACADEMY**  
**BIOLOGICAL SEM WORKSHOP: A COMPLETE PICTURE**

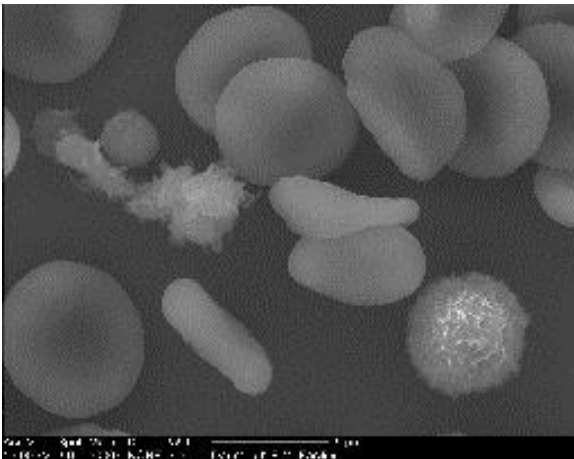
*Examples of the endless possibilities in the field of Microscopy: SEM*



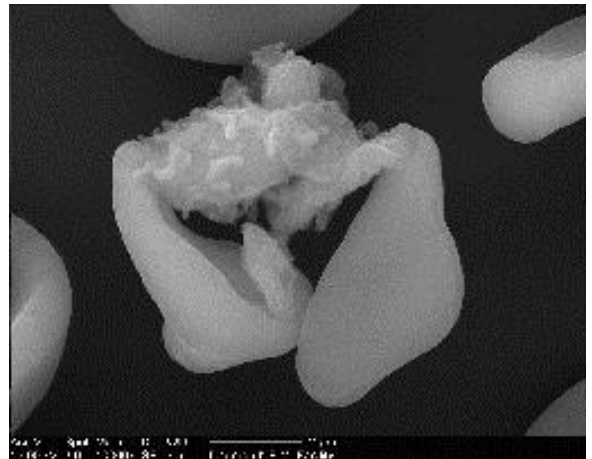
Mouse Lung Tissue: Red blood cells in the lung.  
Louisa Howard, Dartmouth College



Mouse Lung Tissue: Trachea area. Red blood cells inside blood vessel in the lung.  
Louisa Howard, Dartmouth College



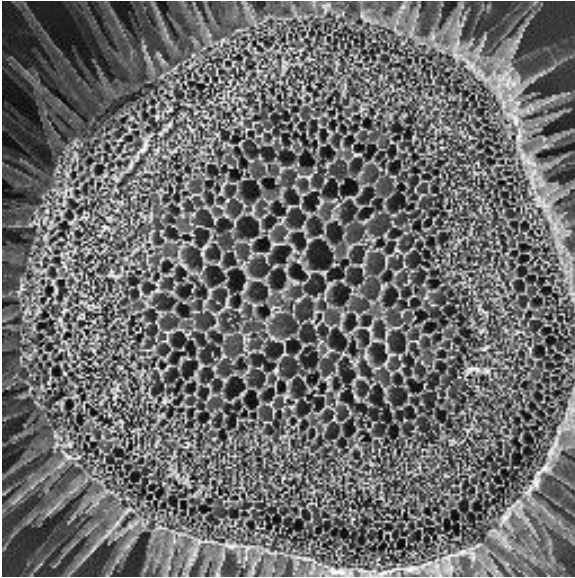
Human Blood Cells: Red blood cells/Platelets/White blood cells.  
Louisa Howard, Dartmouth College



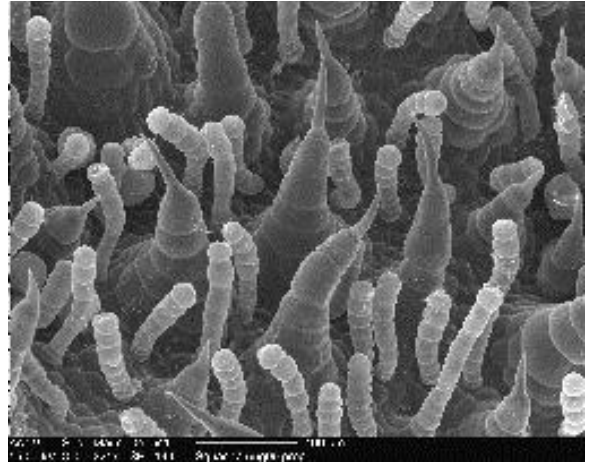
Human Blood Cells: Red blood cells/Platelets.  
Louisa Howard, Dartmouth College

# EMS MICROSCOPY ACADEMY

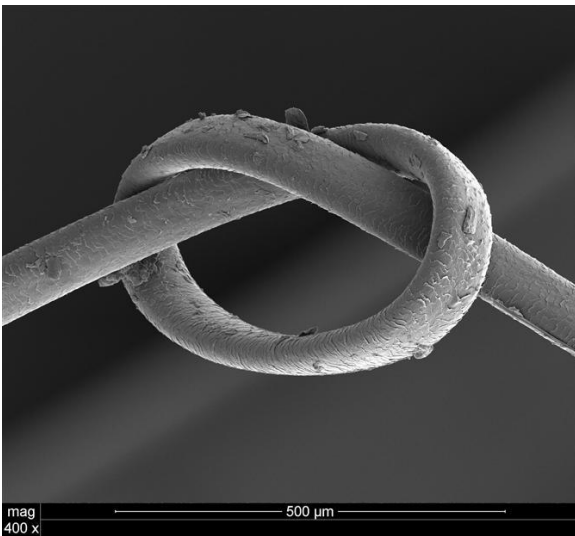
## BIOLOGICAL SEM WORKSHOP: A COMPLETE PICTURE



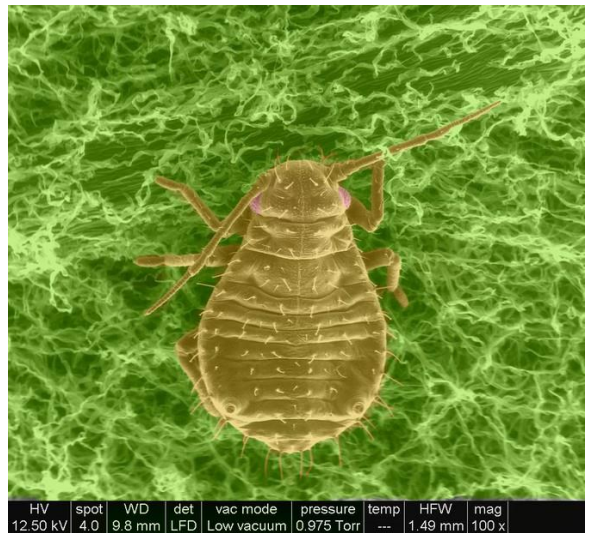
Scanning Electron Microscope image of *Nicotiana glauca* stem cross section. Image shows outer epidermal layer, followed by the cortex and then large vascular bundles. The vascular bundles contain the phloem (nearest the cortex) and xylem.  
Louisa Howard, Dartmouth College



Scanning Electron Microscope image of sunflower lower leaf surface.  
Louisa Howard, Dartmouth College



Knot of human hair.  
Courtesy of Frans Holthuysen



Aphid on white poplar.  
Courtesy of Riccardo Antonelli

# **EMS MICROSCOPY ACADEMY**

## **BIOLOGICAL SEM WORKSHOP: A COMPLETE PICTURE**

### **Details**

Tuesday - Thursday  
October 20 - 22, 2020  
8:30 a.m. - 4:30 p.m.  
Hatfield, Pennsylvania, USA

### **Targeted Participants**

Individuals who currently perform or will be responsible for the preparation of samples and/or operation of the SEM in a research, academic, or industrial setting.

### **Scope of Class**

This course will introduce participants to methods of sample preparation and SEM parameters and operation needed for accurate analysis.

The preparation of samples will start with determination of ROI and subsequent selection of gross cut orientation and determination of which dehydration technique to use: freeze drying, HMDS, Hitachi's ionic liquid or critical point drying (CPD). The chemical processing required before CPD will be stressed. Special attention will be paid to orientation, stability and grounding of the sample when mounting to facilitate ease of imaging. The advantages, disadvantages and instrument requirements for the various coating materials: Au, Pt, Pt/Pd will be discussed.

Selection of accelerating voltage (kV) and spot size are critical for surface detail, resolution, and charging and will be covered in detail. Parameters such as working distance for 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**

## **BIOLOGICAL SEM WORKSHOP: A COMPLETE PICTURE**

### **Main Curriculum**

Identification and isolation of ROI  
Theory and hands-on chemical processing  
Theory and hands-on CPD, HMDS, and Hitachi's ionic liquid  
Theory and hands-on freeze drying  
Mounting  
Theory and hands-on sputter coating  
SEM theory and discussion of parameters affecting image quality  
Demonstration and hands-on practice of SEM operation and effects of parameters  
Theory and demonstration and hands-on practice of variable pressure and Hitachi's ionic liquid

### **Instruments Available**

<b>Hitachi S3500 SEM</b>	<b>K850 Critical Point Dryer</b>	<b>PP3010 Cryo Preparation System</b>
<b>Q150T ES Sputter Coater</b>	<b>COXEM SEM EM-30N</b>	

### **Faculty**

**Michael Kostrna** was the program director of the Electron Microscopy Technician program at Madison Area Technical College and has more than 35 years in EM technical education and research experience. He has been training EM students for 30 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.

**Al Coritz** has been working in the Electron Microscopy field for 39 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.

# **EMS MICROSCOPY ACADEMY**

## **BIOLOGICAL SEM WORKSHOP: A COMPLETE PICTURE**

### **Schedule**

*Tuesday, October 20, 2020*

8:30-9:00 Introductions of staff and participants  
9:00-10:00 Bio processing theory  
10:00-10:15 Coffee break  
10:15-11:15 SEM theory  
11:15-12:00 Mounting and coating theory  
12:00-12:30 Lunch  
12:30-3:00 Hands-on chemical specimen prep / HMDS CPD  
3:00-4:30 Physical prep / freeze dry  
6:00 Hosted dinner

*Wednesday, October 21, 2020*

8:30-9:00 Discussion of previous day's activities and experiences  
9:00-12:00 Hands-on mount and coat samples  
12:00-12:30 Lunch  
12:30-4:30 Hands-on SEM operation

*Thursday, October 22, 2020*

8:30-9:00 Roundtable discussion of previous day's activities  
9:00-9:30 Theory of variable pressure (VP) imaging – advantages and disadvantages  
9:30-10:30 Demonstration of VP  
10:30-10:45 Coffee break  
10:45-12:00 Participant VP imaging  
12:00-12:30 Provided lunch  
12:30-1:00 Workshop assessment  
1:00-4:30 Continued participant VP imaging

***Schedule subject to change***

# **EMS MICROSCOPY ACADEMY**

## **BIOLOGICAL SEM WORKSHOP: A COMPLETE PICTURE**

### **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**  
**BIOLOGICAL SEM WORKSHOP: A COMPLETE PICTURE**

**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 "Biological SEM Workshop Oct20".

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](mailto:info@emsdiasum.com) or Fax: 215-412-8452

**TO REGISTER ONLINE, CLICK [HERE](#).**