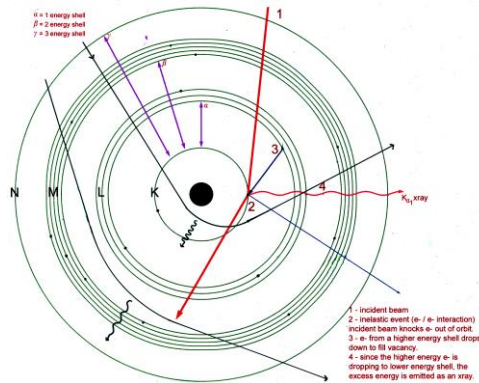
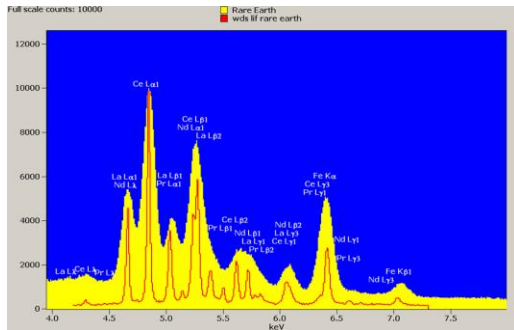


# EMS MICROSCOPY ACADEMY

## X-RAY MICROANALYSIS WORKSHOP: A COMPLETE PICTURE

This course covers qualitative and semi quantitative analysis, beginning with the generation of background and characteristic of x-rays, nomenclature, and peak family ratios.

### *Examples of the endless possibilities in the field of Microscopy*



### Details

Tuesday - Thursday  
May 26 - 28, 2020  
8:30 a.m. - 4:30 p.m.  
Hatfield, Pennsylvania, USA

### Targeted Participants

Individuals who are, or soon will be, expected to operate an SEM, choose appropriate parameters for EDS, and perform qualitative and semi quantitative analysis on materials samples.

### 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.

# **EMS MICROSCOPY ACADEMY**

## **X-RAY MICROANALYSIS WORKSHOP: A COMPLETE PICTURE**

### **Scope of Class**

The nondestructive elemental identification of a sample's micro-composition is a powerful tool for the microscopist. This technique can detect elements from boron to uranium with a minimum concentration detectability of 1000 ppm in solid samples.

This course covers qualitative and semi quantitative analysis beginning with the generation of background and characteristic of x-rays, nomenclature, and peak family ratios.

Collection parameter settings of both the EDS system and microscope, their effect on the spectrum and quality of the subsequent quantification are of primary importance. The non-variable parameters of working distance and tilt will be demonstrated as well as the effect of accelerating voltage on background shape, x-ray spatial resolution, over-voltage requirements, and accuracy of ZAF matrix corrections examined. With the advent of the silicon drift detector (SDD) the pulse processor time constant and beam current (spot size) settings to control % dead time are almost a moot point but will be introduced for those who work with a SiLi detector.

Identification of individual elemental lines as well as methods used for determining peak overlaps such as peak shape, peak family ratio anomalies, and the presence of a peak unassociated with known elements will be paid particular attention.

Quantitative analysis will be limited to the use of ZAF and PhiRhoZ routines but the collection of standards and their use in a full quant will be discussed. Backscattered (BSE) imaging will be correlated with x-ray maps and spectral imaging results.

Energy calibrations will also be performed.

# **EMS MICROSCOPY ACADEMY**

## **X-RAY MICROANALYSIS WORKSHOP: A COMPLETE PICTURE**

### **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.

### **Main Curriculum**

Generation and nomenclature of x-ray lines  
Spectral artifacts  
Deconvolution of peak overlaps  
Qualitative analysis  
Semi quantitative analysis  
Hardware settings/function  
Setup and operation of SEM for BSE imaging and spectral acquisitions  
Sample requirements for BSE/EDS

### **Equipment**

<b>Hitachi S3500 SEM</b>	<b>Bruker Esprit (SDD)</b>
<b>MAC Element Standards</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 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.

**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.

# **EMS MICROSCOPY ACADEMY**

## **X-RAY MICROANALYSIS WORKSHOP: A COMPLETE PICTURE**

### **Schedule**

*Tuesday, May 26, 2020*

8:30-9:00 Introduction of staff and participants  
9:00-10:30 X-ray generation, nomenclature, and peak identification  
10:30-11:00 Break  
11:00-12:00 FWHM, peak overlaps, and qualitative analysis  
12:00-12:30 Hosted lunch  
12:30-3:00 Demonstration of SEM operation and EDS acquisition  
3:00-4:30 EDS software setup and qualitative analysis  
6:00 Dinner

*Wednesday, May 27, 2020*

8:30-9:00 Round table discussion of previous day's activities  
9:00-10:00 SEM parameters affecting spectral acquisition  
10:00-10:30 Break  
10:30-12:00 Demonstration of overvoltage and other collection requirements  
12:00-12:30 Hosted lunch  
12:30-3:00 Group A hands-on EDS operation, acquisition, and spectral analysis  
Group B sample preparation for accurate quantification  
3:00-4:30 Group A sample preparation for accurate quantification  
Group B hands-on EDS operation, acquisition, and spectral analysis

*Thursday, May 28, 2020*

8:30-9:00 Round table discussion of previous day's activities  
9:00-10:00 Semi quantitative analysis, ZAF and Phi Rho Z  
10:00-10:30 Coffee Break  
10:30-12:00 Demonstration and hands-on semi quantitative analysis  
12:00-12:30 Provided lunch  
12:30-4:30 BSE / spectral map / line scan acquisition

***Schedule subject to change***

# **EMS MICROSCOPY ACADEMY**

## **X-RAY MICROANALYSIS 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**  
**X-RAY MICROANALYSIS 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 "X-Ray Microanalysis May20".  
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](#).**