Newsletter

Of the

New York Microscopical Society

1 Prospect Village Plaza
(66F Mt. Prospect Avenue)
Clifton, New Jersey 07013-1918
GPS: Latitude 40.8648N, Longitude 74.1540W

Summer 2015 | **Editor: (201) 791-9826** | **Volume 9 (29) Number6**

Clean Sweep Summer Sale at NYMS in Clifton Going On All Summer Long*

Now - More Items Available

Here is your opportunity to find something you need, or would just like to acquire: Some microscopy/photography-related item(s) that have accumulated over many decades.

Many of the various items from our basement work/storage areas may not be easily attainable through other sources. The tables will be loaded. Feel free to make offers if you find something you like.

Come in and "shmooze:" You may actually find something useful to you.

All NYMS events provide opportunities for information interchange between members and also their guests.

Guests are encouraged to join the New York Microscopical Society and enjoy our events, use our library and equipment and meet other members.

****By Appointment only:***
Contact Mel Pollinger at pollingmel@optonline.net;
or
John Scott at nyconsnfdn@aol.com;

(see page 2 for additional contact information)

Board of Managers listing is now updated – see page 2

Have a great Summer – use your microscope

Save a Tree: Get The Extended Newsletter: By Email Only

Board of Managers

President, 2015-16 Angela Klaus klausang@shu.edu; (973)761-1840, Manager 2015-18

Vice President, **2015-2016** John Scott nyconsnfdn@aol.com; (646)339-6566, Manager 2015-18, Program Chair

Treasurer, 2015-2016 Mel Pollinger pollingmel@optonline.net; (201)791-9826, Manager 2014-17 Facilities, Editor

Secretary, 2015-2018 Lou Sorkin entsult@aol.com; (914)939-0917 Manager, 2015-18, Webmaster Pro tem

Manager, 2015-2018 Guy deBaere guydbaere@aol.com; (347)668-4798 Outreach Program

Manager, 2015-2018 John A. Reffner jareffner@cs.com; (203)358-4539 Past President

Manager, 2014-2017 John R. Reffner, Jr. jrr11p@gmail.com; (215)527-1882

Manager, 2013-2016 Roland Scal rscal@qcc.cuny.edu; (718)631-6071

Manager, 2014-2017 Andrew J. Winter andrew.winter@co.middlesex.nj.us; (732)816-3793, Education Chair

Manager, 2013-2016 Brooke Kammrath bkammrath@newhaven.edu; (203)931-2989, Membership Chair

Manager, 2013-2016 Seymour Perlowitz perlowitzs@hotmail.com; (718)338-6695

Manager, 2013-2016 Peter Diaczuk peter.diaczuk@gmail.com; (212)237-8896, Past President

For additional information contact the Editor: Mel Pollinger at (201) 791-9826, or pollingmel@optonline.net

Dues and Addresses

Please remember to mail in your Dues to:

Mel Pollinger
Treasurer, NYMS
18-04 Hillery St.
Fair Lawn, NJ 07410-5207

Junior (under age 18) $10 Annually
Regular $30
Student (age 18 or above) $20 Annually
Supporting $60 Annually
Corporate (includes one advertisement in NYMS News) $175 Annually
Life $300 (payable within the year)
To avoid missing notices:
Notify Mel Pollinger if you have changed your address, phone or email.

Awards Given by the New York Microscopical Society

The New York microscopical Society takes great pleasure in recognizing and rewarding individuals who have contributed to either the activities of the society or to furthering microscopy. These awards are described in our website and in a pdf file for our email newsletter recipients. All members are eligible to nominate individuals for these various awards, and are encouraged to do so.
John A. Reffner, Awards Committee Chairperson

Awards Committee

Chair: John A. Reffner

Members

Jan Hinsch
Peter Diaczuk
Angela Klaus
John R. Reffner

Mel Pollinger, Editor
18-04 Hillery St.
Fair Lawn, NJ 07410-5207

To Order Your NYMS Lapel Pins

Send a check in the amount of $12.00 per pin to:
New York Microscopical Society
c/o Mel Pollinger, 18-04 Hillery Street, Fair Lawn, NJ 07410. To avoid shipping & handling charges, pins may be purchased directly at any NYMS meeting for $10.00.

The Mission of the New York Microscopical Society is the promotion of theoretical and applied microscopy and the promotion of education and interest in all phases of microscopy.

Alternate Meeting Notifications
Please note that due to time constraints in publishing, some meeting notices may be available by calling Mel Pollinger at 201-791-9826, or by visiting the NYMS website, or emailing: pollingmel@optonline.net

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Please remember to pay your dues

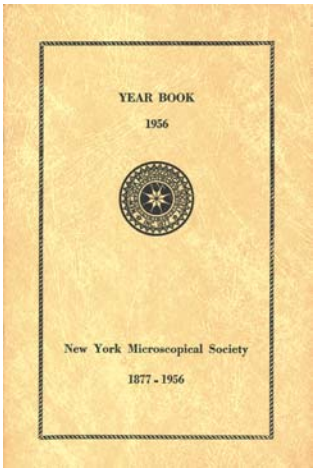
Buy and Read a Good Book on Microscopy.

From the Library:

The NYMS Library contains over 3,700 cataloged volumes, among these is a full set of McCrone's Particle Atlas and copies of Microbe Hunter Magazine.

Come on down and read!

Contact: Mel Pollinger (201) 791-9826, or email Mel at pollingmel@optonline.net



NYMS Yearbook 1877-1956

Be A Volunteer – There's *Always* Something to do and see at NYMS.

If you wish to contribute some of your time to NYMS, please contact me at (201) 791-9826 or by email at pollingmel@optonline.net

Coming Up in 2015

EAS Live Webinars for 2015:

Please search on the below indicated web address and review the EAS Website below for information regarding the upcoming Live Webinars in 2015.

http://easinc.org/wordpress/?page_id=2974

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Members Day Sale/Swap at Clifton

EAS
CALL FOR PAPERS
On-line submission is now open!

Join us November 16-18, 2015 in Somerset, NJ

We invite you to be part of EAS by contributing a paper for oral or poster consideration. EAS seeks contributions from scientists in **ALL** areas of analysis, which make its program uniquely strong. Submit at: www.eas.org/asubmit

Introducing new submission deadlines for 2015!

Marine Biology Link to check out.
http://research.mblwhoilibrary.org/works

Regarding the SCONYC Coney island Estuary Event on May 31st, 2015

From Merryl Kafka:

"…It was a great event and the success and hard work were shared by several lead organizations, and I am proud that NYSMEA was a part of that with Lane Rosen and Gene Ritter. At every opportunity (I was interviewed by channel 12 news, and other reporters) I highlighted NYSMEA. The DOE Dir of STEM Linda Curtis Bay, saw first hand, the work that NYSMEA does to support and advance science for kids and teachers. John Tom from DOE was also present.

Our own member, Guy DeBaere and the Pres of the NY Microscopical Society, John Scott, did a fabulous job, along with our student member Alexander Mildener, who endlessly spoke about whales at the Gotham Whale Table…".

Reported by Guy deBaere , Images by John Scott

May 31st 2015 Meeting in Clifton*

On Sunday 31-May-2015, at the NYMS Meeting in Clifton the Board presented a slate of four Managers for the Bylaws defined term of three years, and four officers for the Bylaws defined one year term. The new term begins in July. The board also bought items out for a garage sale style clearance of antique and "surplus to needs" instrumental and photographic components, and (non-NYMS-library) coffee table style books. Finally, Seymour Perlowitz and John Scott spent a couple hours self-training in use of the partly automated digital microscope recently donated by Leica. (See page two for the new slate of NYMS Board Members.) **From a report by John Scott*

Visitors Always Welcome to NYMS

Although most of our lecture meetings, workshops and classes are held in the NYMS Clifton facility on the last Sunday of the month, the building may be opened for special purposes at other times, by appointment only. For such an appointment, please contact Mel Pollinger by phone at (201) 791-9826, M-F noon to 9:30pm, or by email at pollingmel@optonline.net.

From The Editor...

if you have an email address: Getting the newsletter by email means you can receive an **extended pdf version** that cannot be sent by "snail mail." Even if you only continue your USPS delivery of the newsletter, NYMS needs your email address for reporting priority events and special news. Being able to contact you quickly by email means better communication between you & NYMS■■ Mel

Need to use a Microscope?

The various microscopes that are presently set up on the main floor of the New York Microscopical Society building in Clifton, N.J. are there for the use of its members.

From Gary Mayer: In need of parts for older Olympus Microscopes? Contact J.C. Ricky in Ohio at (740) 862-9252

Microscope Cleaning Kit

A complete set of tools and accessories to keep your microscope in optimum operating condition. The kit is put together by our previous Curator/Educational Chairman, Don O'Leary, and available directly from NYMS, while they last, for only $35.00 plus shipping & handling, or may be purchased at a meeting. Call or email Mel Pollinger for details (see page two for contact numbers).

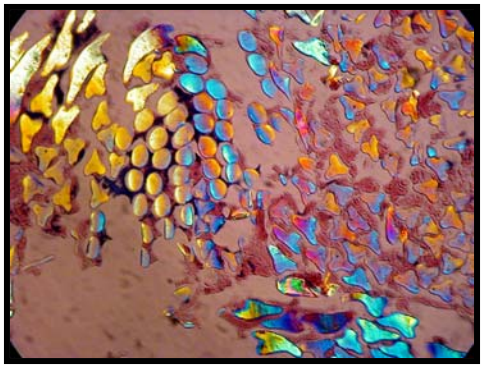
NYMS Meeting Dates

Most meetings of NYMS are usually held in Clifton on the last Sunday of the months of Jan., Feb., Mar., Apr., May, Sep., Oct. Exceptions will be noted in the Newsletter.

NYMS microscope slide collections are available for study at meetings and by appointment.

Please note that our website is presently under repair.

Answer to Mystery Photo for May 2015



Two types of polyester fibers in a single yarn - round and trilobar; From an explanted vascular graft. Imaged by polarized light. Did you guess correctly?

Mystery Photo for Summer 2015

Want to take a guess? Send it to me by email or call me: pollingmel@optonline.net, (201) 791-9826

Additional Historical NYMS Supplements

Email Newsletter recipients will also be getting copies of NYMS Newsletter pdf back-Issues from 2007. Copies of older newsletters will be sent as I convert them.

Attention NYMS Members

Got something to sell? Article to publish? Pictures for the newsletter? Looking to buy something? Want to use the library? Want to use a NYMS microscope? For any of the above, contact the Editor, Mel Pollinger.

N.Y.M.S. NEWSLETTER

SUPPLEMENT

Summer 2015

In This Section:

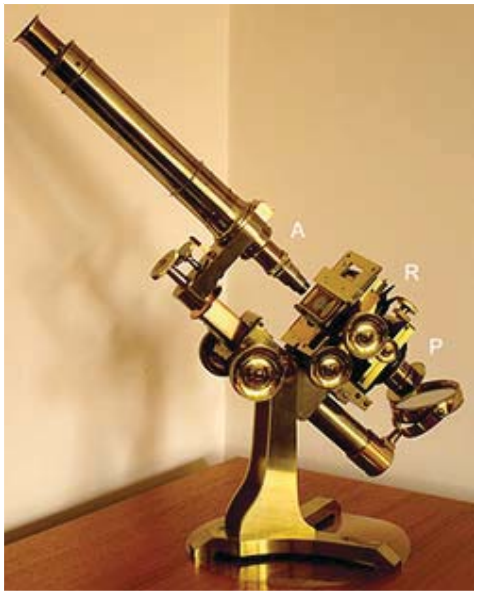
◊ Victorian Microscopes
◊ SCONYC Estuary Day
◊ EAS Tech Tour 2015
◊ McCrone Courses
◊ EAS Retort (Dr. John A. Reffner)
◊ Membership Application
◊ NYMS Items for Sale
◊ Traveling Directions to NYMS
◊ Last page images

…"Made by W. Watson and Sons to the specification of Dr. Henri Van Heurek, Antwerp, for Photo-Micrgraphic and High Power work." NYMS Library image 1223

Victorian microscopy ca. 1860 - a hands-on comparison of microscopy techniques then and now.

Qualitative polarised light microscopy.

by David Walker, UK



One of the appeals of antique microscopes is that they allow a user to explore the implementation of techniques at the time of manufacture, aided by textbooks of the time and to compare them with modern microscopy practice. Using a well specified Ross No.2 microscope ca. 1860 as an example, the various techniques it offered are compared with the same methods as used on a typical research microscope of the second half of the 20th century, a Zeiss Photomicroscope III.

Image right: A Ross No.2 bar limb design microscope ca. 1860 set up for polarised light studies.

The study of the effect of polarised light on a wide variety of subjects was very popular from the outset of the wide availability of affordable achromatic microscopes. Richard Beck's book 'Achromatic Microscopes' 1865 discusses the various methods and accessories available (Plate XVI illustrates typical examples). Copies are available on www.archive.org. The various editions of the classic textbooks e.g. by Hogg and Carpenter also had sections on the technique.

The popularity of these studies was reflected in the wide array of prepared slide subjects—animal, vegetable and mineral—sold by mounters in the 19th century. Subjects particularly suited were labelled variously as 'Polar' or 'For Polariscope'. The practice has continued with some mounters until recently and a selection of these slides are shown right. The red papered slide is by the famous maker Edmund Wheeler.

Studies of these subjects by the amateur were primarily *qualitative* e.g. to enjoy the often striking imagery although the technique could enhance the visibility of some objects or their features.

In the second half of the 19th century, even the most basic microscope e.g. those without a substage or condenser were often supplied with a polariser and analyser. More sophisticated stands such as the Ross described here had a wider range of accessories and polarisers of higher quality. (This is in contrast to today it seems, where basic polarising facilities aren't typically included even with quite advanced models, despite the cheapness of modern polarisers.)

Quantitative polarisation microscopy and the associated development of the petrographic microscope was still in its relative infancy at the time of the Ross microscope used as an example here (see the Timeline in Kile's book below).

A superb illustrated book discussing the development of quantitative methods is 'The Petrographic Microscope: Evolution of a Mineralogical Research Instrument' by Daniel E Kile 2003. Special Publication No. 1 published by 'The Mineralogical Record'.

Image right: Detail of the Ross No.2 bar limb design microscope ca. 1860 set up for polarised light studies. A- Nicol prism analyser above objective, R - 3 swing in retarders, P - Nicol prism polariser.

The substage condenser mount is fully rotatable via the rack and pinion and also centrable. A lock on the rotation would have been useful as the setting easily shifts when using the retarders.

The polariser P fully rotates in its mount so that it can be set to the orientation required with respect to the retarders and analyser. (This microscope and procedures predates the now typical E-W orientation of setting polarisers.)

The slide stage plate is fully rotatable, but it acts *above* the x - y controls, so it is not possible to set the stage rotation to be permanently concentric with the objective optical axis. Thus a feature isolated on the slide will swing in an arc out of the field of view if wish to rotate it between the crossed polars.

Victorian polarisers and analysers - Nicol prisms. One of the commonest form of polarisers in the 19th century were Nicol prisms invented by William Nicol in 1829 who also developed the thin section preparation invaluable for later quantitative polarising studies. The polariser and analyser using these prisms are shown left, the former fitting in the substage mount where present as in the Ross. As shown, the polarisation axis is N-S established by crossing with a modern polariser.

Two forms of Nicol prism analyser were common. The one shown right in the above image fitted immediately above the objective and screwed into the lower end of the eyepiece tube. The cited advantage of this method was that a full field of view was retained at the eyepiece, the disadvantage being that it had to be of high quality to minimise image degradation.

On cheaper stands the quality and size of the prisms was variable. The examples shown are of high quality, the polariser also being larger than many.

Eyepiece polarising accessories. An alternative to the Nicol prism above the objective was a slip-on prism for an eyepiece. This is shown at the top of the image right. Its benefit was cited as offering a brighter image than the objective design. When this was set for crossed polars, the two lozenges of clear prism were at right angles and only a quite small area was offered to the viewer but at the penalty of a narrower field although less prone to image degradation than the nosepiece analyser.

Another alternative to a Nicol prism as an analyser was a small plate of tourmaline fitting over an eyepiece, an example is shown middle right in the image right. This offered a wider field at the eyepiece, but as the transmitted light image shows, it gave a colour cast to the image.

Double prism eyepiece accessory with subject plate. The eyepiece attachment shown middle left in the image right is an uncut rhombohedron of calcite (in contrast to the Nicol prism) which gave a double image from the ordinary and extraordinary ray (a hole in punched card is sat below it to show this). This was used in conjunction with a perforated plate as the stage subject shown and retarders if desired to demonstrate the effects of polarised light.

Victorian retarders. Shown right below are the variable retarders enclosed with the Ross, other makers offered similar. They were often called 'Darker's selenites' after William H Darker, a London instrument maker, who was noted for his ability to prepare the thin plates and for his polarisation apparatus. Selenite is a form of gypsum (hydrated calcium sulphate). The retarders fitted above the polariser on the condenser. Three retarders were offered - 1/4λ , 3/4λ and 9/4λ, PA was the 'positive axis' and each retarder could rotate 360°.

This, at first sight, odd combination of retarders was in reality rather clever. As Beck describes ('Achromatic Microscopes', 1865) it offered 13 retardation settings in ¼λ increments from ¼ to 3¼ wavelengths. These could be achieved by swinging in one or more retarders with their positive axes aligned or one turned 90° to subtract that wavelength from the total. Beck has a table listing all the combinations and their respective primary and 'complementary tint'.

To match the colours Beck describes in his table, a retarder's PA was set parallel to one polariser with the other polariser at right angles, i.e. crossed polars. The 'complementary tint' was achieved by rotating one polariser 90° i.e. uncrossed. This contrasts with the modern practice of keeping the polarisers crossed and inserting the retarder at a fixed 45° angle to both polarising axes.

In use. Although offering a wealth of retardation settings, I found it a rather awkward device to use. It is nestled in a congested substage and does not offer a good view of, or easy access to, the retarders to make changes or check what has been set. I put white marks on the side of each so could check the orientation from the side. The freely rotating condenser mount could also easily be rotated out of alignment while adjusting retarder settings.

With the set of selenites in place, the polariser is some distance from the stage and can affect the aperture. A condenser can be used above the retarders for higher powers as advised by Beck.

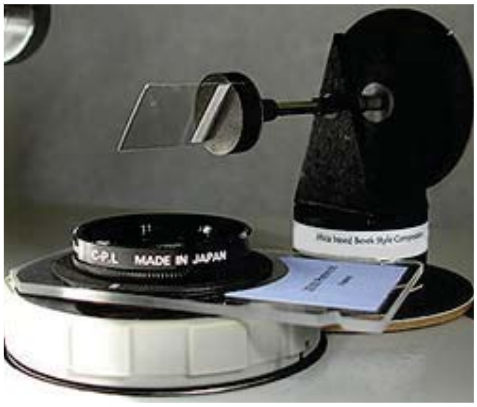
Other methods of introducing retarders included a brass plate that sat below the slide on the stage, incorporating either exchangeable retarders or rotatable forms to give variable retardation.

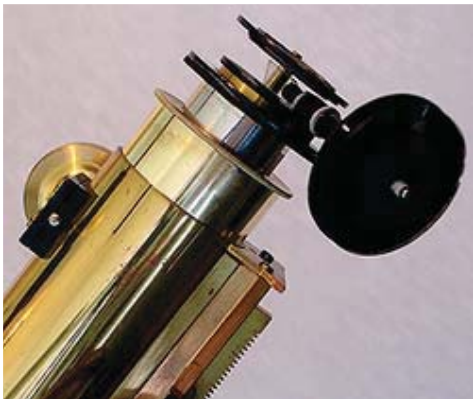
Typical modern polarisers and analysers. Those used post introduction of Polaroid as used in the Zeiss Photomicroscope series are shown in the image right below..

Bottom left: A simple high quality glass Zeiss polariser that can either sit in the condenser filter tray or on the field lens base. A white line indicates the polarising axis, typically set E-W.
Top middle: A basic analyser using the Zeiss filter tray and fits in a slot above the objective nosepiece.
Top left: The more sophisticated Zeiss analyser using the same filter slot allows full rotation with an accurate

micrometer setting of the polarising axis. Somewhat overkill for qualitative work but a delight to use.
Top right: The retarder filter tray (empty here) sits at 45° to and below the analyser slot. Common retarders are the quarter and full wave plate.

Like many users, I prefer not to use a retarder above the objectives—it's one extra optically demanding element—sitting the retarder on the analyser, below the stage allows cheaper grade filters to be used for qualitative studies. They can be set by eye to 45º to the polariser axis.

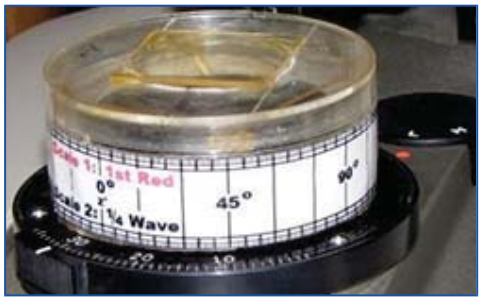




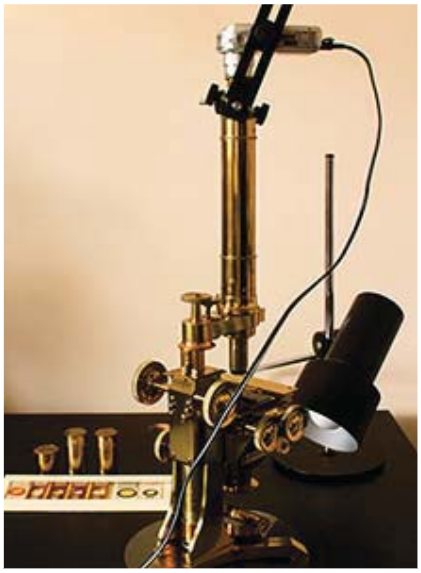
Examples of some variable compensators built by enthusiasts. Modern commercial methods of continuous variation of the retardation are expensive. They are often a special accessory for modular research scopes and advanced polarising microscopes for quantitative rather than qualitative studies. It can take the form of e.g. a quartz wedge that sits above the objective or various calibrated designs of variable retarder e.g. for the eyepiece.

Some enthusiasts have made their own variable compensator. Ian Walker made a tilting Berek style compensator (Micscape April 2006) (left above) just using stiff card and a cleaved piece of mica to sit below the stage on the lamp field lens. This design relies on continuously varying the thickness of angled mica, in contrast to inserting one or more sheets of mica or other material corresponding to a known retardation value as used above by Ross.
Ian later developed this into a miniature version (Micscape November 2006) (right above) to sit above the eyepiece of an older microscope without a built in lamp. *Images courtesy of Ian Walker.*

Jay Phillips (Micscape May 2014) designed and made an elegant calibrated 'variable rotation filter' akin to the Victorian method of using a selenite stage. Shown right. *Image courtesy of Jay Phillips.*



Selection of images. Note on photography. The set-up that worked best with equipment to hand is shown below. The Ross 'A' eyepiece has a useful high eyepoint and suited the Sony P200 consumer camera which was supported over the eyepiece using a commercial 'digiscoping' camera clamp. The 3X optical zoom permitted filling the field if desired but the circular images show the full visual field to the field stop. For the contrasty subjects used, the microscope was focussed visually and the camera's autofocus allowed to focus, which it did without problem.

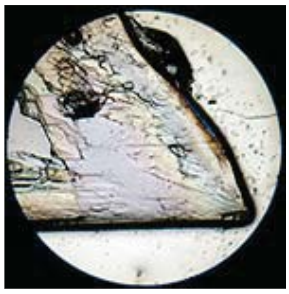
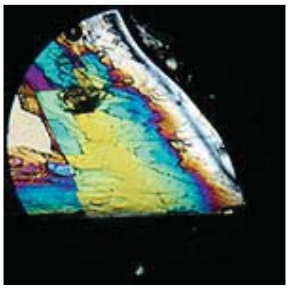
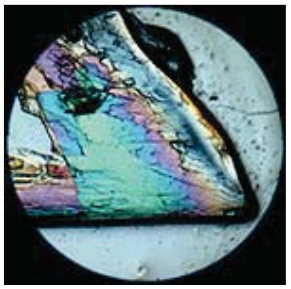
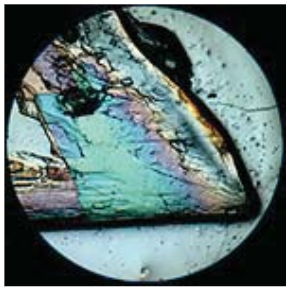
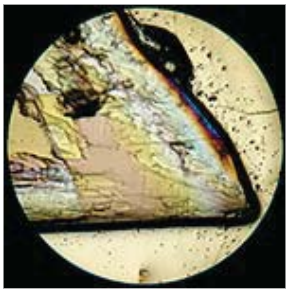
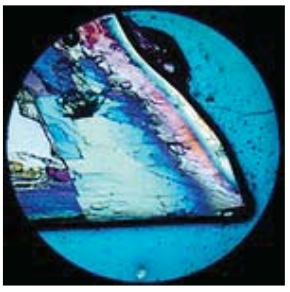
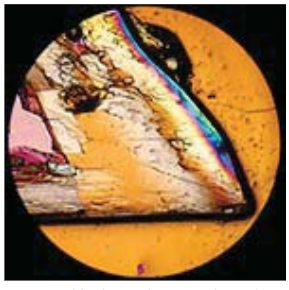
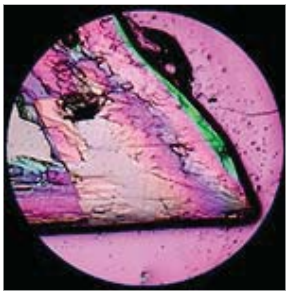


The camera was mains powered to avoid the auto shut-off after 3 mins. Ideally, to fully appreciate the Victorian microscopy experience, an authentic microscope oil lamp of the period would be preferable. But they are very expensive and not something I'd wish to use in a modern home.

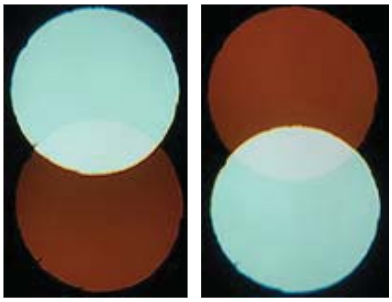
North of England daylight was too fickle, so a desk lamp was used with a 75W photo-enlarger bulb. These have a structureless high quality internal white coating and a good large source for critical illumination. The concave side of the large Ross mirror allowed NAs of up to ca. 0.25 i.e. sufficient for the lower power objectives.

The photo-enlarger bulbs, being a specialist bulb, have bypassed the recent EU laws phasing out tungsten bulbs. They are good value and widely available for a few pounds each from online photo outlets.

Demonstration of the swing in retarders on the Ross, using a quartz fragment as subject. Shown below. (Open University, slide X from set OU260.) Each retarder's PA set either crossed or parallel to the polariser axis. 1½ inch objective (ca. 6.2X mag on Ross tube.) Ross 'A' eyepiece ca. 5X, field stop 18.5 mm, i.e comparable to a Zeiss 1970s Kpl series.

 Brightfield, polars parallel	 Crossed polars.	 Crossed polars plus ¼λ.
 Crossed polars plus ½λ (+ ¾ - ¼)	 Parallel polars plus ¾λ.	 Crossed polars plus ¾λ.
 Parallel polars plus λ. (¾ + ¼)	 Crossed polars plus 3¼λ.	

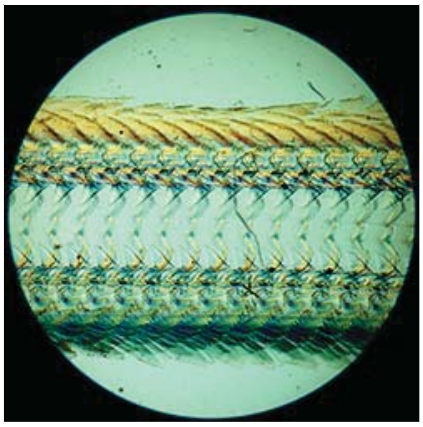
Above. Centre middle and right: The two images using ¾λ compare the effect of using the same retarder between either parallel polars or crossed polars. The former is Beck's 'complementary tint'. Beck describes the colours (seen as the backgrounds in above images) as 'light maize' and 'deep blue' respectively.

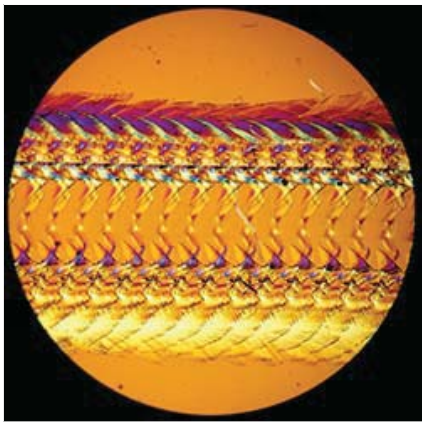


Double prism eyepiece accessory in use. Ross 2 inch objective. The metal perforated slide shown earlier was used with a polariser on the substage but no analyser. By rotating the eyepiece with double prism attached, the tints for the ordinary and extraordinary rays are shown right, in this case for 1λ (¾ + ¼) retarders in place. The colours shift as rotate by 90°.

The larger hole in the slide gives overlapping images as shown, for the smaller hole they do not overlap.

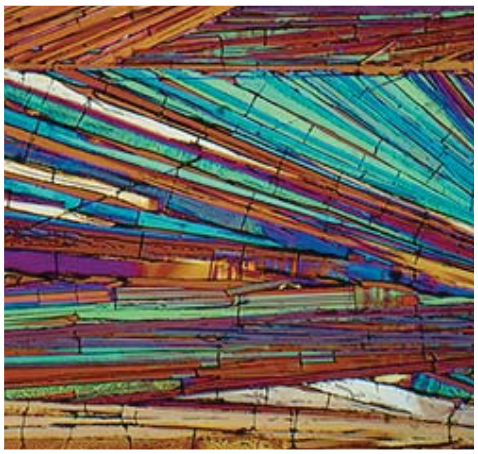
This is a simple but effective way of demonstrating the double refraction of a calcite prism and the associated polarised and unpolarised rays it creates. There's no reason why this accessory could not be used nowadays to help demonstrate the principles associated with polarised light.





Left above. Victorian papered slide 'Palate of Haliotis' i.e. the radula or teeth of the abalone mollusc. 1½ inch objective. Parallel polars plus λ retarder. Right above. As left but crossed polars plus λ retarder.

Image right: Biosil slide of musk ketone crystals. Objective 2/3 inch with λ retarder between crossed polars. Full field after field stop edge cropped.



Final comments. It was very enjoyable as well as instructive learning how the Victorians practised polarised light microscopy. For qualitative studies, there's little the Ross couldn't do using the technique that couldn't match a modern research microscope. The lower power objectives were well corrected and near flat to the edge. The Ross 'A' eyepiece field number was comparable to modern examples for a good field of view and the optics overall offered little loss of image quality cf modern objectives.

Compared with a modern microscope I would say that the weaker aspects of the Ross design, was the rotating stage above the x-y controls thus losing the optical axis if scanned slide. Also the selenite plates in use, although versatile, were rather fiddly.

NYMS at SCONYCS Coney island Estuary Day, 30-April-2015

Images by John Scott

NYMS at SCONYCS 30-April-2015

Main Identity

From: "Sheree Gold" <easinfo@aol.com>
To: <easinfo@aol.com>
Sent: Wednesday, June 17, 2015 10:19 AM
Subject: Signups for 2015 EAS Technology Tour to Begin on July 21

Once again in 2015, we will conduct the Technology Tour during the exposition. This very popular program encourages meeting attendees to visit the exhibitors in order to obtain more information on their products, instruments, and services.

Sign up for this program will begin on July 21.

Here is how it works:

1. When meeting attendees pick up their registration materials at the meeting, they are given a one page sheet explaining how the Technology Tour works. The page will contain a block for each of the 20 participating companies, with the company name, logo, and booth number indicated.
2. When the attendee visits the booth of a participating vendor, the vendor marks the appropriate block on the page with a sticker, stamp, or some other type of marking.
3. When the attendee has visited at least 10 participating companies, they can turn their Technology Tour page in at the EAS Souvenir Booth in 700 aisle for an EAS logoed item.
4. If an attendee visits all 20 participating companies, in addition to the EAS item, they will be entered in a daily drawing for a $50 Visa gift card.
5. We will be holding gift card drawings each day of the exposition.

Here are the critical details for exhibitors:

1. There will be 20 participating companies. Once all 20 slots are full, the program is sold out for this year.
2. The cost to participate will be $300, which will be invoiced in August.
3. In order to participate, a company must have paid for their booth space in full.
4. If you are interested in participating, all you need to do is send me an email on July 21 indicating that you would like to be included. Since this program traditionally sells out in less than 24 hours, obviously it is beneficial to indicate your interest as early on July 21 as you can.

If you have questions about the Technology Tour, or any other aspect of the exposition, please let me know.
Thanks
Sheree

Sheree R. Gold
Exposition Director
2015 Eastern Analytical Symposium
November 16-18, 2015
Somerset, New Jersey
easinfo@aol.com
610-742-4981 (cell)
Join us on Linked In
See our page on Facebook

Main Identity

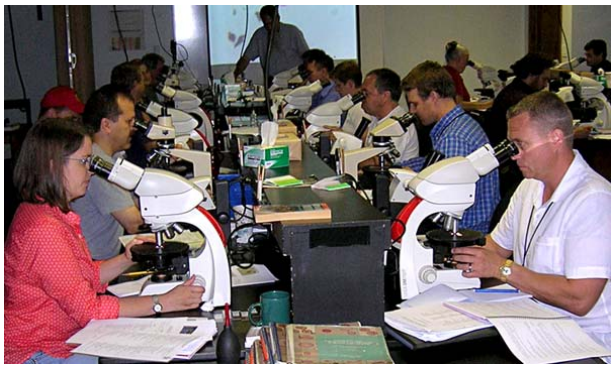
From: "McCrone Research Institute" <courses@mcri.org>
To: <pollingmel@optonline.net>
Sent: Wednesday, May 20, 2015 10:01 AM
Subject: Upcoming Microscopy Courses at McCrone Research Institute, Chicago

Upcoming Microscopy Courses at McCrone Research Institute

Register Today -- Seats Are Limited!

Advanced Asbestos Identification
July 20-24, 2015
In this advanced course using polarized light microscopy (PLM), students learn to identify and differentiate among all asbestos fibers and fibrous substitutes through review of basic theory and inclusion of more advanced methods. Learn more or register

Forensic Dust Analysis
July 27-31, 2015
This introduction to the analysis of dust traces for trace evidence begins with the history of dust analysis and the work of Locard, Popp, Schneider, Heinrich, Frei-Sulzer and others. The course will also explore the techniques for collecting, separating, analyzing and interpreting dust evidence. Learn more or register



Sample Preparation and Manipulation for Microanalysis
July 27-31, 2015
The course consists of lectures, demonstrations and hands-on training in a variety of techniques of small-particle handling. Students are encouraged to bring problems and samples for discussion, practice and analysis. Learn more or register

Advanced Indoor Air Quality: Advanced Fungal Spore Identification
August 19-21, 2015
This course is designed for working analysts with moderate experience and goes beyond the basics to deal with the problems encountered on the job. It identifies less common ascospores, basidiospores, mitospores and other spores using current and classic mycological literature. Learn more or register

Microscope Cleaning, Maintenance and Adjustment
August 26-27, 2015
Students will learn how the microscope works, various approaches to lens cleaning, Köhler illumination adjustment and other tricks of the trade. Lectures will be followed by hands-on adjustment and cleaning. Learn more or register

Animal Hair Identification
September 1-3, 2015
This course begins with an introduction to mammalian taxonomy and the importance of establishing reference collections and hair atlases. The structural, morphological and anatomical features of hairs will also be covered. Learn more or register

Digital Imaging and Photomicrography
September 14-16, 2015
Students learn essential image-collection practices supplemented by lectures, demonstrations and exercises that enable students to collect better images and improve less-than-optimal images via digital processing. Learn more or register

Raman Microscopy
September 28-30, 2015
Emphasis is placed on applications of Raman that arise from its ability to characterize molecular structure, its general ease of use and minimal sample preparation requirements. Non-routine applications will also be discussed. Learn more or register

Other McCrone Microscopy Courses

Click the following links to view all McCrone microscopy courses by type:

Asbestos, Fungal Spore, Pollen, Dust and Other Indoor Air Quality Courses

PLM and Forensic Microscopy Courses

SEM, IR, Fluorescence, Raman, Sample Prep and Other Micromethods Courses

Specialty Microscopy and Other Courses

Since 1960, McCrone Research Institute in Chicago has offered intensive courses in microscopy that emphasize the proper use of the microscope and more specialized microscopy, focusing on a particular technique, material or field of application. All courses are hands-on, featuring lectures, demonstrations and laboratory practice.

Visit www.mcri.org for full descriptions of all courses, secure online registration, hotel information and more.

McCrone Research Institute | 2820 S. Michigan Avenue | Chicago | IL | 60616

RETORT

May 2015 Newsletter of the Eastern Analytical Symposium & Exposition

EAS 2015 – Analytical Innovation from Benchtop to Business

I am excited to announce that Nobel Laureate Professor Kurt Wüthrich will be the Plenary Speaker for EAS 2015! See the following page for more details.

Glancing through this issue of the "Retort" you will realize that significant progress has been made since February. The Short Course Committee brings back highly demanded short courses and develops new ones to meet your evolving needs. The Program Committee has finalized the invited sessions and adds a few exciting sessions, such as "3D Technology: Leveraging Today's Tools for Tomorrow's Applications" and "Analytical Testing for the Cannabis Industry: Consumer Safety vs. Regulatory Requirements." For the technology entrepreneurs and business managers, Rutgers Business School is presenting a session on "Business Essentials for Technology Entrepreneurs" where you can learn about entrepreneurship, production and operation management, marketing, and leadership. Please consider showcasing your analytical innovation by submitting your abstract for an oral presentation by June 15.

We will offer three Workshops related to the employment: *Getting Hired - Secrets of a Contingency Recruite, Using LinkedIn® Professional Networking Services to Network Your Way to a Job and More*, and *Sharpening your Presentation Skills – an Interactive Workshop*. We will also offer four Seminars for undergraduates and high school students and teachers; see page 10 for details.

The Exposition has 113 signed booths/tables at the time of writing and the list continues to grow. Visit our exhibitors this November to learn the latest development in analytical instrument and services.

I thank our sponsors for their generous support! More sponsorship opportunities are still available; please contact me for more information.

Please visit www.eas.org, and follow us on LinkedIn, Facebook or Twitter for up-to-date news about the symposium. I look forward to welcoming you to Somerset this November!

Oscar Liu, PhD
President, EAS 2015
Oscar.liu@eas.org

Registration Fees for 2015 EAS

[Registration will open in early July]

Registration received	Before Oct. 15	After Oct. 15
Full Conferee (includes all technical sessions, exposition, employment bureau, workshops seminars and a souvenir)	$200	$275
Exhibit-Only (includes poster sessions, exposition, employment bureau, and a souvenir)	$100	$100
Undergraduate Student (includes same items as full conferee, but at a reduced cost. Must provide student i.d.)	$30	$30
High School Student with Seminar (must register for a seminar)	$0	$0
Half-Day Short Course (must register as full conferee in order to take course)	$320	$520
One-Day Short Course (must register as full conferee in order to take course)	$570	$785
Two-Day Short Course (must register as full conferee in order to take course)	$800	$1170

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Follow us on:

Here's What's Happening at EAS 2015

PLENARY LECTURE

EAS is pleased to announce that Nobel Laureate Professor Kurt Wüthrich will be the Plenary Speaker for EAS 2015.

Prof. Kurt Wüthrich is a Cecil H. and Ida M. Green Professor of Structural Biology at the Scripps Research Institute, La Jolla, CA, USA and Professor of Biophysics at the Swiss Federal Institute of Technology (ETH Zürich), Zürich, Switzerland. In 2002 Professor Wüthrich was awarded the Nobel Prize in Chemistry "*for his development of nuclear magnetic resonance spectroscopy for determining the three-dimensional structure of biological macromolecules in solution*."

Monday, November 16, 2015, 4:30 pm
DoubleTree Hotel, Ballroom

The lecture will be immediately followed by a reception; all registered attendees of EAS are encouraged to attend.

EAS Mixer in the Exposition Hall

Tuesday, November 17, 2015
from 4:00 to 5:30 pm
A mixer will be held in the poster area at the center of the exposition area.

Mix, mingle, and meet with your colleagues! Enjoy free refreshments while visiting our exhibitors to learn about the latest in analytical instrumentation, supplies, and services. This event is sponsored by our exhibitors and the 2015 EAS and is open to all registered attendees.

More details will follow in the Preliminary Program and Final Program.

CALL FOR PAPERS!

We invite you to be part of EAS's technical program by contributing a paper for consideration for an oral or poster presentation. EAS seeks contributions from scientists in all areas of analysis, which make its program uniquely strong. A preview of this November's invited sessions and speakers are included on the next few pages. Please consider submitting your abstracts for oral and poster presentations. Complementary papers to the topics mentioned are especially welcome.

EAS Call for Papers is now open; visit our website for more details and to submit
www.EAS.org/asubmit

You asked; we listened – extended deadlines!

Oral abstracts submission closes **June 15th**
Poster abstracts submission closes **Sept. 30th**

Submit a paper and be a part of EAS in November!

2015 EAS Invited Technical Sessions

Preliminary List as of May 4, 2015

*Note: List does **not** include contributed oral or poster Sessions – these will be posted in the EAS Preliminary Program. Contributed abstract submission deadlines are June 15 for oral papers and September 30 for poster papers.*

AWARD SESSIONS

EAS AWARD FOR OUTSTANDING ACHIEVEMENTS IN THE FIELDS OF ANALYTICAL CHEMISTRY

Honoring Chris Enke, Indiana University

Sponsored by Bristol-Myers Squibb

Chair: Qin C. Ji, Bristol-Myers Squibb

Distance-of-Flight Mass Spectrometry: The Joy of Collaborating with Chris Enke, Gary Hieftje, Indiana University

21 Tesla Fourier Transform Ion Cyclotron Resonance Mass Spectrometer: A National Resource for Ultrahigh Resolution Mass Analysis, Alan Marshall, Florida State University

Mass Spectrometry as a Method of Accelerated Small-Scale Synthesis, Graham Cooks, Purdue University

Comprehensive Analysis and the Theory of Complex Mixtures, Christie Enke, Indiana University

EAS AWARD FOR OUTSTANDING ACHIEVEMENTS IN NEAR INFRARED SPECTROSCOPY

Honoring Benoit Igne, GlaxoSmithKline

Sponsored by Metrohm USA

Chair: Carl Anderson, Duquesne University

Hyperspectral Image Calibrations for Transdermal Delivery Systems, Carl Anderson, Duquesne University

TBA, Charles Hurburgh, Iowa State University

TBA, Gary McGeorge, Bristol-Myers Squibb

When the Sample Makes the Technology, Benoit Igne, Glaxo-SmithKline

EAS AWARD FOR OUTSTANDING ACHIEVEMENTS IN SEPARATION SCIENCES

Sponsored by Agilent Technologies

Honoring David Hage, University of Nebraska-Lincoln

Chair: William Clarke, Johns Hopkins University

Affinity Methods in Laboratory Medicine: Novel Tools for Clinical Analyses, William Clarke, Johns Hopkins University

Natural Product Screening Using Affinity Chromatography, Ruin Moaddel, National Institute on Aging, NIH

Affinity Chromatography as a Probe of Cellular Pharmacology: Current Practice and Future Directions, Irving Wainer, Mitchell Woods Pharmaceuticals

Frontiers in Affinity-Based Separations: Exploring New and Unique Tools for the Rapid Analysis of Clinical, Pharmaceutical and Environmental Samples, David Hage, University of Nebraska-Lincoln

EAS AWARD FOR OUTSTANDING ACHIEVEMENTS IN CHEMOMETRICS

Honoring Peter Wentzell, University Dalhousie

Sponsored by Eigenvector Research

Chair: David Haaland, Spectral Resolutions

Session speakers to be announced

AWARD SESSIONS

EAS AWARD FOR OUTSTANDING ACHIEVEMENTS IN MASS SPECTROMETRY

Honoring Emile A. Schweikert, Texas A&M University

Sponsored by Thermo Fisher Scientific

Chair: Michael J. Van Stipdonk, Duquesne University

Micrometer-Scale Ion Traps from Micro-Mass Spectrometry to Quantum Information Processing: Why Instrumentation Still Matters, Matthew Blain, Sandia National Laboratory

Characterization of Semiconductor Materials by SIMS, Joe Bennett, National Institute of Standards and Technology

Trapped Ion Mobility Mass Spectrometry and the Preservation of Sample Features, Mel Park, Bruker Daltonics

Molecular Analysis at the Nanoscale, Emile A. Schweikert, Texas A&M University

EAS AWARD FOR OUTSTANDING ACHIEVEMENTS IN NUCLEAR MAGNETIC RESONANCE

Sponsored by Bruker BioSpin and New Era Enterprises

Honoring Timothy Cross, Florida State University

Chair: Eduard Chekmenev, Vanderbilt University

Membrane Proteins: Structural Heterogeneity, Dynamics and Functional Mechanisms from Solid State NMR, Timothy Cross, Florida State University

NMR of Membrane Proteins, Stanley Opella, University of California San Diego

Insights into the Mechanism of Action of Antimicrobial Peptide Piscidin: One Peptide Family, Multiple Roles in Host Defense, Myriam Cotton, Hamilton College

NMR Sensitivity Enhancement by Hyperpolarization, Eduard Chekmenev, Vanderbilt University

NEW YORK SECTION OF THE SOCIETY OF APPLIED SPECTROSCOPY GOLD MEDAL AWARD

Honoring John A. Reffner, John Jay College

Chair: Deborah Peru, Colgate-Palmolive Co.

Some Milestones in Role of Infrared Microspectroscopy as Applied to Microscopic Trace Evidence: A Personal Perspective, Skip Palenik, MicroTrace

The Synergism between Raman and FTIR Microscopy, Fran Adar, Horiba Scientific

New Technologies for the Molecular, Nano, Meso and Micron Scale Characterization of Biopharmaceutical Products, Neil Lewis, Malvern Instruments

Uniting Microscopy and Molecular Spectroscopy, John Reffner, John Jay College

AMERICAN MICROCHEMICAL SOCIETY BENEDETTI PICHLER AWARD

Honoring: Apryll Stalcup, Irish Separation Science Cluster

Chair: Robert Vetrecin

Session speakers to be announced

BIOANALYSIS

From Benchtop to Bedside – Biomarker Analysis in Support of Translational Research
Chairs: Wenying Jian, Naidong Weng, Janssen R&D

Biomarkers of Oxidative Stress, Clementina Mesaros, University of Pennsylvania

Ion-Current-Based Clinical and Pharmaceutical Proteomics for Biomarker Discovery, Jun Qu, University of Buffalo

Biochemical and Biological Characterization of IL-25 Enriched from Primary Human T-Cells, Yazen Jmeian, Jansen R&D

Bioanalytical Challenges and Strategies for Developing a Highly Sensitive LC-MS/MS Method to Quantify Total and Free levels of a Soluble Target, Interferon-gamma-inducible Protein-10 at Picomolar Levels in Human Serum, Hongwei Zhang, Bristol-Myers Squibb

CHEMOMETRICS

Chemometrics Advances for Bioprocess Spectroscopic Monitoring and Control, *organized by the Coblentz Society*
Chair: Benoit Igne, GlaxoSmithKline

Identification of Model Parameters in Cell Culture Bioreactor by Raman Spectroscopy via Calibration-Free Way, Nicholas Spegazzini, Massachusetts Institute of Technology

The Use of Multi-Dimensional Fluorescence Spectroscopy for the Quantitative Analysis of Liquid Media: From Hydrolysates to Protein Solutions, Alan Ryder, National University of Ireland-Galway

Insightful Analytical Data from Upstream Bioprocesses with a Real-time In-Situ Monitor, Mark Arnold, University of Iowa

Using IR Absorption and Raman Spectroscopy for Characterization of Biomass Hydrolysis, Sergey Mozharov, University of Washington

CHROMATOGRAPHY

Young Investigators in Chromatography, *sponsored by the Chromatography Forum of Delaware Valley*
Chair: Mary Ellen McNally, DuPont Crop Protection

Utilizing Computational Predictions to Aid in the Design of Chromatographic and Electrophoretic Separations, Donna Blackney, Drexel University

Trace Level Impurity Analysis in Project Manufacturing, Andrew Kennedy, DuPont Crop Protection

Trace Analysis of Dioxins and Dioxin-Like PCBs Utilizing GC/MS/MS with a New Sensitive Source, Jessica Westland, Agilent Technologies

2D-LC: Practical Considerations and Applications, Marcelo Filgueira, The Dow Chemical Company

Solving Real-World Problems with Two-Dimensional LC,
sponsored by the Chromatography Forum of Delaware Valley
Chairs: William Barber, Xiaoli Wang, Agilent Technologies

Two-Dimensional Liquid Chromatography Strategies Coupled with Mass Spectrometry for Efficiency, High Resolution Characterization of Therapeutic Monoclonal Antibodies, Dwight Stoll, Gustavus Adolphus College

TBA, Chris Welch, Merck

Two Dimensional Heart-Cutting UHPLC for Process Development, Nelu Grinberg, Boehringer Ingelheim

Microdosing Device and Drug Formulation Compatibility Study by 2DLC-MS, Lulu Dai, Genentech

CULTURAL HERITAGE

Terahertz and Allied Methods for Cultural Heritage, Part I, *organized by the New York Conservation Foundation*
Chair: Albert Redo-Sanchez, Massachusetts Institute of Technology

Terahertz in Art and Cultural Heritage Inspection: Present and Future, Albert Redo-Sanchez, Massachusetts Institute of Technology

Development of Novel Systems Architecture in THz Imaging for the Analysis of Cultural Heritage Materials, Roxanne Radpour, University of California-Los Angeles

Terahertz Systems for Cultural Heritage, Philip Taday, TeraView Ltd.

Characterization and Imaging of Archival Texts: Let's Have a Word with Terahertz!, Tiphaine Bardon, UCL Institute for Sustainable Heritage

Terahertz and Allied Methods for Cultural Heritage, Part II, *organized by the New York Conservation Foundation*
Chair: Ilaria Cacciari, CNR - Institute of Applied Physics 'Nello Carrara'

Terahertz Characterization of Archaeological Artefacts, Ilaria Cacciari, CNR - Institute of Applied Physics 'Nello Carrara'

Contribution of THz-Time Domain Imaging to Multi-Layered Artifact Inspection, Corinna Koch Dandolo, Technical University of Denmark

Terahertz Investigation of Materials and Hidden Structures in Historic Art, Enrique Castro Camus, Center of Investigations in Opitca A.C.

THz Waveform Techniques for Nondestructive Evaluation in Dense Materials, David Plusquellic, National Institute of Standards and Techology

Analytical Methods for Cultural Heritage, Part I & II
organized by the New York Conservation Foundation
Chair: John Scott, New York Conservation Foundation

Terahertz in Art Culture and Coatings, Irl Duling, Advanced Photonix Inc

Low-Cost Multispectral Imaging for Art and Archaeology, Antonino Cosentino, Cultural Heritage Science Open Source

Battelle Smart Corrosion Detector™ Bead: Self-Healing with Corrosion Detection by Terahertz, Cindy Conner, Battelle Consumer & Industrial Products

Predictive Assessment of the Impact of Environment and Treatments on Heritage Materials, Fenella France, Library of Congress

EDUCATION

Business Essentials for Technology Entrepreneurs
Organizer: Lei Lei, Rutgers Business School
Chair: Yao Zhao, Rutgers Business School

Technical Entrepreneurship, Arturo Osorio, Rutgers Business School

Production and Operations Management, Yao Zhao, Rutgers Business School

Marketing, Lei Wang, Rutgers Business School

Management and Leadership, David Dobrzykowski, Rutgers Business School

FOOD & ENVIRONMENTAL ANALYSIS

Assuring Water Quality: The Application of Novel Analytical Technologies and Strategies, *sponsored by NY ACS*
Chair: Sut Ahuja, Ahuja Consulting

Assuring Water Quality with Advanced Analytical Methods, Sut Ahuja, Ahuja Consulting

Novel Cation-Exchange Phases for the Analysis of Alkali Metals and Alkaline Earth Cations in Drinking Water, Chris Pohl, Thermo Fisher Scientific

Recent Developments in Analyzing Ionic Components in Drinking Water, Kannan Srinivasan, Thermo Fisher Scientific

Understanding the Mechanism of Drinking Water Disinfection Organic By-products: Analytical Technology Partners with Organic Chemistry, Daniel Norwood

Advances in Food Analysis: Mycotoxins, Pesticides and Toxic Metals
Chairs: Christina Robb, Brian Eitzer, The Connecticut Agricultural Experiment Station

Pesticide Residue Analysis Using GC/MS/MS for Target Compounds and GC/Q-TOF for Screening, Phil Wylie, Agilent Technologies

Advancing FDA Regulatory Screening for Mycotoxins in Foods and Animal Feed Using Liquid Chromatography and Mass Spectrometry, Kai Zhang, US Food and Drug Administration

Heavy Metals in Seafood: Let's have a Risk/Benefit Conversation, Marc Engel, Florida Department of Agriculture, Donald M Axelrad, Florida A&M University

The Analysis of Pesticide Residues on Fruits and Vegetables Using Liquid Chromatography/High Resolution Mass Spectrometry, Brian Eitzer, The Connecticut Agricultural Experiment Station

Analytical Testing for the Cannabis Industry: Consumer Safety vs. Regulatory Requirements
Chair: Christopher Hudalla, ProVerde Labs

Analyzing Cannabis for Physiological Purposes, Jeffrey C. Raber, The Werk Shop

Obtaining Accurate Results for Residual Solvents in Cannabis Concentrates, Amanda Rigdon, Restek

Multiresidue Pesticide Analysis in a Highly Resinous Natural Product Matrix; Sample Preparation Strategies for Ultra High Performance LC-MS and SFC-MS Analysis, Michael S. Young, Waters Corporation

Applications of Supercritical CO2 for the Analysis and Preparation of Cannabis as a Natural Therapeutic, Christopher Hudalla, ProVerde Labs

FORENSIC ANALYSIS

DNA Frontiers, *sponsored by New Jersey Association of Forensic Scientists*
Chair: Matthew Wood, Ocean County Sheriff's Office Forensic Laboratory

Wildlife Forensics: Development of In-House Assays for Non-Human Testing with Emphasis on Elephant DNA Testing, Jillian Fesolovich, Meredith Rohrbaugh, Arcadia University

Wildlife Forensics: Techniques and Applications, Jane Huffman, East Stroudsburg University

Validation and Implementation of the RapidHIT® 200 System in a Crime Lab, Megan Boll, NMS Labs

What is RAPID DNA Analysis? Introduction and New Research Directions, Tracey Dawson-Cruz, Virginia Commonwealth University

LABORATORY ANALYSIS

Issues about which Every Manager Should be Thinking
Chair: Dennis Swijter, International Flavors & Fragrances

What is Your Cultural Competence Level as a Laboratory Manager?, Ephraim Muchada Govere, Pennsylvania State University

Using Technology to Advance your Lab Through the Use of a LIMS Solution, Kim Charles, Labvantage Solutions

Managing the Sandbox: Coaching Toward Collaboration and Teamwork, Richard Durand, Sun Chemical

Lab Leadership-Are you a Chemist or a Manager, Jean-François Borny, CB&I

3D Technology: Leveraging Today's Tools for Tomorrow's Applications
Chair: Alex Baranowski, Bristol-Myers Squibb

3D Technology: A Journey through the Limits of Current Design and Implementation, Alex Baranowski, Bristol-Myers Squibb

3D Scanning: Rapid Analytics, Richman Siansimbi, DigitialScan3D

Continuous Liquid Interface Production, Rima Janusziewicz, University of North Carolina-Chapel Hill

Development of Reactionware for Chemical Discovery by Combining 3D Printing and Configurable Robotics, Lee Cronin, University of Glasgow

MASS SPECTROMETRY

The Applications of Tandem Quadrupole Mass Spectrometry in Absolute Quantitation
Chair: Jim Shen, Bristol-Myers Squibb

Detection of Cathinone and Mephedrone in Plasma by LC-MS/MS Using Standard Addition Quantification Technique, Shu-Yuan Cheng, John Jay College

Sub-Classification of Anti-Drug Antibodies Using LC-MS/MS, Guowen Liu, Bristol-Myers Squibb

Applications of Tandem Mass Spectrometry in Forensic Toxicology , Thomas Rosano, Albany Medical Center Hospital and College

Advances in High Performance Mass Spectrometry for Quantitative Applications and Enhanced Productivity, Keeley Murphy, Thermo Fisher Scientific

New Approaches for Bioanalysis of Small Molecule and Biotherapeutics Beyond Traditional LC-MS/MS
Chair: Naiyu Zheng, Bristol-Myers Squibb

Analysis of Cyclic Peptides Resistant to Gas-Phase Fragmentation Using Survivor-Selected Ion Monitoring (Survivor-SIM) on an HRMS System, Eugene Ciccimaro, Bristol-Myers Squibb

Low-Flow LC-MS and Related Techniques for the Quantification of Biotherapeutics, Jun Qu, University at Buffalo

Improvement of LC-MS Peptide Quantitation Using Differential Mobility Spectrometry, Mingshe Zhu, Bristol-Myers Squibb

Ultrasensitive Quantification of Serum Estrogens Using Pre-ionized Derivatives and LC-MS, Ian A. Blair, University of Pennsylvania

MICROSCOPY

Forensic Microscopy IX
Chair: Thomas Kubic, John Jay College

Confocal Raman Microscopy and Forensic Evidence, Jennifer Leonard, John Jay College

Assessing the Utility of the Light Mineral Fraction of Soils for Forensic Applications, Jack Hietpas, ORISE-FBI

Characteristics and Impact Dynamics of Frangible Ammunition, Peter Diaczuk, John Jay College

Forensic Microscopy Investigations in Civil Litigation, Dale Purcell, SSCI

NMR SPECTROSCOPY

New Developments in Quantitative NMR: From Multinuclear to 2D Applications
Chair: Yande Huang, Bristol-Myers Squibb

From "Pure" Substances to Complex Mixtures: Applications of 1D Quantitative ^{1}H NMR in Medicinal Chemistry and Natural Product Research, Jose Napolitano Farina, AbbVie

Approaches to Quantitative 1D and 2D Carbon-13 NMR Spectroscopy, John Markley, University of Wisconsin-Madison

Using NMR to Understand Pharmaceutical Drug Dissolution, Andy Phillips, AstraZeneca

Improving the Efficiency of Quantitative 1H NMR: An Innovative External Standard-Internal Reference Approach, Yande Huang, Bristol-Myers Squibb

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Advances in Solid-State NMR
Chairs: Yongchao Su, Merck

Investigating Viral Membrane Protein Structure and Function by Solid-State NMR, Mei Hong, Massachusetts Institute of Technology

Expediting the Cures: The Role of Solid-State NMR, George Crull, Bristol-Myers Squibb

Recent Development of Magnetic Resonance: Instrumentation, Physics and Applications, Yiqiao Song, Schlumberger-Doll Research

Application of Solid-State NMR in the Pharmaceutical Industry, Dirk Stueber, Merck

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Macromolecular NMR: Probing Structure and Function
Chair: Nina Gonnella, Boehringer Ingelheim

The Role of Millisecond Conformational Motions in Enzyme Function and Allostery, Patrick Loria, Yale University

Use of 19F NMR to Probe Conformational Heterogeneity and Dynamics of Exchange in Functional RNA Molecules, Nancy Greenbaum, Hunter College

Hybrid Approaches for Protein Structure Determination Combining Computational Modeling with Sparse NMR Restraints, Gaetano Montelione, Rutgers University

FBLD Yields Orally Active, Brain Penetrant Inhibitors for BACE1 and PDE10A, Daniel Wyss, Merck

PHARMACEUTICAL ANALYSIS

Lifecycle Management of Analytical Validation of Pharmaceutical Products
Chairs: Domenick Vicchio, United States Pharmacopeia and Kim Huynh-Ba, Pharmalytik

Lifecycle Management of Compendial Monographs through Modernization, Leonel Santos, US Pharmacopeia

Analytical Method Lifecycle: Recent Updates from USP and FDA, Greg Martin, Complectors Consulting

Method Validation through the Phases of Drug Development, Kevin Dobmeier, Merck

Life Cycle Management for Method Validation of Biologics Drug Products, Nanda Subbarao, Biologics Consulting Group

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Recent Advances in Trace Analysis and Process Control of Genotoxic Impurities in Pharmaceuticals
Chairs: Fenghe Qiu, Boehringer Ingelheim and David Liu, GlaxoSmithKline

ICH M7 Guideline Implementation Perspectives, Warren Ku, Boehringer Ingelheim

Advantages of HILIC-LCMS for the Trace GTI Analysis, Mohan Kanthasamy, Bristol Myers Squibb

Overcoming High Recovery Issues in Trace Level N-chlorosuccinimide (NCS) Analysis by Chemical Derivatization: Sample Matrix Effect, Hong Cui, GlaxoSmithKline

Generic GC-MS Method for Simultaneous Quantitation of Organohalide Alkylators and Benzene in Drug Substances, Li Cui, GlaxoSmithKline

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Dissolution Testing: New Challenges and Solutions for *In-Vitro* Predictive Analysis
Chairs: Xujin Lu, Bristol-Myers Squibb and Justin Pennington, Merck

In-Vitro In-Vivo Correlation in a QbD Environment, Raimar Loebenberg, University of Alberta

Biorelevant Dissolution Measurements at the Drug Solubility Limit: Optimizing Exposure Rankings, Paul Harmon, Merck

Dissolution: Biorelevant or Clinical Relevant? Expectation vs. Reality and How can we do Better, Jian-Hwa Han, Abbvie

Biorelevant Dissolution Media and Applications in Pharmaceutical Development - Case Studies, Xujin Lu, Bristol-Myers Squibb

SPECTROSCOPY

Emerging Trends in Near Infrared Spectroscopy, *organized by the Coblentz Society*
Chair: Franklin E. Barton II, Light Light Solutions

A New Look at the Derivative Quotient Method in Regression, David Hopkins, NIR Consultant

A Novel Configuration for Near-Infrared Analysis of LPG Composition and Quality Control in a Refinery Setting, Susan Foulk, Guided Wave

New Use Cases of a Miniature Fit-for-Purpose NIR Spectrometer in Food, Agriculture, and Pharmaceutical Applications, Nada O'Brien, JDSU

Derivatives: What Are We Actually Doing?, Jim de Haseth, LLS Instruments

SPECTROSCOPY *continued*

Celebrating the "International Year of Light" - How Spectroscopists are Helping Save the World, *organized by the Coblentz Society*
Chair: Brandye Smith-Goettler, Merck

It's Finally Here: Making Quantitative Molecular Spectroscopy into a Metrical Science, Jerry Workman Jr., Unity Scientific

Infrared Microscopy for Practical Cancer Imaging, Rohit Bhargava, University of Illinois at Urbana-Champaign

Use of Near-IR and Hyperspectral Imaging in Analysis of Agricultural Commodities, Stephen R. Delwiche, USDA-ARS

NIR with Problem Data Sets, Franklin E. Barton II, Light Light Solutions

Light and the Single Molecule - Viewing the Nanoworld
Chair: Linda B. McGown, Rensselaer Polytechnic Institute

New Nano Tools for Follow-that-Molecule in Single Live Cells, Nancy Xu, Old Dominion University

Single-Molecule Nanocatalysis: From Fundamentals to Solar Energy Conversion, Peng Chen, Cornell University

Quantitative Single-Molecule Imaging of DNA Hybridization, Joel Harris, University of Utah

Spectroscopic Applications in the Pharmaceutical Industry, *organized by the Coblentz Society*
Chair: Steve Short, Merck

The Role of PAT in Continuous Manufacturing, Jennifer Schubert, Vertex

Transmission Raman Spectroscopy for the Analysis of Bilayered Tablets, Gary McGeorge, Bristol-Myers Squibb

Efficient Design of Experiments for Spectroscopic Calibrations Predicting Quality Attributes of Pharmaceutical Products, Carl Anderson, Duquesne University

Quality-by-Control Approaches for Crystallization Systems Using Spectroscopy-Based Feedback Control Technologies, Zoltan Nagy, Purdue University

SURFACE SCIENCE

Surface Functionalization of Nanoparticles and Nanomaterials
Chair: Andrew Teplyakov, University of Delaware

Surface and Interface Nanostructures of Oxide Catalysts for Solar Water Splitting, Bruce Koel, Princeton University

The Role of Surface Defect Sites of Transition Metal Oxide Nanoparticles in Clean Energy Production, Xianqin Wang, NJ Institute of Technology

Kinetics of Surface-Assisted Silica Nucleation on Model Biological Interfaces, Adam F. Wallace, University of Delaware

Surface Analysis and Correlation to Coating's Adhesion to Metal, Xiaochun Zhang, Ashland

ADDITIONAL INVITED SESSIONS

- **Forensic Toxicology,** *sponsored by New Jersey Association of Forensic Scientists*
  Chair: Barry K. Logan, National Medical Services
- **The Best Chromatography is No Chromatography! - LC/MS Without a Column**
  Chair: Daniel Norwood
- **Advances and Applications in Imaging Science and Technology**
  Chair: John R. Reffner, Dow Chemical
- **Reaction Monitoring by NMR**
  Chair: Gary Martin, Merck
- **Critical Issues in Inhalation Product Development**
  Chair: Philippe Rogueda, Inhalation Asia
- **Chromatography of Biologics,** *organized by the North Jersey Chromatography Group*
  Chair: Landon Greene, Bristol-Myers Squibb

2015 EAS WORKSHOPS & EMPLOYMENT BUREAU

EAS is committed to your professional development, as well as the enhancement of knowledge. Our workshops include topics to help develop your professional skills, as well as to hone other skills critical for career success. These workshops will provide insight into the best techniques for presenting your background and relevant experience using both social media and traditional resume formats. Skills such as these are essential today, and EAS is the place to begin or continue developing them. We offer different workshops each day, which are free to all attendees with a Full Conferee or Student registration. Workshop descriptions and registration details will be posted on the EAS website in early June -stay tuned!

Workshops for Nov. 16-18, 2015

- ***Getting Hired, Secrets of a Contingency Recruiter***
  Donald Truss, Solidus Services Group
- ***Using LinkedIn® Professional Networking Services to Network Your Way to a Job and More***
  Katie DeVito, Katie DeVito LLC
- ***Sharpening your Presentation Skills - An Interactive Workshop***
  Jana Casey, Bristol-Myers Squibb

An **Employment Bureau** is available to provide ample opportunity for employees to meet prospective employers. The Employment Bureau is located in the Exposition Hall and is free to all registered attendees. Visit our website for more details and job seeker forms. www.EAS.org

2015 EAS SHORT COURSES

EAS short courses are designed to help the practicing analyst develop new skills and enhance knowledge. Taught by experts, the short courses emphasize practical knowledge of a variety of important topics to help one keep current with best practices and new techniques.

Pricing for 2015 Short Courses is $320 for a half-day course, $570 for a one-day course and $800 for a two-day course before Oct. 15. Pricing after Oct. 15, is $520 for a half-day course, $785 for a one-day course and $1,170 for a two-day course; note: pricing for courses is in addition to the Full Conferee registration fee. Courses are subject to changes.

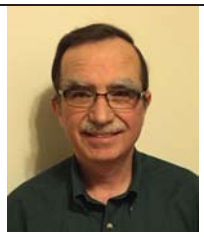
Click on the course title for full course descriptions.

# of Days	Course Names	Instructors
2-day	Practical Gas Chromatography	Eugene Barry, University of Massachusetts Thomas Brettell, Cedar Crest College
2-day	Troubleshooting Chromatographic Systems	Merlin K.L. Bicking, ACCT, Inc. Douglas E. Raynie, SD State University
2-day	Chemometrics Without Equations Part 1 **&/or** Part 2	Donald Dahlberg, Lebanon Valley College Neal Gallagher, Eigenvector Research
2-day	LC/MS: Theory, Instruments, and Applications	Guodong Chen, Bristol-Myers Squibb Ragu Ramanathan, Pfizer
2-day	How to Develop Validated HPLC Methods: Rational Design with Practical Statistics and Troubleshooting	Brian A. Bidlingmeyer, Agilent Technologies Stanley N. Deming, Statistical Designs
2-day	Physical Characterization and Methods of Analysis of Pharmaceutical Solids: Essential Knowledge and Advanced Applications; Part 1 **&/or** Part 2	Xiaoming (Sean) Chen, Shionogi Inc. Steve Byrn, Purdue University
1-day	Introduction to GLP Regulations and Bioanalytical Method Validation by LC-MS/MS **(NEW!)**	Perry Wang, LC-MS Technical Expert
1-day	Practical Guide to Performing HPLC and UHPLC Experiments in Reversed-Phase Mode **(NEW!)**	Merlin K. L. Bicking, ACCTA, Inc. Richard A. Henry, Consultant
1-day	Conducting Effective Investigations of Out of Specification and Atypical Laboratory Results: Using Root Cause Analysis and CAPA to Close Them Quickly and Keep Them from Coming Back **(NEW!)**	Gregory Martin, Complectors Consulting
1-day	Handheld Vibrational Spectrometers: State-of-the Art Instrumentation and Novel Applications **(NEW!)**	Heinz Siesler, University of Duisburg-Essen
1-day	Impurities in Pharmaceuticals: A Survey Course **(NEW!)**	Bernard Olsen, Olsen Pharmaceutical Consulting
1-day	Atomic Spectrometry: Applications of Elemental Analysis in the Pharmaceutical Industry **(NEW!)**	Timothy L. Shelbourn, Eli Lilly and Company
1-day	Keeping Current with GMP and Laboratory Controls in Generic Industry	Anthony DeStefano, YourEncore Kim Huynh-Ba, Pharmalytik
1-day	LC-MS Method Development for Small Molecule Pharmaceuticals	Perry Wang, LC-MS Technical Expert
1-day	Polymers: An Introduction and Characterization Techniques	Diep Nguyen, Illinois Institute of Technology
1-day	How to Create a more Effective Lab Safety Program	James Kaufman, Lab Safety Institute
1-day	Getting the most from GC and GC/MS	Gregory Slack, Clarkson University Nicholas Snow, Seton Hall University
1-day	Interpretation of Mass Spectra with Practical Solutions to Problems	Mike Lee, Milestone Development
1-day	Therapeutic Peptide and Protein Bioanalysis by LC-MS/MS	Faye Vazvaei, Roche Jianing Zeng, Bristol-Myers Squibb Jun Qu, SUNY-Buffalo Yan Zhang, Bristol-Myers Squibb
1-day	Sample Preparation: The Chemistry Behind the Techniques	Douglas E. Raynie, SD State University Merlin K.L. Bicking, ACCTA, Inc.
1-day	Introduction to Vibrational Spectroscopy for Real Time Analysis	Peter J. Larkin, Bristol-Myers Squibb John M. Wasylyk, Bristol-Myers Squibb
1-day	Developing, Validating and Troubleshooting Dissolution Methods	Gregory Martin, Complectors Consulting
1-day	The Chemistry of Drug Degradation	Chris Foti, Gilead Gregory Sluggett, Pfizer Todd Zelesky, Pfizer
½ -day	Making the Transition to GC-MS, GC-MS-MS and GCxGC-MS **(NEW!)**	Nicholas Snow, Seton Hall University Gregory Slack, Clarkson University
½ -day	Advanced HPLC/UHPLC Part 1 **&/or** Part 2 **(NEW!)**	Michael W. Dong, MWD Consulting
½ -day	HPLC Method Development Made Easy **(NEW!)**	Michael W. Dong, MWD Consulting
½ -day	Drug Quality Fundamentals Part I **&/or** Part 2	Michael W. Dong, MWD Consulting

EAS Awards Program
Thomas Brettell, 2015 EAS Awards Chair

Each year the Eastern Analytical Symposium honors Analytical Chemists who have distinguished career achievements. The recipients of these awards advanced these fields by superior work in developing theory, techniques or instrumentation. At the 2015 Symposium scientists in six areas of endeavor, will be presented awards.

Dr. Chris Enke
Indiana University
EAS Award for Outstanding Achievements in the Fields of Analytical Chemistry



Prof. Tim Cross
Florida State University
EAS Award for Outstanding Achievements in Nuclear Magnetic Resonance

Dr. Benoît Igne
GlaxoSmithKline
EAS Award for Outstanding Achievements in Near Infrared Spectroscopy

Dr. Peter Wentzell
Dalhousie University
EAS Award for Outstanding Achievements in Chemometrics

Prof. Emile Schweikert
Texas A&M University
EAS Award for Outstanding Achievements in Mass Spectroscopy

Prof. David Hage
University of Nebraska-Lincoln
EAS Award for Outstanding Achievements in Separation Science

Two other awards will be presented at the Annual Symposium in November under the auspices of the EAS sponsoring organizations

Prof. Apryll Stalcup
Irish Separation Science Cluster
American Microchemical Society Benedetti-Pichler Award

Prof. John A. Reffner
John Jay College of Criminal Justice
New York Section of the Society for Applied Spectroscopy Gold Medal Award

EAS Awards are selected by independent juries of experts in these respective fields from nominations received by the Award Committee from the scientific community at large or by the jury members. Each award consists of an honorarium, travel expenses to EAS, a plaque, and the opportunity for the Awardee to present his or her work at EAS at an Award Symposium in his/her honor.

Persons wishing to make a nomination for any of the awards given by EAS should send complete documentation of the candidate (nominating letter summarizing achievements, curriculum vita or resume, a statement of the nominee's willingness to present an address as part of an EAS Award Symposium, and arrange for at least one seconding letter) electronically (**single PDF file is preferred**) to: **awards@eas.org**

The length of the nomination packet should be commensurate with the nominee's accomplishments, but should be limited to six to eight pages. The deadline for all 2016 award nominations is September 1, 2015.

2015 EAS Seminars

Eastern Analytical Symposium has refocused and expanded its Outreach Program for undergraduates and high school students and teachers.

EAS offers four seminars essentially for high school teachers, students and undergraduate students during the November meeting. Each seminar has outstanding presenters from academia and industry. The goal of each seminar is to demonstrate the advantages of a career in chemistry. The topics of these seminars include:

The Best Way to Teach Forensic Science is to Teach Science
Sunday, November 15, 2015
Registration Limited to TEACHERS ONLY
1:00 p.m. to 4:00 p.m.

This seminar will be offered exclusively to middle and high school teachers. The seminar will be conducted by several scientists active in the field of Forensic Science including: Dr. Lawrence Kobilinsky, John Jay College of Criminal Justice and Dr. Richard Saferstein, Forensic Science consultant and author of the forensic science high school text "Forensic Science: An Introduction" (2nd edition). The focus of this educational seminar is to encourage teachers to use present-day police laboratory techniques in their classroom as a vehicle to motivate students to understand and appreciate basic chemical and biological principles.

Mass Spectrometry and Microbiology
Monday, November 16, 2015
Registration for High School and Undergrad Students
10:00 a.m. to 1:00 p.m.

The focus of this seminar is to introduce students to the fundamentals and applications of mass spectrometry. The seminar will focus on the basics of mass spectrometry, the generation and interpretation of mass spectra, and the application of mass spectrometric tools in different types of chemical analysis from environmental, forensic/clinical, pharmaceutical to biological material. Mass spectrometry will be presented by USP Scientific Liaison Dr. Shankari Shivaprasad. A second topic on will discuss basic microbiology to include description of microorganisms, identification, counting, and other characteristics. Dr. David Porter (former Director of USP General Chapters) will present the topic on microbiology.

Analytical Chemistry and Forensic Science
Tuesday, November 17, 2015
Registration for High School and Undergrad Students
10:00 a.m. to 1:00 p.m.

In this seminar, organized by Dr. Richard Saferstein, several speakers discuss a variety of analytical technologies that are applicable to solving forensic science problems. Students are introduced to the science of forensic toxicology and learn the strategies that forensic toxicologists employ to detect poisons and drugs in the human body. Significant achievements that have been made in utilizing DNA typing for the purposes of linking biological evidence to a single individual are also discussed. A number of actual case discussions are presented and finally an overview of how forensic analysis makes use of minute particles in resolving crimes is given.

Careers in Analytical Chemistry
Wednesday, November 18, 2015
Registration for High School and Undergrad Students
10:00 a.m. to 12:00 p.m.

Thinking about working as an Analytical Chemist? Attend this seminar to hear some of the different roles analytical chemists fill in industry from Donald Truss. Roles in Materials Science, Pharmaceutical Science, Environmental Science, Food Science and more are described and their importance explained. Hear examples of perplexing problems and the detective work used to solve them. Get a better understanding of just how powerful today's instruments are!

*Students and teachers must **pre-register** to reserve a space. Registration will open in early July. Please contact Eastern Analytical Symposium at askeas@eas.org or visit our website at www.EAS.org for more information.*

Visit Us at the 2015 EAS

Last updated April 27, 2015

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Reserve your booth or tabletop now for the 2015 Eastern Analytical Symposium, November 16-18, 2015, Somerset, New Jersey
For more information contact Sheree Gold, EAS Exposition Director at:
610-742-4981 (phone) • easinfo@aol.com (e-mail)

The 2014 Eastern Analytical Symposium – Facts and Statistics

Table I

2014 Registration at a Glance

Total	2440
Full Conferees	1306
Exhibitor Personnel	599
Expo-Only	535

Table II

Employer Category of Those Attending the 2014 EAS

Category	Number
Total Responding	1540
Industry	960
Academic (Student)	342
Academic (Faculty)	105
Other	74
Self-Employed	27
Government	20
No Response	7
Retired	5

Table III

Primary Job Responsibility of those Attending the 2014 EAS

Total Responding	1540
Chemist/Scientist	624
Student	346
Lab Manager	117
Sales/Marketing	89
Group Leader	77
Instructor/Professor	65
Lab Director	60
Other	46
Administration	37
Technician	37
No Response	28
Retired	10
Purchasing	4

Table IV

Primary Techniques/Interest of Those Attending the 2014 EAS*

Total Responses	2808
Chromatography – Liquid/High Pressure Liquid	517
Chromatography – General	377
Spectrometry – Mass	296
Chromatography – Gas	285
Spectroscopy – General	199
Spectroscopy – Infrared/Mid-infrared/Raman	127
Microscopy	108
No Response	84*
Wet Chemistry	83
Lab Automation	81
Sampling	67
Spectroscopy – Ultraviolet/Visible	65
Other	57
Spectroscopy – Magnetic Resonance	53
Laboratory Information Management	50
Chromatography – Size Exclusion	45
Thermal Analysis	44
Spectroscopy – Atomic Absorption/Emission	37
Surface Analysis	32
Chemometrics	28
Chromatography – Ion	28
Electrophoresis	27
Electrochemistry	25
Spectroscopy – Fluorescence	25
Chromatography – Other	24
Capillary Zone Electrophoresis	22
Chromatography – Thin Layer	22

*Respondents could select a maximum of two techniques/interests

Table V

Primary Applications of Those Attending the 2014 EAS

Total Responses	3283
Pharmaceutical Analysis	719
Lab Instrumentation	464
Biotechnology	319
Food Science	210
Education	200
Forensic Analysis	198
Environmental Analysis	185
Polymer Analysis	167
Flavors/Fragrances	147
Cosmetics	129
ISO/GMP	116
Process Analysis	107
Microscale/Nanoscale Analysis	83
No Response	77
Other	69
Hazard Analysis	55
Heritage Conservation	38

The Governing Board of EAS would like to thank the following sponsors for their support

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New England SAS
NJ Association of Forensic Scientists
New York Section of the American Chemical Society
TAKA Instructional Agency, Inc.

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Corporate Sponsors actively participate in the Eastern Analytical Symposium and Exposition. There are numerous opportunities for Corporate Sponsorship of technical sessions, awards, and other activities at the 2014 EAS as well as advertising opportunities in our Final Program. For information, please contact the EAS Executive Secretary at askeas@eas.org

2015 EAS November 16-18, 2015 Somerset, NJ

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Sheree Gold at easinfo@aol.com

EXECUTIVE SECRETARY

Bernadette Taylor at askeas@eas.org

IMPORTANT DATES

March 1	Abstract submission opens for contributed oral and poster abstracts
June 1	Presenters of invited presentations are contacted by email with instructions for the submission of final abstracts
June 15	Abstract submission deadline for contributed **oral** abstracts
July 6	Registration opens
July 15	Presenters of invited presentations are contacted by email with session schedules
July 15	Presenters of contributed oral presentations are contacted by email with session schedules and presentation guidelines
July 15	Deadline for receipt of final abstracts for invited presentations
Aug. 1	Preliminary Program posted on www.EAS.org
Sept. 30	Abstract submission deadline for contributed **poster** abstracts
Oct. 15	Deadline to register for 2015 EAS at a reduced price
Nov. 1	Deadline to cancel registration and still receive a refund
Nov. 16-18	54th Eastern Analytical Symposium & Exposition in Somerset, NJ

How to contact us….

General Information

EAS Executive Secretary and Retort Editor
Eastern Analytical Symposium, Inc.
PO Box 185
Spring Lake, NJ 07762
Phone: 732-449-2290
Email: askeas@eas.org

Volume #24, Number 2, Whole Number 89

Eastern Analytical Symposium & Exposition, Inc. reserves the right, without notice, to modify the material or schedules, as well as to amend the roster of presenters or instructors

New York Microscopical Society

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Please send with payment directly to:
New York Microscopical Society
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I hereby apply for membership in the New York Microscopical Society

Name: (Dr., Ms., Mr.).....Nickname.....
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***I have enclosed a check for $..... to cover my application fees** for membership {Annual $30, Supporting $60, Life $300(payable within the year), Corporate $175(includes one advertisement in NYMS News), Junior $5 (under 18 years old)}.Student (over 18) $20*
I understand portions of the above information may be used in NYMS publications.
I would prefer my home ☐ work ☐ address/ phone included in the NYMS Directory.

*Signature.....*Date.....
NYMS Headquarters: One Prospect Village Plaza, Clifton, NJ 07013 Telephone (973) 470-8733

New York Microscopical Society Items For Sale

N.Y.M.S. Microscope Covers

Item #	Size	Member Price	List Price
MT-003	Small Microscope or Stereo	$18.00	$20.00
MT-004	Lab Microscope or Large Stereo	$23.00	$25.00
MT-005	Large Lab Scope	$28.00	$30.00
MT-009	Large Lab Scope with Camera	$31.00	$33.00
MT-010	Universal Scope with Camera	$36.00	$40.00
MT-012	X-large Scope	$45.00	$50.00

N.Y.M.S. Microscopes

185	Monocular Dissecting Microscope	$85.00	$99.00
131	H.S. Student Microscope	$190.00	$245.00
131-FLU	H.S. Student Microscope (Fluorescent)	$200.00	$255.00
125-LED	H.S. Student Microscope (LED)	$240.00	$309.00

Other Items

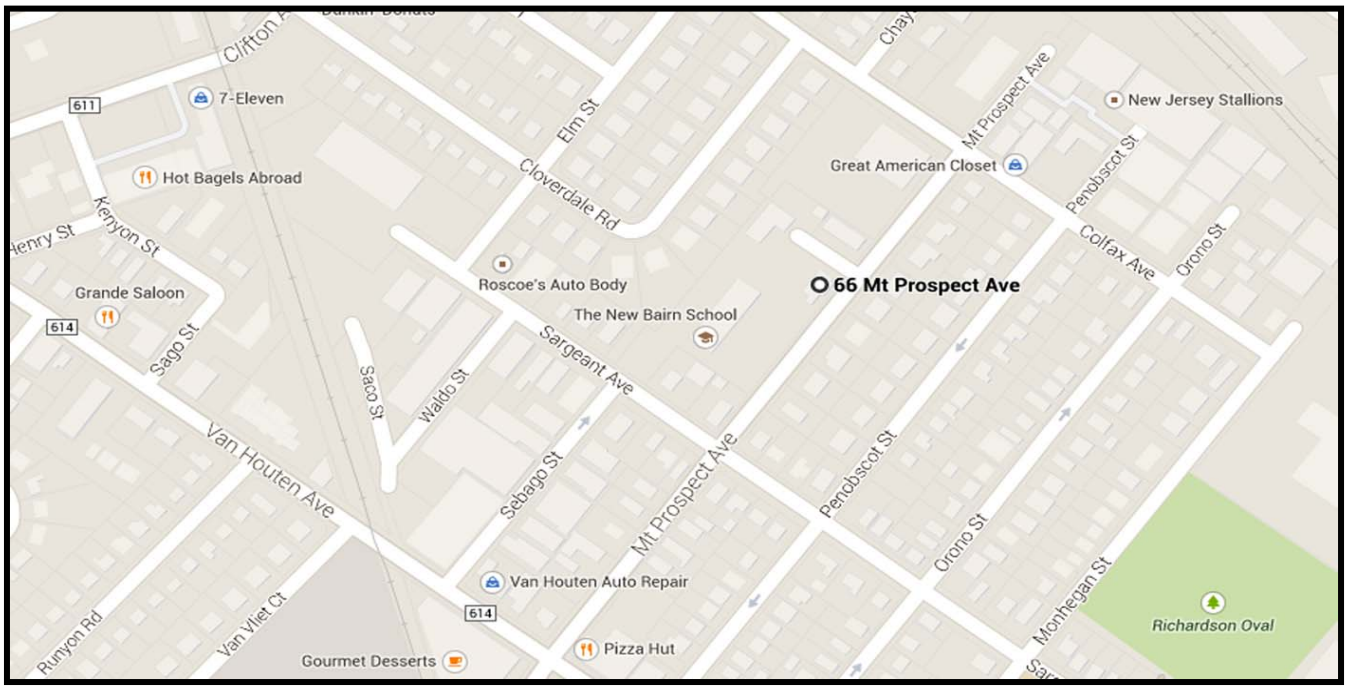
NYMS Glossary of Microscopical Terms	$20.00
NYMS Patch	$5.00
Microscope Cleaning Kit	$35.00
NYMS Lapel Pin	$10.00

Model 131: Tungsten

Model 131-FLU: Fluorescent

Model 185: 20x

Model 125-LED Cordless



Directions to NYMS Headquarters

One Prospect Village Plaza
(66F Mount Prospect Avenue)
Clifton, NJ 07013

GPS: Intersection of Colfax & Mt. Prospect:
Latitude 40.8656 N, Longitude 74.1531W,
GPS: Our building: Latitude 40.8648 N,
Longitude 74.1540 W

From George Washington Bridge:
Take Interstate Route 80 west to Exit 57A, Route 19 South. Take Route 19 to Broad Street and continue two lights to Van Houten Avenue. Turn Left. Go to second light, Mount Prospect Avenue and turn left. Building 66F is on the left side , one and a half blocks from Van Houton.

From Lincoln Tunnel:
Follow exit road to NJ route three west. Continue to Bloomfield Avenue exit. Turn right to Circle and go three quarters to Allwood Road West. Mount Prospect Avenue is a few blocks on the right (a small street) Turn right and go to first light (Van Houton) continue. Building 66F is on the left side , one and a half blocks from Van Houton.

From North:
Take Garden state Parkway South to Route 46 Clifton Exit. On 46 Make second exit to Van Houton Ave. Continue to third light Mount Prospect Avenue and turn left. Building 66F is on the left side , one and a half blocks from Van Houten.

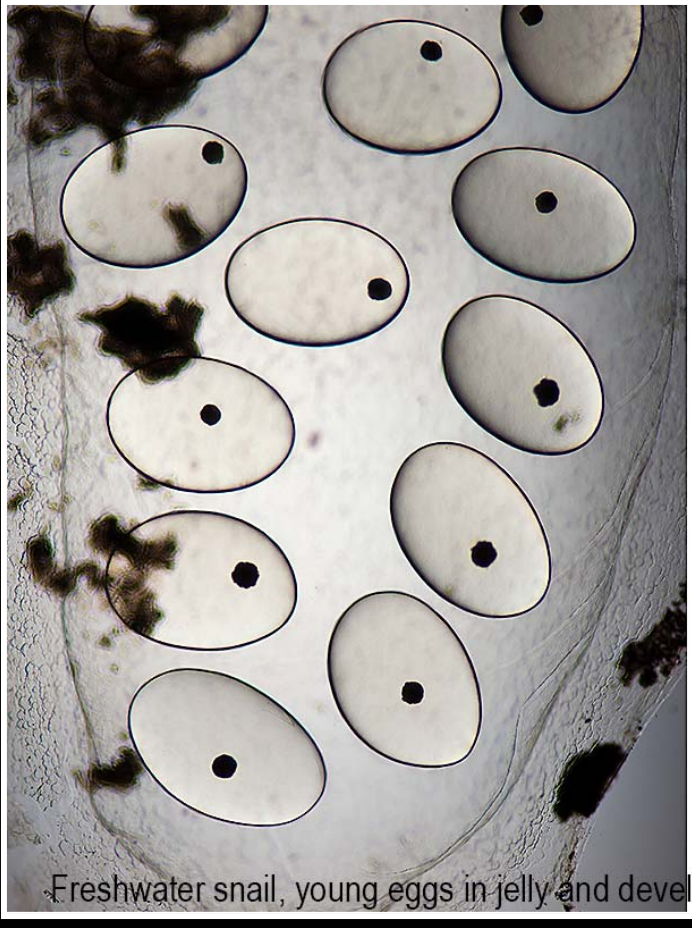
From Route 46 coming from west:
Take Broad Street Exit in Clifton and follow Directions above from GW Bridge.

From route 46 coming from East: Take Paulson Avenue Exit in Clifton and follow to Second light, Clifton Ave turn right. Go to next light, Colfax, turn left, go three blocks and turn right on Mount Prospect Ave.. Building 66F is half block on right.

Public transportation from NY:
Take NJ Transit train from Penn Station to Secaucus Transfer Station. Change trains to Bergen Line to Clifton (call NJ Transit for schedules). From Clifton Station cross under tracks to first street and go left one block to Mount Prospect Street, turn right and Building 66F is one half block on Right.

If you plan to come by bus or train, please copy the links below into your browser:
http://www.njtransit.com/sf/sf_servlet.srv?hdnPageAction=TripPlannerItineraryTo
http://www.njtransit.com/sf/sf_servlet.srv?hdnPageAction=BusSchedulesP2PTo
http://www.njtransit.com/sf/sf_servlet.srv?hdnPageAction=TrainTo

Triatoma: Assassin Bug, 20x (P2021415): *image by Mel Pollinger*



AW Thomas

Freshwater snail, young eggs in jelly and developing snail showing shell (top) and foot (below).