

The SAS Spectrum Newsletter

The Newsletter of the Society for Applied Spectroscopy



June 2012

Introducing the Agilent Cary 630 FTIR: DISTINCTLY BETTER (AND SMALLER) ROUTINE FTIR

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SAS BALTIMORE WASHINGTON DC TOUR SPEAKER: PROBING THE PAST WITH CURRENT STATE OF THE ART SPECTROSCOPIC TOOLS

by Arindam Ganguly

The SAS Baltimore Washington DC tour speaker seminar was held on April 16, 2012, at downtown Silver Spring, Maryland. The venue selection was convenient based on its proximity to downtown and was well attended. The speaker was Dr. Fenella France who holds a distinguished position at the Library of Congress (LOC) Preservation Research and Testing Division. Dr. France's research focus and daily responsibilities include preservation and analysis of maps and historic manuscripts from US history and from other cultures using non-invasive spectroscopic techniques. The presentation by the speaker encompassed examples from all of the above categories and outlined how spectroscopy has assisted in finding unique attributes and features present in these documents. The presentation was preceded by a social hour and dinner.



The presentation started with the speaker's introduction to scripto-spatial analysis of rare documents using hyperspectral imaging. The LOC has recently initiated a program called **Center for Library Analytical Scientific Samples (CLASS)** where researchers are using state-of-the-art spectroscopic instrumentation for manuscript analysis. The spectroscopic system used at the LOC is the MegaVision-Equipoise imaging system, which has 39 megapixel monochrome cameras which are integrated with an LED (Light Emitting Diode) panel which covers the entire spectral region from 350-1050 nm. On average each image generated is approximately 76 MB in size and with assistance from customized software, each pixel position is analyzed and the image is reconstructed. In addition, the imaging system allows various imaging modalities such as reflected, transmitted, and raking (side-lighting) orientations. The speaker also provided a brief description of the imaging processing techniques which were being used for spectral analysis: PCA, Fourier-based Spatial Filtering and the Otsu method for dynamic threshold generation in image analysis.

Dr. France then finished the presentation with examples of how the imaging system at LOC has been used for solving and finding interesting information about rare manuscripts.

The first example was of Thomas Jefferson's draft of the "Declaration of Independence". Using hyperspectral imaging, it was revealed that Jefferson had originally written "fellow subjects", which was later altered to "fellow citizens". One of the most important speeches in US history is the Gettysburg address. The spectroscopic analysis of the original papers revealed three fingerprints, which indicated that the speech was written in the train. One of the challenges of dealing with historical manuscripts is handling. Special care has to be taken during spectral acquisition to maintain the integrity of the specimen. As Dr. France commented, "Balance preservation with access to the documents."

The Portolan Charts (http://en.wikipedia.org/wiki/Portolan_chart) from the 13th century were analyzed for color consistency. In addition, analysis of L'Enfant Plaza maps, Herblock political drawings, and H.R. Haldeman papers are some of the other projects which Dr. France has completed demonstrating the utility of the state-of-the-art imaging system at LOC.



Dr. Fenella France, SAS Baltimore Washington DC Tour Speaker, giving a talk on 16 April 2012.

Gordon F. Kirkbright Bursary Award, 2013

The Gordon F. Kirkbright bursary award is a prestigious annual award that enables a promising student/non-tenured young scientist of any nation to attend a recognized scientific meeting or visit a place of learning.

The fund for this bursary was established in 1985 as a memorial to Professor Gordon Kirkbright in recognition of his contributions to analytical spectroscopy and to science in general. Although the fund is administered by the Association of British Spectroscopists (ABS) Trust, the award is not restricted to spectroscopists.

Applications are invited for the 2013 Gordon Kirkbright Bursary.

For further information contact John Chalmers at vibspecconsult@aol.com.

The closing date for entries is **31 December 2012**.

Joel Harris Honored by the Coblenz Society



Professor Joel M. Harris of the University of Utah received the 2012 ABB-sponsored Bomem-Michelson Award from the Coblenz Society at Pittcon 2012.

Participants in the symposium included (left to right) John Conboy (University of Utah), Larry Nafie (Bio-Tools), Henry Buijs (ABB Bomem), Paul Farnsworth (Brigham Young University), Harris, Peter Griffiths (University of Idaho, retired), and Rina Dukor (Bio-Tools).



June Historical Events in Spectroscopy by Leopold May, Catholic University

June 7, 1896



Robert Sanderson Milliken, who was born on this day, did research in molecular orbital and electronic structure of molecules for which he received the Nobel Prize in Chemistry in 1966 for his fundamental work concerning chemical bonds and the electronic structure of molecules by the molecular orbital method.

June 8, 1918



John D. Roberts applied nuclear magnetic resonance to organic chemistry and did research on molecular orbital calculations. He was born on this date.

June 16, 1923



Paul A. Wilks, Jr., maker of IR instruments and sample-handling products, was born on this date.

June 18, 1918



Jerome Karle, who developed methods for the determination of crystal structures with X-rays, was born on this day. He shared the Nobel Prize in Chemistry with Herbert A. Hauptman in 1985 for their outstanding achievements in the development of direct methods for the determination of crystal structures.

Additional historical events can be found at Dr. May's website, <http://faculty.cua.edu/may/SpectHist.htm>

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