

# Program

58<sup>th</sup> Annual Conference on Applications of X-ray Analysis

# Denver X-ray Conference

27-31 July 2009

Crowne Plaza Hotel  
Colorado Springs, CO  
U.S.A.

**Plenary session: Getting the Lead Out—Again!**

**Training & Applications  
Techniques & Instrumentation  
Exhibits, Workshops, Sessions**

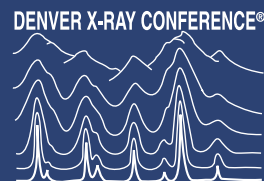
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Sponsored by **International Centre for Diffraction Data**



# 58<sup>TH</sup> DENVER X-RAY CONFERENCE 27–31 JULY 2009

## CROWNE PLAZA HOTEL, COLORADO SPRINGS, COLORADO U.S.A.

### 2009 DENVER X-RAY CONFERENCE ORGANIZING COMMITTEE

Robert L. Snyder, *Chair, Georgia Institute of Technology, Atlanta, GA*

W. Tim Elam, *Co-Chair, Ametek/EDAX Research Group, Mahwah, NJ & University of Washington APL, Seattle, WA*

John A. Anzelmo, *Anzelmo & Associates, Inc., Madison, WI*

Thomas Blanton, *Eastman Kodak Company Research Labs, Rochester, NY*

Victor E. Buhrke, *Past Chair, Consultant, Portola Valley, CA*

Timothy Fawcett, *International Centre for Diffraction Data, Newtown Square, PA*

Denise Flaherty, *International Centre for Diffraction Data, Newtown Square, PA*

George J. Havrilla, *Los Alamos National Laboratory, Los Alamos, NM*

Ting C. Huang, *Emeritus, IBM Almaden Research Center, San Jose, CA*

James A. Kaduk, *INEOS Technologies, Naperville, IL*

Terry Maguire, *International Centre for Diffraction Data, Newtown Square, PA*

Scott T. Misture, *NYS College of Ceramics at Alfred University, Alfred, NY*

I. Cev Noyan, *Columbia University, New York, NY*

Brian Toby, *APS—Argonne National Laboratory, Argonne, IL*

René Van Grieken, *University of Antwerp, Antwerp, Belgium*

Mary Ann Zaitz, *IBM, Hopewell Junction, NY*

### FUTURE DXC DATES

**2-6 August 2010**

Denver Tech Center Hotel, Denver, CO

**1-5 August 2011**

Crowne Plaza Hotel, Colorado Springs, CO

**6-10 August 2012**

Denver Tech Center Hotel, Denver, CO

### PROGRAM & ON-LINE REGISTRATION

This program and on-line registration are also available on the Denver X-ray Conference web page at <http://www.dxcicdd.com>. The information contained in this program is current as of the printing date. Changes will be communicated at the conference.

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# GENERAL INFORMATION

## Accommodations

The 2009 Denver X-ray Conference will be held at the:

**CROWNE PLAZA HOTEL**  
2886 South Circle Drive  
Colorado Springs, CO 80906 U.S.A.  
Phone: 1.719.576.5900 Fax: 1.719.576.7695  
Web site: [www.cpcoloradosprings.com](http://www.cpcoloradosprings.com)

The hotel will offer complimentary transportation to and from downtown Colorado Springs for conference attendees and their families.

### Reservations (Rates applicable until 6 July 2009, subject to availability)

Attendees are responsible for making their own reservations. Please call 800.981.4012 and identify yourself as a Denver X-ray Conference attendee when booking your reservation. The web site for on-line reservations is:

[https://resweb.passkey.com/Resweb.do?mode=welcome\\_ei\\_new&eventID=80423](https://resweb.passkey.com/Resweb.do?mode=welcome_ei_new&eventID=80423). There is a direct link to this site on our homepage: [www.dxcicdd.com](http://www.dxcicdd.com).

The special conference rate of \$122.00 per night (plus tax) has been contracted for our group. Don't wait to book your reservation—there are a limited number of rooms available at the special conference rate! Rates applicable until 6 July 2009 (subject to availability). All reservations must be guaranteed and accompanied by a first night room deposit, or guaranteed with a major credit card.

## Ground Transportation/Shuttle Service

We recommend using the Colorado Springs Shuttle Company for your transportation from the Denver International Airport to the Crowne Plaza Hotel in Colorado Springs. Book on-line: <http://www.coloradoshuttle.com/index.htm>. Offering \$50.00 one way.

## Poster Boards

The poster boards used during the evening poster sessions will be 4' high x 8' wide boards. Authors must bring their own thumbtacks or Velcro.

## Employment Clearinghouse

We will have a separate bulletin board to announce employment opportunities. Prospective employers and employees should bring announcements with them for posting.

## Book of Abstracts

The DXC *Book of Abstracts* will be available at the Conference Registration Desk. To view the abstracts before the conference, visit our web site: [www.dxcicdd.com](http://www.dxcicdd.com). Abstracts are listed in alphabetical order by the contact author's last name, and are searchable.

## Registration Details

All on-site registrations will be conducted at the Conference Registration Desk, located on the ground floor (level one) of the Crowne Plaza Hotel, near the Colorado Grand Ballroom. See the hotel layout on page 25 of this Program for the exact location.

### Registration Times:

<b>Sunday, 26 July</b>	<b>4:00 p.m.–7:00 p.m.</b>
<b>Monday, 27 July</b>	<b>8:00 a.m.–3:00 p.m.</b>
<b>Tuesday, 28 July</b>	<b>8:00 a.m.–3:00 p.m.</b>
<b>Wednesday, 29 July</b>	<b>8:00 a.m.–2:00 p.m.</b>
<b>Thursday, 30 July</b>	<b>8:00 a.m.–2:00 p.m.</b>

**Please Note:** Attendees (even those pre-registered) should check in at the Conference Registration Desk for conference materials (name tags, Book of Abstracts, late announcements, etc.).

### Cancellation Policy

Cancellations must be submitted in writing to the Conference Coordinator. A full refund will be issued, less a \$50 processing fee, if the cancellation is received at least two weeks before the conference (Monday, 13 July 2009). No refunds will be issued for cancellations received after 13 July 2009.

## Visa Application Notice

Obtaining a Visa is the sole responsibility of the attendee. The Denver X-ray Conference is not permitted to mediate with either the U.S. Embassy abroad or with the State Department on behalf of any conference attendee. However, if you need an invitation letter to the conference to submit with your application, please e-mail your request to: [flaherty@icdd.com](mailto:flaherty@icdd.com). Please include your name, passport #, birth date, mailing address, e-mail, and the title(s) of any abstract(s) that you have submitted for the conference. A copy of the letter will be e-mailed and airtailed to you.

# GENERAL INFORMATION

## Conference Proceedings

Don't miss this opportunity to showcase your research by submitting your presented paper for the DXC conference proceedings, *Advances in X-ray Analysis*, Volume 53 on CD-ROM. Work presented during either an oral session or poster session is eligible for submission. Select papers will also be published in the journal, *Powder Diffraction*.

In the interest of releasing the conference proceedings as early as possible, we are encouraging authors to submit their manuscripts for publication during the conference, at the conference registration desk. If you are unable to bring your manuscript with you at that time, it can be accepted until 1 September 2009. Preparation guidelines for DXC manuscripts will be e-mailed to authors after the abstract deadline, and are also available at: <http://www.dxcicdd.com/advances/authors.htm>. Note: To be acceptable for publication, papers should describe either new methods, theory and applications, improvements in methods or instrumentation, or other advances in the state of the art. Papers emphasizing commercial aspects are discouraged. Information for preparing manuscripts will be mailed after abstracts have been received. *Advances in X-ray Analysis* is distributed throughout the world, and the complete manuscripts of volumes 40–48 (1996–2004) can also be viewed on the ICDD web site: <http://www.dxcicdd.com/advances/advances.htm>.

## Sponsorship Opportunities

There are various sponsorships available to exhibitors of the Denver X-ray Conference. Contact Denise Flaherty: [flaherty@icdd.com](mailto:flaherty@icdd.com), 610.325.9814, for more information.

## Have an idea for a workshop or session?

Visit: <http://www.dxcicdd.com/workshopsuggestions.htm>

# STUDENT INFORMATION

## Discount Rooms

There are a limited number of hotel rooms being offered to students at a discounted rate of \$70 per night plus tax. Student rooms are shared—each room will be equipped with two double beds to accommodate two persons. Please visit the Denver X-ray Conference web site: [www.dxcicdd.com](http://www.dxcicdd.com) for a Student Room Authorization form. Student identification will be required. Rooms will be booked on a first-come, first-serve basis.

## Grants

In pursuing its dynamic commitment to the education of the scientific community, the International Centre for Diffraction Data is offering limited travel support to help students attend the 2009 Denver X-ray Conference. Grants are awarded in the amount of \$500 for students living within the USA, and \$1,000 for students living outside of the USA. Denver X-ray Conference also offers a reduced student registration fee and student housing. (see [www.dxcicdd.com](http://www.dxcicdd.com) for full details). Students are required to participate in the technical program by submitting an abstract for a poster presentation. To apply for assistance, download a copy of the Student Grant Application form, and submit with a copy of your abstract and a supporting letter from your research advisor. The deadline for applications is 1 July 2009.

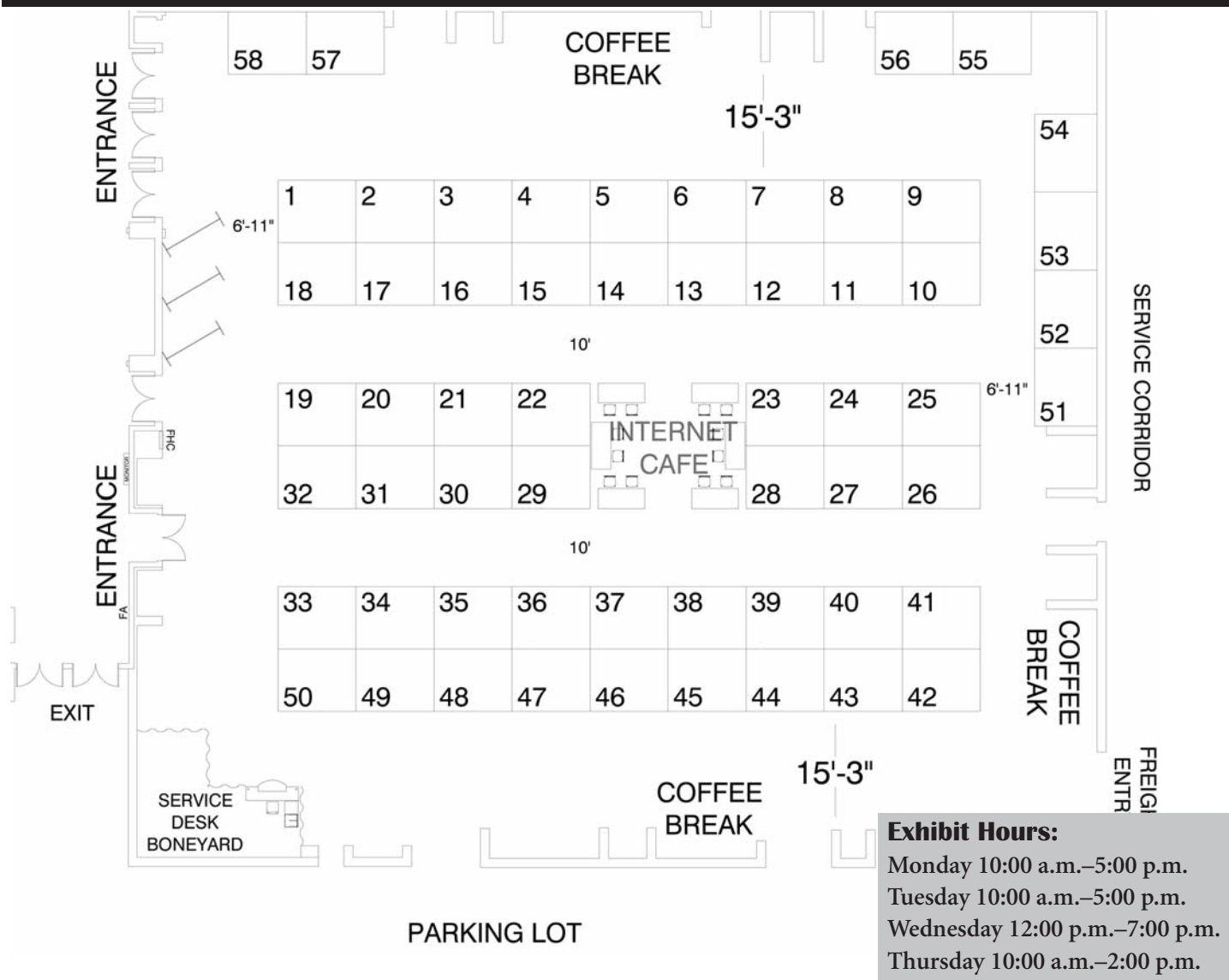
## Jerome B. Cohen Student Award

This award was instituted in the name of Professor Jerome B. Cohen, one of the leaders in the field of X-ray analysis, and in the training of students in this art. The award is intended to recognize the outstanding achievements of student research in this field. All students, graduate or undergraduate, who are working in the field of X-ray analysis, can submit a technical paper describing their work. The following criteria applies:

- The research must be original, of high quality, and must be primarily the work of the student.
- All papers submitted for the Cohen Award must be presented at the conference in either oral or poster session. Thus, all first-author students must submit an abstract and also attend the conference.
- The papers submitted for this competition must be received in final publication form electronically by 1 July 2009. The winning manuscript will also be listed in the conference proceedings.

The winner will be selected by a committee of researchers in the field, and notified one week before the conference. The winner must be able to attend the Plenary session of the conference on Wednesday morning for the announcement of the award. The award for the year 2009 will be in the amount of \$1,000. Students interested in participating in this year's competition must submit their papers and a certification form to [dxcc@icdd.com](mailto:dxcc@icdd.com) by 1 July 2009. The certification form and instructions for preparing a manuscript can be obtained on the Denver X-ray Conference web site: <http://www.dxcicdd.com>.

# EXHIBIT INFORMATION



## 2009 Denver X-ray Conference Exhibit Assignments

<u>Company Name</u>	<u>Booth #(s)</u>	<u>Company Name</u>	<u>Booth #(s)</u>
AMPTEK, Inc.	18	Micromatter, a division of Advanced Applied Physics Solutions	36
Anton Paar USA	17	Micro Photonics, Inc.	8
Bruker AXS, Inc.	19, 20, 21 & 22	Moxtek, Inc.	41
Brush Wellman Electrofusion Products	13	PANalytical	1, 2 & 3
Chemplex Industries, Inc.	58	Photonic Science Ltd.	4
Corporation Scientifique Claisse Inc.	16	PNDetector GmbH	30
e2v Scientific Instruments Ltd	35	PREMIER Lab Supply, Inc.	29
Edax Inc.	37	Princeton Instruments	32
Herzog Automation Corp	28	Proto Manufacturing Inc.	50
HORIBA Scientific, formerly HORIBA Jobin Yvon	49	Rigaku	44, 45 & 46
Huber Diffraktionstechnik - AXO Dresden	31	Rocklabs Ltd	23
Incoatec GmbH	15	SII NanoTechnology USA, Inc.	9
Innov-X Systems	57	SPEX Sample Prep LLC	38
International Centre for Diffraction Data	53 & 54	Thermo Scientific	55 & 56
inXitu, Inc.	7	Xenocs SA	6
John Wiley & Sons	14	X-ray Optical Systems, Inc.	33 & 34
Materials Data, Inc. (MDI)	5		

# EVENING TECHNICAL SESSIONS & SOCIAL EVENTS

*Spouses are welcome to attend all social functions.  
Wine & Cheese Receptions and Poster Sessions  
will be held in the Summit Ballroom on the 4<sup>th</sup> floor, unless noted otherwise.*

## **Monday**

**27 July 5:30–7:30** XRD Poster Session and Wine & Cheese Reception  
Sponsored by PANalytical

## **Tuesday**

**28 July 5:30–7:30** XRF Poster Session and Wine & Cheese Reception  
Sponsored by Chemplex Industries, Inc.

## **Wednesday**

**29 July 5:00–7:00** Vendor-sponsored Wine & Cheese Reception to be held in the exhibit hall—  
Colorado Grand Ballroom

## **Spouses' Coffee Hour**

All spouses are invited to attend a complimentary coffee hour, sponsored by the Denver X-ray Conference. Coffee, tea and pastries will be served in the El Paso Room from 9:30 to 10:30 a.m. on Monday and Tuesday. Information on local attractions and activities of interest will be provided.

## **Thursday "Off-Site" Event**

A "Chuck Wagon Dinner" will be held off-site on Thursday evening of Conference Week. Ticket and transportation information will be posted on the web site as soon as it is available.

**Don't miss the vendor-sponsored  
Wine and Cheese Reception  
Wednesday Evening 5:00–7:00 p.m.**

Special Thanks to our Evening Reception Sponsors:

**PANalytical**

**Chemplex Industries**

And to our Media Sponsor:

**Materials Today**

## Monday 9:00 a.m.–12:00 noon

### XRD & XRF

#### ADVANCES IN DETECTOR TECHNOLOGY

PIKES PEAK 1 &amp; 2

*Organizer and Instructors:*

**T.N. Blanton**, Eastman Kodak Company, Rochester, NY, [thomas.blanton@kodak.com](mailto:thomas.blanton@kodak.com)

**M. Fransen**, PANalytical B.V., Almelo, The Netherlands

**B.B. He**, Bruker AXS, Madison, WI

**P. Salficky**, Dectris Ltd., Villigen, Switzerland

Recent advances in X-ray detectors used for XRD and XRF allow for measurements with high sensitivity, high speed, and high accuracy. New detectors for phase identification, elemental analysis, texture, structure elucidation, etc., are available for users to take advantage of today. This workshop will cover recent developments in theory, instrumentation, data collection and analysis, as well as advantages and disadvantages of advanced X-ray detectors used for materials characterization.

### XRD

#### QUANTITATIVE RIETVELD ANALYSIS I

PIKES PEAK 3 &amp; 4

*Organizers and Instructors:*

**S.T. Misture**, NYS College of Ceramics at Alfred University, Alfred, NY, [misture@alfred.edu](mailto:misture@alfred.edu)

**R.L. Snyder**, Georgia Institute of Technology, Atlanta, GA, [bob.snyder@mse.gatech.edu](mailto:bob.snyder@mse.gatech.edu)

**A. Kern**, Bruker AXS GmbH, Karlsruhe, Germany

As Rietveld analysis has become popular, the applicability in quantitative phase analysis has become clear. The workshop will center on the use of Rietveld analysis for quantitative phase analysis but will begin with a general description of the method for the novice user. We will focus, however, on the pitfalls and traps, then provide tips for successful quantification using Rietveld analysis. More advanced topics will include analysis of specimens with amorphous content, as well as an evaluation of the likely errors in the analysis.

### XRF

#### BASIC XRF

GOLD CAMP

*Organizer and Instructors:*

**W.T. Elam**, Ametek/EDAX Research Group and University of Washington APL, Seattle, WA, [wtelam@apl.washington.edu](mailto:wtelam@apl.washington.edu)

**G. Havrilla**, Los Alamos National Laboratory, Los Alamos, NM

This workshop provides a basic introduction to the principles of XRF, and is specifically aimed at those new to the field. It will start with a general overview of the technique, followed by more specific details of the basic principles. The emphasis will be on understanding how to use XRF and what its capabilities are. In the second half of the workshop, a few selected applications will be presented. The focus of this segment will be to provide an understanding of how the basic principles effect actual practice.

#### SPECIMEN PREPARATION I

CENTENNIAL

*Organizer and Instructors:*

**J.A. Anzelmo**, Anzelmo & Associates, Inc., Madison, WI, [jaanzelmo@aol.com](mailto:jaanzelmo@aol.com)

**P. Daigle**, Corporation Scientifique Claisse, Sainte-Foy, Quebec, Canada

**L. Jacobs**, Wyoming Analytical Laboratories, Golden, CO

**L. Arias**, Bruker AXS, Madison, WI

This workshop will begin in the morning with a review of liquid analysis techniques and equipment (Arias). A discussion of sample preparation physics, and basic operations and equipment for powder preparation and fusion will follow (Anzelmo). The afternoon session begins with a discussion of the preparation of coal, fly-ash, and other service laboratory applications (Jacobs). This will be followed by a discussion of the fusion of difficult samples, including peroxide fusions (Daigle).

## Monday 2:00 p.m.–5:00 p.m.

### XRD

#### QUANTITATIVE RIETVELD ANALYSIS II

PIKES PEAK 3 &amp; 4

See Quantitative Rietveld Analysis I.

#### PAIR DISTRIBUTION FUNCTION

GOLD CAMP

*Organizer and Instructors:*

**V. Petkov**, Central Michigan University, Mt. Pleasant, MI, [petkov@phy.cmich.edu](mailto:petkov@phy.cmich.edu)

**M. Gateshki**, PANalytical B.V., Almelo, The Netherlands

**P. Chupas**, **K. Chapman**, Argonne National Laboratory, Lemont, IL

# WORKSHOPS MONDAY & TUESDAY, 27 & 28 JULY

This workshop will offer practical training on in-house (Gateshki) and synchrotron (Chupas) high-energy X-ray diffraction experiments aimed at atomic PDFs analysis. Introduction to PDFs basics and training on 3D structure determination/refinement based on atomic PDFs will also be done (Petkov and Chapman).

## XRF

### BENEFITS AND LIMITATIONS OF HANDHELD XRF

PIKES PEAK 1 & 2

*Organizer and Instructors:*

**K. Russell**, *Innov-X Systems, Woburn, MA, krussell@innovxsys.com*

**M. Kreiner**, *Oxford Instruments, Elk Grove Village, IL*

**S. Piorek**, *Thermo Fisher Scientific, Billerica, MA*

**B. Kaiser**, *Bruker AXS, West Jordan, UT*

**P. Palmer**, *San Francisco State University, San Francisco, CA*

This workshop will give an overview of Handheld XRF as a powerful analytical tool on its own, as well as in conjunction with other analytical techniques. The benefits and limitations of Handheld XRF will be illustrated through discussions of its technology; its application in industry, research, and the field; and its use as an instructional tool in the academic arena.

### SPECIMEN PREPARATION II

CENTENNIAL

See Specimen Preparation I.

**Tuesday 9:00 a.m.–12:00 noon**

## XRD & XRF

### X-RAY SOURCES/OPTICS DEVELOPMENT AND INTEGRATION

CENTENNIAL

*Organizers and Instructors:*

**A. Khounsary**, *APS—Argonne National Laboratory, Argonne, IL, amk@aps.anl.gov*

**G.J. Havrilla**, *Los Alamos National Laboratory, Los Alamos, NM, havrilla@lanl.gov*

**J. Wiesmann**, *Incoatec GmbH, Geesthacht, Germany*

**A. Michette**, *King's College London, London, United Kingdom*

**S. Kamtekar, N. Gao**, *X-ray Optical Systems, Inc., East Greenbush, NY*

Source-optics integration to provide high X-ray throughput is of paramount importance for efficient utilization of any X-ray source. There are several optical systems, each with its own characteristics, capabilities, advantages and disadvantages and unique application niches. This workshop will provide basic knowledge about X-ray optics (such as multilayer optics, polycapillary optics, doubly curved crystal optics, and monicapillary optics) with emphasis on the integration of optics and the source. One of the objectives in this workshop is to help users understand the basic working principles and performance characteristics of these optics. Attendees will learn the selection, function, and capabilities of an X-ray optical system for optimal source-optics performance.

## XRD

### PHASE IDENTIFICATION—METHODS AND TOOLS

PIKES PEAK 1 & 2

*Organizer and Instructors:*

**T.G. Fawcett**, *International Centre for Diffraction Data, Newtown Square, PA, fawcett@icdd.com*

**C.E. Crowder, S.N. Kabekkodu**, *International Centre for Diffraction Data, Newtown Square, PA*

Integration of powder and single crystal databases has resulted in tremendous growth in the Powder Diffraction File™. Over 650,000 material data sets have been published with PDF-4+ and PDF-4/Organics, each exceeding 300,000 entries. Each entry is also getting more complex in terms of content and context, whereby bibliographic information, quality analyses, physical properties and experimental conditions are recorded. The growth in entry numbers, context, and content alters, and significantly improves, the phase identification processes. The workshop will focus on improved methods for phase identification that utilize data mining, pattern simulation, and multivariate analyses. We will also discuss methods used to evaluate the phase identification results and performance.

## XRF

### TRACE ANALYSIS

PIKES PEAK 3 & 4

*Organizer:*

**M.A. Zaitz**, *IBM, Hopewell Junction, NY, zaitz@us.ibm.com*

This workshop provides a comprehensive review of the basic fundamentals for both the beginner and experienced X-ray spectroscopist. Topics to be covered are trace levels and limits of detection. Understanding the effects of background and ways to reduce levels. Monochromatic vs polychromatic excitation including understanding scattering effects which add to background, polarization of X-rays, secondary targets and filtering. When and where to apply to different samples. Basic introduction to Total Reflection X-ray Fluorescence TXRF. Different quantitative analysis will be also be discussed.

## QUANTITATIVE ANALYSIS I

*Organizer and Instructors:*

**M. Mantler**, Vienna University of Technology, Vienna, Austria, michael.mantler@ifp.tuwien.ac.at

**B. Vrebos**, PANalytical B.V., Almelo, The Netherlands

**W.T. Elam**, University of Washington, Seattle, WA

1. Theoretical and mathematical foundation: Classical fundamental parameter models.
2. Practical application: Working curves and influence coefficients, compensation methods.

**Tuesday 2:00 p.m.–5:00 p.m.**

## XRD

### LINE PROFILE ANALYSIS

PIKES PEAK 1 &amp; 2

*Organizers and Instructors:*

**I.C. Noyan**, Columbia University, New York, NY, icn2@columbia.edu

**D. Balzar**, University of Denver, Denver, CO, balzar@du.edu

Line profile analysis has evolved into a powerful technique for assessing crystallite size, strain, and defects in materials. The workshop will focus on the determination of these properties by Rietveld refinement and other Whole Powder Pattern Fitting (WPPF) programs. A brief theoretical overview will be followed by a practical tutorial with recipes and examples of the determination of crystallite-size distribution and dislocation density in different materials.

### STRUCTURE SOLUTION

PIKES PEAK 3 &amp; 4

*Organizer and Instructors:*

**S.T. Misture**, NYS College of Ceramics at Alfred University, Alfred, NY, misture@alfred.edu

**A. Kern**, Bruker AXS GmbH, Karlsruhe, Germany

This workshop will focus on extracting crystal structures from powder diffraction data. As a first step, we will cover the process of indexing powder patterns using modern software with error corrections. Structure solutions using the simulated annealing and charge flipping approaches will be highlighted. In particular, we will show how heavy atom and equal atom problems can be approached using the two different methods. For the simulated annealing approach, we will demonstrate the use of individual atoms as well as the use of rigid bodies. Finally, the workshop will include a discussion of Fourier synthesis and chemical knowledge to reach full descriptions of structures.

## XRF

### QUANTITATIVE ANALYSIS II

GOLD CAMP

*Organizer and Instructors:*

**M. Mantler**, Vienna University of Technology, Vienna, Austria, michael.mantler@ifp.tuwien.ac.at

**B. Vrebos**, PANalytical B.V., Almelo, The Netherlands

**W.T. Elam**, University of Washington, Seattle, WA

1. How accurate is XRF? (e.g., standardless methods, light elements and low-energy lines, trace-analysis).
2. Obtaining net-intensities: Detector (spectrometer) response function; separation of overlapping peaks/deconvolution; background subtraction; artifacts in spectra.

### STRATEGIES FOR ADVANCED MATERIALS ANALYSIS WITH LAB & SR X-RAY SPECTROSCOPY CENTENNIAL

*Organizer and Instructors:*

**S. Hayakawa**, Hiroshima University, Hiroshima, Japan, hayakawa@hiroshima-u.ac.jp

**J. Kawai**, Kyoto University, Kyoto, Japan

**I. Nakai**, Tokyo University of Science, Tokyo, Japan

**Y. Muramatsu**, University of Hyogo, Hyogo, Japan

**H. Wakita**, Fukuoka University, Fukuoka, Japan

XRF has made great advances in trace sensitivity and in spatial resolution with the use of synchrotron light sources. Moreover, characterization of trace elements in advanced materials has been realized by using X-ray absorption spectroscopy with the XRF yields method. To realize similar performance with the conventional X-ray sources, many state-of-the-art instruments have been invented. In this workshop, a review will be made on the present status of trace and micro analysis with the laboratory and the synchrotron light sources, and a strategy of choice will be indicated according to the samples to be analyzed.

The Monday evening Poster session will be held in conjunction with a Wine and Cheese Reception, sponsored by PANalytical.

Chairs: T.R. Watkins, Oak Ridge National Laboratory, Oak Ridge, TN  
D. Balzar, University of Denver, Denver, CO

Session chairs will select the three best posters for awards.

- D-2 CHARACTERIZATION OF AGING BEHAVIOR OF PRECIPITATES AND DISLOCATIONS IN COPPER-BASED ALLOYS**  
S. Sato, K. Wagatsuma, S. Suzuki, Tohoku University, Sendai, Miyagi, Japan  
Y. Takahashi, NISSAN ARC, LTD., Yokosuka, Kanagawa, Japan
- D-3 X-RAY DIFFRACTION STUDIES OF INDIAN COALS**  
S. Maity, Central Institute of Mining and Fuel Research, Fri, Dhanbad, Jharkhand, India
- D-5 STATE-OF-THE-ART MULTILAYER OPTICS FOR X-RAY ANALYTICS**  
J. Wiesmann, B. Hasse, C. Michaelsen, A. Hembd, U. Heidorn, S. Kroth, F. Hertlein, Incoatec GmbH, Geesthacht, Germany
- D-13 GRAZING INCIDENCE DIFFRACTION STUDY OF EPITAXIAL FILMS USING EXTENDED ROCKING CURVE ANALYSIS**  
A. Takase, K. Omote, Rigaku Americas Corporation, The Woodlands, TX
- D-19 INSITU ANALYSIS OF LiFePO<sub>4</sub> BATTERIES: SIGNAL EXTRACTION BY MULTIVARIATE ANALYSIS**  
M.A. Rodriguez, M.H. Van Benthem, D. Ingersoll, Sandia National Laboratories, Albuquerque, NM  
S.C. Vogel, Los Alamos National Laboratory, Los Alamos, NM
- D-22 RESIDUAL STRESSES AROUND HOLES CUT IN STEEL RAILSIDES FOR TRUCK FRAMES**  
C.R. Hubbard, Oak Ridge National Laboratory, Oak Ridge, TN  
J. Del Prado Villasana, S. Fleming, Metals Roanoke, Inc., Roanoke, VA
- D-24 QUANTITATIVE ANALYSIS OF SAMPLES INCLUDING UNKNOWN TRACE PHASES—COMPARISON OF THE RIETVELD AND CALIBRATION CURVE METHODS**  
E. Kagami, A. Takase, Rigaku Corporation, Akishima, Tokyo, Japan
- D-27 X-RAY DIFFRACTION SPOT OBSERVATION OF Ti<sub>2</sub>Ba<sub>2</sub>CuO<sub>x</sub> USING FOCUSING COHERENT SYNCHROTRON BEAM WITH A MAGNETIC FIELD CHANGE**  
D. Miyamoto, T. Oba, T. Suzuki, The University of Kitakyushu, Fukuoka, Japan
- D-29 X-RAY TOPOGRAPHY FOR EVALUATION OF X-RAY MIRRORS THAT FUNCTION BY MEANS OF TOTAL-EXTERNAL-REFLECTION**  
J. Maj, A. Macrander, A. Khounsary, M. Martens, Argonne National Laboratory, Argonne, IL
- D-30 THE COSUBSTITUTION REACTION OF In<sub>2</sub>O<sub>3</sub> BY ZnO AND SnO<sub>2</sub> AS CHARACTERIZED WITH X-RAY SPECTROSCOPY**  
C.A. Hoel, K.R. Poepfelmeier, J.-F. Gaillard, Northwestern University, Evanston, IL
- D-35 DEVELOPMENT OF XRD BASED ON-LINE CHARACTERIZATION OF SEMICRYSTALLINE PLASTICS**  
H. Huang, A. Verchinine, M. Cusack, W. Gibson, X-ray Optical Systems, Inc., East Greenbush, NY
- D-36 CRYSTAL STRUCTURE REFINEMENTS OF THE THREE-LAYER AURIVILLIUS PHASE Bi<sub>2</sub>LnTi<sub>3</sub>O<sub>12</sub> (Ln = La<sub>2</sub>, LaPr, LaNd, Pr<sub>2</sub>, PrNd, Nd<sub>2</sub>) UTILIZING COMBINED X-RAY AND NEUTRON POWDER DIFFRACTION**  
E.J. Nichols, S.T. Misture, Alfred University, Alfred, NY
- D-37 MICRO-STRUCTURAL ANALYSIS OF HIGH MANGANESE STEELS USING MULTIPLE LINE PROFILE ANALYSIS**  
J.S. Joung, Y.-M. Koo, Pohang University of Science & Technology, Pohang, Korea  
I.K. Jeong, Pusan National University, Pusan, Korea  
S.-K. Kim, Technical Research Lab/POSCO, Pohang, Korea
- D-41 STRUCTURAL STUDY ON THE FERROELECTRIC TRANSITION IN YMnO<sub>3</sub> BY RIETVELD METHOD**  
J.Y. Kim, Y.M. Koo, Pohang University of Science and Technology, Pohang, Korea  
N.S. Shin, Pohang Accelerator Laboratory, Pohang, Korea
- D-46 PREDICTION AND XRD MEASURING OF RESIDUAL STRESSES IN MACHINED WELDED PARTS**  
I. Dahan, G. Refaelov, J. Sariel, Ben-Gurion University of the Negev, Beer-Sheva, Israel  
M. Santo, I. Gilad, Nuclear Research Center of the Negev, Israel

**MONDAY, 27 JULY—XRD POSTER SESSION**  
**SUMMIT BALLROOM, 5:30 P.M. – 7:30 P.M.**

- D-50 X-RAY AND RAMAN SPECTRA STUDIES ON THERMAL ENERGY STORAGE MATERIALS—TRIS(HYDROXYMETHYL)AMINOMETHANE**  
W.-M. Chien, V.K. Kamiseti, J.C. Fallas, D. Chandra, A.M. Covington, *University of Nevada - Reno, Reno, NV*  
E.D. Emmons, *U.S. Army Edgewood Chemical Biological Center, Aberdeen Proving Ground, MD*  
R.S. Chellappa, *Carnegie Institution of Washington, Washington, DC*  
S. Clark, *ALS - Lawrence Berkeley National Laboratory, Berkeley, CA*
- D-55 XRD STUDY OF SOL-GEL PREPARATION OF THE MATERIALS WITH RADIOLUMINESCENT PROPERTIES**  
D. Havlicek, J. Ruzicka, D. Niznansky, *Charles University of Prague, Praha 2, Czech Republic*
- D-56 TRANSITION IN CRYSTAL STRUCTURE OF ETHYLENE-OCTENE FIBER DURING HEAT TREATMENT**  
L.-Z. Liu, R. Paradkar, S. Bensason, D. Chiu, *The Dow Chemical Company, Freeport, TX*
- D-60 COMPARISON OF RETAINED AUSTENITE STANDARDS USING XRD AND OIM**  
T.R. Watkins, E.A. Kenik, *Oak Ridge National Laboratory, Oak Ridge, TN*  
O.B. Cavin, *The University of Tennessee, Knoxville, TN*  
J.A. Cooke, *Graham High School, Bluefield, VA*  
K.M. Everett, *Bath County High School, Hot Springs, VA*  
J.L. Leisner, *Bald Eagle Area High School, Wingate, PA*  
Y. Picazo, *West Carter High School, Olive Hill, KY*  
A.M. Wright, *Tupelo High School, Tupelo, MS*  
J. Carpenter, *TSL/EDAX, Draper UT*
- D-62 REDISTRIBUTION OF MICROSTRESSES IN SHEETS FROM ZR-BASED ALLOYS UNDER ANNEALING**  
M. Isaenkova, Y. Perlovich, *Moscow Engineering Physics Institute, Moscow, Russia*
- D-63 HIGH TEMPERATURE X-RAY DIFFRACTION (HT-XRD) ANALYSIS OF SIMULATED DEFENSE WASTE PROCESS FACILITY (DWPF) GLASSES**  
D.M. Missimer, A.R. Jurgensen, R.L. Rutherford, *Savannah River National Laboratory, Aiken, SC*
- D-64 A NEW PROMISING SCINTILLATION CRYSTAL  $\text{YBa}_3\text{B}_9\text{O}_{18}$ : STRUCTURE, CRYSTAL GROWTH AND ITS PROPERTIES**  
W.Y. Wang, M. He, X.L. Chen, *Chinese Academy of Sciences, Beijing, PR China*
- D-69 SYNCHROTRON POWDER DIFFRACTION SIMPLIFIED: A NEW MAIL-IN SERVICE FOR THE 11-BM HIGH-RESOLUTION DIFFRACTOMETER AT THE ADVANCED PHOTON SOURCE**  
B.H. Toby, L. Ribaud, M.R. Suchomel, J. Doebbler, R.B. Von Dreele, *Argonne National Laboratory, Argonne IL*
- D-70 HYBRID X-RAY DIFFRACTION FOR ANALYSIS OF UNPREPARED SAMPLES IN PLANETARY EXPLORATION**  
P. Sarrazin, *inXitu, Inc., Mountain View, CA*  
P. Dera, *Argonne National Laboratory, Argonne, IL*  
R.T. Downs, *University of Arizona, Tucson, AZ*  
D. Blake, *NASA Ames Research Center, Moffett Field, CA*  
D.L. Bish, *Indiana University, Bloomington, IN*  
M. Gailhanou, *Université Paul Cézanne, Marseille, France*
- D-76 MULTILAYER OPTICS FOR NANOSTRUCTURE INVESTIGATION IN THE LAB, THE EXAMPLE OF HIGH Z ELEMENTS**  
V. Roger, P. Panine, P. Høghøj, *XENOCOS SA, Sassenage, France*  
O. Diat, *ICSM, Bagnols sur Céze, France*
- D-77 NEW LANTANUM TANTALATE PHASES INVESTIGATED BY HIGH TEMPERATURE XRD AND HIGH RESOLUTION POWDER DIFFRACTION**  
M.A. Rodriguez, M.D. Nyman, *Sandia National Laboratories, Albuquerque, NM*
- D-81 HYDROSTATIC PRESSURE CELL INTEGRATED IN A LABORATORY BASED SAXS SYSTEM**  
M. Kriechbaum, P. Herrnegger, P. Laggner, *Austrian Academy of Sciences, Graz, Austria and Hecus X-ray Systems GmbH, Graz, Austria*  
S. Bodner, *Hecus X-ray Systems GmbH, Graz, Austria*  
H. Amenitsch, *Austrian Academy of Sciences, Graz, Austria*
- D-82 STRUCTURAL STABILITY STUDY FOR ULTRA-THIN  $\text{HfO}_2$  FILMS BASED ON GIXRR AND GIXRD**  
W.-E. Fu, Y.-Q. Chang, Y.-C. Chen, *Industrial Technology Research Institute, Hsinchu, Taiwan*
- D-83 DO Q!**  
K.-D. Liss, *Australian Nuclear Science and Technology Organisation, NSW, Australia*

# MONDAY, 27 JULY—XRD POSTER SESSION

## SUMMIT BALLROOM, 5:30 P.M. – 7:30 P.M.

- D-93 CRYSTAL STRUCTURE DETERMINATION OF THE SILVER CARBOXYLATE DIMER  $[Ag(O_2C_{22}H_{43})]_2$ , SILVER BEHENATE, USING POWDER X-RAY DIFFRACTION METHODS**  
T.N. Blanton, M. Rajeswaran, *Eastman Kodak Company, Research Laboratories, Rochester, NY*  
P.W. Stephens, *Stony Brook University, Stony Brook, NY*  
D.R. Whitcomb, *Carestream Health, Oakdale, MN*  
S.T. Misture, *NYS College of Ceramics at Alfred University, Alfred, NY*  
J.A. Kaduk, *INEOS Technologies, Naperville, IL*
- D-94 AN APPROACH TO QUANTITATIVE INTERPRETATION OF XRD PATTERNS OF CLAY MIXTURES USING CLAY MINERAL SOCIETY CLAYS AND THEIR FWHM IN THE GLYCOLATED DIFFRACTOGRAMS**  
D. Alaygut, B. Canga, *Turkish Petroleum Corporation, Research Center, Ankara, Turkey*
- D-97 X-RAY DIFFRACTION AND STRUCTURAL BEHAVIOR STUDIES OF LI-BASED HYDRIDES**  
W.-M. Chien, J.H. Lamb, D. Chandra, *University of Nevada - Reno, Reno, NV*
- D-99 DISLOCATION GENERATION RELATED TO MICROCRACKS IN SI-WAFER: IN-SITU STUDY AT HIGH TEMPERATURE WITH WHITE BEAM X-RAY TOPOGRAPHY**  
A. Danilewsky, J. Wittge, A. Hess, A. Cröll, *University Freiburg, Freiburg, Germany*  
D. Allen, P. McNally, *Dublin City University, Dublin, Ireland*  
P. Vagovic, A. Cecilia, Z. Li, T. Baumbach, *Research Centre Karlsruhe/Institut für Synchrotronstrahlung, Karlsruhe, Germany*  
E. Gorostegui-Colinas, J. Garagorri, M.R. Elizalde, *Centro de Estudios e Investigaciones Técnicas de Gipuzkoa, San Sebastian, Spain*  
D. Jacques, *Jordan Valley Semiconductor, Durham, United Kingdom*  
M.C. Fossati, D.K. Bowen, B.K. Tanner, *Durham University, Durham, United Kingdom*
- D-102 RESIDUAL STRESS ANALYSIS OF A CO-EXTRUDED SOLID OXIDE FUEL CELL PLATFORM**  
I. Cernatescu, S. Rekhi, *PANalytical, Westborough, MA*  
R. Oh, J. Cochran, R.L. Snyder, *Georgia Institute of Technology, Atlanta, GA*
- D-103 WHY YOU SHOULD CARE ABOUT AREA DETECTORS—AN INTRODUCTION**  
K.W. Kirchner, K.A. Jones, *U.S. Army Research Laboratory, Adelphi, MD*

# TUESDAY, 28 JULY—XRF POSTER SESSION

## SUMMIT BALLROOM, 5:30 P.M. – 7:30 P.M.



The Tuesday evening Poster session will be held in conjunction with a Wine and Cheese Reception, sponsored by Chemplex.

Chairs: I. Nakai, *Tokyo University of Science, Tokyo, Japan*

D. Cohen, *Australian Nuclear Science and Technology Organisation, Menai, Australia*

Session chairs will select the three best posters for awards.

- F-1 CHARACTERISTICS OF CAPILLARY X-RAY OPTICS FOR CONFOCAL THREE-DIMENSIONAL MICRO-XRF TECHNOLOGY**  
T. Sun, Y. Li, Z. Liu, X. Lin, P. Luo, Q. Pan, X. Ding, *Beijing Normal University, Beijing, China*
- F-3 NEW VORTEX® SDD DEVELOPMENT FOR LOW ENERGY X-RAY DETECTION**  
V.D. Saveliev, L. Feng, C.R. Tull, S. Barkan, M. Takahashi, E.V. Damron, *SII NanoTechnology USA, Inc., Northridge, CA*
- F-6 USING NON-MONOCROMATIC X-RAYS IS MORE EFFECTIVE FOR HIGHLY SENSITIVE ANALYSIS IN THE TXRF ANALYSIS**  
S. Kunimura, J. Kawai, *Kyoto University, Kyoto, Japan*
- F-11 WASTE REDUCTION AND PROCESS IMPROVEMENTS IN THE ANALYSIS OF PLUTONIUM BY X-RAY FLUORESCENCE**  
C.G. Worley, C.B. Soderberg, L.E. Townsend, *Los Alamos National Laboratory, Los Alamos, NM*
- F-12 SULPHUR ANALYSIS IN BIOFUELS, X-RAY FLUORESCENCE APPROACH IN EUROPE**  
C.-P. Lienemann, L. Burte, E. Roche, *IFP-LYON, Solaize, France*  
V. Uricanu, H. Smit, *PANalytical, Almelo, The Netherlands*
- F-14 X-RAY FLUORESCENCE ANALYSIS OF METAL CONTAMINATION IN THE NORTH RIVER DRAINAGE BASIN**  
M. Jennings, *Innov-X Systems, Inc., Woburn, MA*  
D. Allen, J. Pyburn, *Salem State College, Salem, MA*

# TUESDAY, 28 JULY—XRF POSTER SESSION

## SUMMIT BALLROOM, 5:30 P.M. – 7:30 P.M.

- F-16 NEXT GENERATION X-RAY SPECTROMETRY INSTRUMENTS FOR SPACE EXPLORATION**  
W.T. Elam, M.P. McCarthy, *University of Washington, Seattle, WA*  
W.C. Kelliher, I.A. Carlberg, *NASA Langley Research Center, Hampton, VA*  
R.L. Shuler, *NASA Johnson Space Center, Houston, TX*  
S.M. McLennan, *SUNY, Stony Brook, NY*
- F-19 RADIATION GATHERING POWER INCREASING OF PLANAR X-RAY WAVEGUIDE-RESONATORS**  
E.V. Egorov, V.K. Egorov, *IMT RAS, Chernogolovka, Russia*  
M.S. Afanas'ev, *MIREA, Moscow, Russia*
- F-20 FABRICATION OF HIGH-PRECISION CURVED CRYSTAL SUBSTRATE FOR JOHANSSON-TYPE DOUBLY CURVED CRYSTAL BY NUMERICALLY CONTROLLED LOCAL WET ETCHING**  
K. Yamamura, K. Ueda, M. Nagano, N. Zettsu, *Osaka University, Suita, Osaka, Japan*  
S. Maeo, S. Shimada, *Osaka Electro-Communication University, Neyagawa, Osaka, Japan*  
T. Utaka, K. Taniguchi, *Institute of X-ray Technologies Co. Ltd, Osaka, Osaka, Japan*
- F-23 WHAT ARE THE USEFUL QUALITY METRICS FOR MINIATURE X-RAY TUBES?**  
S. Cornaby, N. Palmer, K. Decker, C. Jensen, *Moxtek, Inc., Orem, UT*  
D.J. Caruso, M. Dinsmore, *TWX, LLC., Concord, MA*
- F-30 APPLICATIONS OF COMPTON PEAK CORRECTION METHOD IN QUANTITATIVE XRF ANALYSIS**  
Y. Shi, L. Brehm, S. Yusuf, *The Dow Chemical Company, Midland, MI*
- F-35 CALCULATION METHODS OF X-RAY SPECTRA: A COMPARATIVE STUDY**  
B. Chyba, M. Mantler, H. Ebel, R. Svagera, *Technische Universität Wien, Wien, Austria*
- F-38 COMPARATIVE MEASUREMENTS OF SECONDARY STANDARDS FOR PAINT LAYERS ON PLASTIC AND GLASS SUBSTRATES**  
A.G. Vershinin, M. Cusack, D. Li, W. Gibson, *X-ray Optical Systems, Inc., East Greenbush, NY*  
K. McIntosh, *State University of New York at Albany, Albany, NY*  
P. J. Parsons, *State University of New York at Albany, Albany, NY and New York State Department of Health, Albany, NY*  
B. Altkorn, *Intertek Group plc, Oak Brook, IL*  
N. Chan, *Intertek Group plc, Shenzhen, China*
- F-40 STRUCTURE ANALYSIS OF SODIUM CATION IN AQUEOUS SOLUTION BY SOFT X-RAY ABSORPTION SPECTRA AND THEIR MOLECULAR ORBITAL CALCULATION**  
T. Kurisaki, H. Wakita, *Fukuoka University, Fukuoka, Japan*
- F-41 NANOMETER THIN FILMS AS XRF REFERENCE SAMPLES**  
M. Krämer, R. Dietsch, D. Weißbach, *AXO Dresden GmbH, Heidenau, Germany*  
G. Falkenberg, *HASYLAB at DESY, Hamburg, Germany*  
R. Simon, *FZ Karlsruhe, Eggenstein, Germany*  
U. Fittschen, *University of Hamburg, Hamburg, Germany*
- F-55 TRACE ANALYSIS ON SOLAR CELL MATERIALS WITH BENCH-TOP TXRF**  
Y. Shimizu, T. Yamada, H. Kobayashi, H. Kohno, *Rigaku Corporation, Osaka, Japan*
- F-62 PORTABLE GPS-XRF FOR REAL-TIME, ON-SITE METAL MAPPING**  
K. Russell, *Innov-X Systems, Inc. Woburn, MA*
- F-63 PORTABLE XRF FOR COST-EFFECTIVE PROJECT MANAGEMENT OF ENVIRONMENTAL SITE INVESTIGATIONS**  
K. Russell, *Innov-X Systems, Inc., Woburn, MA*
- F-65 L<sub>3</sub>M- RADIATIVE RESONANT RAMAN SCATTERING MEASUREMENTS IN <sup>59</sup>PR**  
N. Singh, V. Sharma, S. Kumar, *Panjab University, Chandigarh, India*
- F-70 SPECTROMETER FOR GRAZING INCIDENCE XRF: CHARACTERIZATION OF AS IMPLANTS AND HF LAYERS**  
D. Ingerle, N. Zoeger, P. Wobrauschek, C. Strelti, *Atominsttitut, Vienna University of Technology, Vienna, Austria*  
F. Meirer, *Atominsttitut, Vienna University of Technology, Vienna, Austria and Stanford Synchrotron Radiation Lightsource, Menlo Park, CA*  
G. Pepponi, *Fondazione Bruno Kessler, Povo, Italy*

# TUESDAY, 28 JULY—XRF POSTER SESSION

## SUMMIT BALLROOM, 5:30 P.M. – 7:30 P.M.

- F-71 SI WAFER ANALYSIS OF LIGHT ELEMENTS BY TXRF – CHAMBER ADAPTION TO FIT 6" AND 8" WAFERS**  
S. Sasamori, N. Zöger, C. Strel, P. Kregsamer, S. Smolek, P. Wobrauschek, *Atominstytut, Vienna University of Technology, Vienna, Austria*  
F. Meirer, *Atominstytut, Vienna University of Technology, Vienna, Austria and Stanford Synchrotron Radiation Lightsource, Menlo Park, CA*  
C. Mantler, *Siltronic AG, Freiberg, Germany*
- F-72 MICRO X-RAY FLUORESCENCE SPECTROMETER WITH LOW POWER TUBE FOR LIGHT ELEMENT ANALYSIS**  
S. Smolek, C. Strel, N. Zöger, P. Wobrauschek, *Atominstytut, Vienna University of Technology, Vienna, Austria*  
F. Meirer, *Atominstytut, Vienna University of Technology, Vienna, Austria and Stanford Synchrotron Radiation Lightsource, Menlo Park, CA*
- F-73 PART II (PORTABLE ART ANALYZER) – DEVELOPMENT OF A PORTABLE MICRO X-RAY FLUORESCENCE SPECTROMETER ADAPTED FOR THE SPECIAL NEEDS FOR THE STUDY OF ARTWORKS IN THE KUNSTHISTORISCHES MUSEUM, VIENNA**  
G. Buzanich, C. Strel, P. Wobrauschek, *Atominstytut, Vienna University of Technology, Vienna, Austria*  
A. Markowicz, D. Wegrzynek, *International Atomic Energy Agency, Seibersdorf, Austria*  
E. Chinea-Cano, *International Atomic Energy Agency, Seibersdorf, Austria*  
M. Griesser, K. Uhlir, *Kunsthistorisches Museum, Vienna, Austria*
- F-74 IMPROVEMENT OF CALIBRATION PROCESSES IN TXRF OF WAFER SURFACE ANALYSIS: INVESTIGATION OF SATURATION EFFECTS IN TXRF BY COMPARING PICODROPLETS AND MICRODROPLETS**  
C. Horntrich, S. Sasamori, C. Strel, *Atominstytut, Vienna University of Technology, Wien, Austria*  
F. Meirer, *Atominstytut, Vienna University of Technology, Wien, Austria and Stanford Synchrotron Radiation Lightsource, Menlo Park, CA*  
U.E.A. Fittschen, *Los Alamos National Laboratory, Los Alamos, NM and University of Hamburg, Hamburg, Germany*  
G. Pepponi, *FBK-irst, Povo, Italy*  
G. Havrilla, *Los Alamos National Laboratory, Los Alamos, NM*

# PLENARY SESSION: GETTING THE LEAD OUT—AGAIN!

WEDNESDAY A.M. SUMMIT BALLROOM – 4<sup>TH</sup> FLOOR

Chairs: R. Van Grieken, *University of Antwerp, Antwerp, Belgium*  
G.J. Havrilla, *Los Alamos National Laboratory, Los Alamos, NM*  
W.T. Elam, *Ametek/EDAX Research Group and Univ. of Washington APL, Seattle, WA*

8:30 CHAIRMAN OF THE DENVER X-RAY CONFERENCE, WELCOMING REMARKS  
Robert L. Snyder, *Georgia Institute of Technology, Atlanta, GA*

## PRESENTATION OF AWARDS

**2009 Barrett Award** presented to **Robert Von Dreele**, Argonne National Laboratory, Argonne, IL  
Presented by **Cev Noyan**, Columbia University, New York, NY

**2009 Jenkins Award** presented to **Tim Fawcett**, International Centre for Diffraction Data, Newtown Square, PA  
Presented by **Victor Buhrke**, Consultant, Portola Valley, CA

**2009 Jerome B. Cohen Student Award** (winner announced at the plenary session)  
Presented by **Cev Noyan**, Columbia University, New York, NY

8:50 PLENARY SESSION REMARKS BY THE CHAIRS

The following are the invited papers to be presented during the plenary session:

9:00 F-80 HUMAN EXPOSURE TO LEAD AND NEW EVIDENCE OF ADVERSE HEALTH EFFECTS: IMPLICATIONS FOR ANALYTICAL MEASUREMENTS  
P.J. Parsons, *New York State Dept of Health, Albany, NY*

9:45 F-67 GETTING THE LEAD OUT—AGAIN: LEAD IN FDA REGULATED PRODUCTS  
R. Jacobs, *FDA, San Francisco District Laboratory, Alameda, CA*  
P.T. Palmer, *San Francisco State University, San Francisco, CA*

10:30 BREAK

11:00 F-79 THE TRUTHS AND MYTHS OF TOYS' TESTING FOR LEAD—XRF TO THE RESCUE  
S. Piorek, *Thermo NITON Analyzers LLC, Billerica, MA*

11:45 SYSTEM OVERLOAD!!!—RESTORING ORDER WITH XRF  
M. Fry, *Intertek Ageus Solutions, Ontario, Canada*

# XRD & XRF: NEW DEVELOPMENTS IN XRD & XRF INSTRUMENTATION

WEDNESDAY P.M. PIKES PEAK 1 & 2

Chairs: V.E. Buhrke, *Consultant, Portola Valley, CA*  
T. Fawcett, *International Centre for Diffraction Data, Newtown Square, PA*

1:00 C-4 MICROFOCUS LIQUID-METAL-JET X-RAY TUBES AND APPLICATIONS  
O. Hemberg, M. Otendal, T. Tuohimaa, *Excillum AB, Stockholm, Sweden*

1:15 C-6 PERFORMANCE OF BEAM SHAPING X-RAY OPTICS IN COMBINATION WITH LABORATORY X-RAY SOURCES  
R. Dietsch, Th. Holz, M. Kraemer, D. Weissbach, *AXO Dresden GmbH, Heidenau, Germany*  
St. Braun, *Fraunhofer IWS, Dresden, Germany*

1:30 D-8 THE VERSATILITY OF THE INCOATEC MICROFOCUS SOURCE IN X-RAY DIFFRACTOMETRY  
B. Hasse, J. Wiesmann, J. Graf, C. Michaelsen, *Incoatec GmbH, Geesthacht, Germany*

1:45 D-16 A MAJOR UPDATE OF X'PERT HIGHSORE PLUS  
T. Degen, J. van den Oever, *PANalytical B.V., Almelo, The Netherlands*

2:00 F-21 MINIATURE X-RAY SOURCES AND THE EFFECTS OF SPOT SIZE ON SYSTEM PERFORMANCE  
D.J. Caruso, M. Dinsmore, *TWX, LLC., Concord, MA*  
S. Cornaby, S. Liddiard, M. Heber, C. Jensen, *Moxtek, Inc., Orem, UT*

2:15 F-22 BRIDGING THE PRICE/PERFORMANCE GAP BETWEEN SILICON DRIFT AND SILICON PIN DIODE DETECTORS  
D. Hullinger, K. Decker, J. Smith, C. Carter, *Moxtek, Inc., Orem, UT*

- 2:30 D-25 OBSERVATIONS OF SHOCKED METALLIC SURFACES WITH SINGLE-PULSE X-RAY DIFFRACTION**  
D.V. Morgan, M. Grover, D. Macy, M. Madlener, G. Stevens, W.D. Turley, L. Veaser, *National Security Technologies, LLC, Los Alamos, NM*
- 2:45 F-26 NEW DETECTOR ARCHITECTURES WITH SILICON DRIFT DETECTORS FOR XRF APPLICATIONS**  
A. Simsek, O. Jaritschin, A. Liebel, P. Lechner, G. Lutz, *PNDetector GmbH, Munich, Germany*  
A. Bechteler, A. Niculae, H. Soltau, R. Eckhardt, K. Hermenau, *PNSensor GmbH, Munich, Germany*  
F. Schopper, L. Strüder, *MPI Halbleiterlabor, Munich, Germany*
- 3:00 BREAK**
- 3:30 F-28 CAPABILITIES OF 50 MICRON MONO-CAPILLARY**  
Y. Yokota, S. Mamedov, A. Whitley, *HORIBA Jobin Yvon Inc., Edison, NJ*  
S. Ohzawa, *HORIBA, Ltd., Kyoto, Japan*
- 3:45 D-32 NEW INSTRUMENTATION FOR X-RAY POWDER DIFFRACTION**  
H.R. Ress, *Bruker AXS Inc., Madison, WI*  
A. Kern, K. Knorr, R. Schmidt, *Bruker AXS GmbH, Karlsruhe, Germany*
- 4:00 D-34 DEVELOPMENT OF X-RAY INSPECTION TECHNOLOGY FOR TURBINE BLADES**  
H. Huang, A. Verchinine, M. Cusack, W. Gibson, *X-ray Optical Systems, Inc., East Greenbush, NY*
- 4:15 F-34 COMPACT MICRO-CT/MICRO-XRF SYSTEM FOR NON-DESTRUCTIVE 3D ANALYSIS OF INTERNAL CHEMICAL COMPOSITION**  
A. Sasov, X. Liu, P. Bruyndonckx, J. Van Geert, *SkyScan, Kontich, Belgium*
- 4:30 F-37 ASPHERIC MULTILAYER OPTICS FOR MICRO XRF APPLICATIONS**  
S. Rodrigues, P. Panine, P. Høghøj, B. Lantz, *Xenocs SA, Sassenage, France*
- 4:45 F-49 NEW PRODUCT FOR BORATE FUSION**  
L. Bérubé, *Corporation Scientifique Claisse, Quebec, Canada*
- 5:00 F-50 THE NEW BRUKER S8 LION MULTICHANNEL XRF**  
A. Seyfarth, A. Buman, *Bruker AXS Inc., Madison, WI*  
K. Behrens, *Bruker AXS GmbH, Karlsruhe, Germany*
- 5:15 F-52 THE NEW ORBIS MICRO-EDXRF ELEMENTAL ANALYZER**  
J. Hardy, B. Scruggs, *EDAX/a unit of Ametek, Inc., Mahwah, NJ*
- 5:30 F-69 MICRO-X-RAY FLUORESCENCE WITH THE M4 TORNADO**  
M. Haschke, W. Malzer, U. Rossek, U. Waldschläger, H. Wagenknecht, *Bruker AXS Microanalysis GmbH, Berlin, Germany*

## **XRD & XRF: HIGH ENERGY X-RAY OPTICS AND HIGH THROUGHPUT ANALYSIS**

### **WEDNESDAY P.M. GOLD CAMP**

*Chairs: S.D. Shastri, APS - Argonne National Laboratory, Argonne, IL*  
*I. Takeuchi, University of Maryland, College Park, MD*

- 1:10 D-95 INVITED—HIGH-THROUGHPUT XRD AND ANALYSIS FOR RAPID DETERMINATION OF PHASE DISTRIBUTION ACROSS COMBINATORIAL LIBRARIES**  
I. Takeuchi, *University of Maryland, College Park, MD*
- 1:40 D-74 INVITED—STRUCTURAL INVESTIGATION OF COMBINATORIAL GE-CO-MN EPITAXIAL THIN-FILM SYSTEM USING SYNCHROTRON X-RAY MICROPROBE**  
Y.S. Chu, *APS/Argonne National Laboratory, Argonne, IL and Brookhaven National Laboratory, Upton, NY*  
B.A. Collins, L. He, F. Tsui, *University of North Carolina, Chapel Hill, NC*
- 2:10 D-9 INVITED—TIME-RESOLVED STRUCTURAL STUDIES: STRATEGIES FOR RAPIDLY IMAGING AND ANALYZING LARGE DATA SETS**  
M.J. Kramer, *Ames Laboratory/Iowa State University, Ames IA*
- 2:40 C-16 HIGH ENERGY XRD/XRF FOR HIGH-THROUGHPUT ANALYSIS OF COMPOSITION SPREAD THIN FILMS**  
J.M. Gregoire, R.B. van Dover, *Cornell University, Ithaca, NY*
- 3:00 BREAK**
- 3:20 D-45 HIGH-ENERGY X-RAY OPTICS AT THE ADVANCED PHOTON SOURCE**  
S.D. Shastri, *APS/Argonne National Laboratory, Argonne, IL*

- 3:40 C-14 *INVITED*—HIGH ENERGY X-RAY OPTICS FOR SYNCHROTRON RADIATION  
B. Lengeler, RWTH Aachen University, Aachen, Germany
- 4:10 C-12 *INVITED*—OPTICS FOR NUCLEAR RESONANT SCATTERING AT HIGH ENERGIES  
T.S. Toellner, APS/Argonne National Laboratory, Argonne, IL
- 4:40 D-88 *INVITED*—SAGITTAL FOCUSING OF HIGH-ENERGY X-RAYS BY SAGITTALLY BENT LAUE CRYSTALS: DESIGN AND PERFORMANCE AT NSLS X7B BEAMLINE  
Z. Zhong, D.M. Connor, A. Lenhard, H. Zhong, NSLS/Brookhaven National Laboratory, Upton, NY  
J. Hanson, Chemistry Dept/Brookhaven National Laboratory, Upton, NY
- 5:10 D-101 HIGH-ENERGY MICRO-FOCUSING BY MERIDIONALLY-BENT LAUE CRYSTALS  
U. Lienert, Argonne National Laboratory, Argonne, IL

## XRD: LINE PROFILE ANALYSIS

### WEDNESDAY P.M. CENTENNIAL

Chair: D. Balzar, University of Denver, Denver, CO

- 1:30 C-1 *INVITED*—SINGLE-GRAIN MICROSTRUCTURE FROM POLYCRYSTALLINE SPECIMENS  
T. Ungár, Eötvös University, Budapest, Hungary
- 2:00 D-17 *INVITED*—ANALYSIS OF HIERARCHICAL DISLOCATION ARRANGEMENTS AT DIFFERENT LENGTH SCALES  
R.I. Barabash, Oak Ridge National Laboratory, Oak Ridge, TN and The University of Tennessee, Knoxville, TN  
G.E. Ice, Oak Ridge National Laboratory, Oak Ridge, TN
- 2:30 D-14 UTILIZING THE DEBYE EQUATION IN NANOMATERIAL LINE PROFILE ANALYSIS  
K. Beyerlein, Georgia Institute of Technology, Atlanta, GA and University of Trento, Trento, Italy  
R.L. Snyder, Georgia Institute of Technology, Atlanta, GA  
P. Scardi, University of Trento, Trento, Italy
- 2:50 BREAK
- 3:20 D-6 *INVITED*—DIFFERENT ASPECTS OF MICROSTRAIN BROADENING  
A. Leineweber, E.J. Mittemeijer, Max Planck Institute for Metals Research, Stuttgart, Germany
- 3:50 D-52 THERMAL STABILITY AND CRYSTALLIZATION OF AMORPHOUS AND NANOCRYSTALLINE TiO<sub>2</sub> THIN FILMS AND POWDERS STUDIED BY XRD  
R. Kužel, Z. Matěj, L. Nichtová, Charles University in Prague, Prague, Czech Republic
- 4:10 D-71 HIGH-TEMPERATURE X-RAY DIFFRACTION OF ASTM A743 GRADE CA6NM CAST MARTENSITIC STAINLESS STEEL  
J. Rojas, A. Toro, National University of Colombia, Antioquia, Columbia
- 4:30 D-91 CHARACTERIZING X-RAY MIRRORS IN RECIPROCAL SPACE: RESULTS FROM THE NIST X-RAY OPTICS EVALUATION DOUBLE-CRYSTAL DIFFRACTOMETER  
D.L. Gil, D. Windover, A. Henins, J. Cline, National Institute of Standards and Technology, Gaithersburg, MD

## XRF: ENVIRONMENTAL APPLICATIONS

### WEDNESDAY P.M. PIKES PEAK 3 & 4

Chair: R. Van Grieken, University of Antwerp, Antwerp, Belgium

- 1:30 F-4 *INVITED*—SIMULTANEOUS X-RAY AND ION BEAM TECHNIQUES FOR THE CHARACTERISATION AND FINGERPRINTING OF FINE PARTICLE AIR POLLUTION AND ITS SOURCES IN THE ASIAN REGION  
D.D. Cohen, Australian Nuclear Science & Technology Organisation, Menai, Australia
- 2:00 F-29 *INVITED*—DISTRIBUTION AND CHARACTERISTICS OF TOXIC ELEMENTS IN SOIL AND MINERALS BASED ON X-RAY ANALYTICAL TECHNIQUES  
L. Luo, B. Chu, X. Wang, Y. Liu, National Research Center of Geoanalysis, Beijing, China
- 2:30 F-77 *INVITED*—TXRF ANALYSIS OF ULTRAFINE ATMOSPHERIC PARTICLES FROM MOBILE SOURCES  
J. Osán, S. Török, KFKI Atomic Energy Research Institute, Budapest, Hungary
- 3:00 F-25 THE TOXIC EFFECTS OF CALIFORNIA'S GOLD RUSH LEGACY: PROFILING A MAJOR NORTHERN CALIFORNIA WATERSHED FOR ARSENIC USING HAND-HELD XRF  
P.E. Baker, P.T. Palmer, R. Johnson, San Francisco State University, San Francisco, CA
- 3:20 BREAK

- 3:40 F-68 **QUANTITATIVE ANALYSIS OF LOW LEVEL TOXIC ELEMENTS IN SURFACE LAYER USING HDXRF**  
Z.W. Chen, D. Li, K. Xin, A. Verchinine, W.M. Gibson, D. Gibson, *X-ray Optical Systems, East Greenbush, NY*
- 4:00 F-13 **EVALUATION OF SAMPLING METHODS FOR MEASUREMENT OF ELEMENTS DEFINED BY THE ROHS/WEEE DIRECTIVES**  
J.E. Martin, L.L. Anderson-Smith, *Spex SamplePrep, Metuchen, NJ*
- 4:20 D-66 **SEM-EDS ANALYSIS OF FORENSIC/ENVIRONMENTAL SAMPLES BY UTILIZING TRANSITION-EDGE SENSOR MICROCALORIMETER DETECTOR**  
I. Nakai, Y. Ono, R. Suzuki, Q. Li, *Tokyo University of Science, Tokyo, Japan*  
K. Tanaka, S. Nakayama, H. Takahashi, *SII NanoTechnology Inc., Shizuoka, Japan*
- 4:40 F-47 **TXRF AND MICRO-XRF ANALYSIS OF PLASTIC TOYS AND SOILS**  
K. Tsuji, M. Kawamata, *Osaka City University, Osaka, Japan*  
K. Nakano, *Osaka City University, Osaka, Japan and JST Innovation Plaza, Osaka, Japan*
- 5:00 F-2 **SOIL HEAVY METAL POLLUTION ALONG SUBIN RIVER IN KUMASI, GHANA: USING X-RAY FLUORESCENCE (XRF) ANALYSIS**  
J. Wiafe-Akenten, K. Kdom, *Kwame Nkrumah University of Science and Technology, Kumasi, Ghana*  
D. Boamah, *Geological Survey Department, Accra, Ghana*

## **XRD & XRF: BIOENABLED MATERIALS**

### **THURSDAY A.M. PIKES PEAK 1 & 2**

*Chairs: R.L. Snyder, Georgia Institute of Technology, Atlanta, GA*  
*V. Petkov, Central Michigan University, Mt. Pleasant, MI*

- 8:30 D-43 **INVITED—CHEMICAL TAILORING OF BIOLOGICALLY-ASSEMBLED NANOSTRUCTURED 3-D MICROASSEMBLIES: THE POTENTIAL FOR GENETICALLY ENGINEERED MATERIALS AND MICRODEVICES (GEMs)**  
K.H. Sandhage, Z. Bao, S. Shian, S. Davis, M.R. Weatherspoon, Y. Fang, Y. Cai, G. Wang, S.C. Jones, S.R. Marder, *Georgia Institute of Technology, Atlanta, GA*
- 9:00 D-4 **INVITED—NATURE-MADE NANOCRYSTALS: PDF STUDY ON BACTERIAL AND FUNGAL MnO**  
V. Petkov, *Central Michigan University, Mt. Pleasant, MI*
- 9:30 D-10 **INVITED—NANOTECHNOLOGY AND THE STRUCTURE OF EDIBLE FATS**  
A.G. Marangoni, N. Acevedo, M.F. Peyronel, *University of Guelph, Guelph, ON, Canada*
- 10:00 **BREAK**
- 10:30 D-72 **INVITED—LATTICE DISTORTIONS, STRAIN AND STRESS IN BIOLOGICALLY FORMED CRYSTALS**  
B. Pokroy, *Harvard University, Cambridge, MA*
- 11:00 D-92 **INVITED—NANOSTRUCTURING OF BIOMATERIALS—A PATHWAY TO OPTIMIZING BONE GRAFTING**  
Th. Gerber, *Rostock University, Rostock, Germany*
- 11:30 C-15 **INVITED—BIOMINERAL ULTRASTRUCTURES REVEALED BY SYNCHROTRON SPECTROMICROSCOPY**  
P. Gilbert, R. Metzler, C.E. Killian, S.N. Coppersmith, Y. Ma, Y. Politi, S. Weiner, L. Addadi, *University of Wisconsin, Madison, WI*
- 12:00 C-10 **SYNCHROTRON BASED SPECTRO-MICROSCOPY FOR CELL BIOLOGY**  
S. Bohic, *INSERM U-836, Grenoble, France and X-ray Imaging Group ESRF, Grenoble, France*  
R. Tucoulou, G. Martinez-Criado, S. Labouré, M. Salomé, P. Cloetens, *X-ray Imaging Group ESRF, Grenoble, France*

## **XRD & XRF: X-RAY IMAGING I**

### **THURSDAY A.M. GOLD CAMP**

*Chairs: H. Goebel, Siemens AG, Corp. Tech. and LabXA, Munich, Germany*  
*F. de Carlo, APS - Argonne National Laboratory, Argonne, IL*

- 8:30 C-3 **INVITED—LATEST DEVELOPMENTS IN MICRO AND NANO TOMOGRAPHY AT PETRA III**  
A. Haibel, F. Beckmann, T. Dose, J. Herzen, S. Utcke, A. Schreyer, *GKSS Research Centre, Geesthacht, Germany*
- 9:00 D-44 **TOWARDS SUB-100 NM X-RAY MICROSCOPY FOR TOMOGRAPHIC APPLICATIONS**  
P. Bruyndonckx, A. Sasov, B. Pauwels, *SkyScan, Kontich, Belgium*
- 9:20 C-11 **NANOTOMOGRAPHY AT THE ARGONNE HARD X-RAY NANOPROBE BEAMLINE**  
R.P. Winarski, M.V. Holt, V. Rose, F. DeCarlo, J.M. Maser, *Argonne National Laboratory, Argonne, IL*

- 9:40 D-12 **MULTI-LENGTH-SCALE X-RAY COMPUTED TOMOGRAPHY WITH SUB-50 NM RESOLUTION FOR NON-DESTRUCTIVE 3D VISUALIZATION AND ANALYSIS**  
J. Gelb, A. Tkachuk, M. Feser, H. Chang, S. Chen, T. Fong, L. Hunter, I. Goldberger, S.H. Lau, W. Yun, *Xradia, Inc., Concord, CA*
- 10:00 **BREAK**
- 10:30 C-8 **INVITED—GRATING BASED X-RAY PHASE CONTRAST IMAGING USING LABORATORY X-RAY SOURCES**  
M. Schuster, *Siemens AG Corporate Technology, Munich, Germany*
- 11:00 D-39 **MONTE-CARLO SIMULATIONS FOR EVALUATION OF DIFFERENT INFLUENCES ON PROJECTIONS IN COMPUTED TOMOGRAPHY**  
B. Chyba, M. Mantler, *Technische Universität Wien, Wien, Austria*  
M. Reiter, *Fachhochschule Wels, Austria*
- 11:20 F-59 **X-RAY IMAGING ON BIOLOGICAL MODEL ORGANISMS USING MICRO AND NANO X-RAY FLUORESCENCE**  
B. De Samber, K. De Schamphelaere, B. Masschaele, S. Vanblaere, F. Vanhaecke, L. Van Hoorebeke, C. Janssen, L. Vincze, *Ghent University, Ghent, Germany*  
S. Bohic, G. Martinez-Criado, R. Tuculou, P. Cloetens, *European Synchrotron Radiation Facility, Grenoble, France*  
G. Falkenberg, *Hamburger Synchrotronstrahlungslabor at DESY, Hamburg, Germany*
- 11:40 F-17 **DEVELOPMENT OF A 3D ELEMENTAL REFERENCE MATERIAL FOR CONFOCAL MICRO X-RAY FLUORESCENCE**  
G.J. Havrilla, U.E. Fittschen, *Los Alamos National Laboratory, Los Alamos, NM*

## **XRD: MATERIALS DEFORMATION STUDIES USING HIGH-ENERGY X-RAY DIFFRACTION I**

### **THURSDAY A.M. CENTENNIAL**

*Chairs: J. Almer, APS - Argonne National Laboratory, Argonne, IL*  
*D. Haeflner, APS - Argonne National Laboratory, Argonne, IL*

- 9:00 C-2 **INVITED—SINGLE GRAIN DEFORMATION EXPERIMENTS AT THE APS 1-ID BEAMLINE**  
U. Lienert, *Argonne National Laboratory, Argonne, IL*
- 9:30 D-7 **INVITED—DEFORMATION MECHANISMS IN AMORPHOUS AND NANOCRYSTALLINE METALS MEASURED BY IN SITU X-RAY DIFFRACTION**  
R.T. Ott, *Ames Laboratory (USDOE), Ames, IA*
- 10:00 D-48 **INVESTIGATION OF SURFACE STRUCTURES BY POWDER DIFFRACTION: A DIFFERENTIAL PAIR DISTRIBUTION FUNCTION (PDF) STUDY INTO ARSENATE SORPTION ON FERRIHYDRITE**  
R. Harrington, D. Middlemiss, J. Parise, *State University of New York at Stony Brook, Stony Brook, NY*  
D. Hausner, D. Strongin, *Temple University, Philadelphia, PA*  
P. Chupas, K. Chapman, *APS/Argonne National Laboratory, IL*
- 10:20 **BREAK**
- 10:50 D-80 **IN-SITU OBSERVATION OF DYNAMIC RECRYSTALLIZATION AND RELATED PHENOMENA IN THE BULK OF ZIRCONIUM ALLOY**  
K.-D. Liss, U. Garbe, H. Li, *Australian Nuclear Science & Technology Organisation, NSW, Australia*  
K. Yan, *Australian Nuclear Science & Technology Organisation, NSW, Australia and University of Wollongong, NSW, Australia*  
T. Schambro, *University of Wollongong, NSW, Australia*  
J. Almer, *APS/Argonne National Laboratory, Argonne, IL*
- 11:10 D-75 **MEASURING AND MODELING DEFORMATION PARTITIONING IN TITANIUM ALLOYS**  
M.P. Miller, C. Efstathiou, P.R. Dawson, D.E. Boyce, *Cornell University, Ithaca, NY*  
U. Lienert, *APS/Argonne National Lab., Argonne, IL*

## **XRF: TRACE ANALYSIS AND TXRF**

### **THURSDAY A.M. PIKES PEAK 3 & 4**

*Chair: M.A. Zaitz, IBM, Hopewell Junction, NY*

- 8:30 F-39 **INVITED—TXRF-XANES AND GI-XAS: X-RAY ABSORPTION SPECTROSCOPY IN TRACE ANALYSIS**  
F. Meirer, *Atominstytut/Vienna University of Technology, Vienna, Austria and Stanford Synchrotron Radiation Lightsource, Menlo Park, CA*  
C. Streli, P. Wobrauschek, *Atominstytut/Vienna University of Technology, Vienna, Austria*  
G. Pepponi, D. Giubertoni, *Fondazione Bruno Kessler, Povo (Trento), Italy*  
P. Pianetta, *Stanford Synchrotron Radiation Lightsource, Menlo Park, CA*

- 9:00 F-60 PORTABLE XRF FOR FDA FIELD INVESTIGATORS: A REVIEW OF SOME RECENT INVESTIGATIONS AND APPLICATIONS**  
P.E. Baker, R.R. Jacobs, *U.S. FDA/San Francisco District Laboratory, Alameda, CA*  
P.T. Palmer, *San Francisco State University, San Francisco, CA*
- 9:20 F-24 SOLVING FORENSICS MYSTERIES WITH THE XRF MICROSCOPE**  
S. Mamedov, F. Adar, E. Lee, A. Whitley, J. Goldey, G. Setola, Y. Yokota, *HORIBA Jobin Yvon Inc., Edison, NJ*  
D. Ward, *xk, Inc., Clackamas, OR*
- 9:40 F-27 WATER ANALYSIS USING A PROTOTYPE MONOCHROMATIC MICROFOCUS GRAZING INCIDENCE X-RAY FLUORESCENCE DEVICE COMPARING PICOLITER AND NANOLITER DEPOSITION AS SAMPLE PREPARATION APPROACH**  
U.E.A. Fittschen, G.J. Havrilla, *Los Alamos National Laboratory, Los Alamos, NM*
- 10:00 F-75 TRACE ELEMENT ANALYSIS OF MICRO-XRF BY PINPOINT CONCENTRATION METHOD**  
A. Bando, H. Ono, K. Tsujita, H. Uchihara, *HORIBA, Ltd., Kyoto, Japan*
- 10:20 BREAK**
- 10:40 F-5 PORTABLE TOTAL REFLECTION X-RAY FLUORESCENCE SPECTROMETER: COMPARISON BETWEEN NON-MONOCHROMATIC AND MONOCHROMATIC X-RAY SOURCES**  
J. Kawai, Y. Ueda, Y. Morikawa, N. Sasaki, S. Kunimura, T. Yamamoto, *Kyoto University, Kyoto, Japan*
- 11:00 F-33 FILTERED TWO COLOR X-RAY MICROBEAMS FOR ENHANCEMENT IN SENSITIVITY OF LIGHT ELEMENTS**  
S. Hayakawa, K. Izawa, T. Hirokawa, *Hiroshima University, Hiroshima, Japan*
- 11:20 F-48 TXRF ANALYSIS OF MULTIPLE DROPLET RESIDUES**  
K. Nakano, *Osaka City University, Osaka, Japan and JST-Innovation Plaza, Osaka, Japan*  
M. Kawamata, K. Tsuji, *Osaka City University, Osaka, Japan*
- 11:40 F-51 TRACE ELEMENT ANALYSIS OF DIETARY SUPPLEMENTS AND NUTRIENTS BY TXRF**  
H. Stosnach, A. Buman, *Bruker AXS Microanalysis GmbH, Berlin, Germany*  
M. Rider, A. Seyfarth, *Bruker AXS Inc., Madison, WI*  
J. Neil-Kababick, *Flora Research, Grants Pass, OR*
- 12:00 F-56 DEPTH ANALYSIS WITH BENCH-TOP TXRF INSTRUMENT**  
T. Yamada, Y. Shimizu, H. Kobayashi, H. Kohno, *Rigaku Corporation, Osaka, Japan*

## **XRD & XRF: X-RAY IMAGING II**

### **THURSDAY P.M. GOLD CAMP**

*Chairs: H. Goebel, Siemens AG, Corp. Tech. and LabXA, Munich, Germany*  
*F. de Carlo, APS - Argonne National Laboratory, Argonne, IL*

- 2:00 C-13 INVITED— OVERVIEW OF X-RAY IMAGING AT NSLS-II**  
Q. Shen, *NSLS II/Brookhaven National Laboratory, Upton, NY*
- 2:30 C-7 SYNCHROTRON-BASED RADIOSCOPY WITH SPATIO-TEMPORAL MICRO-RESOLUTION USING HARD X-RAYS**  
A. Rack, *European Synchrotron Radiation Facility, Grenoble, France and Forschungszentrum Karlsruhe GmbH – ANKA, Karlsruhe, Germany*  
F. García-Moreno, J. Banhart, *Helmholtz Centre Berlin, Berlin, Germany*  
O. Betz, *Universität Tübingen, Germany*  
S. Zabler, *Technische Universität Berlin, Germany*  
T. Baumbach, *Forschungszentrum Karlsruhe GmbH – ANKA, Karlsruhe, Germany*
- 2:50 C-9 UTILIZATION OF SYNCHROTRON RADIATION IN NEUROCHEMICAL RESEARCH**  
M. Szczerbowska-Boruchowska, J. Chwiej, S. Wójcik, Z. Stęgowski, M. Lankosz, *AGH-University of Science and Technology, Kraków, Poland*  
D. Adamek, A. Krygowska-Wajs, B. Tomik, Z. Setkowicz, *Jagiellonian University, Kraków, Poland*  
K. Rickers, D. Zajac, *HASYLAB-DESY, Hamburg, Germany*  
J. Susini, *European Synchrotron Radiation Facility, Grenoble, France*
- 3:10 BREAK**
- 3:40 F-8 X-RAYS IN 3D**  
B.M. Patterson, G.J. Havrilla, K.A. Defriend Obrey, J.M. Campbell, *Los Alamos National Laboratory, Los Alamos, NM*

- 4:00 F-61 POLYCAPILLARY BASED CONFOCAL DETECTION SCHEMES FOR XRF MICRO AND NANO-SPECTROSCOPY**  
 B. Vekemans, B. De Samber, T. Schoonjans, G. Silversmit, L. Vincze, R. Evens, K. De Schamphelaere,  
 C.R. Janssen, B. Masschaele, L. Van Hoorebeeke, *Ghent University, Ghent, Belgium*  
 S. Schmitz, F. Brenker, *JWG University, Frankfurt, Germany*  
 R. Tucoulou, P. Cloetens, M. Burghammer, J. Susini, C. Riekkel, *European Synchrotron Radiation Facility,  
 Grenoble, France*
- 4:20 D-49 RECENT DEVELOPMENT OF HARD X-RAY TRANSMISSION MICROSCOPY AT THE 32ID BEAMLINE AT THE APS**  
 J.M. Yi, W.-K. Lee, F. De Carlo, *APS/ Argonne National Laboratory, Argonne, IL*  
 Y.S. Chu, *APS/Argonne National Laboratory, Argonne, IL and NSLS II/Brookhaven National Laboratory, Upton, NY*  
 W. Yun, *Xradia Inc., Concord, CA*  
 Y. Hwu, *Academia Sinica, Taipei, Taiwan*
- 4:40 F-36 PROTRUSIONS IN A PAINTING OF MAX BECKMANN EXAMINED WITH CONFOCAL XRF**  
 R. Simon, *Forschungszentrum Karlsruhe/ISS, Karlsruhe, Germany*  
 W. Faubel, *Forschungszentrum Karlsruhe/IFG, Karlsruhe, Germany*  
 H. Becker, *Kunsthalle Mannheim, Mannheim, Germany*  
 W. Schmidt, *Landesmuseum für Technik und Arbeit Mannheim, Germany*

## **XRD: STRESS ANALYSIS**

### **THURSDAY P.M. PIKES PEAK 3 & 4**

*Chairs: C. Goldsmith, IBM, Hopewell Junction, NY*  
*T. Watkins, Oak Ridge National Laboratory, Oak Ridge, TN*

- 1:30 D-11 INVITED— NANOSCALE STRAIN CHARACTERIZATION IN MICROELECTRONIC MATERIALS USING X-RAY DIFFRACTION**  
 C.E. Murray, *IBM T.J. Watson Research Center, Yorktown Heights, NY*
- 2:00 D-21 DIFFRACTION GEOMETRY AND THE DETERMINATION OF STRAIN FREE LATTICE PARAMETERS FOR RESIDUAL STRESS MEASUREMENTS**  
 J.M. Shackleton, P.J. Withers, M. Preuss, *University of Manchester, Manchester, United Kingdom*
- 2:20 D-40 GROWTH STRESSES AND TEXTURE OF NANO-STRUCTURED OXIDE LAYERS GROWING ON IRON ALUMINIDES**  
 P. Brito, H. Pinto, *Max-Planck-Institut für Eisenforschung, Germany*  
 M. Klaus, *Technische Universität Berlin, Berlin, Germany*  
 Ch. Genzel, A. Pyzalla, *Helmholtz-Zentrum Berlin für Materialien und Energie, Berlin, Germany*
- 2:40 D-68 APPLICATION OF DIFFERENT METHODS FOR RESIDUAL STRESS MEASUREMENT OF A CASTING COMPONENT OF AN EN-AC 44000 ALLOY**  
 S.M. Sadrossadat, S. Johansson, R.L. Peng, *Linköping University, Linköping, Sweden*
- 3:00 BREAK**
- 3:30 D-58 INVITED— HIGH-PERFORMANCE XRPD WITH A NEW CHROMIUM MICRO FOCUS SOURCE**  
 H.E. Goebel, U. Hermeking-Goebel, *LabXA, Munich, Germany*  
 B. Hasse, *Incoatec GmbH, Geesthacht, Germany*  
 M. Honal, *Siemens AG, Munich, Germany*
- 4:00 D-23 BENDING ZNO NANOWIRES WITH ATOMIC BOMBARDMENT**  
 J.I. Hong, Y. Shen, Z.L. Wang, R.L. Snyder, *Georgia Institute of Technology, Atlanta, GA*
- 4:20 D-79 FROM SINGLE GRAINS TO TEXTURE**  
 K.-D. Liss, U. Garbe, *The Bragg Institute/Australian Nuclear Science & Technology Organisation, NSW, Australia*  
 K. Yan, *The Bragg Institute/Australian Nuclear Science & Technology Organisation, NSW, Australia and  
 University of Wollongong, NSW, Australia*  
 R. Dippenaar, *University of Wollongong, NSW, Australia*  
 J. Daniels, *European Synchrotron Radiation Facility, Grenoble, France*
- 4:40 D-61 DISTRIBUTION OF RESIDUAL MICROSTRESSES IN ROLLED TI-NI SINGLE CRYSTALS**  
 Y. Perlovich, M. Isaenkova, V. Fesenko, *Moscow Engineering Physics Institute, Moscow, Russia*
- 5:00 D-53 PRINCIPLES OF MICROSTRESS EQUILIBRIUM IN TEXTURED METAL MATERIALS**  
 Y. Perlovich, M. Isaenkova, V. Fesenko, *Moscow Engineering Physics Institute (State University), Moscow, Russia*

# XRD: MATERIALS DEFORMATION STUDIES USING HIGH-ENERGY X-RAY DIFFRACTION II

## THURSDAY P.M. CENTENNIAL

Chairs: J. Almer, APS - Argonne National Laboratory, Argonne, IL  
D. Haefner, APS - Argonne National Laboratory, Argonne, IL

- 1:30 D-73 INVITED— IMPACT OF ZIRCONIUM HYDRIDE PRECIPITATES ON FRACTURE OF A ZIRCONIUM ALLOY**  
M. Kerr, M.R. Daymond, R.A. Holt, *Queen's University, Kingston, ON, Canada*  
S. Stafford, *Kinectrics Inc., Toronto, ON, Canada*  
J.D. Almer, *APS/Argonne National Laboratory, Argonne, IL*  
K. Colas, *The Pennsylvania State University, University Park, PA*
- 2:00 D-96 INVITED— SYNCHROTRON X-RAY STUDIES OF DEFORMATION OF HEXAGONAL METALS**  
D.W. Brown, W.R. Blumenthal, B. Clausen, T.A. Sisneros, C.N. Tomé, S.C. Vogel, *Los Alamos National Laboratory, Los Alamos, NM*  
S.R. Agnew, *University of Virginia, Charlottesville, VA*
- 2:30 D-84 OBSERVATIONS OF RETAINED AUSTENITE STABILITY AND STRESS PARTITIONING IN TRANSFORMATION-INDUCED PLASTICITY STEEL DURING IN SITU TENSILE TESTING USING SYNCHROTRON X-RAY DIFFRACTION**  
K.-D. Liss, U. Garbe, *Australian Nuclear Science and Technology Organisation, Lucas Heights, NSW, Australia*  
L.C. Zhang, T. Schambro, E.V. Pereloma, *University of Wollongong, Wollongong, NSW, Australia*  
J. Almer, *APS/Argonne National Laboratory, Argonne, IL*
- 2:50 BREAK**
- 3:20 D-85 3D MEASUREMENTS OF POLYCRYSTAL RESPONSE TO ANNEALING**  
C.M. Hefferan, S.F. Li, R.M. Suter, *Carnegie Mellon University, Pittsburgh, PA*  
U. Lienert, *APS/Argonne National Laboratory, Argonne, IL*
- 3:40 D-98 MICROSTRUCTURE EVOLUTION IN COLD ROLLED NANOCRYSTALLINE Ni-Fe ALLOYS DETERMINED BY SYNCHROTRON X-RAY DIFFRACTION**  
L. Li, G.J. Fan, H. Choo, P.K. Liaw, *The University of Tennessee, Knoxville, TN*  
T. Ungar, G. Tichy, J. Lendvai, *Eötvös University, Budapest, Hungary*  
Y.D. Wang, N. Jia, Y.L. Yang, *Northeastern University, Shenyang, P.R. China*  
Y. Ren, *Argonne National Laboratory, Argonne, IL*
- 4:00 D-100 BIOMECHANICS STUDIES AT APS USING HIGH-ENERGY X-RAYS**  
J. Almer, *APS/Argonne National Laboratory, Argonne, IL*  
S. Stock, *Northwestern University, Chicago, IL*

# XRF: QUANTITATIVE ANALYSIS

## THURSDAY P.M. PIKES PEAK 1 & 2

Chair: W.T. Elam, *Ametek/EDAX Research Group and Univ. of Washington APL, Seattle, WA*

- 1:30 F-57 INVITED— CONSIDERATIONS ON CALIBRATION AND PREDICTION IN QUANTITATIVE X-RAY FLUORESCENCE ANALYSIS**  
P. Van Espen, *University of Antwerp, Antwerp, Belgium*
- 2:00 F-66 COMPARISON OF VARIOUS XRF QUANTITATIVE METHODS FOR DETERMINATION OF TOXIC ELEMENTS IN SUPPLEMENTS**  
P.T. Palmer, J. Hamdani, *San Francisco State University, San Francisco, CA*  
R. Jacobs, *FDA, San Francisco District Laboratory, Alameda, CA*
- 2:20 F-44 ASTM D 6247 DETERMINATION ELEMENTAL CONTENT OF POLYOLEFINS BY X-RAY FLUORESCENCE SPECTROMETRY— VALIDATION OF THE REVISED STANDARD**  
J.R. Sieber, *National Institute of Standards and Technology, Gaithersburg, MD*
- 2:40 F-42 TRADITIONAL EMPIRICAL WDXRF CALIBRATION COMPARED WITH USING THE CALIBRATION TOOL MULTISCAT®: APPLICATIONS SHOWN ON FOR METAL BASES**  
S. Bäckman, I. Bernhardsson, *XRF Analytical AB, Örsundsbro, Sweden*
- 3:00 F-9 COMBINED MULTIPLE-EXCITATION FP METHOD FOR MICRO-XRF ANALYSIS OF DIFFICULT SAMPLES**  
W.T. Elam, B. Scruggs, J. Nicolosi, *EDAX, a unit of Ametek Inc., Mahwah, NJ*
- 3:20 BREAK**

- 3:40 F-45 **SRM 2855 ADDITIVE ELEMENTS IN POLYETHYLENE WDXRF ANALYSES AND CERTIFICATION APPROACH**  
J.R. Sieber, *National Institute of Standards and Technology, Gaithersburg, MD*
- 4:00 F-43 **OXIDIC CALIBRATION USING WDXRF-MULTISCAT®: APPLICATIONS SHOWN FOR MINERALS, ORE CONCENTRATES AND SLAGS**  
S. Bäckman, I. Bernhardsson, *XRF Analytical AB, Sweden*
- 4:20 F-31 **CLASSES OF MATERIALS (COM)—A TOOL FOR ANALYSIS AND MATERIAL IDENTIFICATION**  
J. Kessler, V. Roßiger, *Helmut Fischer GmbH+Co.KG, Sindelfingen, Germany*  
M. Haller, *Fischer Technology, Windsor, CT*
- 4:40 F-54 **STARDUST COMETARY MATTER ANALYZED BY SYNCHROTRON NANO-XRF: NEW RESULTS AND DEVELOPMENTS**  
T. Schoonjans, B. Vekemans, G. Silversmit, L. Vincze, *Ghent University, Gent, Belgium*  
S. Schmitz, F. Brenker, *Institut für Geowissenschaften, Frankfurt, Germany*
- 5:00 F-64 **L SHELL X-RAY FLUORESCENCE CROSS-SECTIONS FOR ELEMENTS WITH  $33 \leq Z \leq 50$**   
V. Sharma, N. Singh, S. Kumar, *Panjab University, Chandigarh, India*

## **XRD: HIGH RESOLUTION XRD**

### **FRIDAY A.M. PIKES PEAK 1 & 2**

*Chair: B. Tanner, University of Durham, Durham, United Kingdom*

- 8:30 D-15 **INVITED—LABORATORY-BASED CHARACTERIZATION OF HETEROEPITAXIAL STRUCTURES: ADVANCED EXPERIMENTS NOT NEEDING SYNCHROTRON RADIATION**  
P. Zaumseil, *IHP, Frankfurt, Germany*
- 9:00 D-67 **HIGH-RESOLUTION X-RAY DIFFRACTION DATA ANALYSIS FROM THE PARTLY RELAXED SEMICONDUCTOR STRUCTURES**  
A. Ulyanenkov, *Bruker AXS GmbH, Karlsruhe, Germany*  
A. Benediktovitch, I. Feranchuk, *Belarussian State University, Minsk, Belarus*  
B. He, H. Ress, *Bruker AXS, Inc., Madison, WI*
- 9:20 D-59 **SPATIALLY RESOLVED DETERMINATION OF STRESS IN THIN FILMS AND DEVICES FROM CURVATURE MEASUREMENTS**  
N. Herres, *Interstate University of Applied Sciences, Buchs, Switzerland*
- 9:40 D-57 **NIST SRM 2000—A HIGH RESOLUTION X-RAY DIFFRACTION STANDARD REFERENCE MATERIAL**  
D. Windover, D.L. Gil, A. Henins, J.P. Cline, *National Institute of Standards & Technology, Gaithersburg, MD*
- 10:00 **BREAK**
- 10:20 D-89 **INVITED—SIX WAYS OF DETERMINING FILM THICKNESS FROM HIGH RESOLUTION XRD DATA**  
A.J. Ying, I.C. Noyan, *Columbia University, New York, NY*  
C.E. Murray, *IBM T. J. Watson Research Laboratory, Yorktown Heights, NY*
- 10:50 D-28 **HIGH-RESOLUTION X-RAY SCATTERING METHODS FOR THE STRUCTURAL CHARACTERIZATION OF EPITAXIAL NITRIDE STRUCTURES**  
J.F. Voitok, *PANalytical B.V., Almelo, Netherlands*
- 11:10 D-87 **GRAZING INCIDENCE IN-PLANE X-RAY DIFFRACTION FROM EPITAXIAL Fe/MGO/Fe AND Fe/AU/MGO/Fe TUNNEL JUNCTIONS**  
D.S. Eastwood, M. Abes, B.K. Tanner, *University of Durham, Durham, United Kingdom*  
T.P.A. Hase, *University of Warwick, Coventry, United Kingdom*  
M. Ali, B.J. Hickey, *University of Leeds, Leeds, United Kingdom*

## **XRD: RIETVELD ANALYSIS**

### **FRIDAY A.M. CENTENNIAL**

*Chairs: S.T. Misture, NYS College of Ceramics at Alfred University, Alfred, NY*  
*R.L. Snyder, Georgia Institute of Technology, Atlanta, GA*

- 8:30 D-86 **INVITED—STRUCTURE SOLUTION AND REFINEMENT APPROACHES FOR OXIDE CERAMICS**  
S.T. Misture, *Alfred University, Alfred, NY*
- 9:00 D-54 **CHARGE-FLIPPING STRUCTURE SOLUTION FROM SINGLE CRYSTAL AND POWDER DIFFRACTION DATA**  
A. Kern, A.A. Coelho, *Bruker AXS, Karlsruhe, Germany*

- 9:20 D-65 **POWDER DIFFRACTION FOR CHARACTERIZATION AND DEVELOPMENT OF OXIDE FUELS**  
H.M. Volz, C.R. Stanek, E.P. Luther, J.T. Dunwoody, R.M. Dickerson, K.J. McClellan, S.C. Vogel,  
D.A. Weldon, D.R. Coughlin, D.D. Byler, *Los Alamos National Laboratory, Los Alamos, NM*
- 9:40 D-26 **QUANTITATIVE ANALYSIS OF PHASES WITH PARTIAL OR NO KNOWN CRYSTAL STRUCTURE**  
H. Cordes, *Bruker AXS, Inc., Madison, WI*  
A. Kern, *Bruker AXS GmbH, Karlsruhe, Germany*
- 10:00 **BREAK**
- 10:20 D-47 **INVITED— STUDYING OXIDES, ALLOYS, GAS HYDRATES, BOROHYDRIDES, AND METAL-ORGANIC-FRAMEWORK STRUCTURES USING THE RIETVELD METHOD**  
C.J. Rawn, *Oak Ridge National Laboratory/University of Tennessee, Oak Ridge, TN*
- 10:50 D-90 **ADDRESSING THE AMORPHOUS CONTENT ISSUE IN QUANTITATIVE PHASE ANALYSIS: THE CERTIFICATION OF NIST SRM 676A**  
J.P. Cline, J.J. Filliben, *National Institute of Standards & Technology, Gaithersburg, MD*  
R.B. Von Dreele, *Argonne National Laboratory, Argonne, IL*  
R. Winburn, *Minot State University, Minot, ND*  
P.W. Stephens, *State University of New York at Stony Brook, Stony Brook, NY*
- 11:10 D-18 **CRYSTAL STRUCTURES OF THE MINERALS STICHTITE AND WOODALLITE USING RIETVELD REFINEMENT**  
P.S. Whitfield, *National Research Council Canada, Ottawa ON, Canada*  
S.A. Wilson, S.J. Mills, G.M. Dipple, M. Raudsepp, *University of British Columbia, Vancouver BC, Canada*

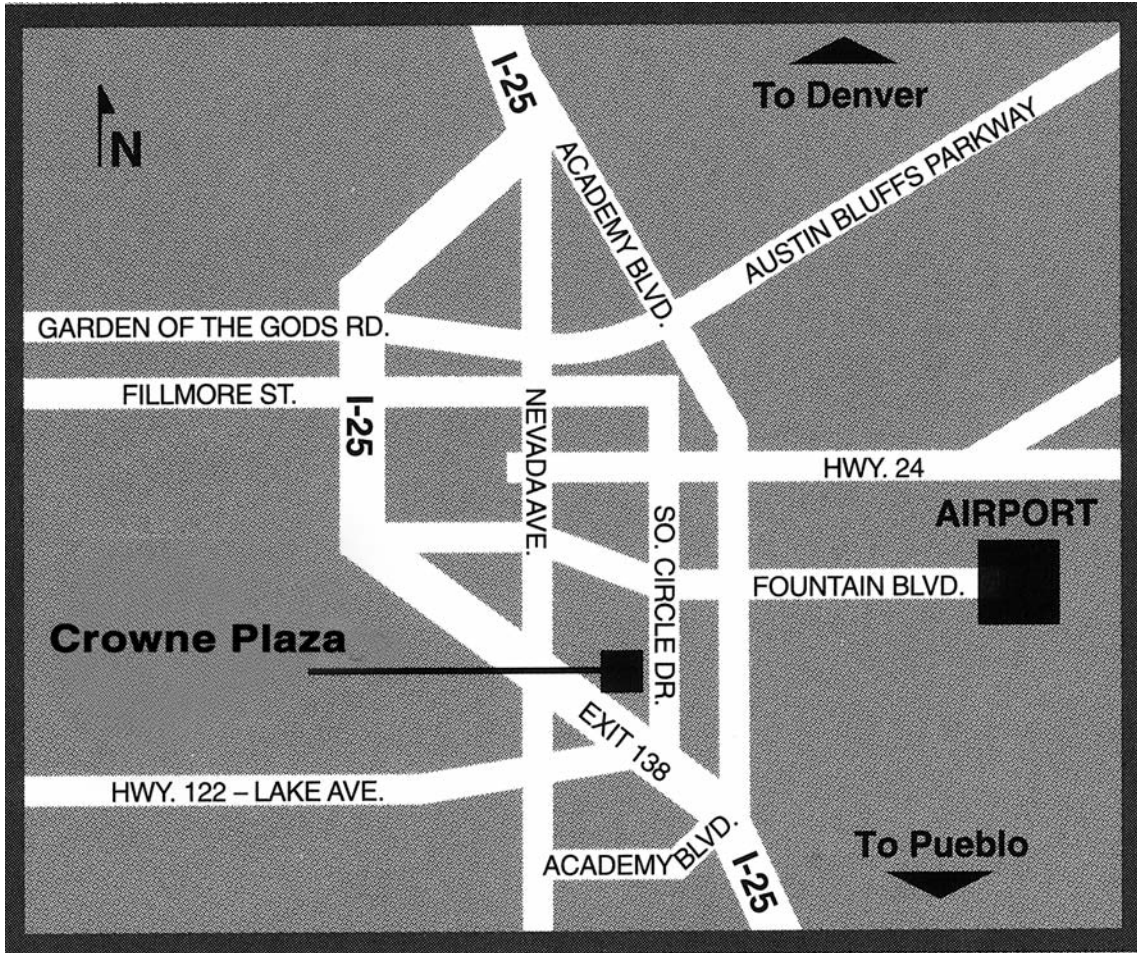
## **XRF: FUSION AND INDUSTRIAL APPLICATIONS OF XRF**

### **FRIDAY A.M. PIKES PEAK 3 & 4**

Chair: J.A. Anzelmo, *Anzelmo & Associates, Inc., Madison, WI*

- 8:30 F-78 **INVITED— APPLICATIONS OF X-RAY FLUORESCENCE (XRF) IN THE GLASS INDUSTRY**  
L.M. Schurter, *Owens Corning, Science and Technology Center, Granville, OH*
- 9:00 F-58 **INVITED— ESTABLISHING PERFORMANCE CRITERIA FOR AN ASTM XRF STANDARD TEST METHOD FOR PORTLAND CEMENTS**  
P. Stutzman, *National Institute of Standards and Technology, Gaithersburg, MD*
- 9:30 F-53 **GLOBAL CEMENT AND RAW MATERIALS FUSION/XRF ANALYTICAL SOLUTION**  
M. Bouchard, S. Rivard, J. Anzelmo, *Corporation Scientifique Claisse, Quebec, Canada*  
A. Seyfarth, L. Arias, *Bruker-AXS, Madison, WI*  
K. Behrens, *Bruker-AXS GmbH, Karlsruhe, Germany*
- 9:50 F-18 **ANALYSIS OF IRON ORE USING X-RAY FLUORESCENCE SPECTROMETER**  
P. Sharma, N.C. Lakshman, B.K. Choudhary, N.K. Nanda, *NMDC Limited, Hyderabad, India*
- 10:10 **BREAK**
- 10:30 F-10 **MOLYBDENUM CONCENTRATES - BORATE FUSION WITH NIOBIUM INTERNAL STANDARD**  
J.R. Sieber, *National Institute of Standards & Technology, Gaithersburg, MD*
- 10:50 F-15 **OPTIMIZING XRF CALIBRATION PROTOCOLS FOR ELEMENTAL QUANTIFICATION OF MINERAL SOLIDS FROM ATHABASCA OIL SANDS**  
B. Patarachao, P.H.J. Mercier, J. Kung, J.R. Woods, L.S. Kotlyar, T. McCracken, *National Research Council Canada, Ottawa ON, Canada*  
B.D. Sparks, *V. Bede Technical Associates, Ottawa ON, Canada*
- 11:10 C-5 **ABSOLUTE THICKNESS DETERMINATION OF SmCo FILMS ON SILICON SUBSTRATES UTILIZING X-RAY DIFFRACTION AND THEIR COMPOSITION MEASUREMENTS BY EXRF**  
I. Vander, F.J. Cadieu, *Queens College CUNY, Flushing, NY*

# DIRECTIONS & AREA MAP



## From West

Take Highway 24 East to I-25 South. On I-25 South, take Exit 138 (Circle Drive). Turn right at light. The hotel is on the left side of I-25 and clearly visible from the highway.

## From North

Take Interstate 25 South to Exit 138 (Circle Drive). The hotel is on east side of I-25 and clearly visible from the highway.

## From South

Take I-25 North to Exit 138 (Circle Drive). Turn right at the light. The hotel is on the right side of I-25 and clearly visible from the highway.

## From Colorado Springs Municipal Airport

Take Drennan for 2 miles. Turn right onto Hancock for 4 miles. Turn right onto South Circle Drive for 1 mile. The hotel is on the right side of South Circle Drive.

# LOCAL ATTRACTIONS

## **Garden of the Gods - 719-385-5940**

West on Circle Blvd., right (North) on I-25 to exit Highway 24 West. Right (North) on 31<sup>st</sup> St., left (West) on Colorado Ave., right (North) on Beckers Lane to the Trading Post. **Approx. 15 min.**

## **Seven Falls - 719-632-0765**

West on Circle Blvd., which turns into Lake Avenue. Continue on Lake until veering to the right at The Broadmoor. Left on Mesa Road. Follow signs to Seven Falls entrance. **Approx 15 min.**

## **Air Force Academy - 719-333-7731**

West on Circle Blvd., right (North) on I-25 to exit #156B left (West). Follow signs. **Approx. 25 min.**

## **US Olympic Training Center - 719-578-4618**

West on Circle Blvd., right (North) on I-25 to exit Highway 24 East. Take next exit, Union Blvd., go left (North) to Boulder Street & turn left. Entrance is on the right. **Approx. 10 min.**

## **Pikes Peak - (Gray Line Tours - 719-633-1181)**

Use directions (below) to North Pole. \$10.00 each or \$35.00/car. Under age 16 - free. **Approx. 30 min.**

## **Peterson AFB - 719-556-7321**

West on Circle Blvd., right (North) on I-25 to exit Highway 24 East, which turns into Fountain Blvd. Take to Powers Blvd., left (North) to Platte Ave. exit (Hwy 24). right (East) to Peterson Road, right (South) to gate. **Approx. 20 min.**

## **Cave of the Winds - 719-685-5444**

West on Circle Blvd., right (North) on I-25 to exit Highway 24 West. Pass over the Town of Manitou & take Cave of the Winds exit on right. **Approx. 20 min.**

## **Royal Gorge Bridge - 719-275-7507 or 888-333-5597**

West on Circle Blvd., which turns into Lake Avenue. Left (South) on Highway 115 (Nevada Avenue), right (West) on Highway 50. Continue through Canon City. Follow signs. **Approx. 1 hour.**

## **North Pole and Santa's Workshop - 719-684-9432**

West on Circle Blvd., right (North) on I-25 to exit Highway 24 West. Continue on Hwy 24 into foothills. Watch for Pikes Peak Tollway sign - exit on left (just after overhead bridge). Follow signs. **Approx. 30 min.**



## **Cheyenne Mountain Zoo - 719-633-9925**

West on Circle Blvd., which turns into Lake Avenue. Continue on Lake until veering to the right at The Broadmoor. Take left onto Cresta Road. Follow signs. **Approx. 12 min.**

## **Cripple Creek - 877-858-GOLD (4653)**

West on Circle Blvd., right (North) on I-25 to exit Highway 24 West. Continue on Hwy 24 to Town of Divide, left at Cripple Creek/Victor sign. **Approx 1 1/2 hour.**

## **Cog Railway - 719-685-5401**

West on Circle Blvd., right (North) on I-25 to Highway 24 West. Take Manitou exit, go West through the Town of Manitou then left on Ruxton Ave. to Cog Depot. **Approx. 20 min.**

## **Manitou Cliff Dwellings - 719-685-5242 or 800-354-9971**

West on Circle Blvd., right (North) on I-25 to Highway 24 West exit. Pass over the Town of Manitou & take Cliff Dwellings exit on right. **Approx. 20 min.**

## **Pro Rodeo Hall of Fame and American Cowboy Museum - 719-528-4764**

West on Circle Blvd., right (North) on I-25 to exit #147 (Rockrimmon). Left on Pro Rodeo Dr. **Approx. 15 min.**

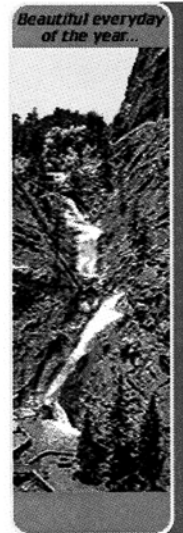
## **Flying W Ranch - 800-232-FLYW (3599)**

West on Circle Blvd., right (North) on I-25 to exit #146 (Garden of the Gods Road) West until it ends. Right (North) on 30<sup>th</sup> Street, next left (only way) on Flying W Ranch Road, left on Chuckwagon to parking lot. **Approx. 25 min.**

## **Miramont Castle - 719-685-1011**

West on Circle Blvd., right (North) on I-25 to Highway 24 West. Take Manitou exit, go West through the Town of Manitou then left on Ruxton Ave. Visible from Ruxton - turn right on Capitol. **Approx. 20 min.**

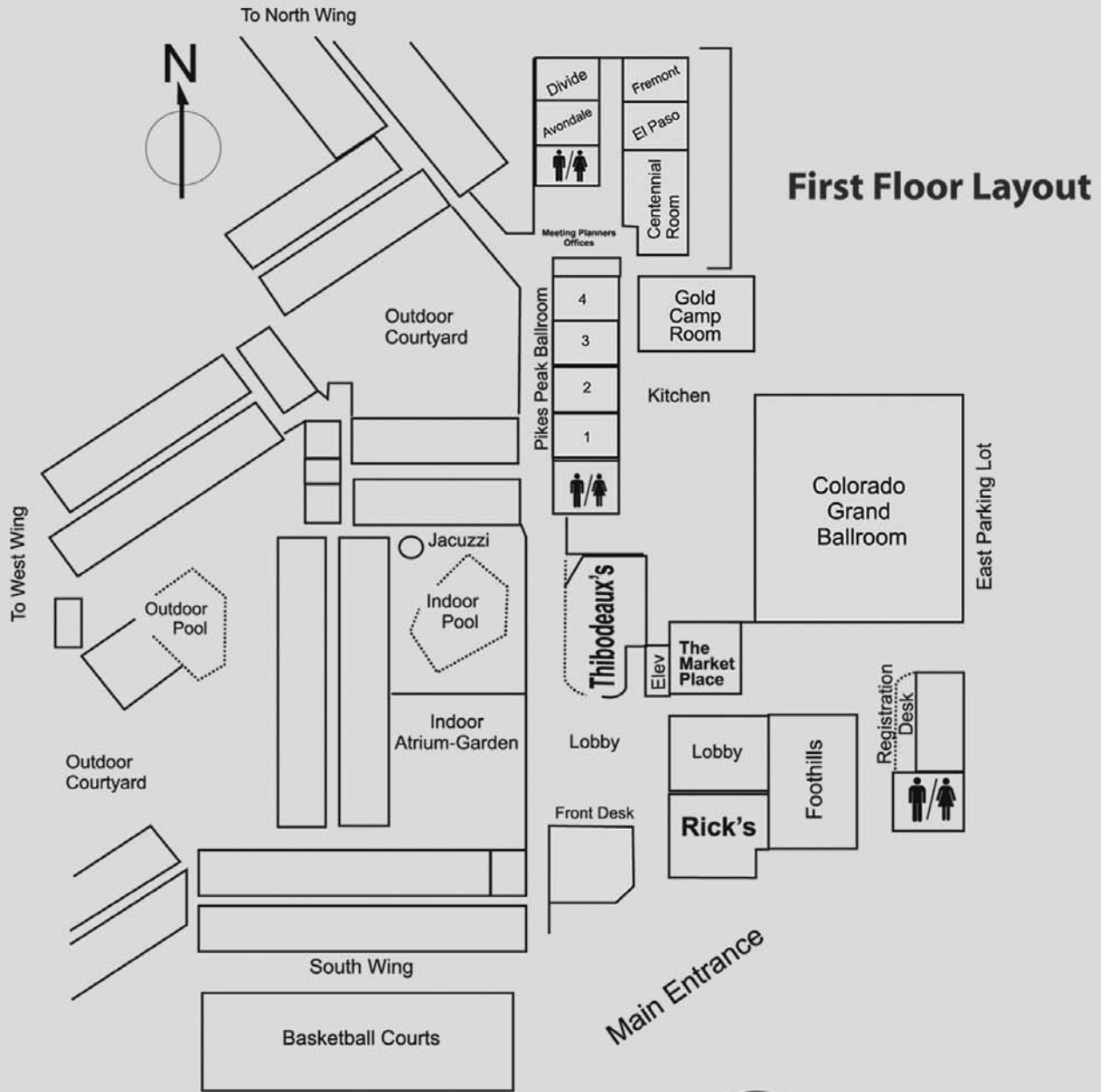
**Shopping** - Manitou Springs, Old Colorado City, Downtown Colorado Springs, Citadel Mall and Chapel Hills Mall.



# HOTEL LAYOUT



## First Floor Hotel layout



  
**CROWNE PLAZA**<sup>®</sup>  
 COLORADO SPRINGS  
 THE PLACE TO MEET.

# PROGRAM-AT-A-GLANCE

2009 Denver X-ray Conference Program-at-a-Glance ♦ Monday, 27 July – Friday, 31 July				
Monday Workshops 9:00 a.m. – 12:00 Noon				
	Meeting Room			
	Pikes Peak 1 & 2	Pikes Peak 3 & 4	Gold Camp	Centennial
XRD & XRF	Advances in Detector Technology (Blanton)			
XRD		Quantitative Rietveld Analysis I (Snyder/Misture)		
XRF			Basic XRF (Elam)	Specimen Preparation I (Anzelmo)
Monday Workshops 2:00 p.m. – 5:00 p.m.				
XRD		Quantitative Rietveld Analysis II (Snyder/Misture)	Pair Distribution Function (Petkov)	
XRF	Benefits & Limitations of Handheld XRF (Russell)			Specimen Preparation II (Anzelmo)
Monday Evening XRD Poster Session & Reception 5:30 – 7:30 p.m. Sponsored by PANalytical; Summit Ballroom, 4 <sup>th</sup> floor. (Watkins/Balzar)				
Tuesday Workshops 9:00 a.m. – 12:00 Noon				
XRD & XRF				X-ray Sources/Optics Development (Khounsary/Havrilla)
XRD	Phase Identification (Fawcett)			
XRF		Trace Analysis (Zaitz)	Quantitative Analysis I (Mantler)	
Tuesday Workshops 2:00 p.m. – 5:00 p.m.				
XRD	Line Profile Analysis (Noyan/Balzar)	Structure Solution (Misture)		
XRF			Quantitative Analysis II (Mantler)	Strategies for Advanced Materials Analysis (Hayakawa)
Tuesday Evening XRF Poster Session & Reception 5:30 – 7:30 p.m. Sponsored by Chemplex; Summit Ballroom, 4 <sup>th</sup> floor. (Nakai/Cohen)				
Wednesday Plenary Session 8:30 a.m. – 12:30 p.m. Summit Ballroom, 4 <sup>th</sup> floor; (Van Grieken, Havrilla, Elam)				
Wednesday Afternoon Sessions				
XRD & XRF	1:00 – 5:45 New Developments in Instrumentation (Buhrke)		1:10 – 5:30 High Energy X-ray Optics and High Throughput Analysis (Shastri/Takeuchi)	
XRD				1:30 – 4:50 Line Profile Analysis (Balzar)
XRF		1:30 – 5:20 Environmental Applications (Van Grieken)		
Wednesday Evening Vendor-Sponsored Reception 5:00 – 7:00 p.m.; Colorado Grand Ballroom (exhibit hall)				
Thursday Morning Sessions				
XRD & XRF	8:30 – 12:20 Bioenabled Materials (Snyder/Petkov)		8:30 – 12:00 X-ray Imaging I (Goebel/de Carlo)	
XRD				9:00 – 11:30 Materials Deformation Studies I (Almer/Haefner)
XRF		8:30 – 12:20 Trace Analysis and TXRF (Zaitz)		
Thursday Afternoon Sessions				
XRD & XRF			2:00 – 5:00 X-ray Imaging II (Goebel/de Carlo)	
XRD		1:30 – 5:20 Stress Analysis (Goldsmith)		1:30 – 4:20 Materials Deformation Studies II (Almer/Haefner)
XRF	1:30 – 5:20 Quantitative Analysis (Elam)			
Thursday Evening Panel Discussion "Everything you ever wanted to know about X-rays but were Afraid to Ask" 5:30 – 6:30 p.m.; Foothills				
Friday Morning Sessions				
XRD	8:30 – 11:30 High Resolution XRD (Tanner)			8:30 – 11:30 Rietveld Analysis (Misture/Snyder)
XRF		8:30 – 11:30 Fusion and Industrial Applications of XRF (Anzelmo)		

# 2009 Denver X-ray Conference Registration Form

Crowne Plaza, Colorado Springs, Colorado U.S.A.  
27-31 July 2009

PLEASE TYPE to avoid errors on name tags and attendee list. On-line registration is also available at: [www.dxcicdd.com](http://www.dxcicdd.com)

First Name \_\_\_\_\_ Last Name \_\_\_\_\_

Organization \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Country \_\_\_\_\_ Phone \_\_\_\_\_

E-mail \_\_\_\_\_

Check this box if you DO NOT want your name included on the attendee list.

Registration Fees: Discount fees will only apply if registration form and payment are received by 1 July 2009.

	<u>by July 1</u>	<u>after July 1</u>
<input type="checkbox"/> Full week: exhibits, workshops, sessions <sup>†</sup>	\$500	\$575
<input type="checkbox"/> Monday & Tuesday: exhibits, workshops <sup>†</sup>	\$450	\$525
<input type="checkbox"/> Wed., Thurs. & Friday: exhibits, sessions <sup>†</sup>	\$450	\$525
<input type="checkbox"/> Session organizer, invited speaker & workshop instructor <sup>†</sup>	\$100	\$100
<input type="checkbox"/> Student (I.D. required)	\$125	\$200
<input type="checkbox"/> Unemployed	\$125	\$200
<input type="checkbox"/> 65 and older	\$125	\$200

<sup>†</sup>Includes a copy of Volume 53 of *Advances in X-ray Analysis* on CD-ROM.

## Payment:

Total Amount Due: \_\_\_\_\_

Check enclosed for \_\_\_\_\_ made payable to **ICDD/DXC**

Charge my:     Visa     Mastercard     American Express

Card number \_\_\_\_\_ Expiration date \_\_\_\_\_

Card holder's name (please print) \_\_\_\_\_

Signature \_\_\_\_\_

## Please take the time to answer the following questions:

1) Are you primarily interested in XRD or XRF topics?

XRD     XRF     Equally interested in both

2) What is your highest education level?

HS     BS     MS     Ph.D

3) Job Title \_\_\_\_\_

## To Submit Registration Form:

**Mail:** ICDD, Denise Flaherty, 12 Campus Boulevard, Newtown Square, PA 19073-3273 U.S.A.

**Fax:** 610.325.9823

**Cancellation Policy:** Cancellations must be submitted in writing to Denise Flaherty. A full refund will be issued, less a \$50 processing fee, if the cancellation is received at least two weeks before the conference (Monday, 13 July 2009). No refunds will be issued for cancellations received after 13 July 2009.

Please contact Denise Flaherty for any additional information, e-mail [flaherty@icdd.com](mailto:flaherty@icdd.com) or phone 610.325.9814.