

67th Annual Denver X-ray Conference Report

Denise Zulli

ICDD, Newtown Square, PA, USA

LOCATION, DATES, AND ATTENDANCE

The Denver X-ray Conference (DXC) returned to its home state of Colorado in 2018. The conference was held at the Westin Hotel in Westminster, Colorado, a short drive north of Denver, during the week of August 6–10. It was the 67th consecutive year that the Annual Conference on Applications of X-ray Analysis took place, hosting close to 300 registered attendees and 150 exhibit personnel. X-ray and materials scientists gathered at the conference to discuss various techniques, applications, software, instruments, and products for X-ray diffraction (XRD) and X-ray fluorescence (XRF) analysis. The combination of attendees and exhibitors brought the total attendance to over 400 X-ray scientists, with 30% from outside the United States. See [photo 1](#) for a visual overview of this much anticipated annual event.

WORKSHOPS

The technical program began with 17 half-day tutorial workshops held on Monday and Tuesday of the conference week. Topics were categorized as XRD, XRF, or Special Topic, and focused on both beginner and advanced levels. Forty-five specialists were invited to participate as workshop instructors, and many provided handouts that were posted on a private website for attendees only.

PLENARY SESSION

The Plenary Session, *Minerals and Gems*, was held on Wednesday morning, as the opening session for the oral talks that would be presented the next two days of the conference week. The plenary was chaired by **Tom Blanton**, International Centre for Diffraction Data, and began with an awards presentation. The Birks Award, given biennially to recognize outstanding contributions to the field of X-ray spectrometry, was presented to **Christina Strel** of the Atominstitut, Technical University Wien, Austria. Dr. Strel received the award for her contributions to the development and applications in the field of XRF spectrometry including total reflection XRF (TXRF), micro XRF, confocal XRF, and two-dimensional (2D) and three-dimensional (3D) chemical imaging for a better understanding of complex problems; and for her commitment to her students and the international XRF community.

In addition to the Birks Award, the 2018 Robert L. Snyder Student Award grants were presented during the plenary session to seven outstanding young scientists. The awardees and the works they presented at the conference were:

In Situ Monitoring of the Crystallization of Amorphous Solid Dispersions in Aqueous Solution, using Synchrotron Radiation

K. Konadu Amponsah-Efah, University of Minnesota, USA

A Straightforward Program Written in Octave and Julia for X-ray Diffraction Line Profile Analysis: A Study in Gold Thin Films

A. Perez Casanova, Instituto Tecnológico de Estudios Superiores de Monterrey, México

Oxygen Storage Properties and Structural Evolution of AFe_2O_4 ($A = Lu, Y, Yb, In$) Under Chemical Looping Conditions

R. Jayathilake, University of Maryland, USA

The Role of Lattice Disorder in Water Mediated Dissociation of Cocrytals

N. Kaur, University of Minnesota, USA

BM: A Python Code for Modelling Physically Based Background for XRD

B. Araceli Ramírez Almaguer, Universidad Nacional Autónoma de México, México

Effect of Process Variables on Physical State of Mannitol in Tert-Butyl Alcohol–Water Systems

J. Sonje, University of Minnesota, USA

Variation in the Precipitation of Metal Ions in Standard Water with Different Analytical Conditions

S. Verma, Panjab University, India

Following the awards presentation, the plenary session continued with two fascinating talks by renowned keynote speakers **David Bish**, Indiana University, USA and **Aaron Celestian**, Natural History Museum of LA, USA. Dr. Bish presented the talk, *Using X-ray Diffraction to Elucidate Source Materials and Firing Conditions of Pompeian Ceramics*, followed by Dr. Celestian's presentation on, *Collaborative Mineralogical Research in Museums*. The session was well attended, and received many positive comments from attendees.

SPECIAL SESSIONS

From Wednesday afternoon until Friday morning, 15 half-day oral sessions were held. Nearly 200 presentations were organized in the oral sessions, with 26 of the presentations given by invited speakers, experts in their respective fields. Included was a special session and open group discussion on *Advanced Fundamental Parameters*, which served as the annual meeting for the International Initiative on X-ray Fundamental Parameters. The FP initiative has met annually since 2008, and attracts attendees from national metrology institutes, academic institutions, and industry. **Joel Ullom** of NIST, USA served as Chair for the special interest group.

POSTER SESSIONS

Posters were presented on Monday and Tuesday evening during the XRD and XRF poster sessions. Two E-poster



Photo 1. Scenes from the 2018 Denver X-ray Conference.

stations were also set-up in the exhibit hall. Attendees were given the opportunity to study electronic copies of the posters at the E-poster stations, or through the mobile app, Guidebook. Best poster awards were chosen, and the competition was intense. Ultimately, the following presenters were named winners:

XRD Best Poster Awards:

Crystal Structural Analysis of $InAs_xP_{1-x}$ Nanowire Exploiting High Resolution X-ray Diffraction

S. Song, C.S. Kim, Korea Research Institute of Standards and Science, Korea

Evaluation of Physicochemical Properties of ^{137}Cs in Geological Materials by X-ray Diffractometry

T. Mizunuma, K. Fujii, M. Kasari, Meiji University, Japan; **A. Ohbuchi, Y. Koike**, Applied Rigaku Technologies, USA

3D Immersive Visualization of Micro-Computed Tomography and XRD Texture Datasets

M.A. Rodriguez, T.T. Amon, J.J.M. Griego, D. Adams, H.J. Brown-Shaklee, Sandia National Laboratory, USA; **N. Green**, Department of Energy's Kansas City National Security Campus, USA

Monitoring of FeS_2 Reactions using High Temperature XRD Coupled with Gas Chromatography (GC)

K.M. Stirrup, M.A. Rodriguez, J.J.M. Griego, E.N. Coker, T.M. Anderson, Sandia National Laboratory, USA

XRF Best Poster Awards:

A Novel Approach to the Analysis of Glass Components used in Portable Electronic Devices by Micro-XRF

J. Vargeson, K. Eckart, A. Nached, Corning Incorporated, USA

Polychromatic Simultaneous WDXRF for Valence Evaluation of Cathode Active Materials in Lithium-ion Batteries

T. Yoneda, T. Izumi, S. Tokuda, S. Adachi, K. Sato, Shimadzu Corporation, Japan

M. Kobayashi, T. Mukai, H. Tanaka, M. Yanagida, National Institute of Advanced Industrial Science and Technology, Japan

Green Chemistry with MWDXRF: Np Determination without Chemical Reagents

K. McIntosh, Los Alamos National Laboratory, USA

EXHIBITS

The exhibit hall accommodated 44 companies with displays of products and services for the X-ray community. A complete listing of exhibitors and their product descriptions can still be found on the conference website: <http://www.dxcicdd.com/18/exhibitors.htm>.

Social Event and Sponsorships

The conference was fortunate to have many generous companies offer their financial support as sponsors. Bruker once again reigned as Platinum Sponsor of the DXC, inviting every attendee, exhibitor, and guest to a murder mystery dinner in the mountains, complete with tasty foods, abundant libations, music, and prizes. Silver sponsorships were received from Chemplex Industries, Inc., DECTRIS Ltd., KETEK and Proto. The generosity of our sponsors helps to keep attendee costs low, and the quality of the conference high. We are grateful for their support!

Website, Abstracts, and Proceedings

To view the complete DXC Program, including abstracts, please visit the Program page of the conference website, <http://www.dxcicdd.com/18/program.htm>. The conference

proceedings, *Advances in X-ray Analysis*, Volume 62, will be published in the summer of 2019. Select papers will also be published in *Powder Diffraction*. Please also visit the Research Tools page of the ICDD website: <http://www.icdd.com> for free full access to manuscripts published in Volumes 40 through 59 of *Advances in X-ray Analysis*.

2019 JOINT MEETING

In 2019, DXC will return to the Chicago area, August 5–9, at a new hotel, The Westin Lombard Yorktown Center, Lombard, IL, USA, and will be a joint meeting with ICXOM-25; the 25th International Congress on X-ray Optics and Microanalysis.