

Current Status of Plans for the 2010 User Meeting and Workshops

David Tiede

Chair, 2010 APS User Meeting Organization Committee
Division of Chemical Sciences and Engineering Division
Argonne National Laboratory

Paul Fuoss

Chair, APS User Organization Steering Committee
Material Sciences Division
Argonne National Laboratory

Jane Andrew, Connie Vanni, and Susan Strasser

X-ray Science Division
User Office
Advanced Photon Source
Argonne National Laboratory

APS/Users Operations Monthly Meetings

February 17, 2010

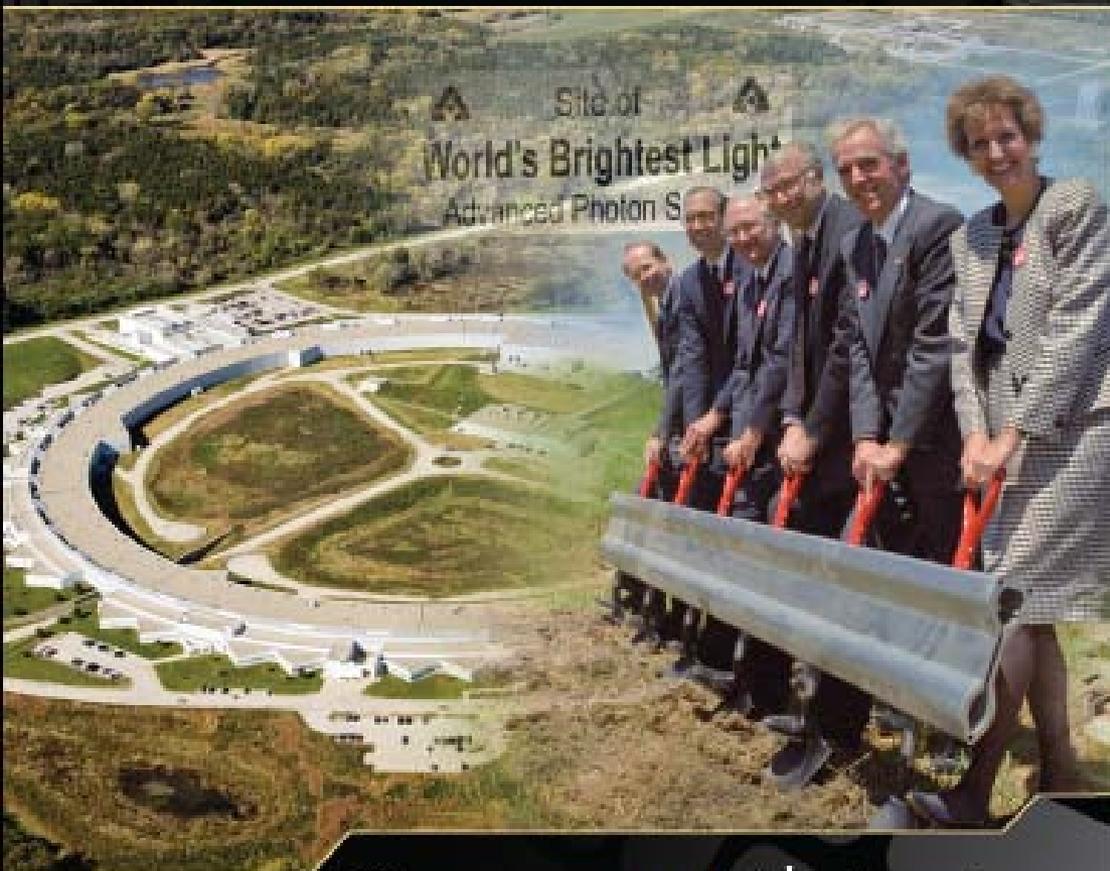
2010 APS/EMC Users Meeting

Argonne National Laboratory

May 3-5, 2010



Celebrating 20 Years of Groundbreaking Science



Program and Abstracts

Program Theme:

- Groundbreaking Science: celebrating the 20th anniversary of APS groundbreaking

Cover art:

Jane Andrew, Connie Vanni, and Susan Strasser

2010 APS/EMC Users Meeting

Argonne National Laboratory

May 3–5, 2010

Celebrating 20 Years of Groundbreaking Science

Workshops

- Application of Advanced X-ray Techniques to Industrial Research
- Beamline 2.0: The Fully Integrated Instrument
- Biotemplated Materials for Environmental and Energy Sustainability
- Actinide Research at the APS: Successes and Prospects
- Are Phase-Contrast and Diffraction Imaging/Microscopy Ready for Biology and Medicine?
- Linking Structure and Magnetism in Novel Materials: Future Opportunities at an Upgraded APS
- Workshop on XFEL Sciences

Deadline

- April 5 Poster Abstracts Due
- April 9 Registration for Non-U.S. Citizens
- April 16 Housing Reservations
- April 16 Regular Registration

Organizers

- David Tiede – Science Chair, Advanced Photon Source
- Jennifer Mawdsley – Science Chair, Electron Microscopy Center
- Linda Carlson – Administrative Chair

<http://www.aps.anl.gov/Users/Meeting/>

Meeting Poster

Poster design:

Jane Andrew, Connie Vanni, and Susan Strasser

Sunday May 2	Monday May 3	Tuesday May 4	Wednesday May 5	
	Exhibits: 8:00 - 5:00 Registration: 7:00 - 5:00, Atrium	Exhibits: 8:00 - 5:00 Registration: 7:30 - 5:00, Atrium	Exhibits: 8:00 - 5:00 Registration: 7:30 - 5:00, Atrium	
	Opening Session 9:00 - 12:00 <i>Lect. Hall</i> <ul style="list-style-type: none"> • Lab Director's Intro (M. Peters) • DC Report (W. Foster?) • DOE Perspective (H. Kung) • APS Update (M. Gibson) • EMC Update (D. Miller) – <i>parallel user session</i> • CNM Update (A. Petford-Long) 	Science Session I <i>Lect. Hall</i>	Workshops Full-Day Workshops <ul style="list-style-type: none"> •WK1 Application of Advanced X-ray Techniques to Industrial Research •WK2 Beamline 2.0: The Fully Integrated Instrument •WK3 Linking Structure and Magnetism in Novel Materials: Future Opportunities at an Upgraded APS [PM session to be confirmed] •WK4 Workshop on XFEL Sciences [PM session to be confirmed] Half-Day Workshops, AM <ul style="list-style-type: none"> •WK5 Biotemplated Materials for Environmental and Energy Sustainability 	
	Lunch 12:00 - 1:30 <i>Tent</i>	Lunch 12:00 - 1:30 <i>Tent</i>	Lunch 12:00 - 1:30 <i>Tent</i>	APSUO Meeting 12:00 - 1:00 <i>Fifth Floor</i>
Vendor Setup	Plenary Session <i>Lect. Hall</i> <ul style="list-style-type: none"> • APS 20 years (Shenoy?) • Keynote Struct. Bio (Hendrickson) • Keynote Science TBD • Keynote Science TBD • Student Award (TBD abstracts) • APS Upgrade summary (Murray, Fuoss, Fischetti) 	Science Session II <i>Lect. Hall</i>	Workshops Full-Day Workshops <ul style="list-style-type: none"> •WK1 Application of Advanced X-ray Techniques to Industrial Research •WK2 Beamline 2.0: The Fully Integrated Instrument •WK3 Linking Structure and Magnetism in Novel Materials: Future Opportunities at an Upgraded APS [PM session to be confirmed] •WK4 Workshop on XFEL Sciences [PM session to be confirmed] Half-Day Workshops, PM <ul style="list-style-type: none"> •WK6 Actinide Research at the APS: Successes and Prospects •WK7 Are Phase-Contrast and Diffraction Imaging/Microscopy Ready for Biology and Medicine? 	
	Poster Session and Reception <i>Experiment Hall</i> 5:00 - 7:00 <ul style="list-style-type: none"> • 6 upgrade theme posters Interest Group Meetings <ul style="list-style-type: none"> • TBD (<i>Partner User Council?</i>) 	Banquet <i>TBD</i> <i>White Sox Cellular Field ?</i>		

Exhibits: 8:00 - 5:00

Registration: 7:00 - 5:00, Atrium

Opening Session 9:00 am - 12:00

APS Lecture Hall

- Laboratory Director's Intro (M. Peters)
- Congressional Report (W. Foster?)
- DOE-Office of Science Perspective (H. Kung)
- *break*
- APS Update (M. Gibson)
- EMC Update (D. Miller) (*planning parallel user session*)
- CNM Update (A. Petford-Long)

Lunch 12:00 - 1:30 *Tent*

Plenary Session 1:30 pm to 5:00 pm

APS Lecture Hall

- APS 20 since ground breaking perspective (Gopal Shenoy)
- Wayne Hendrickson (Columbia University), Keynote Lecture, Structural Biology
- Keynote Science TBD
- *break*
- Keynote Science TBD
- Student Award (TBD from abstracts)
- APS Upgrade summary (Murray, Fuoss, Fischetti)

Poster Session and Reception

Experiment Hall 5:00 - 7:00

- **6 upgrade theme posters**
- **job fair/ job bulletin board?** (Sandi-Tapia)

Interest Group Meetings

- *TBD (Partner User Council?)*



Tuesday May 4

Exhibits: 8:00 - 5:00

Registration: 7:00 - 5:00, Atrium

Science Session I 9:00 am - 12:00

APS Lecture Hall

- Antonino Miceli, "My Perspective on Future X-ray Detectors" (Recipient DOE Early Career Award)
- TBD, User Science 1
- TBD, User Science 2
- *break*
- TBD, User Science 3 (Ultrafast Dynamics)
- APSUO Rosalind Franklin Young Investigator Award Presentation

Lunch 12:00 - 1:30 *Tent*

Science Session II 1:30 pm to 5: 00 pm

APS Lecture Hall

- TBD, User Science 4 (Imaging and Coherence)
- TBD, User Science 5 (High Resolution Spectroscopy)
- TBD, User Science 6 (Extreme Conditions)
- *break*
- TBD, User Science 7 (Interfaces in Complex Systems)
- TBD, User Science 8 (Proteins to Organisms)
- APSUO Townhall (Fuoss)

Banquet

TBD

White Sox Cellular Field ?



Exhibits: 8:00 - 5:00

Registration: 7:30 - 5:00, Atrium

Workshops Session I 9:00 am - 12:00

Full-Day Workshops

- WK1 Application of Advanced X-ray Techniques to Industrial Research
- WK2 Beamline 2.0: The Fully Integrated Instrument
- WK3 Linking Structure and Magnetism in Novel Materials: Future Opportunities at an Upgraded APS
(PM session to be confirmed)
- WK4 Workshop on XFEL Science
- (PM session to be confirmed)

Half-Day Workshops, AM

- WK5 Bio-templated Materials for Environmental and Energy Sustainability

Lunch 12:00 - 1:30 Tent

APS/USO Meeting 12:00- 1:00 pm Fifth Floor

Workshops Session II 1:30 pm to 5: 00 pm

Full-Day Workshops

- WK1 Application of Advanced X-ray Techniques to Industrial Research (con't)
- WK2 Beamline 2.0: The Fully Integrated Instrument (con't)
- WK3 Linking Structure and Magnetism in Novel Materials: Future Opportunities at an Upgraded APS
(PM session to be confirmed)
- WK4 Workshop on XFEL Science
(PM session to be confirmed)

Half-Day Workshops, PM

- WK6 Actinide Research at the APS: Successes and Prospects
- WK7 Are Phase-Contrast and Diffraction Imaging/Microscopy Ready for Biology and Medicine?



Workshop 1

May 5, all day

Application of Advanced X-ray Techniques to Industrial Research

Organizer: Steve Heald, APS

Abstract:

Synchrotron methods have long been applied to industrial problems. Foremost among these have been standard diffraction and XAFS methods. In recent years a number of more advanced methods have been developed that could have application to industrial problems. These include high-speed imaging, x-ray Raman and other advanced spectroscopies, and new techniques using high-energy x-rays. These capabilities may not yet be as widely appreciated in the industrial community as the more standard techniques. This workshop will survey the current and future applications of some of these newer techniques. It will also look at how the APS upgrade could enhance opportunities for industrial research.



Workshop 2

May 5, all day

Beamline 2.0: The Fully Integrated Instrument

Organizers: Lahsen Assoufid (APS), Dean R. Haeffner (APS), Peter J. Eng (University of Chicago), and John P. Quintana (APS)

Abstract:

The potential of an APS upgrade gives the community the opportunity to reexamine the paradigm on which beamlines are designed and integrated. The workshop will examine storage ring beamlines from the standpoint of complete integrated instruments from the particle beam through the final experimental setups. Future directions in state-of-the-art synchrotron radiation instrumentation technology will be explored. Speakers will present their individual topics within the framework of what is required of a completely integrated beamline instrument.



Workshop 3

May 5, duration TBD

Bldg. 440, Rm. 105/106 (Center for Nanoscale Materials)

Linking Structure and Magnetism in Novel Materials: Future Opportunities at an Upgraded APS

Organizers: M. Bode (CNM), J.W. Freeland (APS)

Magnetism is a fundamental property that underpins much of our basic understanding of the functionality of many systems. Since magnetism arises from cooperative interactions between, it is not only dependent on the electronic state of a local atom but also how it is connected to the rest of the system (i.e. its structure). Understanding this inter-relationship is key to unraveling forefront questions in magnetism such as how magnetic order evolves with reduced dimensionality and how it responds to external stimuli. Of equal importance is the interrelationship with other properties (i.e. metallicity, superconductivity, ferroelectricity,...) and how we can rationally control the state of a material through its structural, electronic, and magnetic interactions. Synchrotron radiation provides a unique suite of tools (spectroscopy and diffraction) that are crucial to our understanding of this link between structure and magnetism. This workshop will focus on how the planned upgrade of Advanced Photon Source will allow us to go well beyond our current capabilities by enabling new types of measurement. Topics of interest are: controlling magnetism with external stimuli (pressure, light, magnetic fields), the evolution of the magnetic state with dimensionality (i.e. nanomagnetism), and probing structural response to changes in magnetic state.



Workshop 4

May 5, duration TBD

Workshop on X-ray Free Electron Laser (XFEL) Sciences

Organizers: K.-J. Kim and Y. Shvyd'ko

Preliminary description: With high spectral purity and high average brightness, an x-ray free electron laser (XFEL) offers photon characteristics complementary to that of self-amplified spontaneous emission (SASE). The goal of this workshop is to explore the scientific opportunities that these characteristics can provide, thus to evaluate an XFEL as an option for the APS beyond the upgrade.



Workshop 5

May 5, morning

Viral Assemblies as Materials Synthesis Templates: From Molecular Fundamentals to Energy and Environmental Sustainability Applications

Organizer: Hyunmin Yi, Tufts University, and Qian Wang, University of South Carolina

This proposed workshop will focus on studies in harnessing exquisite structural and chemical features of nanobiological template materials ranging from peptide assemblies to viruses for facile synthesis of functional materials. Particular attention will be given to balance the invited speakers' expertise from the two ends of the spectrum: molecular and nanoscale structures and advanced functional devices for catalytic and energy applications. Bringing together leading scientists and engineers with disciplines ranging from structural biology, organic chemistry, physics and bioengineering will provide a unique platform that is rarely available from other discipline-oriented conferences, benefitting the users of the Advance Photon Source (APS) of Argonne National Laboratory.



Workshop 6

May 5, afternoon

Actinide Research at the APS: Successes and Prospects

Organizers: Jim Tobin (Lawrence Livermore National Laboratory), and Mark Antonio (Argonne National Laboratory)

The actinide elements are unique in many respects, from their fundamental, practical, theoretical, and environmental concerns to their impact on the worldwide energy economy. As such, actinide materials pose extreme challenges to the scientific community in terms of their chemistry, composition, and characterization. For example, their complex electronic structures result in many unusual properties that even today are not well understood, if at all. In this regard, the availability of synchrotron radiation has revolutionized actinide chemistry and materials research. The focus of this workshop will be basic actinide science and its role in resolving technical challenges posed by actinide materials. Both fundamental and applied experimental approaches, as well as theoretical modeling and computational simulations, will be part of the workshop.

Experimental results gathered at synchrotron radiation sources, both national—with highlights of activities at the APS—and international facilities, on a deep and broad selection of actinide systems will be discussed. Particular emphasis will be placed upon projecting the needs for the next generation of cutting-edge experiments with actinide elements. Issues associated with the nuclear fuel cycle, ranging from fuel development to waste disposal, particularly as it relates to environmental remediation, will be of special significance.



Workshop 7

May 5, afternoon

Are Phase-Contrast and Diffraction Imaging/Microscopy Ready for Biology and Medicine?

Organizers: Han Wen (National Institutes of Health), and Christoph Rose-Petruck (Brown University)

Within the past five years, phase-contrast (PC) and diffraction imaging saw rapid advance, particularly in full-field techniques, which are driven by the speed requirement of biological and medical applications. Among these are wave-propagation-based PC techniques using high spatial-coherence sources, Talbot-grating-based phase-stepping techniques, grid-based spatial harmonic techniques, and crystal-analyzer-based techniques. These approaches are distinct but also interconnected. They are now being implemented in a number of forms that include microscopy, radiography, tomography, and elastography and some have reached live animal in vivo imaging. This workshop aims to facilitate exchange of the latest ideas among researchers of the various approaches, to focus on the first biomedical applications that are on the horizon, and to highlight what needs to be developed for further expansion into biology and medicine.



Questions, Comments?

