

# PSC ALL-HANDS MEETING JANUARY 22, 2020



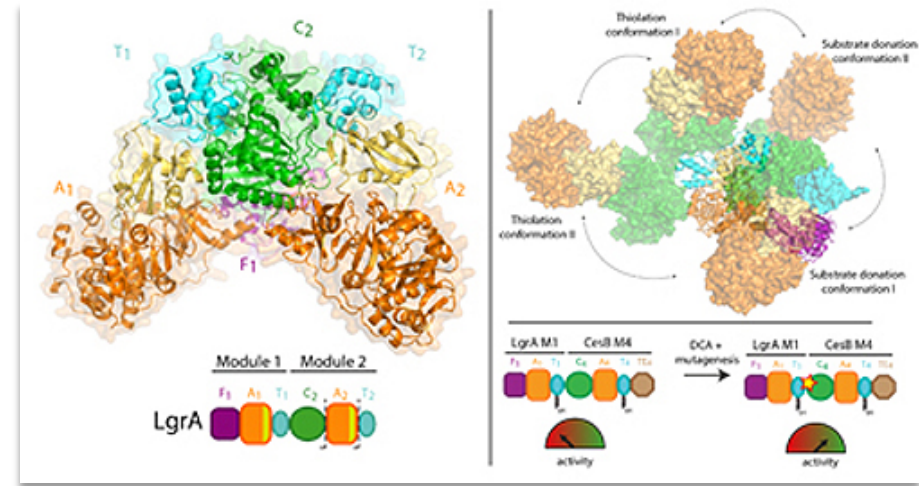
**STEPHEN STREIFFER**

Director, Advanced Photon Source

Associate Laboratory Director, Photon Sciences

# AGENDA

- PSC Update – Stephen Streiffer
- APS Operations: Shutdown Projects – John Connolly
- 2019 APS User Survey Results – Denny Mills
- APS Upgrade Update – Bob Hettel



To keep up with the latest APS research:  
[www.aps.anl.gov](http://www.aps.anl.gov)

**JUNE 9-11, 2020**

# **DOE-BES TRIENNIAL REVIEW OF APS OPERATIONS**



U.S. DEPARTMENT OF  
**ENERGY**

Office of  
Science



Your turn.

# RADIOACTIVE MATERIAL SAMPLES AT APS

The APS currently supports ~ 80 experiments/yr. involving the use of radioactive samples

- These samples requires additional controls, reviews, and approval from the APS Radioactive Sample Safety Review Committee (RSSRC).
  - Therefore experimenters are strongly advised to send in the experiment proposal at least 2 months before the experiment for new experiments
  
- There are two possible exceptions to these requirements for very low-level samples:
  - Rocks or soil with very low activity have been allowed without regard to radioactivity since 2015.
    - Based on Health Physic Technical Note HPTN-2015-002 RADIOACTIVE SAMPLES AT USER FACILITIES
  
  - **New for the 2020-1 run** – Solids with very low activity (< 1pCi per sample) will be allowed without regard to radioactivity.
    - Based on Health Physic Technical Note HPTN-2019-002 RADIOLOGICAL CONTROL OF SAMPLES THAT ARE INDISTINGUISHABLE FROM BACKGROUND

# UPCOMING TRAINING OPPORTUNITIES:

- **WPC 203 - HUMAN FACTORS** - Human errors in the workplace can ruin research projects, jeopardize grant funding, and even threaten life and limb. Learn management strategies used by pilots, surgeons, elite military units, and other high reliability teams.

Date	Time	Building	Room
Monday, March 9	8:30-12:30	446	AUD
Tuesday, March 10	8:30-12:30	202	B169
Wednesday, May 13	8:30-12:30	446	AUD
Tuesday, August 4	8:30-12:30	202	B169
Wednesday, August 5	8:30-12:30	446	AUD

- **WPC 204.2 - What Really Happens When We Punish People for Errors** - The theory is that “holding people accountable” for errors reduces errors, but the practical truth is quite the opposite. Punishing people for errors actually chills communication, erodes trust and generates more errors over time.

Date	Time	Building	Room
Monday, March 9, 2020	3:00-4:00	241	D172
Tuesday, March 10, 2020	1:30-2:30	202	B169
Tuesday, May 12, 2020	1:30-2:30	202	B169
Wednesday, May 13, 2020	3:00-4:00	446	AUD
Tuesday, August 4, 2020	1:30-2:30	202	B169

- **WPC 204.3 – The \$37 Billion Challenge – Coming Soon**

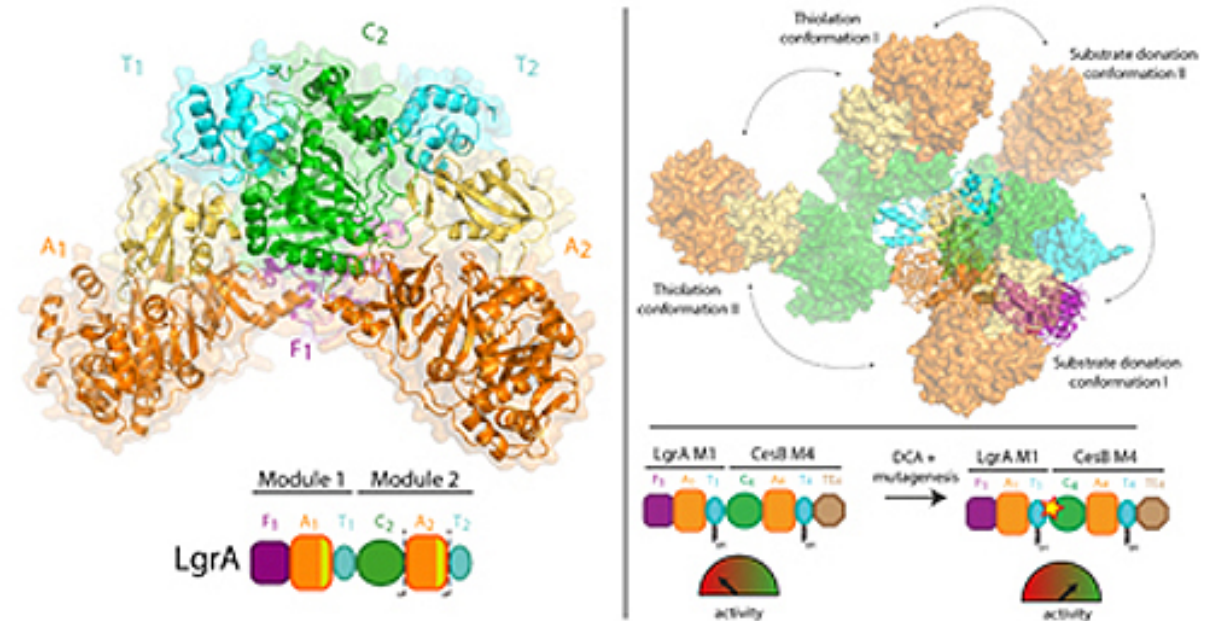
# A NEW UNDERSTANDING OF ANTIBIOTIC SYNTHESIS

## Scientific Achievement

Researchers at McGill University's Faculty of Medicine using NE-CAT 24-ID-C beamline and Canadian Light Source x-ray beamline 08ID-1 made important strides in understanding the functioning of enzymes that play an integral role in the production of antibiotics and other therapeutics.

## Significance and Impact

For the first time, made high-quality observations about how an individual module relates to nonribosomal peptide synthetases (NRPSs), which synthesize antibiotics, by visualizing a two-module portion of the NRPSs that makes the antibiotic linear gramicidin; the results could have implications for eventual production of new antibiotics and therapeutics.



Structures of a dimodular NRPS protein reveal the central condensation state and infer very large conformational changes.

J.M. Reimer, M. Eivaskhani, I. Harb, A. Guarné, M. Weigt, T.M. Schmeing, "Structures of a dimodular nonribosomal peptide synthetase reveal conformational flexibility," *Science* **366**, 706 (8 November 2019). DOI: 10.1126/science.aaw4388

# INSECTS' PHYSIOLOGICAL RESPONSES TO GRAVITY

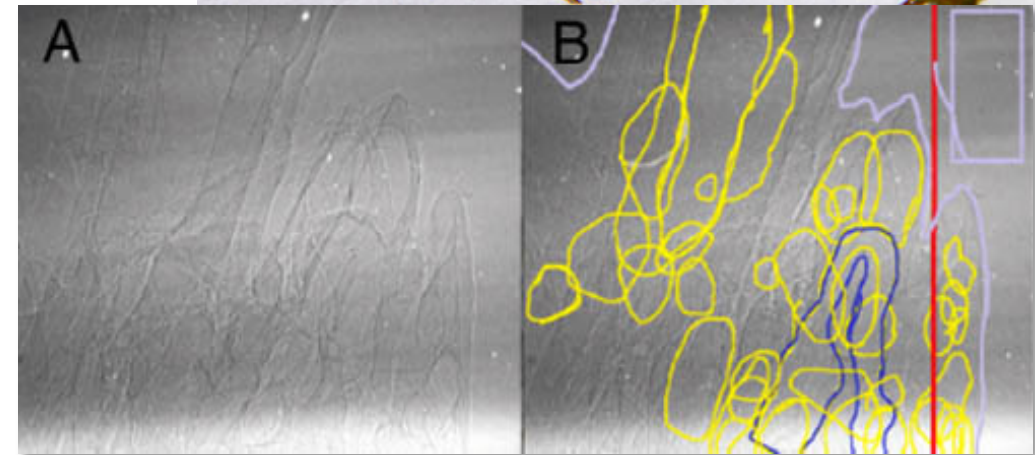
## Scientific Achievement

Researchers from Arizona State University, Virginia Tech, XSD Imaging Group imaged grasshoppers using 32-ID-B,C, discovered that air sacs located in the head greatly expand when insect is head-up (upright) while air sacs in the abdomen are smaller; when the animal is head-down, air sacs in the head decrease in size while air sacs in the abdomen greatly expand.

## Significance and Impact

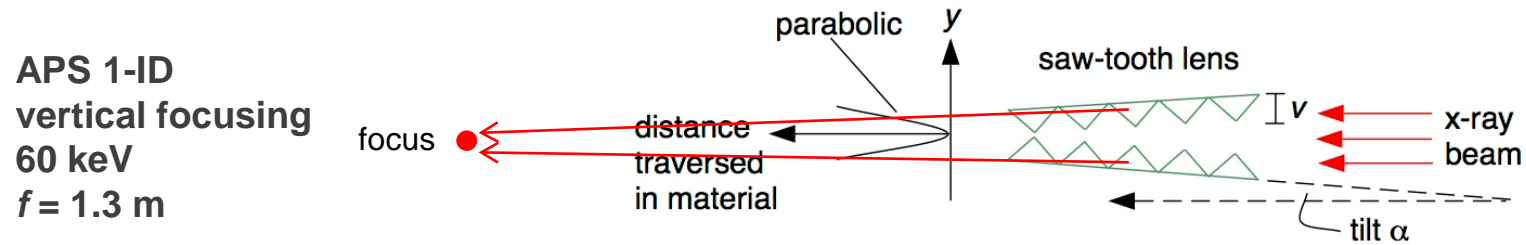
Indicates that fluid pressure due to gravity may affect the insect's body and its bodily systems just as in humans; this is counterintuitive to prior scientific thought and could have larger implications in future research.

J.F. Harrison, K. Adjerid, A. Kassi, C.J. Klok, J.M. VandenBrooks, M.E. Duell, J.B. Campbell, S. Talal, C.D. Abdo, K. Fezzaa, H. Pendar, J.J. Socha, "Physiological responses to gravity in an insect," Proc. Natl. Acad. Sci. U.S.A., first published January 13, 2020 <https://doi.org/10.1073/pnas.1915424117>



X-ray image of the abdominal tip of a head-down grasshopper. Lighter regions are expanded air sacs and tracheae, which are traced in yellow and blue, respectively, in B.

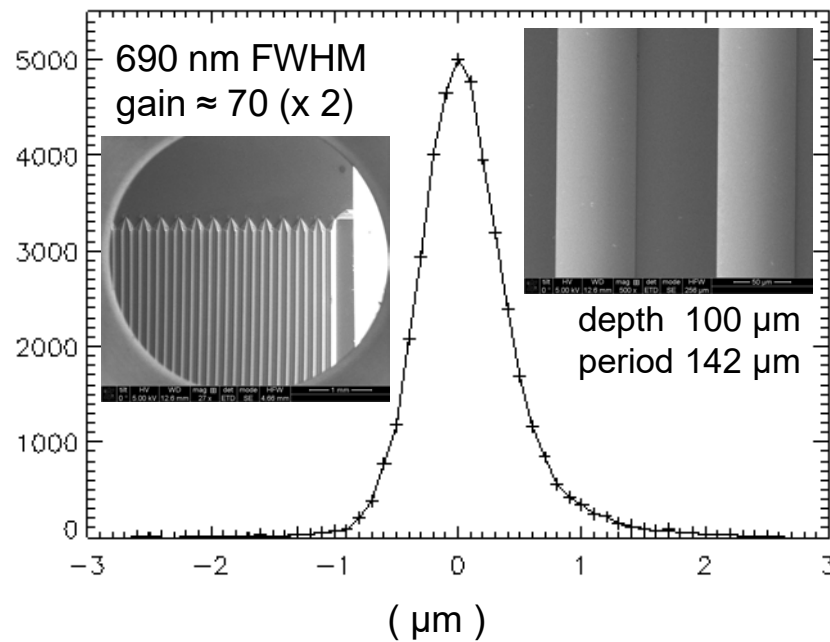
# HIGH-ENERGY FOCUSING WITH TUNABLE SAW-TOOTH LENSES



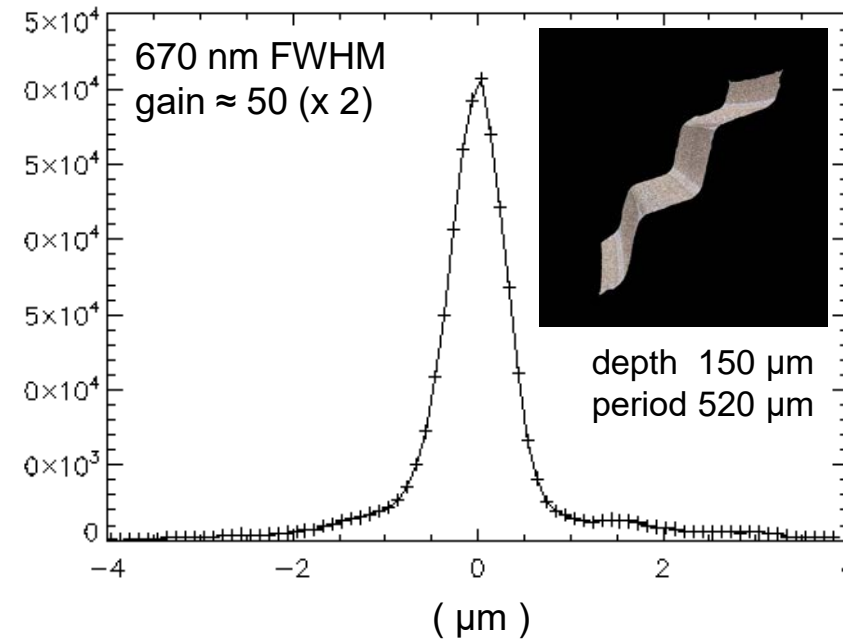
Planned for 6-ID-D, APS-U HEXM, & NSLS-2 HEX

$$f = (v \sin \alpha) / \delta$$

Si lenses – N. Moldovan (Alcorix Co.) & Shastri



Al lenses – E. Benda & Shastri



Supported by DOE-BES-ADRP



# ACCELERATOR STATISTICS FOR RUN 2019-3

## ■ Started 10/1/19, 08:00; ended 12/17/19, 24:00

Total Amount of User Time	1601 hours
Delivered Beam	1516.14 hours
Percentage of Scheduled Time	94.70%
Mean Time Between Faults (MTBF)	189.52 hours
Downtime During Period	84.81 hours
Mean Fill Duration in Period	168.46 hours
Faults Per Day of Delivered Beam	0.13
Total Number of Faults	8

### Downtime

72 hours due to S:IS1 septum replacement 10/8-11

PS Group had 2 faults for a total of 1.92 hours

RF Group had 3 faults for a total of 3.52 hours

Controls had 0 faults with 3.02 hours

There was 1 radiation monitor trip for 1.28 hours

AOP had 1 fault for a total of 2.07 hours

# FY20 BUDGET UPDATE

- FY19
  - All light sources: \$505M
  - APS Ops: \$137M
  - APS-U: \$130M
  
- FY20 Budget

	PBR	House	Senate	Enacted
<b>Light sources</b>	\$485M	\$520M	\$550M	\$525M
<b>Ops</b>	\$129M	–	–	\$140.5M
<b>APS-U</b>	\$150M	\$170M	\$180M	\$170M



# PSC INTERFACE PORTFOLIO MANAGEMENT

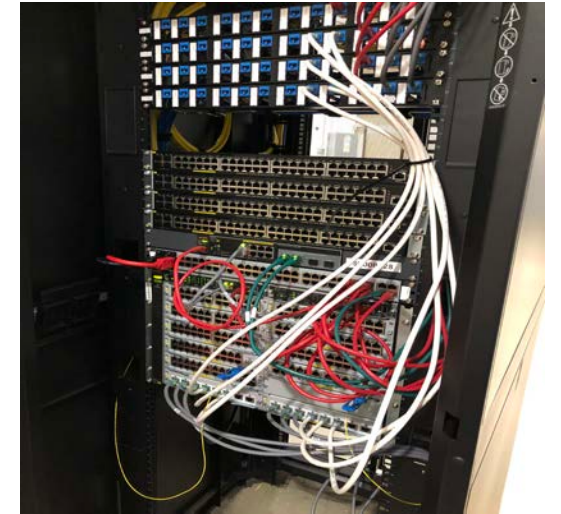
## Primary Mission:

Develop and manage an integrated, multi-year, resource-loaded portfolio of Operations-funded projects to support:

1. Readiness for the APS Upgrade Project
2. Maintenance and obsolescence mitigation to ensure reliable x-ray beam delivery and mature accelerator operation
3. The PSC long-term strategy for continued science excellence at the APS

# PSC INTERFACE PORTFOLIO MANAGEMENT: LARGE PROJECTS STATUS UPDATE

- Linac rf station #1 (2 klystrons, modulator, low-level rf): \$1.4M
  - Procurement approved for two klystrons and modulator; detailed planning for installation started Jan. 20
- Solid-state rf #1 (includes waveguides and hardware): \$2.7M
  - Prototype testing completed; scope definition, planning in progress
- Beamline single-mode fiber (D1109, LOM 435, LOM 438): \$460K
  - APS-U milestone for 28-ID network completed ahead of time; fiber to LOMs ongoing
- Long trace profiler upgrade: \$260K
  - Mechanical design completed; autocollimator received in February 2020
- Windows 7-10 update (DOE-mandated to be completed by 2/1/20): \$275K
  - Ongoing, 80% complete; forecast finish: 1/31/20
- Business operations Windows servers: \$338K
  - Completed
- Business operations Linux servers: \$196K
  - Hardware installed, working on migration



Network infrastructure installed in  
28-ID beamline

## “IMPACT ARGONNE” AWARDS

- Any Argonne employee may complete an ANL-1253 Form (Impact Argonne Award Nomination Rationale) and share it with their manager to review and advance the nomination through the Workday process
- Significantly increases funding to provide more meaningful awards and for wider adoption for both scientific and operational achievements
- **Everyone in PSC is encouraged to recognize co-workers who contribute to our success**



Detailed information: <https://inside.aps.anl.gov/impact-argonne-award-psc-information> (APS Intranet)

<https://www.aps.anl.gov/impact-argonne-award-psc-information> (APS public web site)

Contact Tom Padilla ([tpadilla@anl.gov](mailto:tpadilla@anl.gov)) for assistance

# “CORE VALUES SHOUT-OUTS”

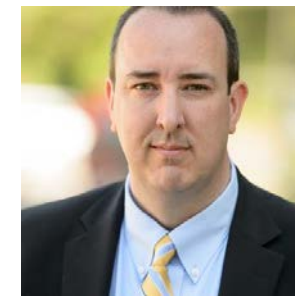
- Recognize a colleague who demonstrates one of the specified behaviors (or other behaviors that show the Core Values in action) by giving them a shout-out
- Complete and submit the “Core Values Shout-Out” form (ANL-1238)
- The recipient will receive a copy of the form and a corresponding button, which can be worn on a lanyard or displayed in their office
- **The program has been extended to March 5**



Information is at  
<http://inside.anl.gov/core-values>

# AWARDS & HONORS

- **John Connolly** (PSC Deputy Associate Laboratory Director, AES Division Director) has been selected as an Oppenheimer Science and Energy Leadership Program (OSELP) Fellow. He will join a year-long series of site visits and discussions at the national labs covering a wide variety of DOE missions and operations.
- **Daniel Haskel** (Magnetic Materials Group Leader, XSD) was presented with the UChicago Argonne Board of Governors Distinguished Performance Award recognizing his work on developing and leading instrumentation, user programs, and research for studies of quantum matter under extreme pressure conditions.
- **Kwang-Je Kim** (ASD) was named an Argonne Emeritus Scientist - granted only to the most distinguished contributors in a scientific discipline.
- **Brian Toby** (Computational X-ray Science Group Leader, XSD) has been elected President of the 2020 American Crystallographic Association Executive Council.



# 25+ YEARS SERVICE AWARDS

Congratulations to the following individuals for **25+ years of dedicated service to Argonne National Laboratory** (fourth quarter of 2019):

**25 years**

**David Donkers**

**30 years**

**Lauren Ambrose**  
**Gregory Markovich**  
**Alireza Nassiri**  
**John Hammonds**  
**Ju Wang**

**35 years**

**Charles Kurtz**

**40 years**

**Nestor Zaluzec**



# 2020 USER MEETING

- Banquet at the Monte Bello Estate in Lemont on Monday
- Poster Session on Tuesday, including student poster prizes
- Large exhibitor show Monday-Wednesday
- Awards: Rosalind Franklin Young Investigator Award and Gopal K. Shenoy Excellence in Beamline Science Award
- Student travel support available

## Workshops & Satellites (SAT)

- **APS:** Advanced Spectroscopy Probes to Investigate Matter Under Extreme Conditions - Opportunities Afforded by the MBA lattice
- **CNM:** Hybrid Quantum Systems
- **APS:** Biological Studies Via X-ray Fluorescence and Ptychography at the BioNanoprobe
- **APS/CNM:** Autonomous Control of Experiments in the Microscopes and Light Sources of the Future
- **APS/CNM:** Advances in Phase Retrieval Methods for High-Resolution X-ray Imaging
- **APS:** Multi-Modal X-ray Techniques for Emergent Quantum Materials
- **CNM:** Artificial Intelligence for Autonomous Synthesis and Processing
- **SAT A:** Beyond  $R_g$ : BioSAXS Short Course
- **SAT B:** TBD
- **SAT C:** SAXS Software Course Irena and Nika
- **SAT D:** X-ray Ptychography Training Course
- **SAT E:** Data Analysis School on X-ray Scattering from Liquid Interfaces
- **SAT F:** Macromolecular Synchrotron Data Collection Workshop @ LS-CAT



Argonne  
NATIONAL LABORATORY

# 20/20 PERFECT VISION

SCIENCE AT ARGONNE'S  
USER FACILITIES

## APS/CNM USERS MEETING

**APRIL 20 – 24, 2020**  
Argonne National Laboratory  
9700 South Cass Avenue, Lemont, Illinois 60439

**HIGHLIGHTS**

- APS and CNM Scientific Workshops
- APS Satellite/ Training Courses
- CNM Short Courses
- Poster Session
- Student Travel Support Available
- Large Scientific Exhibitor Event
- SAXS Software Course
- Meeting Banquet

**SCIENTIFIC ORGANIZERS**

**Carlo Segre**  
Rice Institute of Technology  
Chair, APS User Organization  
Steering Committee

**Fan Zhang**  
National Institute of Standards  
and Technology  
Vice-Chair, APS User Organization  
Steering Committee

**Joshua Wood**  
Dynaflow, Inc.  
Chair, CNM Users  
Executive Committee

**Jacqueline Cole**  
Cambridge Laboratory,  
University of Cambridge  
Vice-Chair, CNM Users  
Executive Committee

**DEADLINES**

**February 3**  
Nominations for the  
Rosalind Franklin Award

**February 17**  
Nominations for the  
Gopal K. Shenoy  
Excellence in Beamline  
Science Award

**March 9**  
Poster Abstracts

**April 6**  
Lodging reservations for  
Argonne Guest House

**April 13**  
Registration

**REGISTER TO ATTEND**  
[www.anl.gov/register/usersmeeting2020](http://www.anl.gov/register/usersmeeting2020)

U.S. DEPARTMENT OF ENERGY  
Argonne National Laboratory  
9700 South Cass Avenue  
Lemont, Illinois 60439

# MEDSI2020 – JULY 13-17

- 11<sup>th</sup> International Conference on Mechanical Engineering Design of Synchrotron Radiation Equipment and Instrumentation
- Hosted by the APS and Argonne
- Fairmont Chicago, Millennium Park Hotel
- Will bring together mechanical engineers, researchers, and industrial exhibitors from around the world engaged in the design and fabrication of synchrotron radiation instrumentation
- **CONFERENCE TOPICS**
  - Insertion devices and magnets
  - Beamline optics and end-station instruments
  - Front ends and XBPMs
  - Major facility upgrades
  - Simulation techniques
  - Core technology in cryogenic, vacuum, etc.
  - High-precision mechanics and more



## KEYNOTE SPEAKERS

Efim Gluskin (APS)

Jean Claude Biasci (ESRF)

Fabrice Matchard (LIGO Lab, Caltech/MIT)

## ORGANIZERS

MEDSI IOC Chair: Brad Mountford (Australian Synchrotron)

Conference Chair: Yifei Jaski (APS)

Scientific Program Chairs: Yifei Jaski (APS),  
Keihan Tavakoli (SOLEIL)

[www.anl.gov/MEDSI2020](http://www.anl.gov/MEDSI2020)

# UPCOMING EVENTS

- **January 24:** APS Artificial Intelligence/Machine Learning (AI/ML) Workshop
- **March 30-March 31:** Beamline reviews
- **April 01-April 02:** APS Scientific Advisory Committee (SAC) Meeting
- **April 20-April 24:** 2020 APS/CNM Users Meeting
- **May 10-May 15:** 11th International Particle Accelerator Conference (IPAC'20), Caen, France
- **May 18-May 19:** Structure, Kinetics, and Dynamics in Soft Materials workshop
- **June 9-11: DOE-BES Triennial Review of APS Operations**
- **June 13-June 27:** National School on Neutron and X-ray Scattering
- **July 13-July 17:** 11th International Conference on Mechanical Engineering Design of Synchrotron Radiation Equipment and Instrumentation (MEDSI2020)
- **Sept. 21-Sept. 22:** Industrial Processes and the Role of the APS Upgrade workshop
- **Sept. 23-Sept. 24:** Materials under Extreme Conditions at the APS Upgrade workshop