PSC All-Hands Meeting
January 25, 2023

Laurent Chapon
Associate Laboratory Director for Photon Sciences
APS Director

AGENDA

Dava Keavney
Program Manager for X-ray Light Source and Neutron Scattering Facilities, DOE Office of Science
Introduction and remarks

Laurent Chapon
Safety, DEI, Budget, HR, Division Highlights

Jim Kerby
APS Upgrade update

Denny Mills
User survey, partnerships and celebrations

Laurent Chapon
New starters, awards

U.S. DEPARTMENT OF ENERGY | Office of Science

Meet & Greet

APS All-Hands Meeting

January 25, 2023

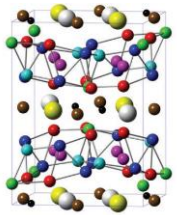
Dr. Dava Keavney

Program Manager for X-ray Light Sources, Basic Energy Sciences,

Scientific User Facilities Division

Origin Story*

Argonne NATIONAL LABORATORY



JHU, Argonne, U of A

Magnetic Materials

AAAS AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

Advanced Photon Source

Beamline Scientist

2001-2019

Magnetic Spectroscopy and Imaging

U.S. DEPARTMENT OF ENERGY | Office of ENERGY EFFICIENCY & RENEWABLE ENERGY

ADVANCED MANUFACTURING OFFICE

U.S. State Department

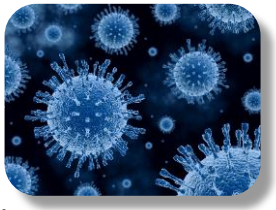
AAAS Science and Technology Policy Fellow

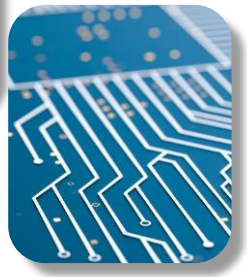
2019-2021

Clean Energy Mineral Supply Chains

U.S. DEPARTMENT OF ENERGY

Office of Science





U.S. DOE Advanced Manufacturing Office

2021-2022

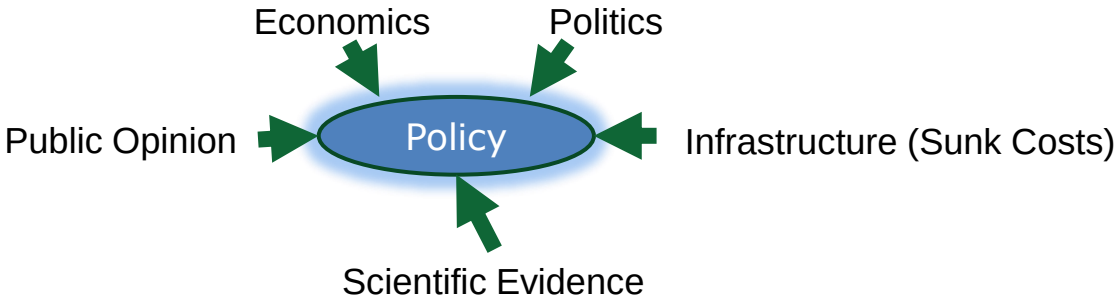
Critical Material Supply Chains, Industrial Decarbonization

"Career paths only make sense in retrospect"

*Having an Origin Story does not imply possession of a Superpower.

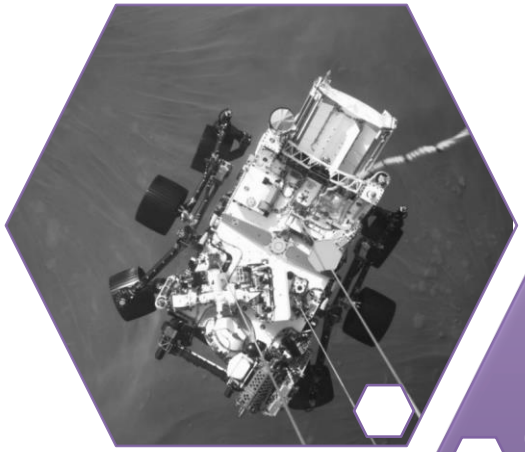
AAAS Fellowship – what was learned?

1. Policy, including science policy, has inputs other than science



2. Communicating scientific and technical ideas
   - We need to get over the fact that science doesn't speak for itself
   - The important messages are very audience-specific
3. For such a huge Federal government the Federal government is kind of small

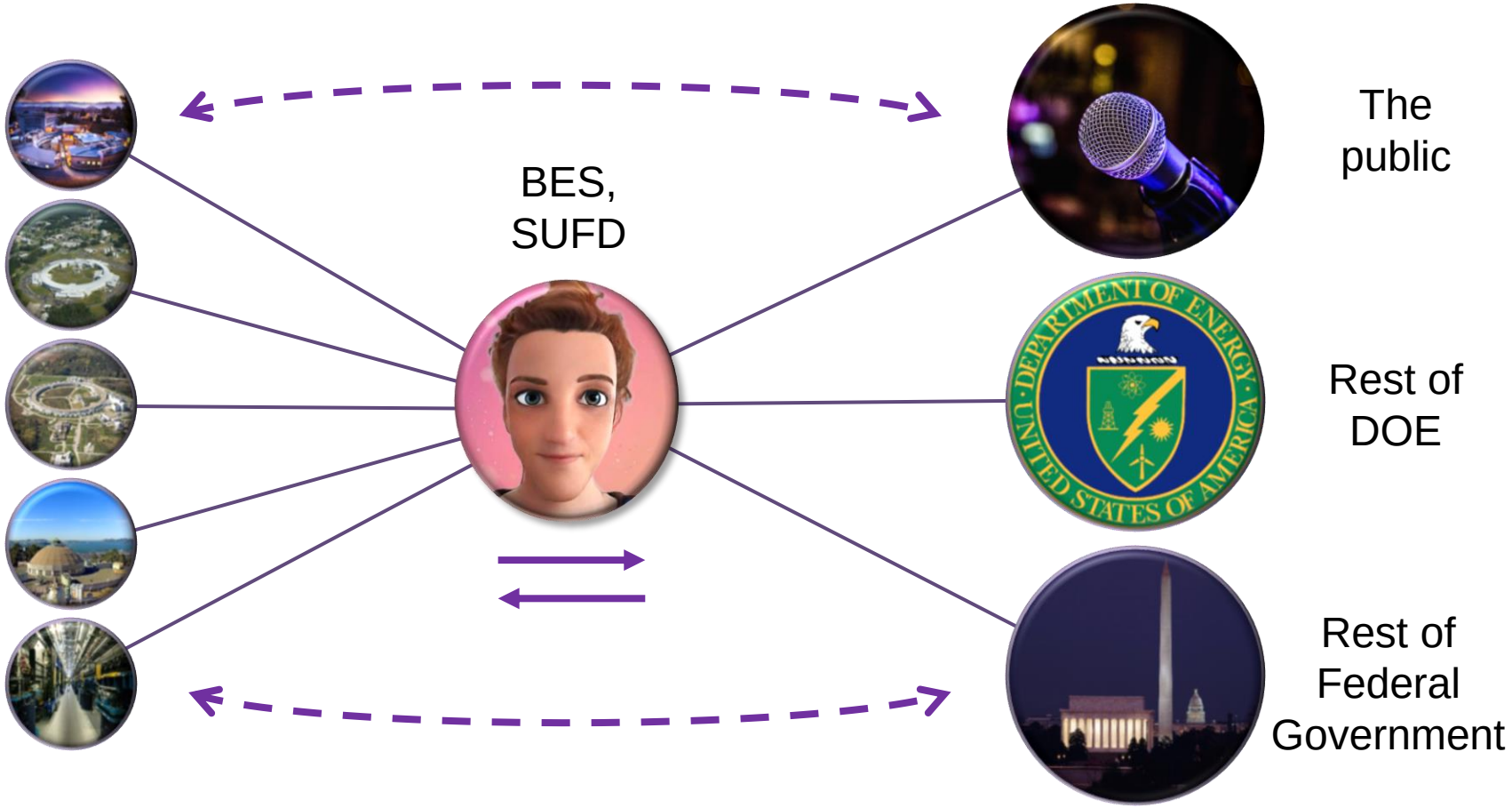
Two areas I want to speak to



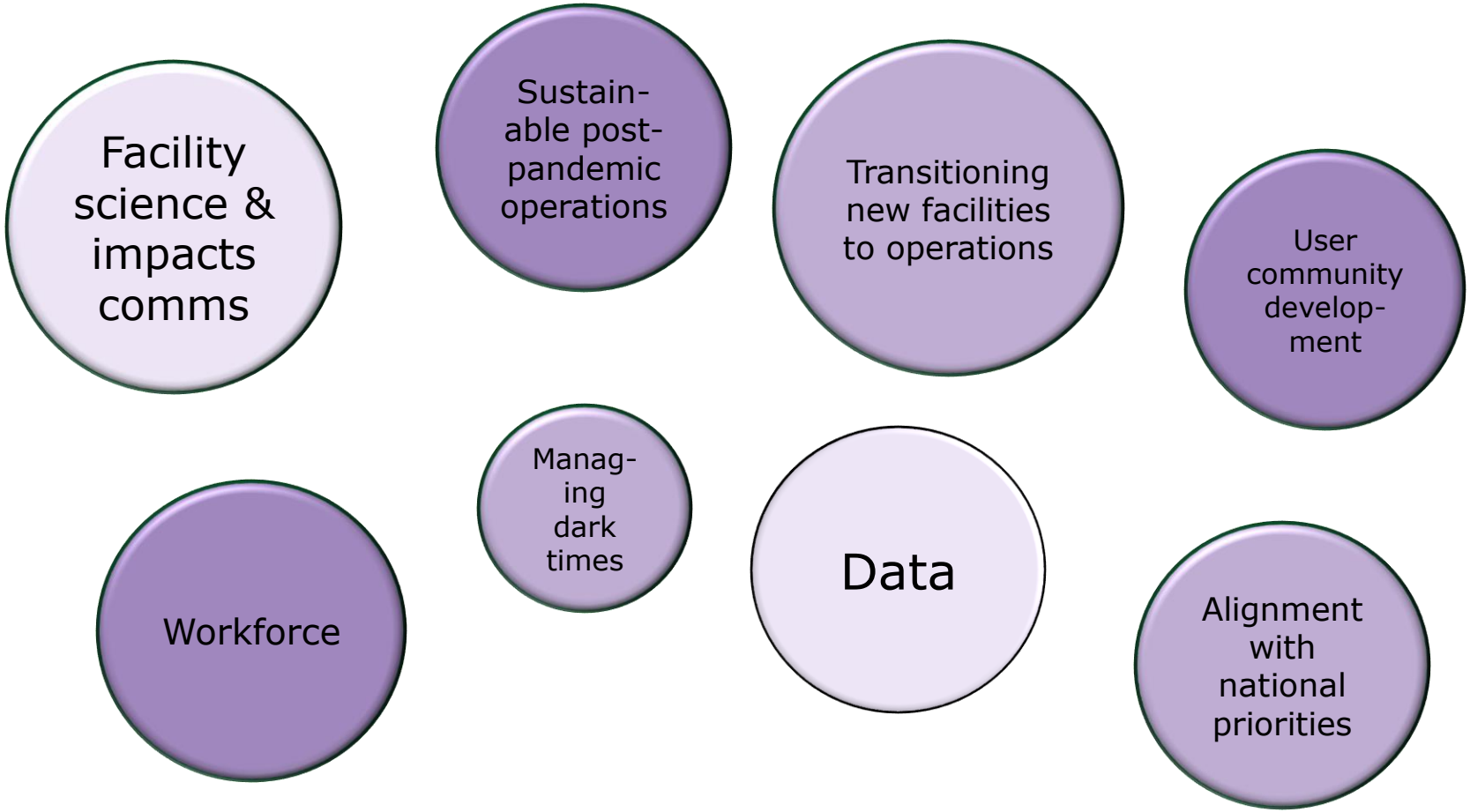
Communication with the public

Communication with DOE

One view of my role



Challenges and opportunities



Some things I'm working on

👇👇 This Friday! 👇👇

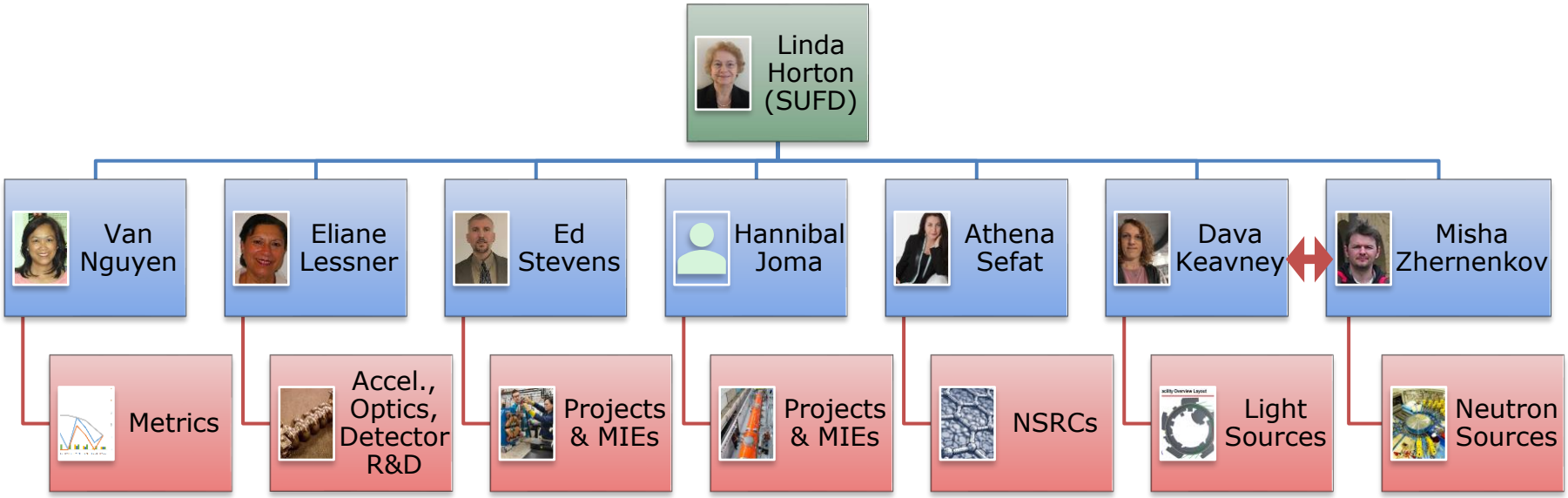

Town Halls


"DOE/Budgets 101"


Science Slams


Interagency/International Engagement

BES/SUFD


Linda Horton (SUFD)
Van Nguyen
Eliane Lessner
Ed Stevens
Hannibal Joma
Athena Sefat
Dava Keavney
Misha Zhernenkov
Metrics
Accel., Optics, Detector R&D
Projects & MIEs
Projects & MIEs
NSRCs
Light Sources
Neutron Sources

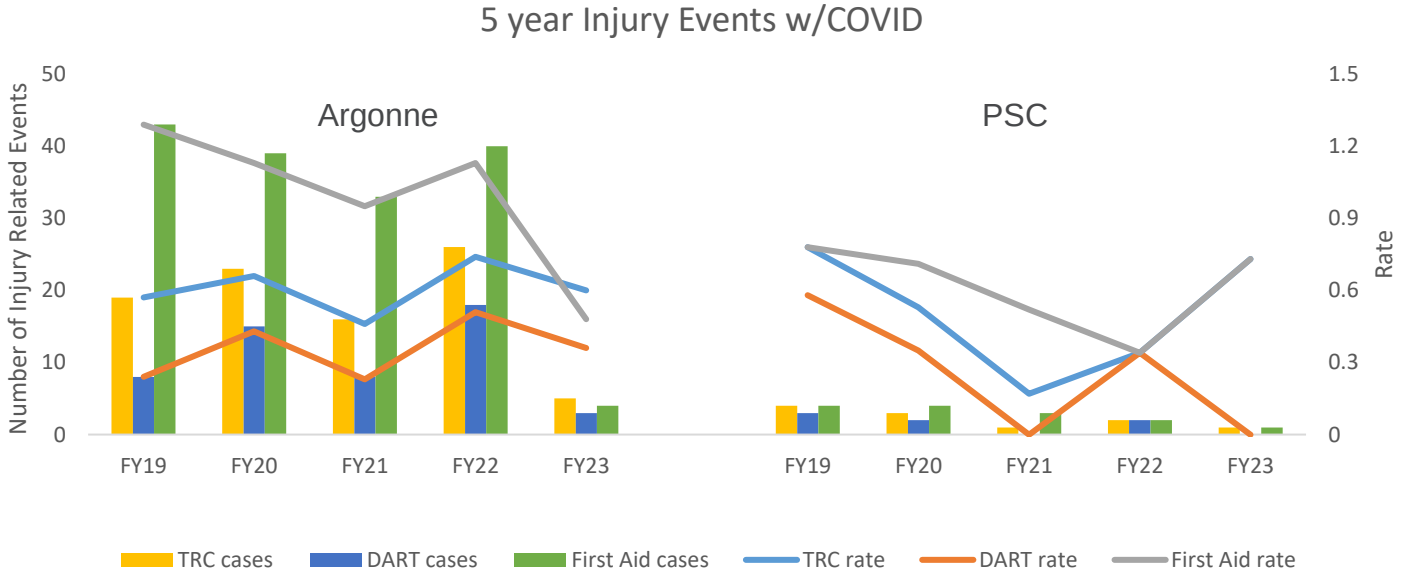
Safety, DEI, Budget, HR and Division Highlights

Laurent Chapon
Associate Laboratory Director for Photon Sciences
APS Director

George Crabtree
1944-2023

SAFETY

- **Photon Sciences safety record for FY23 thru December**
  - 1 First Aid Injury
  - 1 OSHA Recordable Cases (TRC)
  - 0 Days Away or Restricted Time (DART)



SLAC ELECTRICAL ARC FLASH INJURY

Event Description

On Tuesday, December 27, 2022, three electricians at SLAC in California were involved in an electrical incident. The workers were preparing to do maintenance on 12 kV switchgear. They turned off the main breaker and three load-side breakers in the switchgear and disconnected them. To do a ZVV (Zero Voltage Verification), they opened the back panel of the switchgear. At some point, while attempting the ZVV, there was an arc flash.

The electrician in the switchgear was taken to a local hospital.

Key Take-Aways

Although the investigation is ongoing, there are some important preventative measures that are worth highlighting. All employees and contractors have the authority to stop or pause work if they believe there is a safety concern.

Examples of reasons to pause or stop work include:

1. improper PPE and clothing for the task
2. incorrect meter or incorrect tools
3. unsafe environmental or weather conditions
4. uncertainty of ZVV testing points

LAB WIDE SAFETY REFRESH

- **February 16th**
  - ANL All-Hands Meeting, 10 a.m.
- **Take an opportunity to refresh and refocus on working safely**
  - Reiterate important points/content from the Lab All-Hands
  - Important accomplishments over the past year
- **Focus on the change in work environment and practices as we begin the Upgrade project**

DEI STRATEGIC PLANNING

- Include DEI in APS strategic plan
- Ambition to have a more strategic document published, with a 5-year horizon.
- BES supports facility directors in redefining the way we will approach strategic plans in the future.
- Opportunity to think big and plan strategically for DEI activities.

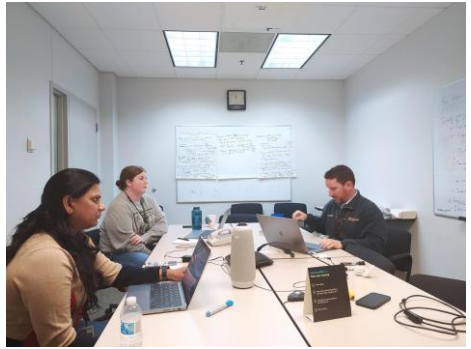
FOCUS GROUPS

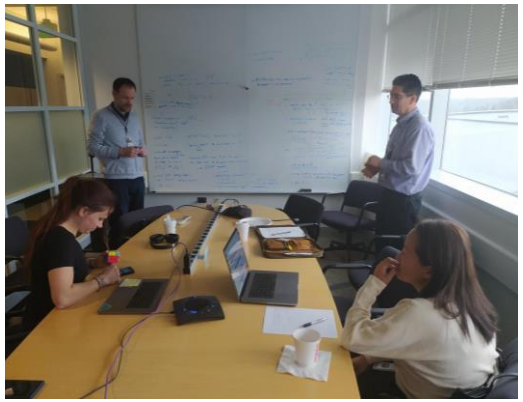
Psychological Safety: Increase real and perceived safety of “speaking up” & Improve communication about avenues available to resolve DEI issues

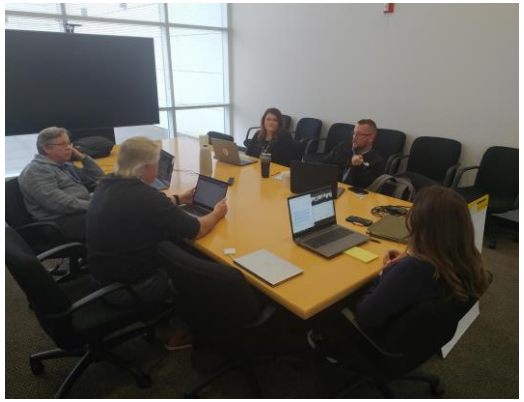
Diversity: Leverage ANL & DOE support for DEI activities and attract underrepresented minorities

Hiring: Carefully calibrate descriptions in job postings to lower the barrier for application but not the actual requirements for jobs

Career development: Increase engagement with staff on promotion process to facilitate career progression & improve the communication of opportunities for prof. development







DEI COUNCIL MEMBERS

Fanny Rodolakis
Chair

Becky Sikes
Co-chair

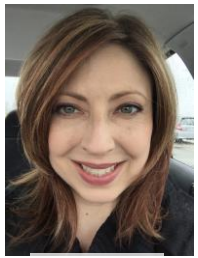
ALD

Nathan Rogers

Tracy Thomas

XSD

John Freeland



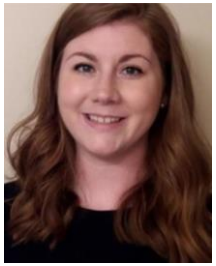
Lisa Gades

Zou Finfrock

AES

Chris Gorman

Luis Diaz



Ashley Wayman

ASD

Kathy Harkay

Sirisha Kallakuri

Elroy Chang

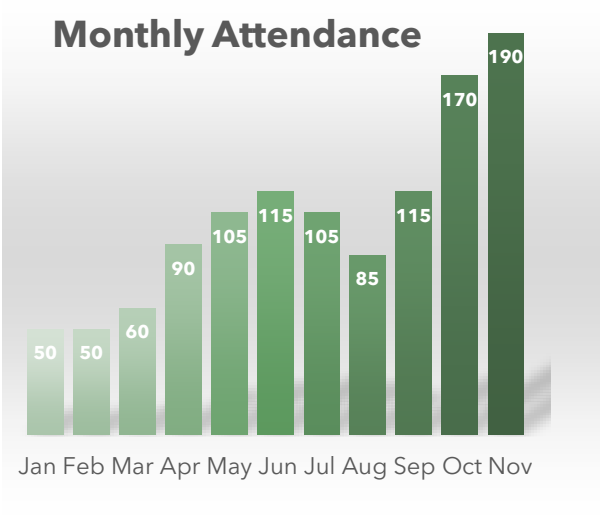
APS-U

Grace Avellar

Katie Martin

THE VOICE OF PSC

Every 3rd Thursday of the month @ 1PM



March

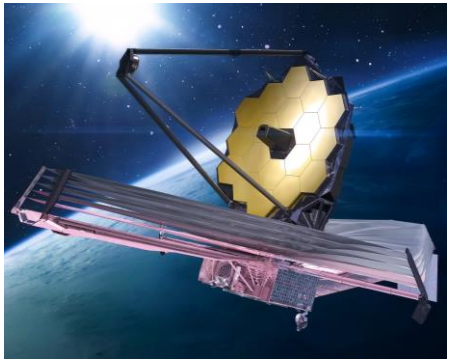
Dr. Jessica Wade

British Physicist Creates Over 1,600 Wikipedia Pages for Women Scientists and Scientists of Color

By Madeleine Muzdakis on October 19, 2022

April

Dr. Lou Strolger

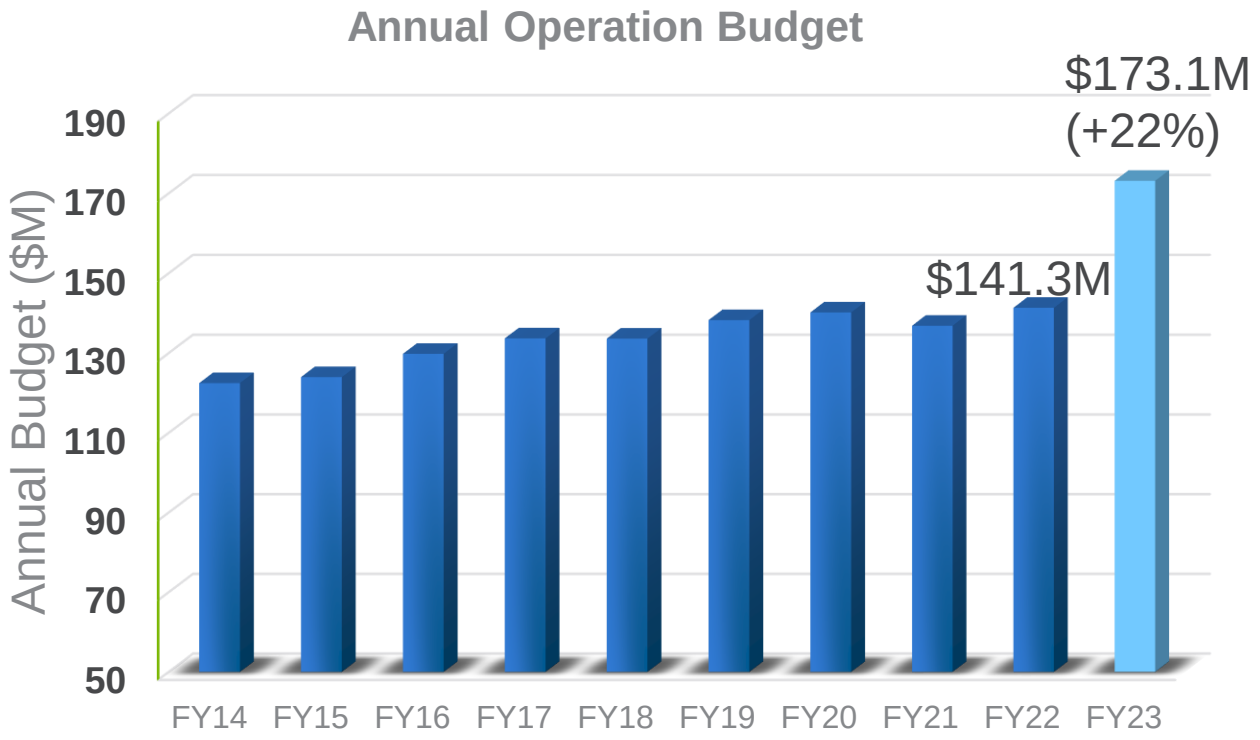


DEI – CONSULTATION

1. The DEI Committee will be seeking feedback from all employees on what HRS policies and procedures they would like more information on, this will include a prioritization of these items and a recommended approach to close the gaps in knowledge

2. The DEI Committee will be forming a diverse committee to gather recommendations on guidance on what it takes to receive an “Exceeds” in the Core Values and DEI assessments on the performance appraisal.

APS OPERATIONS – FY23 BUDGET



OPERATIONS BUDGET FOR LIGHT SOURCES

Thanks for the exceptional teamwork

- Staff /partners/users consistently delivering high impact science, new technology and operational excellence
- Exceptional support and engagement from BES to build out years budget bottom-up
- Lab directors and government relation staff working together to drive change for light sources
- Very active engagement, and excellent tours/VIP visits to showcase the importance of APS in the research ecosystem.

Harriet Kung, Deputy Director for Science Programs, Office of Science
Oct. 13, 2022

MOVING FORWARD

1) Increase staffing levels to support beamline operation at APS-U and existing beamlines that have not operated at full capacity

*This is essential to **attract and retain talent**, remain at the cutting edge of innovation in collaboration with our user community, and successfully address the **big data and sample environment/automation** challenges at fourth generation synchrotron facilities*.

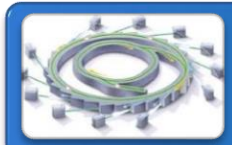
2) Replacement of the **obsolete high-power radiofrequency** (RF) klystrons with solid-state RF amplifiers for the APS Booster synchrotron and Storage Ring, **deferred maintenance at APS**.

3) Include a level of capital expenditure in our baseline budget to support a rolling program of upgrades to maintain an internationally competitive beamline portfolio

4) Financial support for **DEIA activities** commensurate with our ambitions

EXCHANGE OF STAFF PROGRAM

A rolling yearly visitor program that encourages long duration visits (1 to 6 months) of PSC staff at various host institutions



Working collaboratively at other BES U.S. light sources, neutron sources or nano centers

MSIs

Create new partnerships with MSI and HBCUs (primarily non r1 MSIs), including educating communities on synchrotron enabled science and technology

Working at international light sources with the aim of improving bilateral collaborations (US-Germany, US-UK, US-Sesame….)

Working at a collaborator academic institution on existing science and technology projects, or as a learning experience in a priority area identified as part of the annual personal development plan

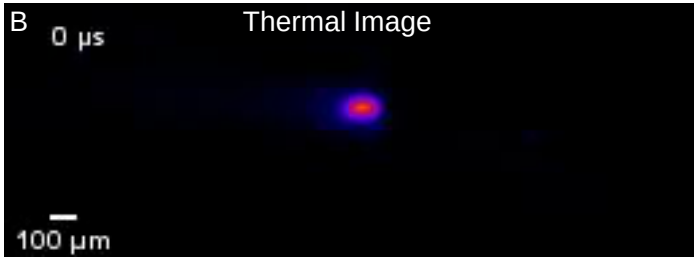
Please contact your DD or senior leader for more details

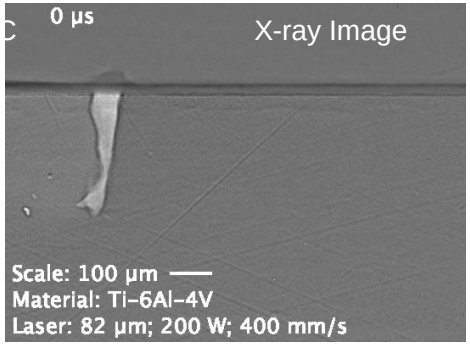
HR UPDATES

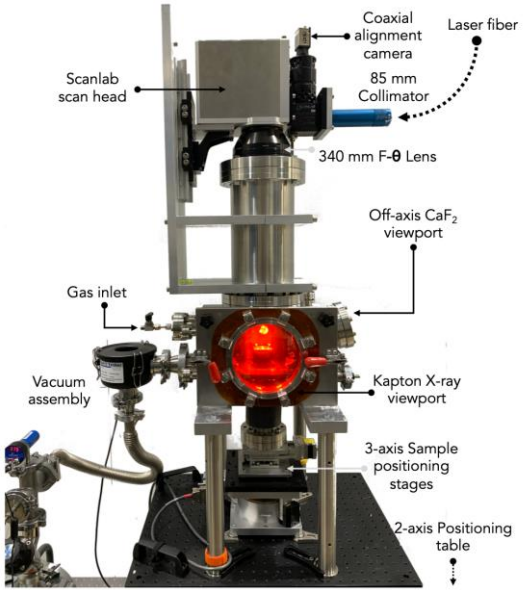
- **Effective immediately there is a revised Impact Argonne Awards process for PSC**
  - Do not submit the nomination in Workday until it has been approved
- **Mentors and Volunteers are needed for 2023 Introduce a Girl to Engineering Day**
  - Register by February 8th
- **Argonne's Employee Assistance Program expands on-site counseling hours**
  - Argonne's Employee Assistance Program (EAP), now offers on-site counselor appointments on Tuesdays and Thursdays. Licensed social workers are available for employees from 8 a.m. to 4 p.m. on those days
  - Contact the Perspectives call center at 800-456-6327
- **New enhancements to the bereavement leave to include pregnancy, fertility, adoption losses**
  - For absences due to the death of any covered family member, benefits-eligible employees receive three days of paid leave, and up to 10 days of unpaid leave
  - Please see LMS-PROC-170: Bereavement Leave for details
- **Ombuds offering classes on communication**
  - More information available on MyArgonne

MACHINE LEARNING-AIDED REAL-TIME DETECTION OF KEYHOLE PORE GENERATION IN LASER POWDER BED FUSION

In-situ high-speed imaging 32-ID, Ex-situ tomography 2-BM





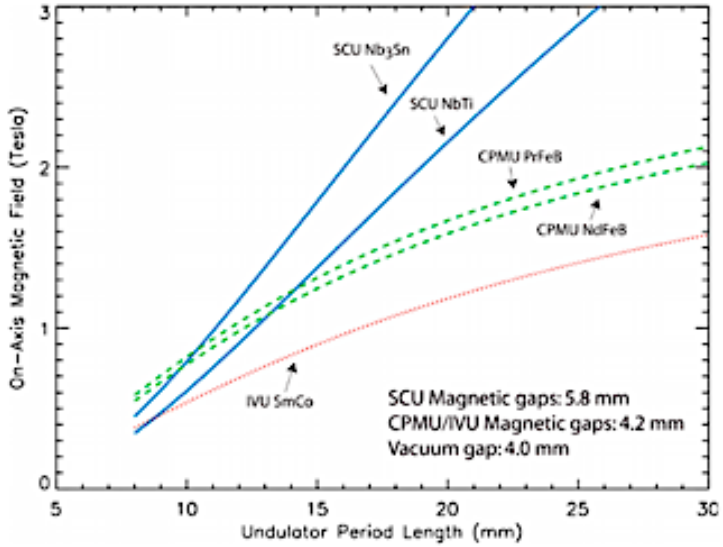


Zhongshu Ren, et. al. Science **379**, 89 (6 January 2023).

SUPERCONDUCTING UNDULATOR TECHNOLOGY

APS is on the Verge of another step forward in SCU, with the delivery of a Nb3Sn SCU with potential 20-25% field enhancement

- Existing SCUs use the well-established NbTi wire
- Nb3Sn wire has higher current capabilities
- However, the material is more brittle and difficult to handle, requiring high temperature treatment
- In 2018, DOE-BES funded a development effort to demonstrate Nb3Sn in an SCU. Working together with Fermilab (heat treatment) and Berkeley Lab (quench protection), we have built the world's first Nb3Sn SCU for use in an accelerator and are about to demonstrate in the APS.

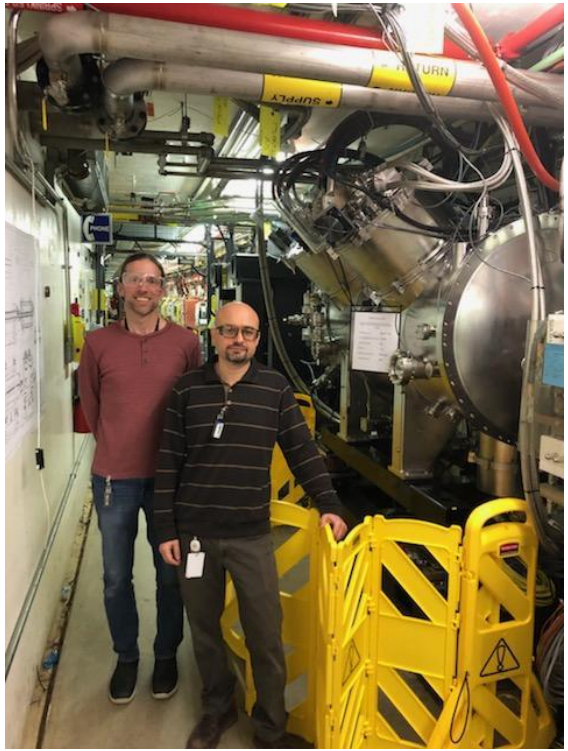


Calculated on-axis magnetic fields of two cryogenic permanent magnet undulators (CPMUs), two superconducting undulators (SCUs) and on in-vacuum undulator (IVU) for a vacuum gap of 4.0 mm for period length from 8 mm to 30 mm.

E. Moog, et.al. ANL/APS/LS-348, 2017.

NB_3SN SCU IS INSTALLED IN SECTOR 1 AND READY FOR COMMISSIONING

- Efim Gluskin serves as the PI for this project and Ibrahim Kesgin as the Technical Lead.
- The minimal goal is to demonstrate that Nb3Sn SCUs can survive a real beam radiation environment. The ”stretch” goal is to show the brightness improvement expected with higher field.
- The SCU team has worked very hard to install this device for a beam test since it’s the last chance to do so before the APS dark time.
- Thank you to the beamline users for supporting this effort.

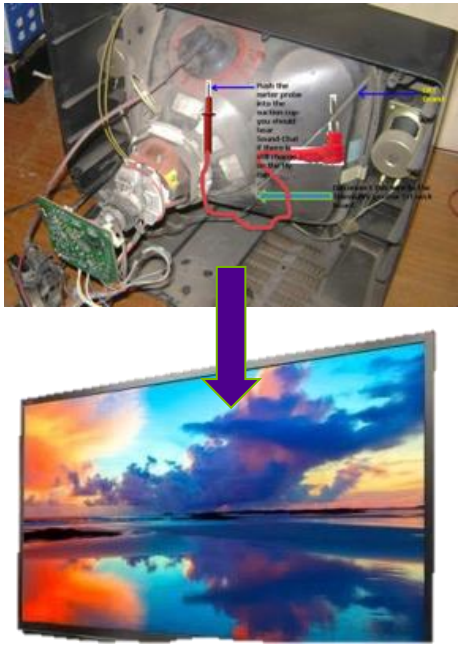


Ibrahim Kesgin and Matt Kasa next to the newly installed Nb3Sn SCU

FROM TUBES TO TRANSISTORS: UPGRADING THE STORAGE RING RF SYSTEM TO SOLID-STATE

A critical need to maintain operation beyond the APS Upgrade

- The original APS RF system is based on MW-class klystrons that no longer are being produced; all modern telecom systems are based on solid-state amplifiers.
- This development is similar to what other storage rings have done. **For APS the challenge is the 2 MW RF power requirement.**
- Plan to convert the APS storage ring RF system to solid-state amplifiers. The new budget authority makes the delivery of this program a reality.



FIRST 200 KW SSA PROTOTYPE REACHES FULL POWER AND MEETS ALL ACCEPTANCE!

Kudos to project leaders Ali Nassiri and Doug Horan and the entire RF group.

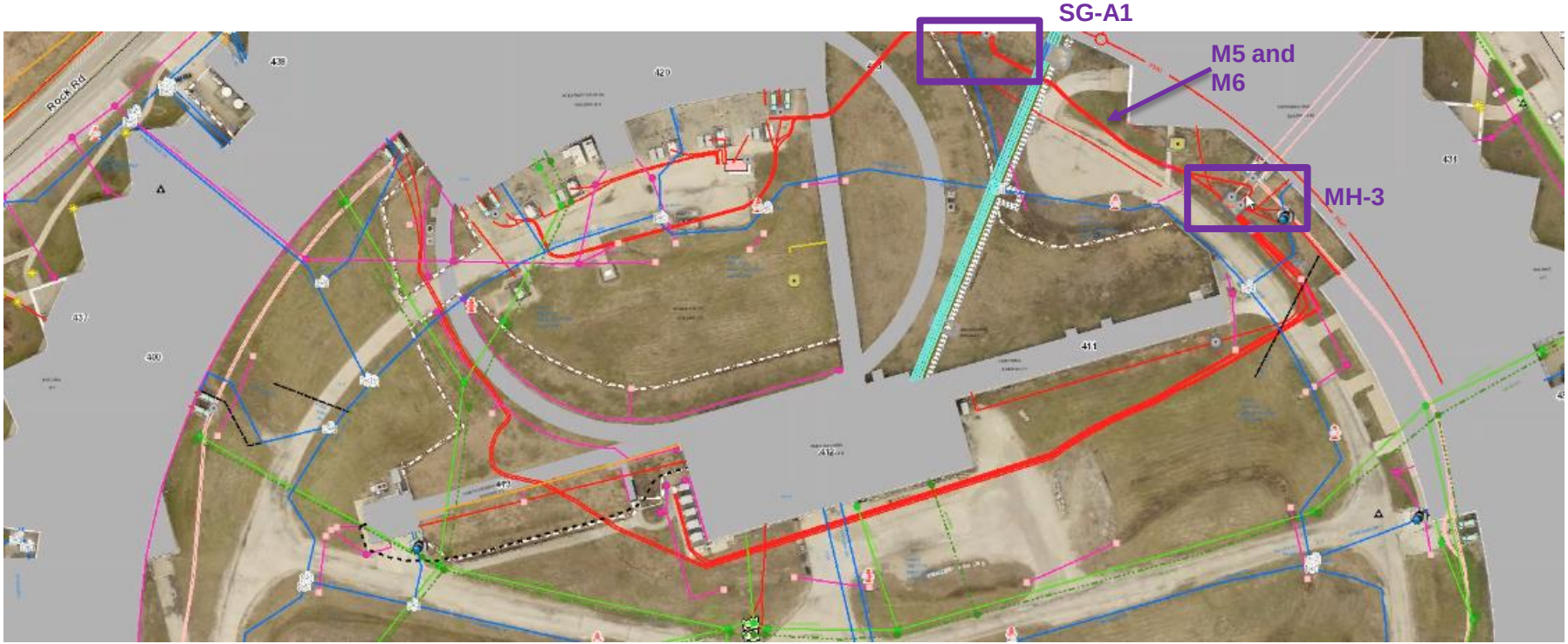
Combiner cavity

Amplifier racks

Plan is to begin procurement of production system in spring 2023 with first units arriving after APS-U commissioning. System will be completed by 2027.

APS 13.2KV POWER SHUTDOWN JAN. 3-13

Repair faulted cable (M6) from manhole 3 (MH-3) to switchgear A-1

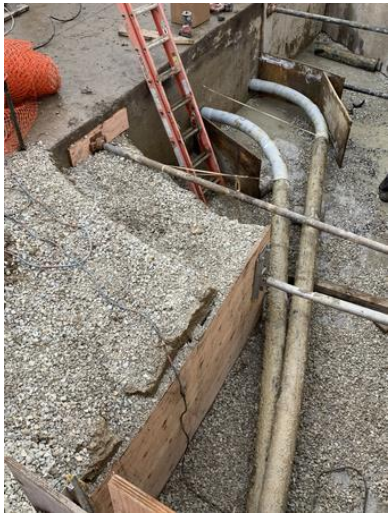


APS 13.2KV POWER SHUTDOWN JAN. 3-13

Repair faulted cable (M6) from manhole 3 (MH-3) to switchgear A-1

Included in the planned repair:

- Replace M6
- Identification and labeling of all cables in MH-3
- Install two sump pumps
- Cable testing

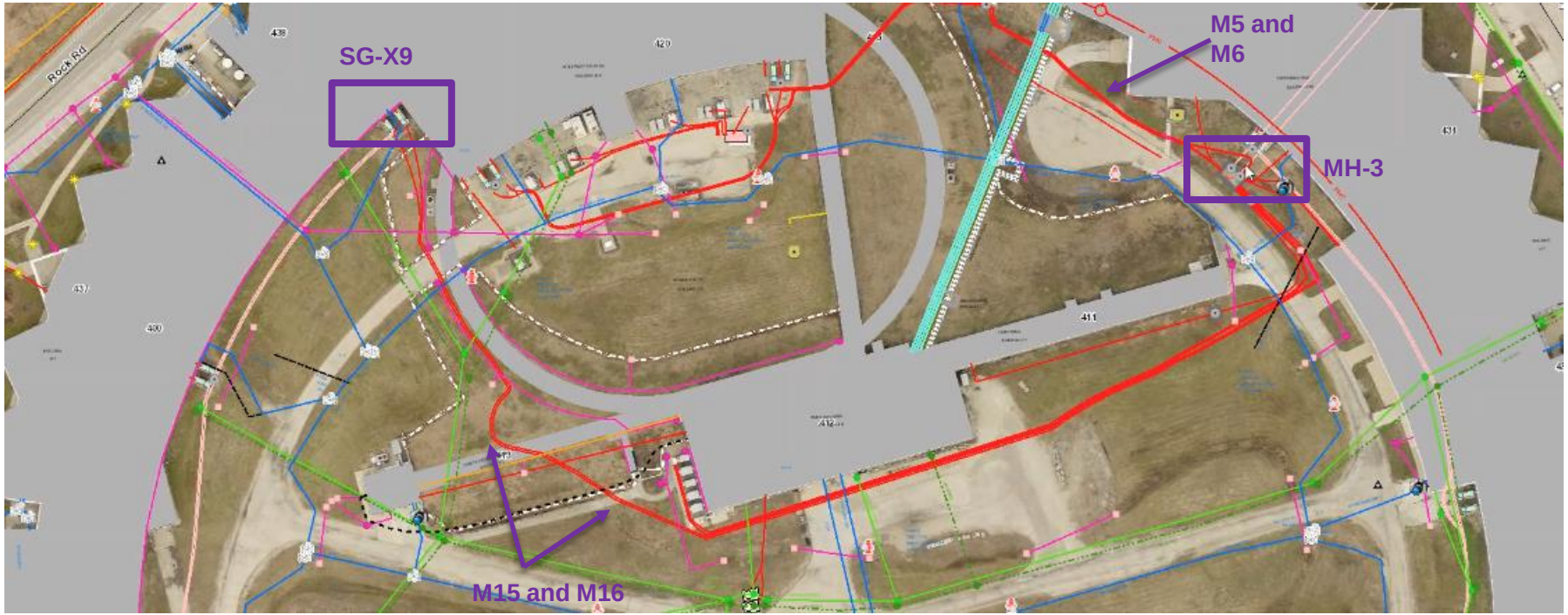


MH-3 buried conduit

M-6 in MH-3 and cable labeling

APS 13.2KV POWER SHUTDOWN JAN. 3-13

Scope expansion: M5 replacement, M16 splice repair, cable testing



APS 13.2KV POWER SHUTDOWN JAN 3-13

Scope expansion: M5 replacement, M16 splice repair, cable testing

- M6's adjacent cable (M5) did not pass test – replaced
- M16 did not pass testing – splice replaced
- M16's adjacent cable (M15) passed testing, will monitor.

APS-U PROJECT UPDATE

2016 Kentucky Derby winner Nyquist coming out of the last turn…

Jim Kerby
APS Upgrade Project Director
PSC All Hands Meeting

January 25, 2023

U.S. DEPARTMENT OF ENERGY
Argonne National Laboratory is a U.S. Department of Energy laboratory managed by UChicago Argonne, LLC.

Argonne NATIONAL LABORATORY | Advanced Photon Source

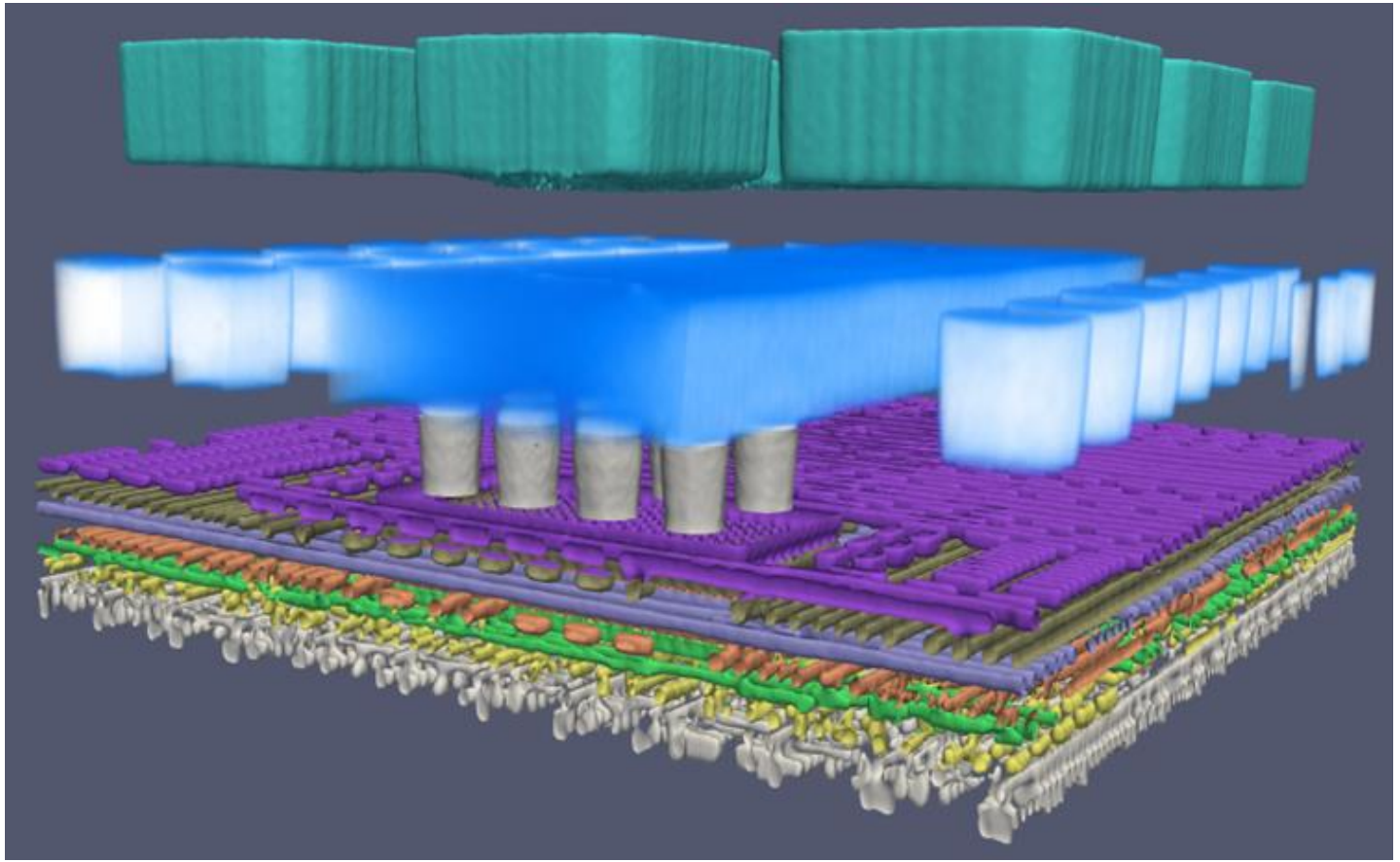
AND HERE WE COME…

AND HERE WE COME…

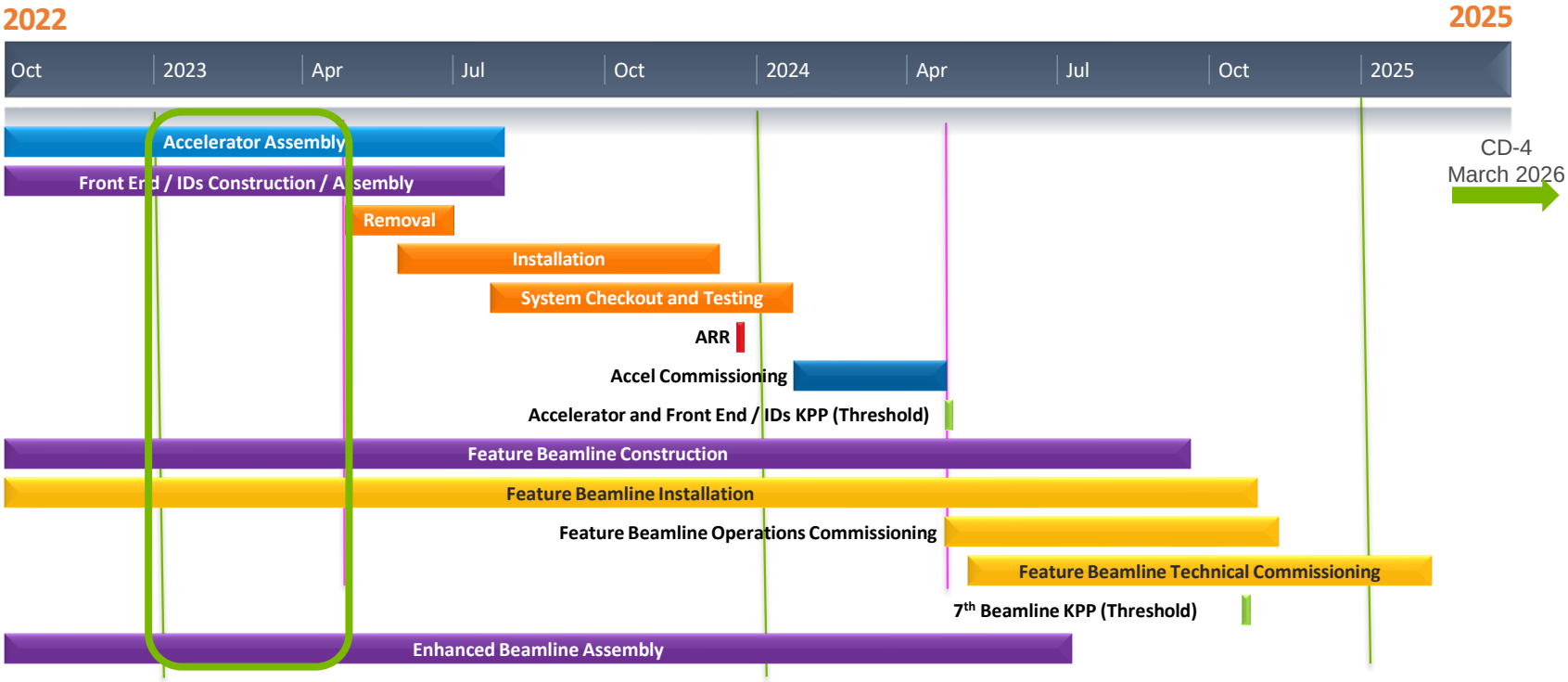
x500

$815M

$1.5B



SCHEDULE – LOOK AHEAD



THIS IS THE LAST APS USER RUN

81 days to go! You can find the counter at the top of the APS Web Page.

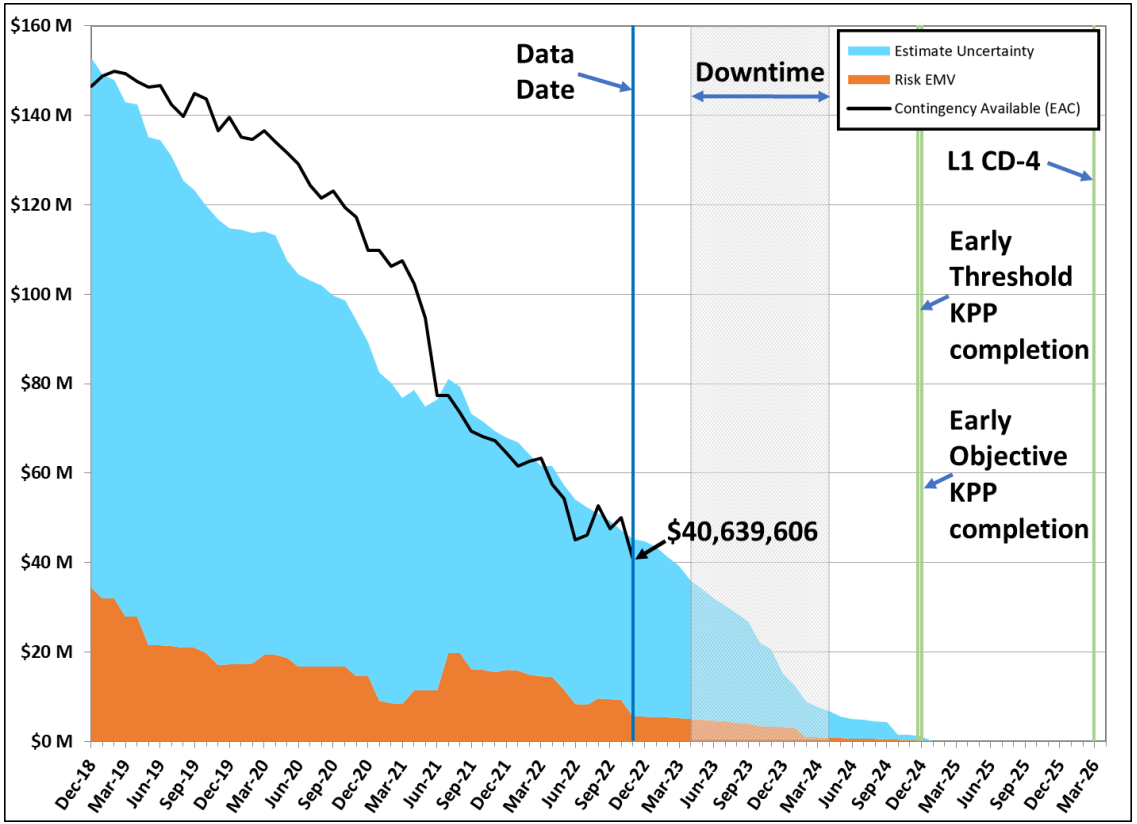
The start of the downtime is driven by our accelerator systems readiness.

Despite all hardships, module production has continued, and as of today we have 21 modules FULLY completed and 5 more in the final stages of assembly.

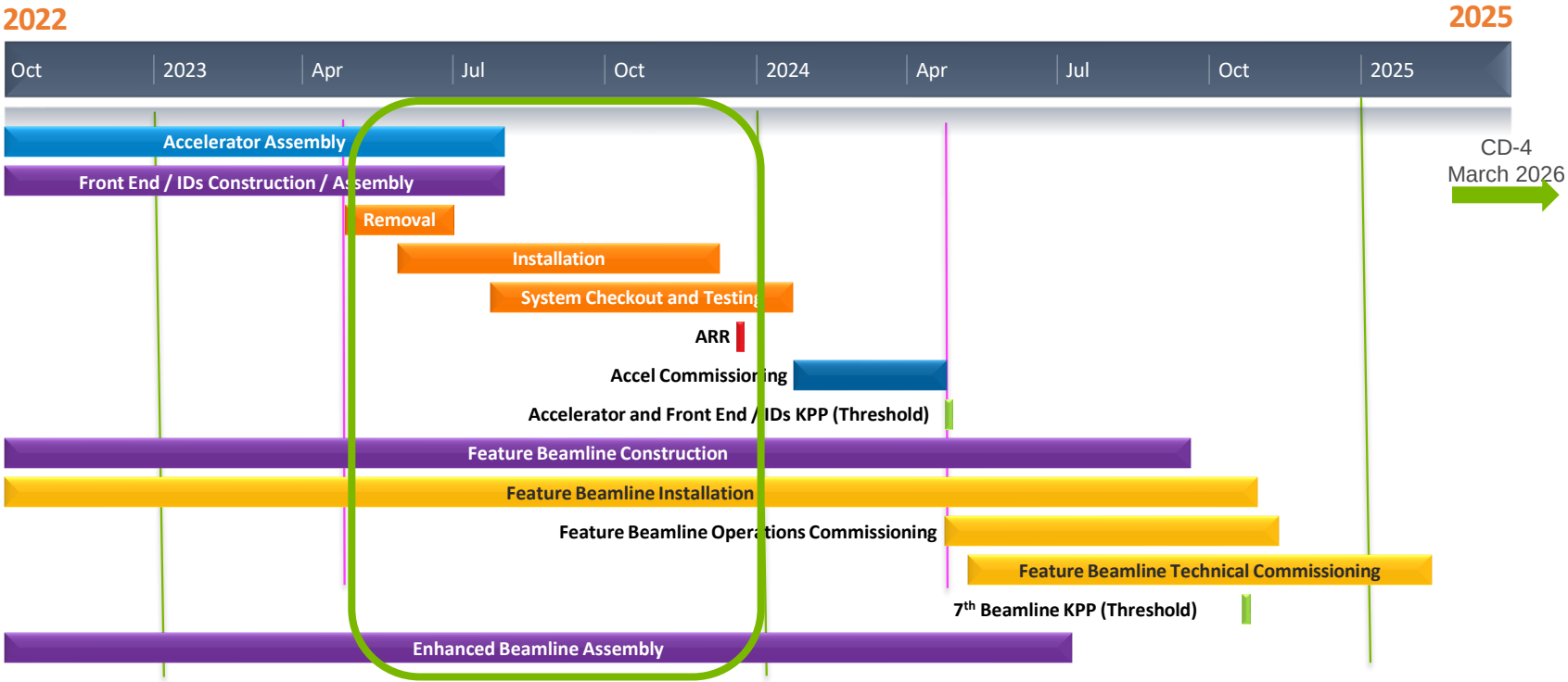
With continued oversight, we expect to safely execute the downtime.

PROGRESS AND CONTINGENCY

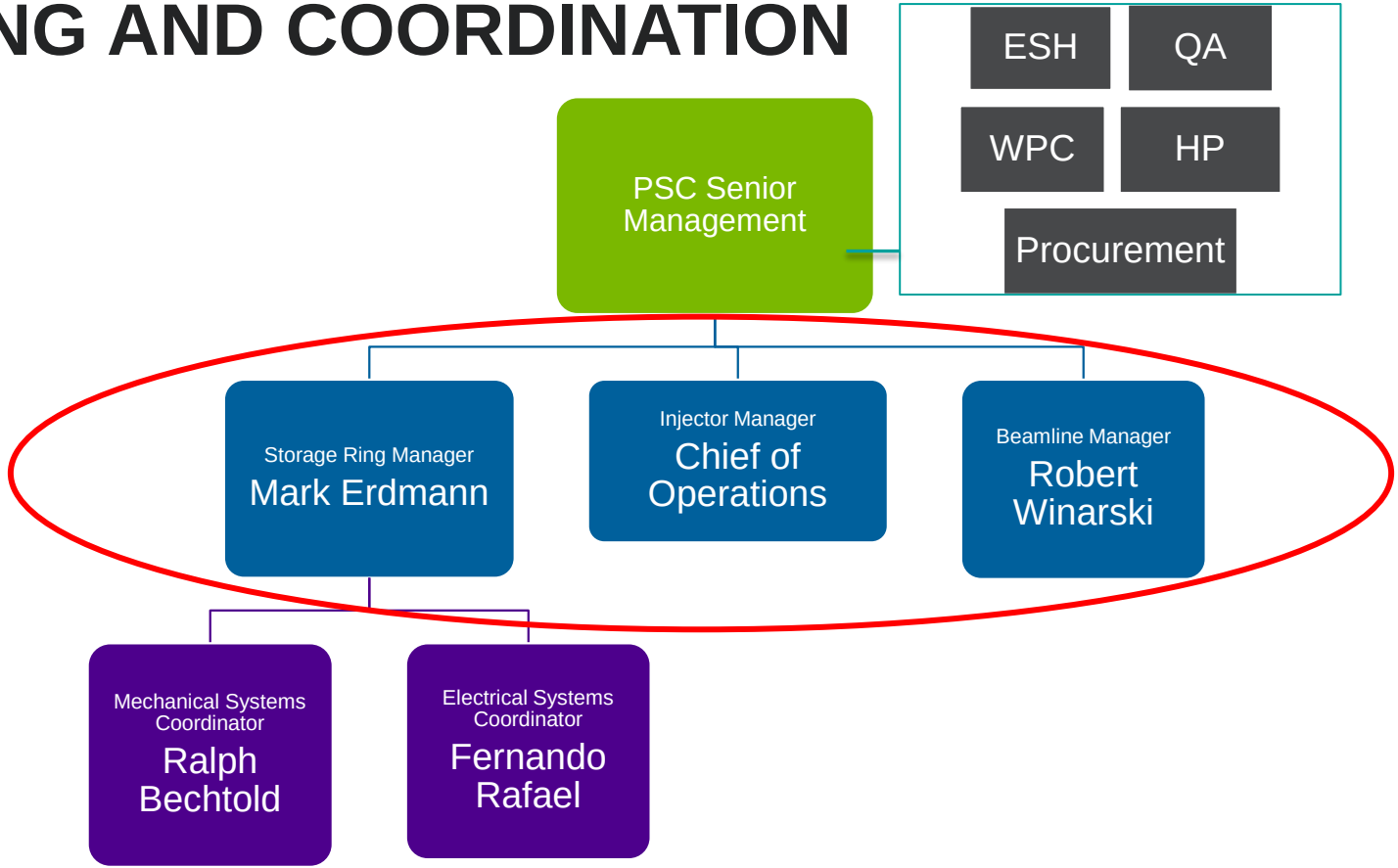
- Contingency remains TIGHT, and the schedule is near.
- Focus on completion of all designs – every last piece – and decisions needed to deliver the initial facility.
- Planning for the ramp-up of the machine and restart of the experimental program being done at the Directorate level.
- This is a massive and complex undertaking. Thoughtful and coordinated planning is needed to execute this -- SAFELY!



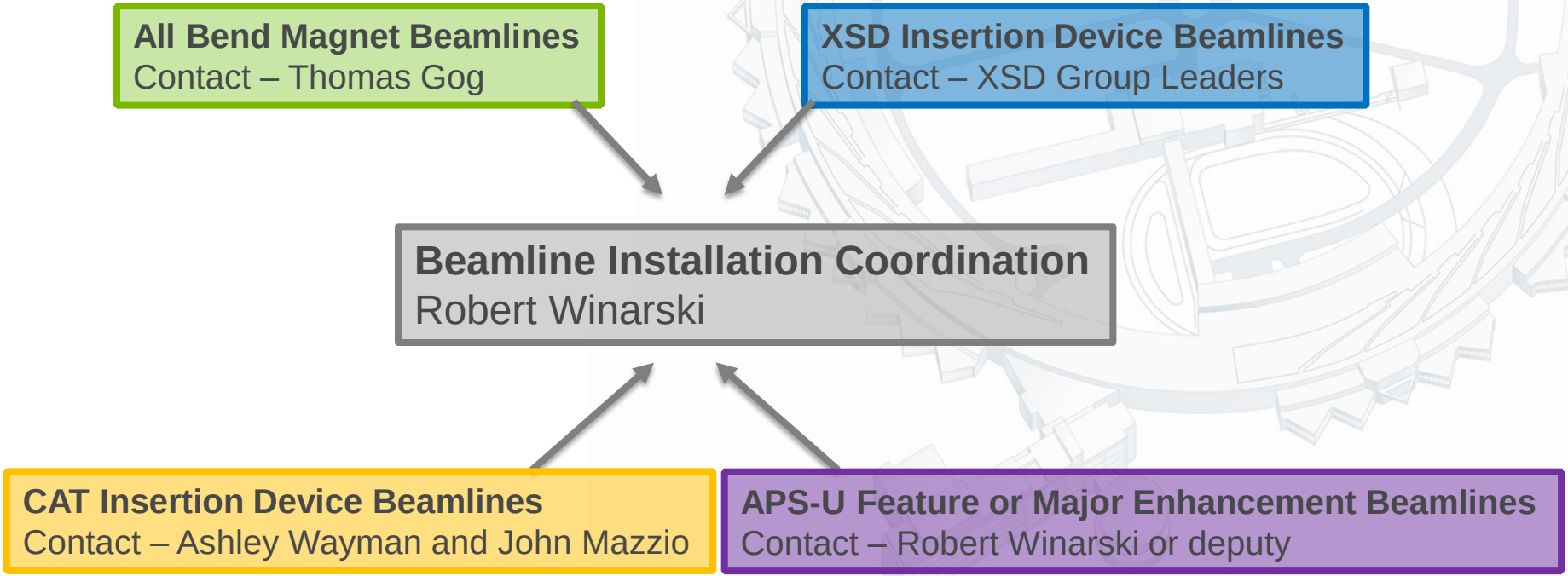
SCHEDULE – LOOK AHEAD



PLANNING AND COORDINATION



BEAMLINE RESOURCE COMMUNICATION COORDINATION



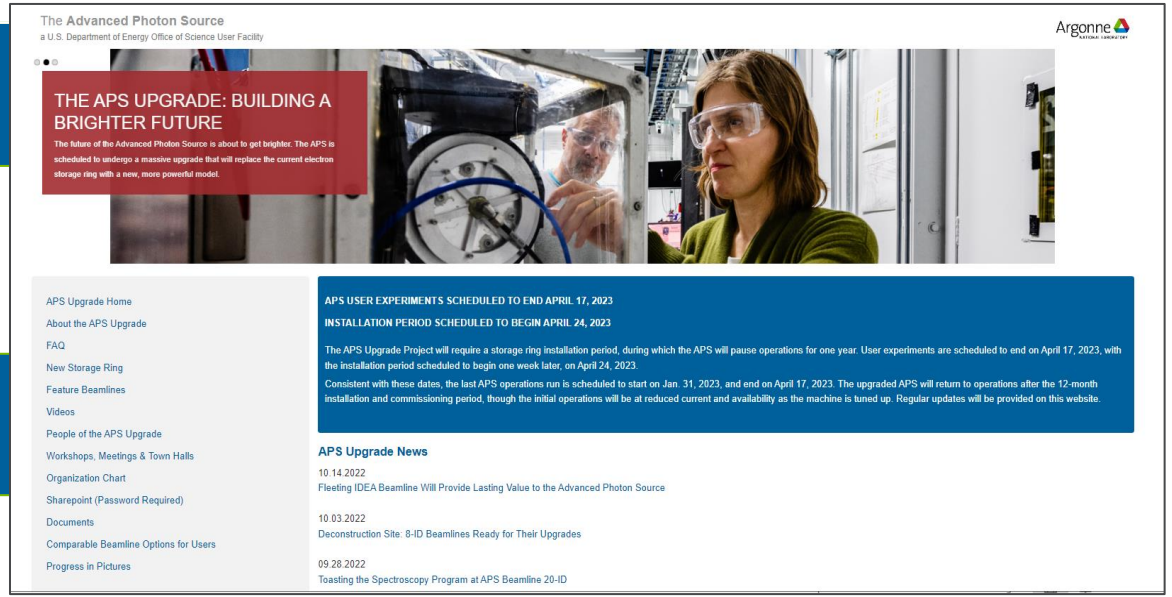
COMMUNICATIONS

APS Upgrade web page on the APS website

- https://www.aps.anl.gov/APS-Upgrade

APS Upgrade web page on the Argonne website

- https://www.anl.gov/aps-upgrade



SUMMARY

81 days to go! Safely!

It’s an exciting time! The goal is in reach. We will get there…One thoughtful step at a time.

The upcoming shutdown will be unlike any shutdown that has occurred in the past 25+ years.

Thank you for your continued interest in, support of, and safe work conducted on behalf of the Lab, PSC and the Upgrade.

USER SURVEY RESULTS AND PARTNERSHIPS

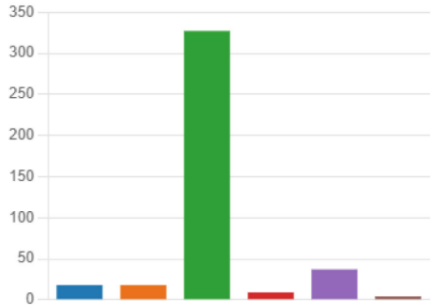
Dennis Mills
Deputy Associate Laboratory Director for Photon Sciences

DEMOGRAPHICS OF SURVEY RESPONDENTS

- **Survey fielded October/November 2022**
- **414 respondents (7% of the 5,558 survey recipients)**

What is your primary APS affiliation?

APS staff member	18
Resident user/resident beamline...	18
General user	327
Partner user	9
Collaborative access team mem...	37
Other	4



What techniques do you use? (Check all that apply)

Imaging techniques	96
Macromolecular crystallography	91
Scattering and diffraction techni...	253
Spectroscopy techniques	126

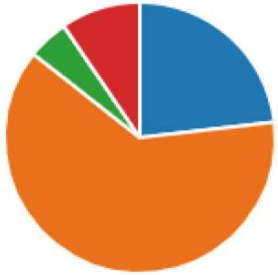
QUESTIONS ABOUT APS-U COMMUNICATIONS

Do you feel you are well-informed about the APS Upgrade Project?

Very well informed	123
Well informed	167
Somewhat well informed	99
Not well informed	23

Where do you get news and information about the APS and the APS Upgrade?

APS/Argonne website	95
Emailed updates	256
Q&A sessions	20
Other	39

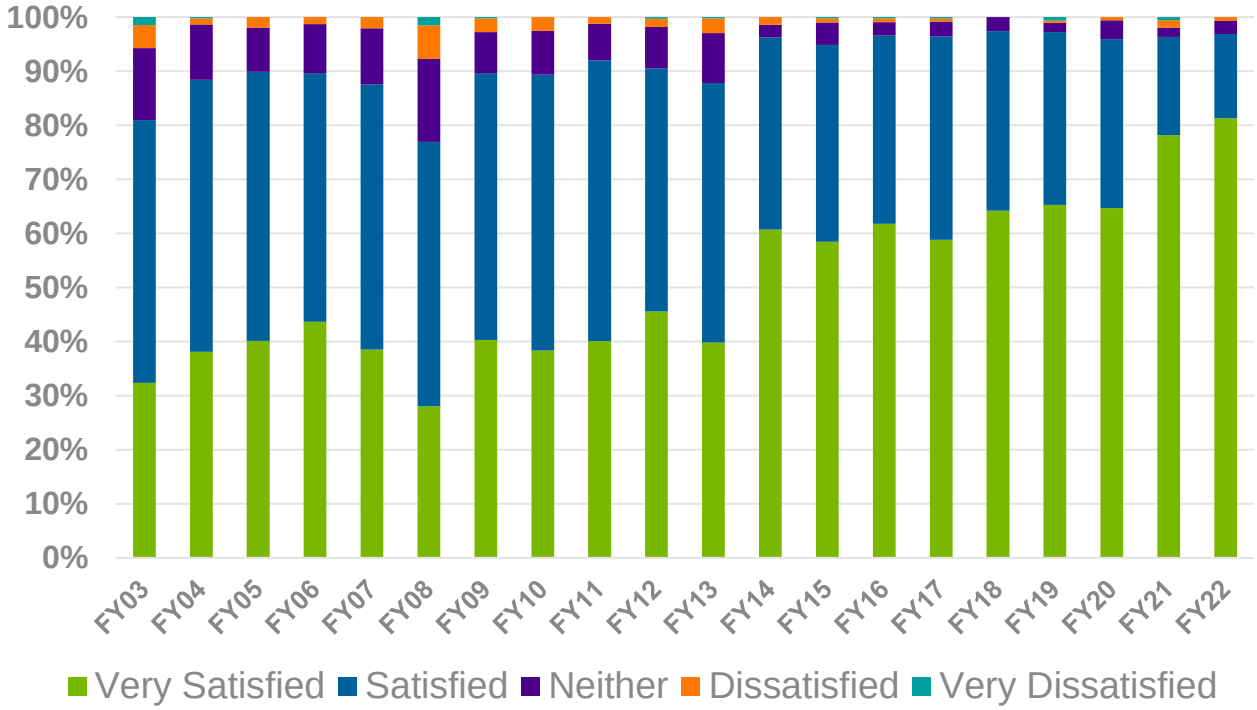


Have you participated in the twice-yearly APS Upgrade Q&A sessions?

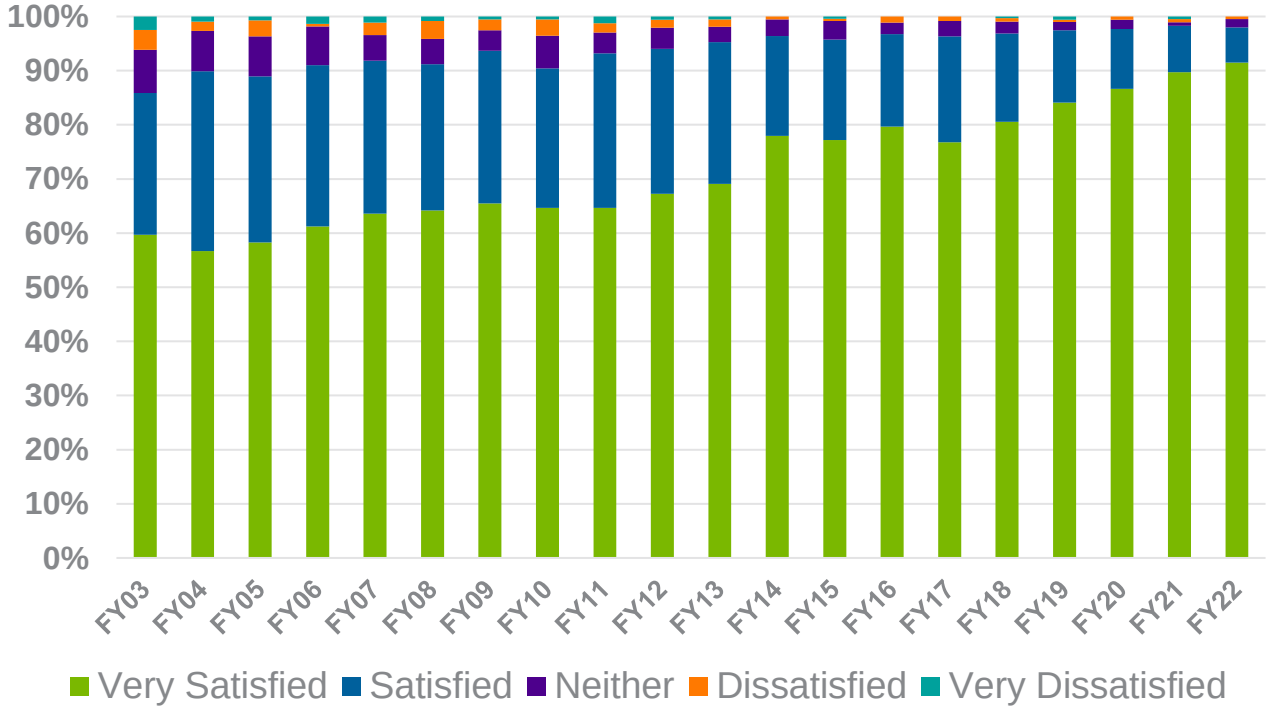
Yes	78
No	328

The next Q&A session will be held during the APS User Meeting. If you are in contact with users between now and then, encourage them to attend.

How satisfied were you with the fraction of the year that the facility operates?



How satisfied were you with the support for users provided by the beamline staff?



A LOT OF SHOUT-OUTS TO THE STAFF…

- We were so appreciative of **Dr. Sungsik Lee**, for his dedicated and professional assistance.
- **Steve Weigand** is awesome. So friendly, excited, charismatic, knowledgeable, and helpful
- **Yu-Sheng Chen** is wonderful and made everything about our visit better.
- **Andrey Yakovenko from 11-ID-C** was a fantastic trainer and provided us with virtual help even after his working hours!!
- Thanks to the cooperation of the 12-BM beamline manager, **Sungsik Lee.**
- **Beamline staff at 31-ID** have provided excellent support to our projects.
- Big thanks to the highly participating and enthusiastic **Wenqian Xu (17-BM).**
- My **contacts at NE-CAT** are simply the best.
- APS is really a great facility. (my experience is only at **DCS**).
- The **staff and facility at SER-CAT** are excellent.
- Great support from the **staff at 33-ID**.
- Nothing but positive things to say about the local instrument **staff at Sector 1.**
- **Wei Bu and Mrinal Bera (Sector 15)** are the best scientists I have worked with.
- The beamline scientist **Pasha at 2-BM** went above and beyond helping us.
- Thanks for the help from **Saul Lapidus and his postdoc.**
- We hugely appreciate the help and expertise of **Jesse Hopkins and Max Watkins at BioCAT**.
- **Alex Deriy at 32** was a tremendous help.
- **24-ID-C and 24-ID-E** are very efficiently operated beamlines.

OPPORTUNITIES FOR IMPROVEMENT

Site Access

The security protocols need to be improved. Every time we had an uber driver come to pick us up the protocol was different!

Operations

There were more and longer beam dumps than one would like. Machine obsolescence is understandable, it is important to use this as feedback to DOE that such obsolescence has to be fixed on a continuing basis.

Amenities

I own an electric vehicle that I would like to drive to APS for beamtime. But visitors cannot use the onsite charging stations. For a DOE facility to not allow visitors to charge their vehicles on site seems very strange. I think this should be fixed.

Miscellaneous

The short run #2 and its interruption in August/September is very inconvenient.

SOME FINAL COMMENTS

I have been an APS user for over 10 years, first as a trainee and now a PI. The facilities have been essential to my research. Thank you for providing access to such an outstanding facility and services to general users.

Finish the upgrade as quickly as possible.

APS is an outstanding facility – has good safety support and beam energies for actinide/radioactive materials work.

You should strongly consider returning the Users Meeting to an in-person format. One of the most important aspects of this meeting is networking.

I received help and guidance from the APS staff at all required moments. My samples were run and the data collected was sent to me on a great timeline.

UPDATE ON NEW PARTNERSHIPS

- **Defense Materials Science Sector (DMSS)**

- **Diamond Light Source (DLS) / LS-CAT / APS collaboration to mitigate the impact of the dark time during APS-U for MX users**

- **SSRL collaboration to mitigate the impact of the APS dark time for MX users**

More details to follow on both the DLS and SSRL partnerships soon!

SYMPOSIUM AT THE APS/CNM USERS MEETING AND THE LAST LIGHT CELEBRATION

We are planning two events to mark the transition from APS to APS-U:

Symposium at the APS/CNM User Meeting
on the afternoon of Tuesday, April 18

Symposium Organization Committee
- Jeff Collins (AES)
- Geoff Pile (AES)
- Karolina Michalska (XSD)
- Suresh Narayanan (XSD)
- Alec Sandy (XSD)
- Susan White De Pace (PSC)
- Michelle Mejia (APSUO Chair)
- Lisa Keefe (IMCA CAT)
- Communications Team

Last Light Celebration (date TBD but expected to be near the start of the dark time).

Last Light Organization Committee
- John Byrd (ASD)
- Anita Garcia (ASD)
- Vadim Sajaev (ASD)
- Steve Davey (AES)
- Andrzej Joachimiak (XSD)
- Dean Haeffner (XSD)
- Tracy Thomas (PCS)
- Denis Keane (DND CAT)
- Mark Rivers (GSECARS CAT)
- Communications Team

Currently planning both events. Ideas? Contact me or a member of our planning committee.

Awards and New Starters

Laurent Chapon
Associate Laboratory Director for Photon Sciences
APS Director

IMPACT ARGONNE AWARD RECIPIENTS

Extraordinary Effort

- Claybourne White
- Kevin Peterson, Junjing Deng, Si Chen, Evan Maxey, Fabricio Marin

25+ YEARS SERVICE AWARDS

25 years

Jorg Maser
Michael Hahne
Jin Wang

30 years

Gregory Banks
Guy Harris
Mark Martens
Linda Shoudis

35 years

Dennis Mills

40 years

Kenneth Volin

AWARDS AND RECOGNITIONS

Stefan Vogt selected for DOE Oppenheimer Science and Energy Leadership Program

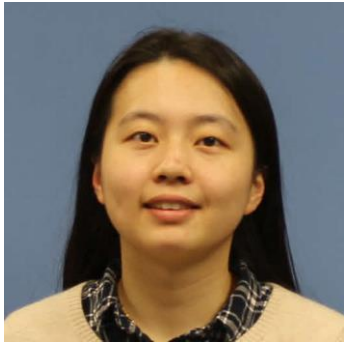
Ken Belcher, Mike Edelen and George Doktorczyk received Board of Governors awards for Outstanding Safety Performance

NEW STARTERS

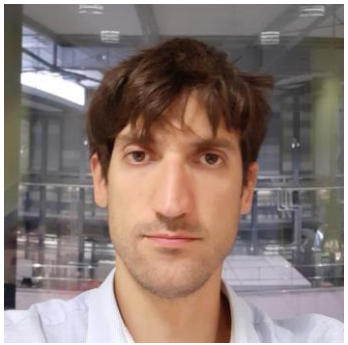
Davide Bianculli

Paul Bednarski

Shea Stewart



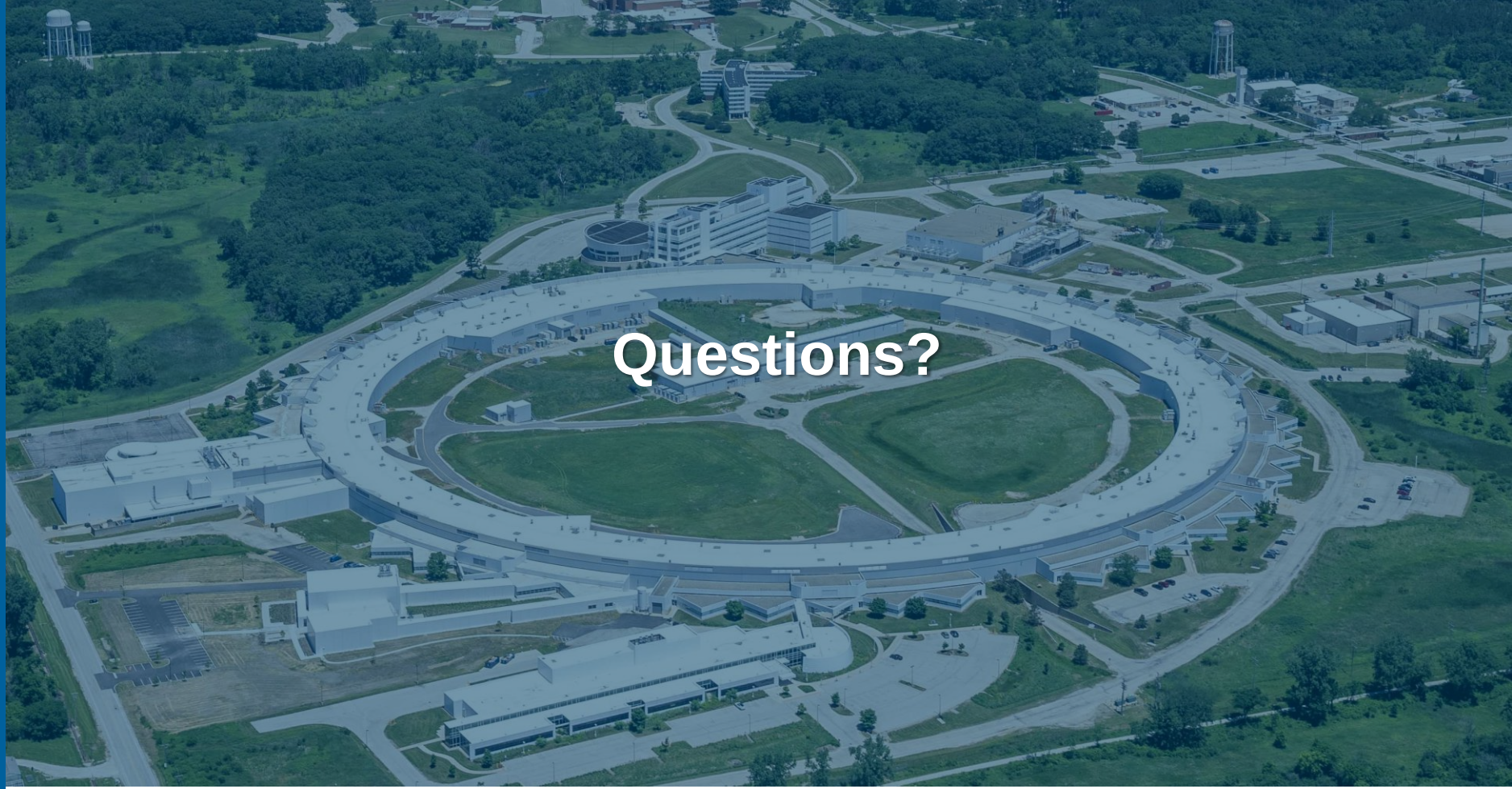
Xiaoyang Liu

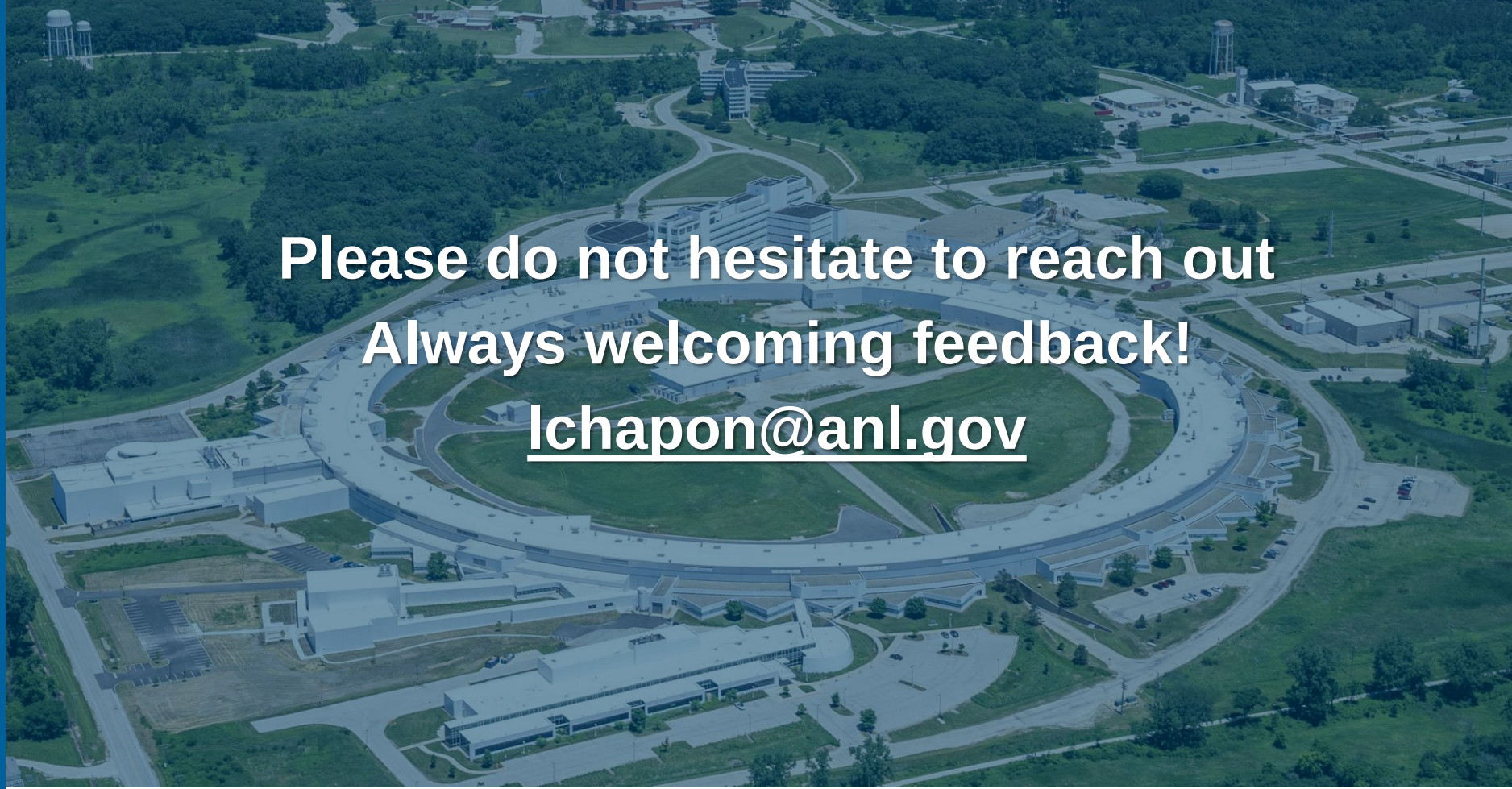


Alberto Mittone

Savannah Novencido

Frankie Hernandez


Questions?



Please do not hesitate to reach out

Always welcoming feedback!

lchapon@anl.gov