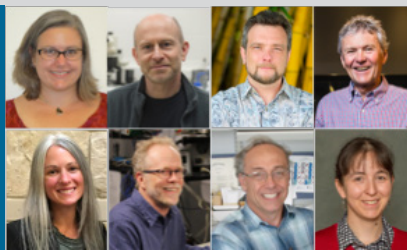


# COMPRES

CONsortium for Materials Properties Research in Earth  
Sciences



Newsletter  
May 2020

## COMPRES 2020 Virtual Annual Meeting Aug. 14

Because of the COVID-19 pandemic, the 2020 COMPRES Annual Meeting will be held virtually on Friday, August 14, 2020.

There will be no registration fee, however all participants must register by July 29, 2020. To register go to <http://compres.unm.edu/form/registration-2020-virtual-meeting>.

Abstract submission is now open to students, post-docs and professionals. Please go to <http://compres.unm.edu/form/submit-abstract-2020> for a template and to submit an abstract. Abstracts are due at 5pm MDT on June 26, 2020. Unlike years past, there will not be a poster requirement for each abstract.

The meeting will be for one day (9-16:30 MDT) and will include oral presentations of abstracts, a student break-out session, and the COMPRES business meeting.

<http://compres.unm.edu/events/annual-meeting/2020/2020-compres-annual-meeting-general-information>

Please contact Beth Ha ([beth3ha@unm.edu](mailto:beth3ha@unm.edu)) or Gloria Statom ([gstatom@unm.edu](mailto:gstatom@unm.edu)) for any questions.

## Some past COMPRES Annual Meetings

2019



2018

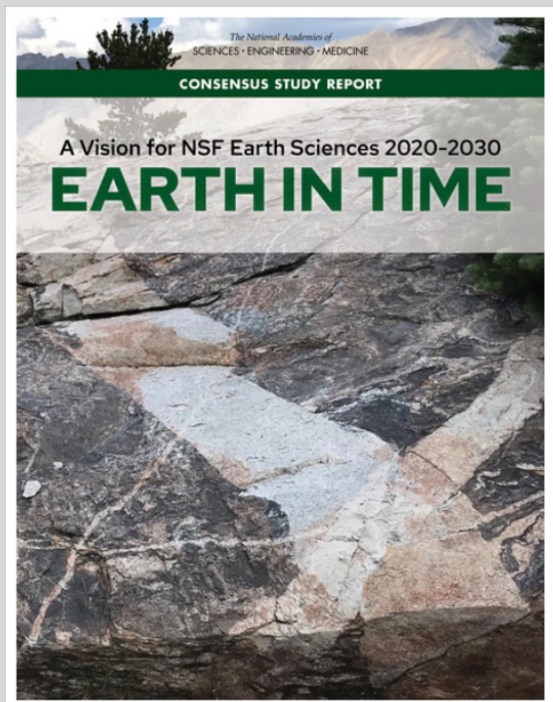


2016



2017

# National Academy of Sciences Decadal Survey



**“Recommendation: EAR should fund a Very Large Multi-Anvil Press Facility”**

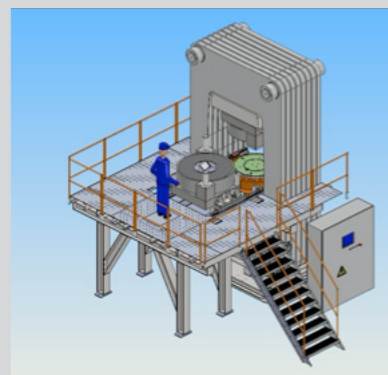
The NASEM recently published their decadal survey for NSF EAR for the period 2020-2030. Among the top 3 recommendations for new initiatives is a Very Large Multi-Anvil Press (VLMAP) User Facility. The report can be downloaded here: <https://www.nap.edu/catalog/25761/a-vision-for-nsf-earth-sciences-2020-2030-earth-in>

Science Magazine did a nice summary for the report press release: <https://www.sciencemag.org/news/2020/05/nsf-pushed-boost-funding-dating-and-squeezing-rocks>

In 2015 COMPRES supported a large multi-anvil workshop: <http://compres.unm.edu/workshop/us-large-multi-anvil-workshop>

A large multi-anvil press facility was also in the COMPRES IV renewal proposal: [http://compres.unm.edu/sites/default/files/renewal-proposals/COMPRES\\_IV\\_Project\\_Description.pdf](http://compres.unm.edu/sites/default/files/renewal-proposals/COMPRES_IV_Project_Description.pdf)

COMPRES looks forward to participating in future plans to make this facility a reality!

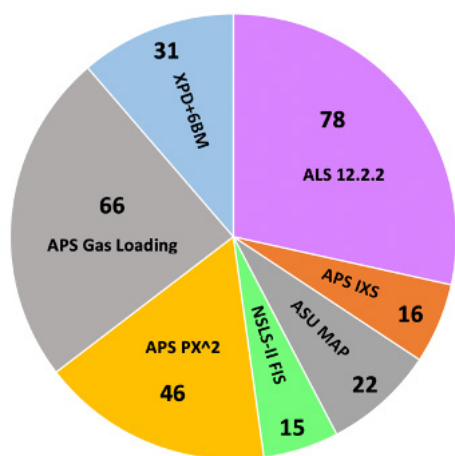


Very-large, high-pressure, multi-anvil systems in Europe (5000-ton, Bayerisches Geoinstitute, Germany, left), Japan (6000-ton, Geodynamic Research Center, Ehime University, Matsuyama, Japan, center), and a 3D sketch of a VLMAP (right). No such facility for materials synthesis and physical properties measurements exists in the United States.

## Some COMPRES Annual Report Highlights

We are approaching the end of year-3 (June 1, 2019-May 31, 2020) and embarking on year-4 of the five-year COMPRES IV Cooperative Agreement (2017-2022). We continue to support innovative high pressure Earth materials research at three national synchrotron facilities: Advanced Light Source (ALS) at Lawrence Berkeley National Laboratory, Advanced Photon Source (APS) at Argonne National Laboratory, and National Synchrotron Light Source-II (NSLS-II) at Brookhaven National Laboratory. COMPRES funds six facility sub-awards at these synchrotrons, as well as a seventh sub-award facility, the multi-anvil project, at Arizona State University, and eighth and ninth sub-awards within Education Outreach and Infrastructure Development (EOID) at Princeton University and the University of California, San Diego.

COMPRES Publications 2018-2019 n=274

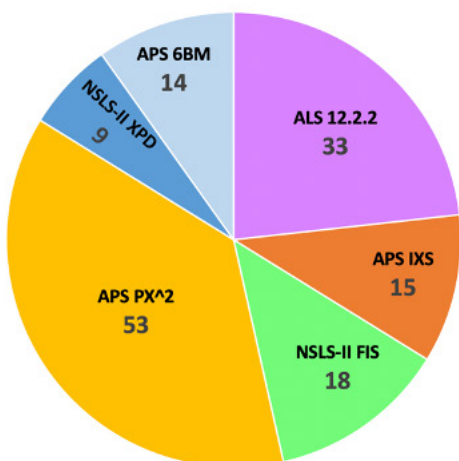


### Publications

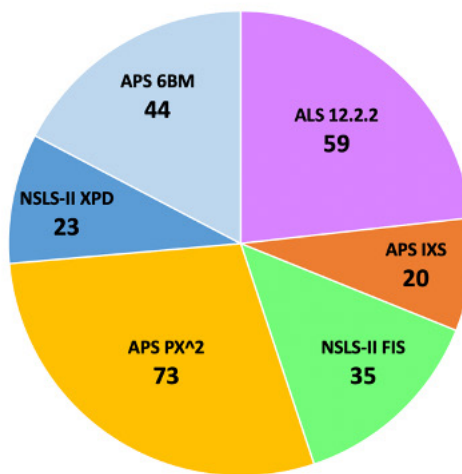
One the main products of the COMPRES enterprise is our contribution to the peer-reviewed literature. COMPRES supported research in 274 publications in 2018-19. The pie diagram gives the number of publications for each of the COMPRES facilities. For the complete list see: <http://compres.unm.edu/sites/default/files/publications/Publications2018-2019.pdf>

### User Metrics

COMPRES Beamline Total Unique Users n=142



COMPRES Beamline Total User Visits n=254



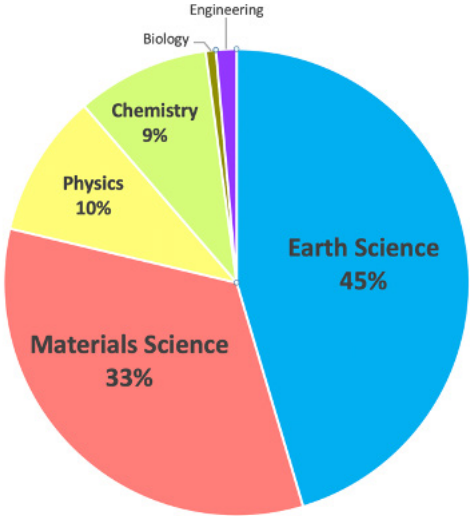
In the past year COMPRES hosted 142 unique users and 254 user visits at its synchrotron facilities



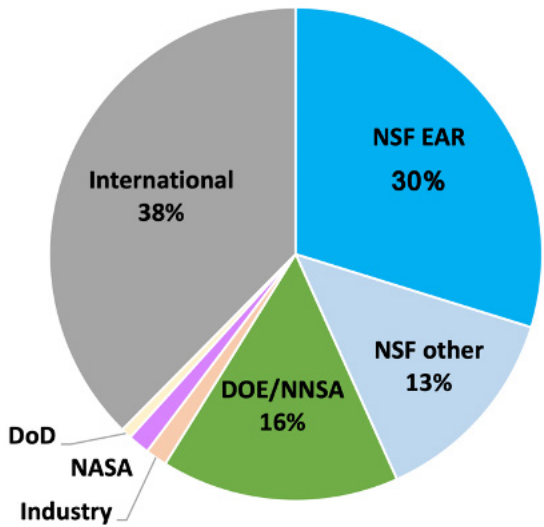
# Some COMPRES Annual Report Highlights

## More User Metrics

Research Areas of Beamline Proposals

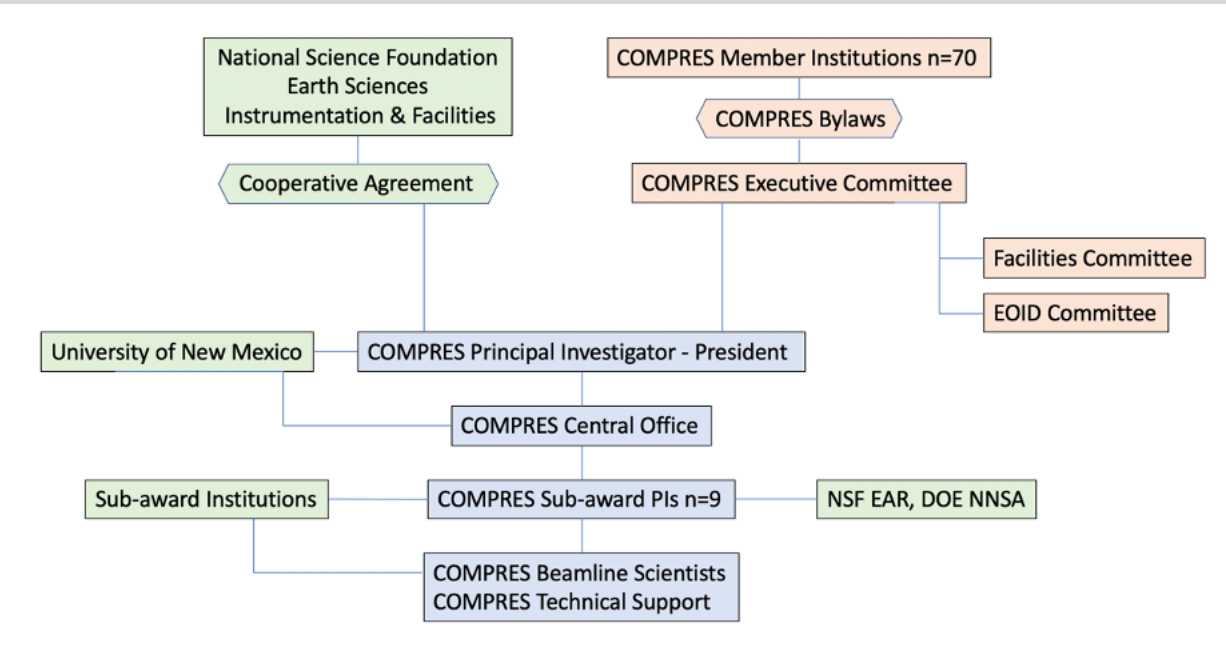


Sources of Funding COMPRES Beamline Users



COMPRES facilities offered high pressure synchrotron research opportunities to users in Earth Science, but also in materials science and other physical sciences. User funding came from NSF EAR, but also a variety of other sources including a significant international component.

## COMPRES Organizational Structure

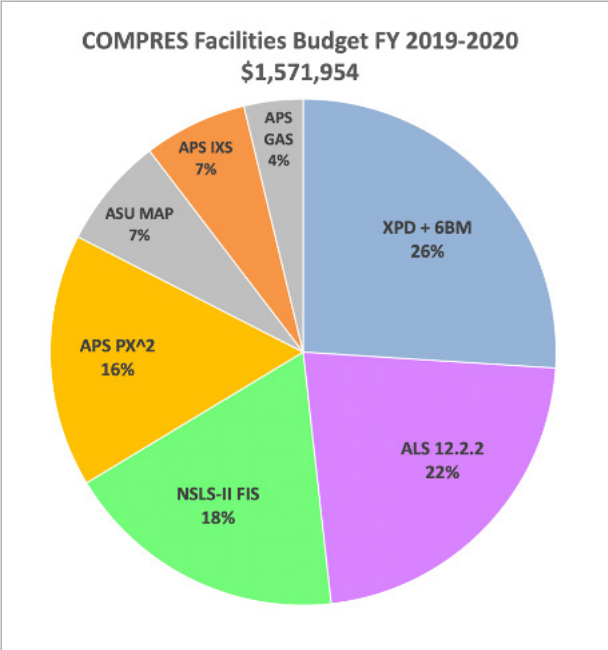
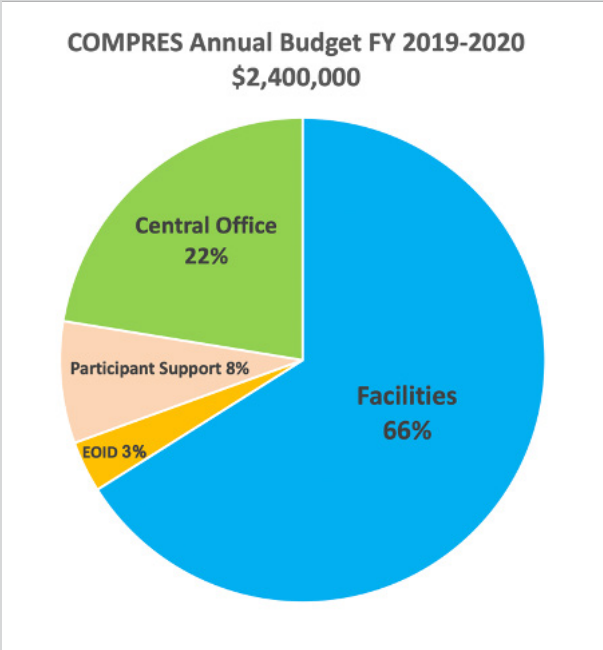


# Some COMPRES Annual Report Highlights

## Facilities and Projects

- 1. ALS 12.2.2 Beamline Diamond Anvil (PI: [Quentin Williams](#), UC Santa Cruz)
- 2. APS Beamline 6BMB Multi-anvil (PI: [Don Weidner](#), [Matt Whitaker](#), Stony Brook)
- 3. NSLS-II XPD Beamline Multi-anvil (PI: [Don Weidner](#), [Matt Whitaker](#), Stony Brook)
- 4. APS Beamline 13BM-C PX^2 Diamond Anvil (PI: [Przemek Dera](#), Univ. Hawaii) [GSECARS partnership](#)
- 5. APS Gas Loading for Diamond Anvil (PI: [Mark Rivers](#), Univ. Chicago) [GSECARS partnership](#)
- 6. APS Sector 3 IXS Diamond Anvil, Mössbauer (PI: [Jay Bass](#), UIUC)
- 7. NSLS-II FIS IR Beamline Diamond Anvil (PIs: [Russell Hemley](#), [Zhenxian Liu](#), UIC) [CDAC partnership](#)
- 8. Multi-Anvil Project (PI: [Kurt Leinenweber](#), ASU)
- 9. Development of an Electrical Cell in the Multi-anvil (PI: [Anne Pommier](#), UC San Diego)
- 10. Deep-Earth Large-Volume Experimentation "DELVE" (Lead: [Yanbin Wang](#), Univ. Chicago)
- 11. Mineral Elasticity Database (PI: [Tom Duffy](#), Princeton University)

## Budget



## Some Recent Reports from the COMPRES Beamline Scientists under COVID-19 Restrictions

### **Matt Whitaker (MAX XPD NSLS-II)**

“NSLS-II has currently shut down all but protein crystallography beamlines dedicated to COVID-19 research. The facility and BNL as a whole has begun to put together a phased re-opening plan, but nothing is yet set in stone. Their planned phases of reopening are quite similar to ANL’s plans, by and large. Mail-in experiments are not yet accepted at XPD as a whole, though this current situation is expediting the implementation of a mail-in program they’ve been discussing for quite some time. There are as of today no estimated dates for any of the phases of re-opening to occur. The current understanding is that beamlines will come up in stages, working with limited staff, and will work on science commissioning, technical commissioning, and beamline development projects. The beamlines will not all come back at the same time but will be staggered. It has not been decided where XPD will sit in this staggered return scheme. When XPD does come up, I have negotiated with the 28-ID crew that I will be able to return on-site and conduct experiments if/when time becomes available because I am certified as ABS (Authorized Beamline Staff). However, it is unlikely that General Users will be returning to normal operations in the next few months. Again, there are no concrete dates for any of this to be reported at this time.”

### **Bora Kalkan (12.2.2 ALS)**

“Due to the COVID-19 situation and the associated shelter-in-place order for the Bay Area (currently extended to May 31st, 2020), the ALS (and LBNL main campus) is still closed to all external users until further notice; internal staff classified as non-essential also cannot access the facility (COMPRES, and 12.2.2, fall in the non-essential category). Only approved essential remote-access research (COVID-19 research only) is being conducted on a limited number of beamlines (crystallography beamlines) with limited beamtime (~ 3 days a week). The Lab management is planning to bring more people safely back on site after the shelter-in-place order ends. They plan to do this in a 5-phase approach, but this is currently all that we know. Definitions of the phases and a specific timeline are not clear and have not been announced yet. The ALS will follow LBNL guidelines, and is thus planning to bring user operations to normal situation gradually (from Phase 1 to Phase 5). Phase 1 is the current status (standby mode of LBNL/ALS, with the exception of COVID research), and Phase 5 would be our routine normal. Unfortunately, the schedule for this 5-phase approach has not been determined yet but it is quite likely that no external users will be allowed on site before the end of June (assuming the current shelter-in-place subsides on May 31st). The start and length of the summer shut down/maintenance that was originally planned to start on July 1 for ~ 8 weeks has also not been decided yet.”

## Some Recent Reports from the COMPRES Beamline Scientists under COVID-19 Restrictions

### Dongzhou Zhang and Jingui Xu (PX<sup>2</sup> APS)

“As a user facility that serves both domestic and international high pressure research community, PX<sup>2</sup> has been impacted by the COVID-19 global pandemic since January 2020. In the APS Run 2020-1, we had 10 groups of users from Asian countries who had to cancel their beamtime because of the international travel ban. On March 20, the governor of Illinois issued the stay-at-home order for the whole state. The PX<sup>2</sup> staff have not been able to go on-site to switch samples for remote users, and the experiments have been frozen since then. Currently the stay-at-home order is expected to be in effect until May 29, 2020. Argonne currently is operating exclusively for COVID-19 related projects. The plans to resume normal operation are not clear at this moment. Until now the APS has not yet announced detailed plans to resume normal operation. The APS is expected to allow limited staff (one per beamline) to be on-site once the stay-at-home order is lifted. Since PX<sup>2</sup> is sharing the beamline with GSECARS surface diffraction program, and for the coming run 2020-2, PX<sup>2</sup> is expected to take the second half of the beamtime (July 28 till the end of the run). At this moment, we do not have a concrete schedule for the coming run yet. However, we expect that in the run 2020-2, extensive “remote-experiments” will be carried out. As we have tested earlier in March, PX<sup>2</sup> is ready for remote experiments from a hardware perspective. We are working closely with GSECARS staff to determine the best way to grant remote computer access to our users. Meanwhile, we also work closely with our COMPRES colleagues to figure out strategies for sample preparation, like the gas loading.”

### Zhenxian Liu (FIS NSLS-II)

“Governor Cuomo’s executive order (“New York State on PAUSE”) is extended until June 13th and Long Island so far meets five of the seven criteria of “NY Forward” for re-openings. BNL’s min-safe operating model (meaning only essential staff are allowed to access the lab) currently extends through May 22nd. The BNL Resumption of Operations Plan (ROOP) has been drafted and submitted to DOE on May 13th, for review. A principal element of the transition to operations involves staging the return of staff in a methodical and incremental progression over time (e.g., over at least sixty days). Although we do not know exactly when we as beamline scientists will be allowed to go back to the facility, we will support a sample mail-in program for users who have been allocated beamtime at FIS as long as the proposed experiments are feasible in that mode of operation (e.g., they can be executed by one person). Some users have already mailed samples to us, and we will contact all users as soon as the BNL Resumption of Operations Plan becomes clear.”



Contact: Dr. Carl Agee  
COMPRES President  
agee@unm.edu  
505-750-7172  
[www.compres.us](http://www.compres.us)



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