

COMPRES

CONsortium for Materials Properties Research in Earth Sciences



Newsletter
March 2021

COMPRES 2021 Virtual Annual Meeting date TBD

Because of the COVID-19 pandemic, the 2021 COMPRES Annual Meeting will be held virtually again in 2021. We expect to announce the meeting date in the near future.

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

Impact of COVID-19

The COVID-19 pandemic has had a significant negative impact on nearly every aspect of the COMPRES enterprise this past year. For example, we booked 120 experiments at our synchrotron facilities in 2020, and by comparison in 2019 we had 242 experiments. Early in the pandemic lockdown all facilities were closed for non-COVID research. While our facilities at DOE synchrotron beamlines have adjusted to the visitor restrictions by offering remote and mail-in experiments to our user community, operations are far from normal. The unusual work and stress load on our beamline scientists continues to be a major challenge. Remote/mail-in is also less than ideal for complex or custom-designed experiments where the actual presence of the user PI at the beamline is critical.

Our education and outreach activities have also been severely impacted by the pandemic with travel not allowed. In response, our in-person annual meeting in Palisades, NY scheduled in July 2020 was canceled. Instead, we held a 1-day virtual annual meeting on August 14, 2020 with Zoom. Over 200 people logged into the annual meeting which is significantly higher than a normal annual meeting attendance. In order to include keynote speakers, we scheduled three guest talks over Zoom in August (Peter Driscoll), September (Maureen Long) and October (Joseph O'Rourke). No in person workshops were held during the past year, we did however host single day events 1) Large Volume Multi-anvil Press Facility Workshop, September 16, 2020; 2) COMPRES Town Hall at the AGU Fall Meeting, December 7, 2020. The COMPRES Distinguished Lecturer for 2019-2020 was Rebecca Fischer who gave her 2019 lectures in person and continued with Zoom lectures in 2020.

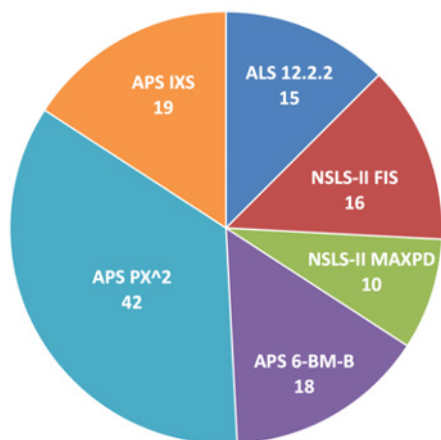
Some COMPRES Annual Report Highlights

We are embarking on year-5 of the five-year COMPRES IV Cooperative Agreement (2017-2022). In the upcoming year we will 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 three Education Outreach and Infrastructure Development (EOID) projects.

The work plan for year-5 and the proposed budget was reviewed by the COMPRES Facilities Committee (Chair, Mark Rivers, University of Chicago; Alisha Clark, University of Colorado; Lowell Miyagi, University of Utah; Chris Seagle, Sandia National Labs; June Wicks, Johns Hopkins) in January 2021, and unanimously endorsed by the COMPRES Executive Committee (Chair, Andrew Campbell, University of Chicago; Vice Chair, Susannah Dorfman, Michigan State; Anat Shahar, Carnegie Science; Tom Sharp, Arizona State; Heather Watson, Union College) on February 12, 2021.

User Metrics

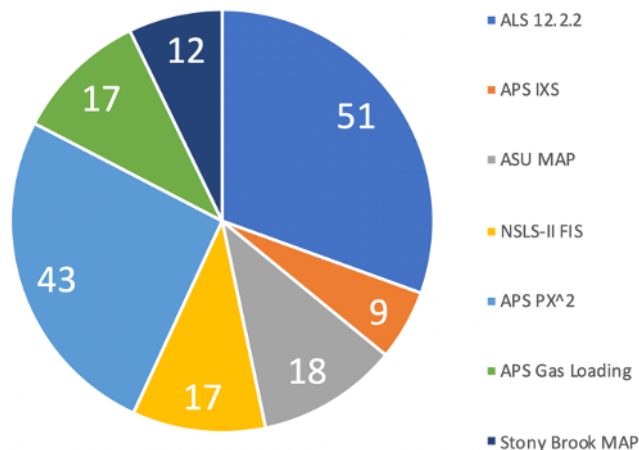
Experiments in 2020
n=120



In the past year COMPRES hosted 120 experiments at its synchrotron facilities.

Publications

COMPRES Publications 2019-2020 n=167



COMPRES supported research in 167 publications in 2019-20.

The pie diagrams give the metrics for each of the COMPRES facilities.

For the complete list of publications see: <http://compres.unm.edu/sites/default/files/publications/Publications%202019-2020.pdf>

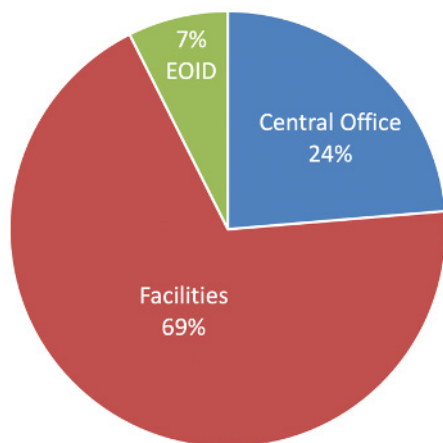
Some COMPRES Annual Report Highlights

COMPRES facilities offer high pressure synchrotron research opportunities to users in Earth Science, but also in materials science and other physical sciences. User funding comes from NSF EAR, but also a variety of other sources including a significant international component. Below is a current list of COMPRES facilities and projects.

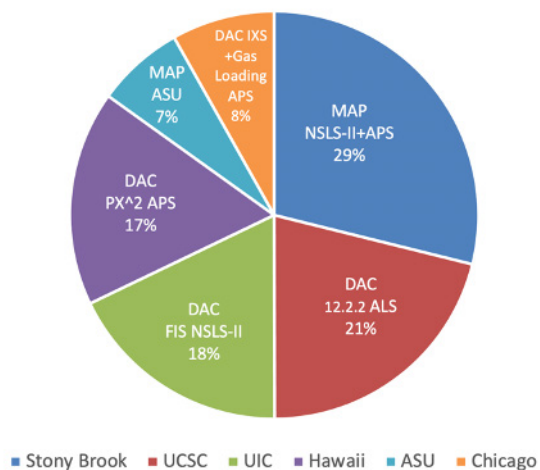
1. ALS 12.2.2 Beamline Diamond Anvil (PI: [Quentin Williams](#), UC Santa Cruz)
2. APS Beamline 6BMB Multi-anvil (PI: [Don Weidner](#), [Matt Whitaker](#), Stony Brook)
3. NSLS-II XPD Beamline Multi-anvil (PI: [Don Weidner](#), [Matt Whitaker](#), Stony Brook)
4. APS Beamline 13BM-C PX² Diamond Anvil (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: [Mark Rivers](#), Univ. Chicago)
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. Mineral Elasticity Database (PI: [Tom Duffy](#), Princeton University)
11. Externally-Heated Diamond [ANvil](#) Cell Experimentation (EH-DANCE) (Lead [Bin Chen](#), Univ. Hawaii)

Proposed Budget for COMPRES FY starting June 1, 2021

Proposed COMPRES Annual Budget FY2021-2022
\$2,404,490

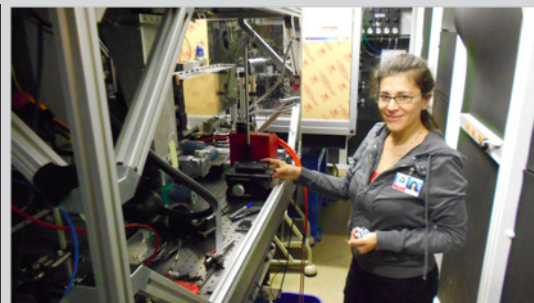


Proposed COMPRES Facilities Budget FY 2021-2022
\$1,656,619



Welcome: New COMPRES Beamline Scientists

Senior Spectroscopist Dr. Barbara Lavina (University of Chicago) joined COMPRES on November 1, 2020. She supports users at the APS 3-ID and 30-ID beamlines for inelastic x-ray scattering (IXS) at extreme temperatures pressures. Dr. Lavina received her Ph.D. (2001) and M.S. (1996, cum laude) in Geosciences from the University of Padova. Her research has focused on iron oxides under extreme experimental conditions, in particular new high-pressure compounds such as Fe_4O_5 and Fe_5O_6 that may be present in deep planetary interiors.



Barbara Lavina

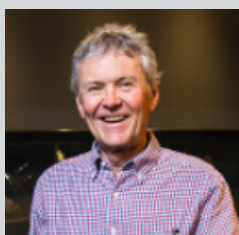


Katherine Armstrong

Specialist Dr. Katherine Armstrong (University of California, Santa Cruz) will join COMPRES on April 1, 2021. She will support users at the ALS 12.2.2, a dedicated high-pressure diffraction beamline. It focuses on double-sided in-situ laser heating and high-pressure single crystal diffraction. Dr. Armstrong received her Ph.D. at the Bayerisches Geoinstitut, University of Bayreuth (2018), Thesis title: "Redox evolution of the early Earth's mantle". She holds a BS in Earth and Planetary Science, University of California, Santa Cruz (2008), Thesis title: "Origin and Evolution of Asteroids".

Jay Bass steps down as Principal Investigator of IXS at the APS

Last fall in 2020, Jay Bass (UIUC) stepped down as Principal Investigator of IXS at the APS 3-ID and 30-ID beamlines. Mark Rivers (U. Chicago) is serving as interim PI until 2022. Jay brought the IXS facility into the COMPRES portfolio in 2014, and it has seen a high level of popularity with the COMPRES user community. Thanks Jay, for your years of dedication to the COMPRES enterprise!



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