**ALS 12.2.2 2017 Annual Report**

**COMPRES Facilities Comments**

**Bin Chen**

-The facility continues to be a great asset for the high-pressure community. COMPRES is supporting two beamline scientists (Christine Beavers and Jinyuan Yan) and funding for some equipments through the EOID program. There are 42 peer reviewed publications in 2017, which is pretty good. However, only a few of them are geoscience-related.

-The single crystal XRD system is under heavy development and the user group has started to grow from last reporting period. 3 groups of researchers supported by Beavers are COMPRES-affiliates. It would be good to see the number of groups from COMPRES community grow significantly in the future. As indicated in Beavers’ report, she dedicated 30% of her time supporting only 10 research groups. I would suggest Beavers can also provide support to users who do not use single crystal XRD technique, to lower the load of Jinyuan Yan who seems to support most of the user groups.

-The development of the resistive heater for DAC by Jinyuan Yan is going well. Many user groups have started to benefit from the new capability. Yan was involved in 4 published papers, significant increase from last reporting period. He has also submitted a manuscript on the resistive heater as first author.

**Arianna Gleason**

-Concerted efforts being made on the single-crystal diffraction front and sample heating platforms. Advancements here will be very useful to the COMPRES community though it seems there were some facility set backs this term which were unavoidable. Despite these difficulties I think 12.2.2 is on a good track to provide an excellent resource to the user community in these areas critical for extreme conditions Earth Sciences research. Regarding an ability to track users – “ …local groups, a shifting cast of characters shows up at different times” – this sounds inappropriate. How can the facility keep track of funding agencies and more importantly sample safety concerns if there isn’t a good, rigorous protocol for user sign-in and beamtime usage. Is there a better way to tackle this? How do we know if there are new users coming in if we aren’t really tracking users to begin with?

-The nature of the partnership between COMPRES and the PIs seems appropriate. If anything, I think there could be more professional development support from COMPRES in the capacity of travel support for Yan, Beavers and Kunz to have more international conference exposure.

-It appears that the Facility is matching the needs of the community reasonably well.

-An additional note: we are aware of the upcoming upgrade to ALS, so-called ALS-U. Should the COMPRES community through the facilities committee be more vocal about this upgrade and how it can be advantageous for our science?

**Anne Pommier**

*-Science*: This facility kept being successful over this past year, as underlined by the long list of publications (42). However, research highlights and the publication list mostly focus on studies relevant to the industry, and only a few studies are relevant to Earth science (O’Bannon et al. on lawsonite, Miyagi and Wenk on bridgmanite, Solomatova et al. on ferropericlase). This point echoed a comment already made last year, and since COMPRES supports two scientists there, it would be good to see the number of Earth scientists (and hence, of publications in Earth science journals) increase.

*-User community:* 87 users (29 groups), including 46 students. It is reported (overview and p.10) that more than half of the time is used by COMPRES-related people but it seems less than that if we look at the beamline operation statistics (p.7-8) (?)

*-Management team:* As last year, Dr. Beavers and Dr.Yan are supported by COMPRES.

This facility contributed to the professional training of other staff members: an ALS doctoral fellow and a postdoc from HPSTAR.

Beavers keeps being very active in both science (developing the XRD system) and training users/mentoring students. Following Committee’s recommendation from last year, Dr. Yan’s report is more detailed and now reflects his efforts and slightly increased productivity (4 pubs and 5 submitted, against 4 and 4 last year).

*-Facility:* Some big issues (monochromator, fabrication error with the single crystal diffractometer) seem to have been handled efficiently, highlighting the very good functioning of the management team.

It is great to see that the compact laser heating system is working and used by different groups (for Earth science studies). Significant efforts are spent (by Dr. Yan) to develop new heaters (DAC experiments), this was already taking place last year.

Plan for the coming year to develop XRD measurements under high-pressure with external heating and make them a routine.

Budget for upcoming year: same as the one requested as part of COMPRES IV.

**Mark Rivers**

There is a brief mention of the HPSTAR post-doc on this beamline. I would like to see more information on this. What does this post-doc do, how is he/she integrated into the planning for beamline operations and upgrades, etc.

The single crystal program continues to develop rather slowly. It has been a significant part of each annual report since at least 2014, but there are still very few single crystal publications in earth science. There has been a one year slip in bringing the new ES1 single crystal station online.

Has the availability of the ambient pressure high temperature capability which is mostly used by material scientists adversely affected COMPRES users getting high-pressure time? Is this a worry for the future?

They say that 52% of the time went to COMPRES, not counting HPSTAR (page 10). But the data on page 8 shows 399 shifts granted in 1-2017 and 2-2017, of which 162 (66+96) went to COMPRES. That is only 40.6%. What is the source of this discrepancy? Perhaps because page 10 includes 2016-2 but page 8 does not?

Is this list of publications provided all publications from 12.2.2? I believe it is. It would be good to have them identify which they view as “COMPRES” relevant publications. This should be those that might reasonably have been funded by NSF-EAR even if they were not. I would also like to see a flag on each publication as to whether it is single-crystal or not. Sometimes this is not obvious from the title.

**Dan Shim**

* **It is not clear in the proposal what type of improvements are being made for the external/internal heating.  It would be useful if they can provide specific works which have benefit from such development (citation of papers).**
* **Also, it is not clear what improvement has been made since the last year for the internal/external heating.  Last year I believe we requested information on the flexibility of their heaters, in particular whether their heaters can fit to a wide range of DAC designs.**
* **Can they annotate the list of papers for the impact of these two developments?  For example, \* for papers benefit from single crystal development and \*\* for papers benefit from external heating.**
* **Some of the records for helping particular group need to be carefully checked.**