

Common Fund Transformative CryoEM Program Recommendations

Based on May 12-13 PI meeting presentations, Program Consultant reports and Working Group Coordinators discussions with the Program Chairs

7/6/2021

Consultants, WG Chairs and WG Coordinators agreed:

- Program is going fantastically well despite the pandemic-related issues.
- The merit badge program received approval overall, and most projects were well-regarded.
- Meeting went well, participants were engaged, acknowledged what the problems were, especially with screening access

Suggested action items from one or more Consultant reports that WG Chairs or Coordinators also encourage:

Lowering the barriers of entry to cryoEM

- Provide a compilation of existing information for cryoEM resources so potential users of CryoEM centers could get access to screening and training in sample preparation, a possible location would be the shared website set up for the Merit Badge initiative.
- Work toward a common application and review process in the future, a common data collection application form would be beneficial and could be implemented with little difficulty.
- MOUs from each national cryoEM Center to shift projects to less-busy centers when capacity is limited.
- "Example Project Application" for new users be provided by each center .
- Recommend centers give priority to PIs from teaching institutions for summer training slots.
- Follow up with MoS/Lawrence PI – is he using centers, if not, why not; if so, where and is he getting what he needs?
- Suggest IDeA Universities contact local cryoEM centers if possible.
- Recommend IDeA investigators be included in next year's presumably in-person meeting.

Suggestions provided in one or more consultant reports

Training

- Maintain a diversity of training videos with respect to the type of data acquisition hardware, and not just focus on Thermo Fisher Scientific products.
- Develop training videos for facility managers.

Outreach

- Include the question "How did you hear about us and our services?" on the application to evaluate outreach

CryoET specimen prep advice, (CryoET Center PIs are likely already are aware)

- Best practice is cryoFIB milling Aquilos-operating technician provides consistently good samples; end user needs remote access capability is important so user can see sample and communicate with cFIB technician.
- percentage of non-experts applying or cryoET service may be higher than in SPA centers; if correct, the balance between training and service for instrument use may have to be adjusted.
- in turn, non-expert labs will require more guidance for data processing and analysis

- Avoid the term "FIB-SEM" (unless you are referring to the "slice and view" method), and instead replace it with "cryo-FIB" "cryo-FIB milling using a DualBeam instrument" or similar. "FIB-SEM" is strongly connected with a different technique, i.e. Serial-block face backscattering SEM (SBF-SEM).

Data quality and quantity issues for NIH and Centers to monitor

- Concern about deletion of raw data given the rapid improvement in data analysis methodology now underway and also proscribed under current/future rules. Therefore, there is a need to identify an economical archive for data that cannot be deleted.
- Concern that computation will become bottleneck as more cryoEM and cryoET projects are initiated. Monitor need/usage.
- Ask center PIs to estimate the full cost per data collection session and screening session, including all staff time, service contracts, consumables and a factor for instrument down time to inform the succession plan.
- Remain aware of the issue that validation is important.