



Damir Sudar  
Staff Scientist  
Life Sciences Division

October 4, 2015

Jason Swedlow, Ph.D.  
Centre for Gene Regulation & Expression | Open Microscopy Environment  
College of Life Sciences  
University of Dundee  
Dow Street  
Dundee, DD1 5EH, Scotland, UK

Dear Jason,

I'm writing to express my strong support for the efforts of the Open Microscopy Environment to bring critically important imaging tools to the community. The current revolution in the development of new imaging technologies and the very rapid adoption of these technologies in the biological research community is generating image data sets that are exponentially larger in size and in complexity. Of particular note are high-content image screens, lightsheet imaging data, histopathology slide scanning, and the various super-resolution imaging approaches.

OME tools such as OMERO and BioFormats have become critical and integral to the workflow in many projects at Lawrence Berkeley National Laboratory (LBNL) and are also the main vehicle for image data storage, interchange, and analysis in the laboratory of my close collaborator, Dr. Joe Gray at Oregon Health and Science University (OHSU) in Portland, OR. Dr. Gray has established the OHSU Center for Spatial Systems Biomedicine which relies on integrating various microscopies and other imaging modalities to understand disease formation (see: <http://www.ohsu.edu/xd/education/schools/school-of-medicine/departments/basic-science-departments/biomedical-engineering/spatial-systems-biomedicine/>).

We use OMERO and BioFormats to integrate image data from many different microscopy systems such as electron microscopes, many types of light microscopes, and importantly high-content imaging systems that allow rapid biological-system-wide analyses of responses to drugs, cellular micro-environments, and RNA interference to elucidate pathway function in normal and diseased cells. True understanding of disease mechanisms requires the integration of information from genomics, proteomics, and metabolomics analyses with the localization and organization of the cellular components and pathways that can only be derived from imaging and image analysis and we use OMERO to provide that point of integration. Considering how important OMERO and BioFormats have become for so many of our projects, I am writing you now to express our appreciation for all the work of OME team but also to confirm our

commitment to provide input and assistance in making the OME environment even better and further increase its impact.

One specific funded large project of ours where OME tools have had enormous positive impact is the NIH LINCS project (see: <http://www.lincsproject.org/>) which awarded grants to us at OHSU and a number of other sites such as the Peter Sorger lab at Harvard Medical School. At OHSU, our Micro-Environment Perturbation LINCS project is collecting over 3 million images over the next 4-5 years and all this will be in the form of imaging screens where each well (or cell spots on a high density spotted micro-array format) has had a specific treatment (drug, RNAi, micro-environment) and/or is a different cell line, each channel encodes a specific endpoint, and more complexity along that line. Both LINCS projects at OHSU and the Sorger lab are collecting this type of data that needs to be stored, tracked, quantitatively analyzed, subjected to significant quality control, and most importantly, made available for the entire research community to interpret, further analyze, and use in their own experiments. At the September 2015 annual meeting of the LINCS consortium, we (Sorger and Gray labs) presented how we both use OMERO and other OME tools to achieve this and we proposed OMERO as the standard environment for all LINCS image data. Over the next year, we will work with other LINCS awardees to make that a reality.

One specific challenge with that is the large size of the image data. Currently no central repositories exist and likely never will. Thus we will need a way to "federate" repositories in multiple locations. I'm extremely excited that you are proposing to develop a federated database infrastructure within OMERO to allow queries and retrieval of data across multiple federated instances. That capability coupled with the flexible login/sign-on will greatly enhance OMERO's ability to work across sites and between institutions. We have experience with high-speed image data exchange using Globus technology ([www.globus.org](http://www.globus.org)). I look forward discussing with your team how that may be used for data transfer between OMERO instances and end-user endpoints.

I am looking forward to further discussions and to continue working with you and the OME team on such a critical and forward-looking project.

Sincerely yours,

A handwritten signature in blue ink that reads "Damir Sudar". The signature is fluid and cursive, with the first name "Damir" and last name "Sudar" clearly distinguishable.

Damir Sudar  
Staff Scientist, LBNL  
Visiting Scientist, OHSU