Euro-BioImaging
European Research Infrastructure for Imaging Technologies in Biological and Biomedical Sciences

WP6 Advanced Light Microscopy - General Access

Task 6.2
Organization of proof of concept at three sites

Deliverable 6.4
Report from EMBL to be used as guidance for tests

Task leader
IEO / UNIVDUN / ABO

Task contributor
EMBL

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Report on Best Practice and Utility — Advanced Light Microscopy Facility / EMBL Heidelberg, Germany

1 Executive summary

At the EMBL Advanced Light Microscopy Facility (ALMF), we have had 207 external visitors during the period from 2006 to 2010, using 29 different imaging platforms. This visiting program has generated 67 peer reviewed published articles so far and a number of collaborations that have led to future funding for the research of the visitors at their home base.

The enclosed report contains a summary of ALMF usage by visiting scientists and a copy of the guidelines used to evaluate and run projects by external scientists.

Based on this success, we suggest that the principles that have guided the EMBL ALMF visiting scientist program can be used as a guideline for the establishment and running of Euro-BioImaging WP6 Advanced Light Microscopy – General Access resources.

2 Introduction

The Advanced Light Microscopy Facility (ALMF) at EMBL Heidelberg provides advanced light microscopy and image analysis services for all of EMBL's scientific groups and external visitors predominantly from EMBL Member States. The facility actively develops, maintains and offers state-of-the-art light microscopy equipment and software packages in collaboration with industrial partners leading in the field. The facility staff comprises eight members (including the facility head) who teach and offer support to users at all levels of an experiment. To serve external visitors, they are supported by the administrative assistant of EMBL's visitor programme.

3 The ALM facility at EMBL Heidelberg

3.1 Profile of the facility

In collaboration with our industrial partners and EMBL scientists and visitors, who have a strong interest to use the equipment available by the respective industrial partner, we develop and test new light microscopy techniques and their applications in biological problems. After successful completion of this development/evaluation phase, the equipment becomes available in the ALMF for use by EMBL scientists and visitors. Based on such collaborations, the ALMF can provide a wide spectrum of complementary state-of-the-art microscope techniques, which are often contributed by the industrial partners at no cost to EMBL.

See the ALMF homepage at: http://www.embl.de/almf/almf_services/ for more detailed information.

Presently the ALMF houses 21 advanced microscopy systems for low to medium throughput and 9 microscope systems for high throughput (screening) microscopy. The equipment, offices of ALMF staff members and visitor space including laboratories for specimen preparation and tissue culture occupy approximately 800 square meters in a dedicated imaging facility floor, with suitable building and IT-infrastructure. The techniques available

include: confocal laser scanning microscopy, spectral imaging, spinning disk-confocal microscopy, multi-spectral 3D time-lapse and deconvolution microscopy, correlative light and electron microscopy (in collaboration with the electron microscopy core facility), multi-color total internal reflection fluorescence microscopy (TIRF), fluorescence correlation spectroscopy (FCS), fluorescence lifetime imaging microscopy (FLIM), super resolution microscopy (GSD technology), laser nano-surgery and automated microinjection.

Several commercial and open source software packages are available on five offline computer workstations as well as on EMBL's compute cluster for many data analysis tasks, including tracking of fluorescently labelled structures in time-series, 3D reconstruction and deconvolution of image data, automated image analysis for the quantitative evaluation of large data sets generated by high throughput microscopy are available. Two of the eight staff are dedicated entirely or in the majority of their work to support of users in image analysis tasks and development of new open source tools to solve new problems.

3.2 Usage of the ALMF by external visitors

During the years 2006 until 2010 in total 207 external scientific visitors used the equipment in the ALMF to conduct short- (less than two weeks) and long-term (longer than two weeks) projects (see Fig. 1). The total hours of usage of the ALMF equipment by external users covered about 20% of the total usage of the facility and has increased from 6,600 to 13,650 hours between the years 2006 and 2010, respectively (Fig. 2).

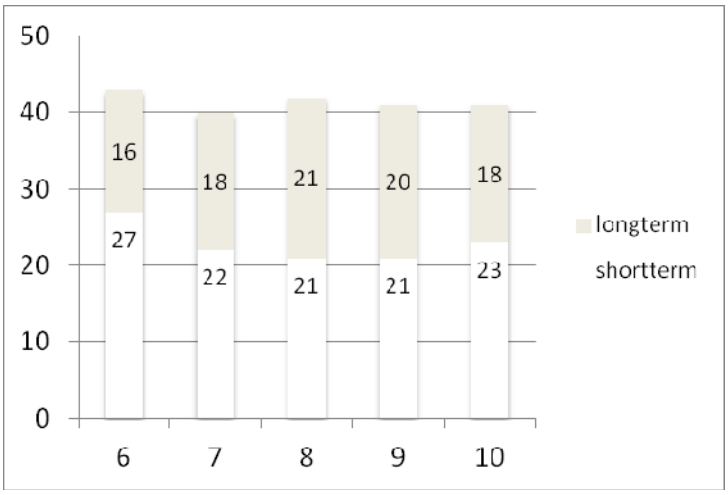

Figure 1. Number of external visitors to the ALMF in the years 2006-2010.

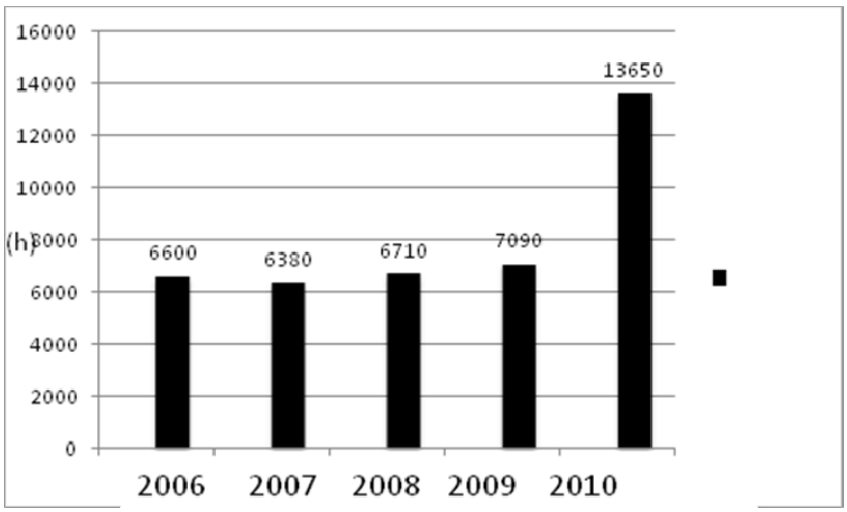

Figure 2. Total hours of usage of the ALMF equipment by external visitors.

4 Guidelines for scientific visits to the ALMF

4.1 General outline of the project schedule

1. The scientist interested to conduct a project in the ALMF contacts informally the head of the facility to enquire the feasibility to conduct the project in the ALMF, to explore the possibilities for a scientific host and to estimate the approximate project costs.
2. After positive response from the ALMF head the scientist submits a formal but concise application to the ALMF. This needs to include also the proposal of a scientific host (who should have agreed to act as such, and can in some cases be the head of ALMF) at EMBL (see 4.2. for an application template).
3. The project application is evaluated on a scale from 1 -10 by written procedure (email) by a board of EMBL scientists representing the different scientific disciplines of EMBL, the head of the ALMF committee and ALMF and the proposed scientific host at EMBL. (see 4.3. for an evaluation template)
4. After positive project evaluation the scientist is invited to visit the ALMF and conduct the project work. Timelines are arranged according to the project ranking (average score of the board evaluation). Highly ranked projects may be considered earlier than lower ranked ones. Due to space and personnel constraints no more than three external visitors are accepted to work in the ALMF at any time and scientific hosts (except for the head of the ALMF) typically accept only one external visitor at a time. The ALMF makes every effort to host the scientist as soon as possible after application to maintain scientific competitiveness.
5. The logistics of the visit (e.g. accommodation, travel, shipment of reagents) should be arranged with ALMF staff, scientific host and the administrative assistant of EMBL's visitor programme.
6. The project work is conducted in the ALMF supported by the scientific host's laboratory.
7. After project completion, the scientist summarizes the project results and in a short report (typically one page) and provides standardized feedback on various issues of his/her stay.
8. In the post visit period the scientist will inform the ALMF when the results obtained at EMBL are published in scientific journal(s) with appropriate mention of ALMF support in the acknowledgement section of the article. This is included in ALMF visitor reports.

4.2 Application Guidelines

The formal application of the scientist to the ALMF should be concise and typically no exceed two pages and include the following items:

1. A short CV of the applicant.
2. A short scientific project description containing the following information:
    - Project title
    - Scientific background of the project
    - Description of work proposed to be conducted at the ALMF
    - Importance of the project for the overall research of the scientist
    - Expected results
3. Further information requested
    - Equipment/technology that is envisaged to be used

- Approximate costs of the project (e.g. based on equipment usage hours and reagents; needs to be estimated consulting the head of ALMF and scientific host)
- Previous experience of the applicant in light microscopy techniques (in particular the one that he/she intents to use at the ALMF)
- Biological hazards associated with the project
- Approval of the scientific host at EMBL (could be head of ALMF)
- Estimation of the time to be spent at EMBL (preferred starting and ending dates should be proposed)
- Agreement to acknowledge the ALMF in publications resulting from data obtained during the visit.
- Approval of the scientists home institution supporting the visit to the ALMF

4.3 Evaluation Guidelines

The project application will be evaluated according to the following criteria (scale 1 to 10, 1=lowest, 10=best mark). Evaluations should be concise and typically not exceed one page:

1. Scientific excellence

- Significance/importance of the project in comparison with international standards in the field
- Relevance/contribution of the project to the scientist's overall scientific work/interests
- Relevance of project's results for inclusion in future scientific publications
- Scientific quality of the scientist or home laboratory

2. Feasibility of the project

- Feasibility of the project to be successfully conducted in the ALMF
- Availability of required technologies at the ALMF
- Required training capabilities of applicant for the conduction of experiments or possibility to acquire the skills in the timeframe of the proposed project
- Reasonable estimation of project costs and coverage by the scientist

If any of the questions above are evaluated as not feasible or insufficient (ranking as "1") the project will be rejected.

3. Others

- Benefit for applicant (e.g. training received, results obtained, scientific networking started, be able to apply for his/her own grant)
- Necessity to conduct the research at the ALMF (or could the applicant conduct the work in another place that is closer by his home laboratory, or more qualified for the specific application)

4.4 Reporting Guidelines

After project completion the scientist is asked to report on the scientific results obtained, the impact the results have on his/her future work, the quality of the scientific, technical and

logistic support from the ALMF and EMBL (if feasible scale 1 to 10, 1=lowest, 10=best mark). Reporting should be concise and typically not exceed one page:

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- Type of instruments used
- Satisfaction concerning given advice and information on usage of most appropriate imaging instrument(s)
- Satisfaction concerning logistic support at the facility (office space, computing, libraries, accommodation)
- Satisfaction concerning technical support to make best use of the imaging instrument(s)
- Satisfaction concerning training (if received) in imaging technology
- Satisfaction concerning scientific support to set up the experiments and interpretation of results
- Rating of scientific impact of imaging infrastructure usage on the project
- Satisfaction concerning administrative support

- Summary on project results which were achieved by using ALMF instrument(s)
- List of publication(s) containing project results based on using ALMF instrument(s)