



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

WP7 Access to Innovative Technologies-ALM

Task 7.3
Infrastructure surveys

Deliverable 7.6
Summarizing report on surveys of existing European
infrastructures for innovative technologies ALM

Task leader
EMBL, Weizmann, MPG, UMCU, Imperial

March 2012

Deliverable 7.6

Summarizing report on surveys of existing European infrastructures for innovative technologies ALM

1	General remarks	3
2	Survey results	3
3	Summary and conclusions	5
4	Tables	5

1 General remarks

This report summarizes the results obtained through a pan-European survey on biological and biomedical imaging infrastructure, related to the WP7 “access to innovative light microscopy technologies” of the EuroBioimaging (EUBI, research infrastructure for imaging technologies in biological and biomedical sciences) project. The goals of WP7 are the identification of emerging innovative light microscopy technologies for which a need for access throughout Europe exists and the development of strategies for rendering such technologies accessible to researchers throughout Europe. The EUBI pan-European survey was conducted between June 1st and July 15th, 2011 as an online questionnaire. In total 660 participants from 25 different countries addressed the WP7-specific questions.

The main goal of the WP7-specific part of the survey was to explore for which of the light microscopy technologies covered by WP7, there exist infrastructures in Europe, which provide access to users, in form of a facility, and how such access is administered. Additional important questions addressed the limitations of the access to external users that exists in these facilities and the relationship of the infrastructures with industry developing and providing the respective technologies to the scientific community.

In this report the results of the answers to WP7 specific survey questions are analyzed on a question-by-question basis. Raw survey data related to these questions are provided in the appendix.

2 Survey results

*Questions: Which innovative imaging technologies are provided at your institution?
How much of the infrastructure usage is provided to external users?*

In total 214 and 187 participants responded to these two questions, respectively. More than 60% of the participants provide infrastructures to more than 50 users per year. Significantly less than 50% of participants provide access to the technologies defined in WP7, with the exception of “functional imaging of living cells” (79%, Table1). A much smaller fraction of participants also provides access to the WP7 technologies to external users (Table1). **For the majority of infrastructures access to external users of any kind represents 10% or less of the total infrastructure usage (Table2).**

Question: What kind of resources and support is provided to users of the infrastructure?

In total 217 participants answered this question. Instruments, technical assistance and training, data processing and analysis, methodological set-up, wet lab and server space are provided to users in at least 50% of the participants' infrastructures. Animal facilities, probe preparation or guesthouse for facility users are less represented (see Table3).

Question: What are the criteria applied for providing access to external users?

196 participants answered this question. **The majority of infrastructures accept external visitors on the basis of the scientific quality of the project proposal (65%) and/or if they represent a scientific collaboration with institute internal research groups (62%).** In 44% of the answers the funding of the project was of relevance. Only 20% of participants do not apply specific criteria for providing access to external users.

Questions: If your institution does not provide access to external users indicate why? If the infrastructure were upgraded would you give access.

In total 43 and 179 participants answered these questions, respectively. The major reasons for not providing external access were the lack of personnel (80%) and instruments (63%). Only 20% of the survey participants do not provide access because this is not in line with the institute's funding or access policies or due to the lack of lab space. **If the infrastructure were upgraded 100% of participants would provide external access.**

Industry related questions

The questions of the survey, which were addressed to the representatives of companies developing and providing technology in the field of light microscopy, were answered by significantly fewer participants (not exceeding 20) than those questions addressed to scientists. We assume that this reflects the fact that only one representative for each company in the field answered the survey. As only few major commercial players exist in the field of light microscopy the number of participants may thus be sufficient for the analysis to be representative. Interestingly, 19 out of the 20 company participants stated to collaborate with already existing academic imaging infrastructures in Europe.

*Questions: What is the type of collaboration with imaging infrastructures?
What is your usual contribution to the collaboration?
What type of collaboration would be beneficial for your company in a future pan-European infrastructure?*

The major type of existing collaborations with imaging infrastructures is to identify the needs of scientists (16 out of 18), running demonstration equipment at the infrastructure (15 out of 18) and to conduct joint technical developments (14 out of 18), including service as alpha or beta sites for novel equipment. Only 5 out of 18 participants are operating parts of the infrastructures and 7 out of 18 give onsite scientific support or participate as "students" in training courses of the infrastructure. Similar figures were obtained when asking which type of collaboration participants could envision in a future pan-European research infrastructure. The companies' contribution is in most cases reduced prize of the equipment (13 out of 16). Less than half of the participants provide free service, equipment or project specific funding.

Question: For which innovative imaging technologies does your company provide resources in collaborations with academic imaging infrastructures?

Several companies of the 18 participants provide already support on innovative light microscopy technologies to imaging infrastructures in the form of hardware, software or other resources such as personnel. Compared to technologies which are commercially available since longer time (e.g. laser scanning or spinning disk confocal microscopy) the number of supporting industry participants is significantly less.

*Questions: Which imaging technologies would your company wish to access in a future pan-European research infrastructure?
For which additional items (not imaging) would you need access?*

The number of participants answering these questions was 11. As these participants are most likely from companies that will use rather than supply microscopy technology in an infrastructure and the number of such companies within Europe may by far be more than the number of participants in these questions, we consider the survey results as most likely not significant.

3 Summary and conclusions

Existing European imaging infrastructures already provide access to all imaging technologies defined in WP7 preferentially on the basis of scientific excellence or scientific collaborations.

The majority of them provide access to the technologies to in-house users rather than external users at the national or international level. The latter ones represent in most cases 10% or less of the total infrastructure usage.

Most infrastructure providers consider the lack of personnel and instruments as the major reasons for the inaccessibility of facilities to external users.

It was further indicated that all infrastructures would be made accessible to external users if the infrastructures were appropriately upgraded.

For all technologies defined in WP7 collaborations between industrial partners and the respective infrastructures already exist. They focus predominantly on the exploration what scientist need for their experiments by e.g. running demonstration equipment at the infrastructure or on joint technical developments. The industrial partners wish to apply the same focus also to collaborations in a pan-European infrastructure to provide access to innovative light microscopy technology.

4 Tables

Table1 Technologies provided by participant's home institutions (214 participants).

Technology	% of participants that provide access to the specific technology	% of participants that provide the access also to external users
Laser Scanning Confocal Systems	90	24
Spinning Disc Confocal Systems	54	20
Deconvolution widefield microscopy	59	16
* Single Plane Illumination Microscopy (SPIM)	16	7
* Stimulated Emission Depletion Microscopy (STED)	18	11
* Stochastic Optical Reconstruction Microscopy (STORM)	20	7
* Photoactivated Localization Microscopy (PALM)	26	9
* Correlated Light and Electron Microscopy	32	10
Electron Microscopy	65	19
* Fluorescence Correlation Spectroscopy (FCS)	32	13
* Fluorescence Lifetime Imaging Microscopy (FLIM)	43	17
* Functional Imaging of Living Cells (e.g. FRAP, FRET)	79	19
* High-throughput Microscopy	40	11
* Non-linear Microscopy Techniques (e.g. CARS, SHG, THG and SRS)	18	8
* Photothermal Heterodyne Imaging	4	3
* Single Molecule Imaging Techniques	29	10
* : Technology defined in WP7		

Table 2 Distribution of infrastructure usage (187 participants)

Usage	Access for industry users (%)	External academic access international (%)	External academic access national (%)	Internal academic access (%)
10%	41	48	42	2
20%	7	9	29	3
30%	2	1	11	3
40%	1	1	3	2
50%	1	1	1	9
60%	0	1	1	15
70%	0	0	0	19
80%	0	1	0	19
90%	0	0	0	18
100%	1	2	2	11

Table3 Resources/support provided to users of infrastructure (217 participants)

Resource/support provided	% of participants
Guest house for facility users	19
Animal preparation	27
Probe preparation	34
Animal facilities	43
Training seminar room	43
Training workstations	45
Server Space	53
Wet lab space	58
Methodological setup (e.g. design of study protocol)	77
Data processing and analysis	82
Training in infrastructure use	86
Technical assistance to run instrument	95
Instruments	96

Table 4 WP7 imaging technologies and resources provided by industrial partners (18 participants) collaborating with imaging infrastructures

Technology	Hardware	Other resources (e.g. personnel)	Software
* Laser scanning confocal microscopy	7	8	7
* Spinning disk confocal microscopy	11	8	7
Single Plane Illumination Microscopy (SPIM)	2	2	1
Stimulated Emission Depletion Microscopy (STED)	2	1	1
Stochastic Optical Reconstruction Microscopy (STORM)	6	5	5
Photoactivated Localization Microscopy (PALM)	5	4	5
Correlated Light and Electron Microscopy	5	6	5
Fluorescence Correlation Spectroscopy (FCS)	3	2	2
Fluorescence Lifetime Imaging Microscopy (FLIM)	8	7	6
Functional Imaging of Living Cells (e.g. FRAP, FRET)	9	9	9
High-throughput Microscopy	7	4	6
Non-linear Microscopy Techniques (e. g. CARS, SHG, THG and SRS)	4	4	3
Single Molecule Imaging Techniques	7	6	6

*: included in WP6