NFFA - Nanoscience Foundry and Fine Analysis

Project No. FP7 – 212348

NFFA
Nanoscience Foundry and Fine Analysis

D2.1
NFFA Users survey

<table>
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<td>Work Package Title</td>
<td>Analysis of users and science program, development of NFFA roadmap</td>
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<td>Activity Type</td>
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<tr>
<td>Lead Beneficiary</td>
<td>No.2 STFC</td>
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<td>Nature</td>
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<td>Dissemination level</td>
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</tr>
<tr>
<td>Authors</td>
<td>Zheng Cui, STFC</td>
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## Delivery Slip

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Annex-I: Introduction to NFFA Survey

Annex-II: Summary of NFFA Survey
Deliverable D2.1: NFFA users survey

1. INTRODUCTION

1.1. Purpose of the document

The purpose of this document is to show the summary of NFFA users survey and analysis of the survey results.

1.2. Application Area

The targets of this document are the members of the NFFA Project, the EC Project Officers, and the general public.

1.3. References


1.3.1. Objective of Work Package 2

The detailed analysis of the needs of nanoscience users in the next 10 years will be carried out by the proponent participants, this will include:

a) A survey of the groups that are already users, or who are clearly potential users, of synchrotrons, high power lasers, FELs and neutron sources for experiments in the domain of nanoscience. This will provide a map of the existing competences in nanoscience that already operate synergies with the LSFs.

b) A broader analysis of the range of impact of NFFA in domains of nanoscience that are not yet connected with the access to LSFs. This includes research on functional materials and systems, but also on metrology, toxicology of nanoparticles, certification.

c) An estimate of the overall community that could benefit form NFFA not necessarily as active users but also as users of the data repository of results, nanofabrication/synthesis protocols, remote access.

1.3.2. Description of work broken down into tasks

The following tasks are defined in WP2:

T2.1) The detailed analysis of nanoscience users needs in the perspective of the next 10 years will be carried out by the proponent participants. All participants will compare their medium term plans and those of other European institutions in the field in order to understand the patterns of investment in nanoscience and the way NFFA can intervene.
T2.1.1) A survey of established collaborating groups operating at LSFs will provide a complete map of the existing distribution of competences in nanoscience that already operate synergies with LSFs and the pattern of specialised centres that can emerge from it.

T2.1.2) A survey of nanoscience activities that are NOT involved with LSFs but would benefit from NFFA either becoming users of NFFA and LSFs, or becoming users of the NFFA repository of data and standards.

T2.2) Definition of a science program for NFFA-RI which will be composed of two synergic activities: the in-house research projects under the responsibility of NFFA-RI staff and associated scientists and the users’ scientific projects.

T2.3) Definition of a roadmap for the construction of NFFA (localization of potential sites, definition of a time scale for construction phasing).

T2.4) Set up an Industrial Liaison Office to manage economical and R&D relations with external companies. Public and private/public projects will be considered taking into account procedures for intellectual property protection.

2. EXECUTIVE SUMMARY

It is well known that large scale facilities, such as synchrotron radiation source, neutron scattering source and high power laser, are the national and international focus points of basic and applied scientific research. There are intimate links between nanosciences, such as nanomaterials and nanobiology, and large scale scientific research facilities. By co-locating nanoscience foundries with the large scale facilities, an integrated research environment can be created. Such an environment already exits in the US where 5 nanoscience centres have been set up in 5 different US national facilities. Europe has been lagging behind and started to seriously look into such a strategic development. As a part of the NFFA feasibility study, a wide consultation in nanoscience research community and the user community of large scale facility is essential to collect public opinion on the concept of distributed nanoscience centres co-located with European large scale facilities.

A web based survey was designed and launched on July 21, 2008. First collection of survey results in early November 2008 showed poor response (total 437 responses). At the third Consortium coordination board meeting in November 2008, it was decided to extend the survey period to end of February 2009. By end of February 2009, total 1151 responses from 42 countries had been collected.

Analysis of the 1151 responses has shown that 95% of the people who responded said their work or research is related to nanoscience and nanotechnology. 57% of them are large scale facility users, 16% are large scale facility scientists and 27% are non-users but belong to nanoscience research community. For the key question we asked in the survey, “Do you support distributed European nanoscience foundries co-located with large scale facilities”, 79% of responded are in favour of this concept. This report will give details about the methodology of designing the survey questions, the ways the survey was broadcasted, summary of the survey results and analysis of the results, and the conclusions from the survey.
3. DESIGN OF SURVEY QUESTIONNAIRE

3.1. Methodology

The methodology of designing the survey was to collect the information about the users and non-users of large scale facilities whose research are related to nanoscience and nanotechnology, gathering their needs in nanofabrication and nanocharacterisation, asking them if they are in favour or against the concept of having a nanoscience foundry co-located with a large scale facility, so that they can have nanofabrication or nanocharacterisation done while using one of the onsite large scale facility, or access such a centralized and better equipped facility instead of their own in-house facility.

3.2. Survey questions

To keep the questionnaire brief so that responders would only spend short time to answer them, 20 questions are structured in 6 categories in the survey:

1. Basic information.
   1.1. Where are you located?
   1.2. Your field of expertise
   1.3. Is Nanoscience or Nanotechnology relevant to your research and development?
   1.4. Please tick any in-house facilities which you can access to in your organisation
   1.5. Please rate the following technologies in your current and future research/development
   1.6. Which of the following groups do you belong to?

2. Large scale facility users
   2.1. Are you a large scale facility user?
   2.2. Which particular experiments have you performed in large scale facilities (e.g. spectroscopy, diffraction, imaging, etc.)?
   2.3. If sample preparation requires micro/nanofabrication, where do you have them prepared?
   2.4. Please rate the importance of following facilities in your sample preparation

3. Large scale facility Scientists
   3.1. What large scale facilities do you support?
   3.2. Which particular experiments have you performed in large scale facilities (e.g. spectroscopy, diffraction, imaging, etc.)?
   3.3. Do you need micro-nanofabrication and inspection tools in your work?
   3.4. Please rate the importance of following facilities in your work

4. European Nanoscience foundries
   4.1. Do you support distributed European nanoscience foundries co-located with Large scale facilities?
   4.2. What are the basic requirements for such a foundry (please choose all that apply)?
   4.3. What type of foundry services would you like to have?

5. On-site training
   5.1. Would you like to have on-site training?
   5.2. If yes, what training courses the Nanoscience foundry should provide?

6. Survey feed back
   6.1. Would you like to be kept informed about the progress of NFFA project?
Each question has either multichoice of answers or rated answers. The responders spend no more than 5 minutes to answer all the questions. In this way, the completion of the survey is not a daunting task and would invite more people to participate.

3.3. Distribution methods of the survey

In order to get a convincing survey results, we need to reach as wide as possible of the user community. To achieve this goal, all the major European large scale facilities have been contacted. A short introduction followed by the survey web link (see Annex-I) was sent to either the user office or the director of these facilities. It is estimated over 10,000 of the European large scale facilities users had been sent the survey request. In addition, researchers and academics in universities in several European states who are active in nanoscience and nanotechnology research were also contacted and asked to participate the survey. For example, over 500 academics in 35 UK universities had been sent the survey request. The survey was also published in NFFA flyer, at the NFFA web site (http://nffa.tasc.infm.it/pmwiki/), Nanoforum web site (www.nanoforum.org), European Research Infrastructure Network web site (www.euroris-net.eu), and UK Nanotechnology Knowledge Transfer Network (NanoKTN).

4. SUMMARY OF SURVEY RESULTS

4.1. Responders profile

Total of 1151 responses were collected from 42 countries. The country origins of responders are shown in Fig.1.
Major European states where most of the large scale facilities are located have the largest number of responses. It should be pointed out that only those who think their research is relevant to nanoscience and nanotechnology had chosen to respond to the survey. This is indicated by Fig.2 which shows 96% of responders consider themselves are either in or relevant to the field of nanoscience and nanotechnology. For this reason, the answers they gave to the survey should be relevant and valid.

The survey also shows that both the users and beam line scientists of European large scale facilities (LSF) had participated in the survey. There were also a large number of researchers – neither LSF users nor LSF beamline scientists-who participated in the survey. Fig.3 is the chart showing the relative proportion of different type of responders.
4.2. Key results of the survey

The key question we asked in the survey is “Do you support distributed European nanoscience foundries co-located with large scale facilities?” Those who chose to answer the question had 79% in favour of such a concept, as shown in the bar chart of Fig.4.

![Pie chart showing support for NFFA Nanoscience Centres](image)

Fig.4

Different communities have slightly different responses to this question. The LSF users have 81% of support, the LSF scientists have 82% of support while the nanoscience researchers who are neither LSF users nor LSF scientists have 71% of support. People who participated the survey also showed high level of interest in further development of NFFA project, hence the nanoscience foundry concept. In answering to the question, “Would you like to be kept informed about the progress of NFFA project?”, 84% of those who answered the question said they would like to be informed.

The results of responses to all the survey questions are in the attached document (Annex-II)

5. ANALYSIS AND CONCLUSIONS

5.1. Analysis

For those who clearly expressed “no” to the NFFA nanoscience foundry concept, we asked them to give reasons. Following are the typical comments:

“Although I support the basic idea, I would be concerned if its implementation was at the expense of academic-based facilities or personnel”

“I worry that creation of European nanoscience foundries will result in substantial cuts in the state financial support to the laboratories (at least in France)”
“I am not convinced that the concentration at the same place of both the foundries and the large scale facilities is a good thing, except from the simultaneous use of both”

“Most of the facilities described here are already available at most research-intensive universities. They are more productive when in extended and close proximity to the researchers who need them”

“I prefer to have only basic nanofab facilities at the large-scale facilities where we are active. For everyday use it is much more important to have them locally available in the university environment “

“Specialist facilities and expertise are required for each particular materials system, and the concept of a central foundry does not work”

“In the proposed scheme, the statement ‘Geographically distributed / centrally managed’ would lead to an inefficient organization. My experience tells me that it should be ‘Geographically localized and locally managed’ "

It is clear that people who are against the centralized facility are worried that such a facility will divert the national resource from their own research facilities. These are the researchers who are likely to have already had their own in-house facilities for fabricating and inspecting samples. They are less worried about building large scale facilities as the investment for a large scale facility is so big that no single institution can own such a facility. It has to be nationalized and centralized. A facility for nanofabrication and nanocharacterisation requires less investment and some top universities around Europe already have such facilities within the university campus. However, the argument for having such a centralized and co-located nanoscience foundry is also strong. It is the better use of national resources, accessible to wider spectrum of users, since there are many universities and research institutes which do not have such a state-of-the-art nanoscience facility. A national and centralized facility can also become a focus point which gathers a large number of nanoscience researchers and fosters cross-disciplinary collaboration. What we learnt from the users’ comments is how to make sure the nanoscience foundry has a well organized user access system and high efficiency in dealing with users’ requirements.

The survey also revealed what the users’ needs in various sample preparation and characterization techniques are. Though all the techniques listed in the survey have been required by users who responded to the survey, higher percentage of users requires material growth/thin film deposition and inspection facilities. This reflected the direct needs of a user who is also using the onsite large scale facility. This has further proved the rational of having the nanoscience foundry co-located with a large scale facility.

5.2. Conclusions

From the survey, the following conclusions are drawn:

- Great participation of large scale facility (LSF) users and scientists (most of them are synchrotron or neutron users/scientists) whose research is relevant to nanoscience and nanotechnology
- Over three quarters of responders support the NFFA concept
• Most of responders have in-house characterisation facilities (SEM/TEM) but less of them have material growth and nanofabrication facilities
• Most of them currently prepare their samples either in-house (75.6%) or at other laboratories (47.5%)
• For sample preparation, thin film deposition is more important than patterning and second important is inspection/metrology for both LSF users and LSF scientists
• 70% considered that micro/nanofabrication and inspection tools are important in their work
• Non LSF users endorse NFFA, but are slightly less supportive than LSF users/scientists
• Those who are against the concept have the fears that such a centralized facility is a “diversion of national/European funds”, “become a local facility”, “only a minority of users are benefit from the centres”, “inefficient organization”, “each experiment is unique, can’t have fit-all-purposes facility”
• With the majority of supporting the NFFA concept, what the consortium needs to do is to come up with a good plan to address those fears and to make the European distributed nanoscience foundries accessible to wide spectrum of users and efficient in dealing with user requirements
ANNEX-I

Survey for setting up a European Research Infrastructure for Nanoscience

European Commission has awarded a feasibility study for setting up a cluster of distributed nanoscience foundries co-located at the large scale facilities in EU member states (for further information see http://nffa.tasc.infm.it/). As a part of the feasibility study, a wide consultation in nanoscience research community and the user community of large scale facility is necessary.

It is well known that large scale facilities, such as synchrotron radiation source, neutron scattering source and high power laser, are the national and international focus points of basic and applied scientific research. There are intimate links between nanosciences, such as nanomaterials and nanobiology, and large scale scientific research facilities. By co-locating nanoscience foundries with the large scale facilities, an integrated research environment can be created. Such an environment already exits in the US where 5 nanoscience centres have been set up in 5 different US national facilities (see http://www.science.doe.gov/News_Information/News_Room/2006/nano/index.htm). Europe has been lagging behind and started to seriously look into such a strategic development.

The present survey is to investigate the current and future needs of European nanoscience research and to gauge the requirements of setting up such a cluster of distributed nanoscience foundries. Scientists and nanotechnology developers who need an access to state of the art instrumentation and methods for designing, synthesizing, nanofabricating, characterizing matter with atomic precision and performing experiments also using the fine analysis methods based on X-rays, neutrons or fast pulsed radiation are all welcome to participate the survey. This includes current and future users of large scale facilities, as well as those are engaged in nanoscience research. Your response will help to shape the European landscape of nanoscience research and nanotechnology development, and ultimately bring benefit to your own research.

The survey takes no more than 5 minutes. The survey web is completely secure and all data transmission is encrypted. The e-mail address you provide in the survey will ONLY be used in case that the participant of the survey has interest in further information of NFFA and only for this purpose.

Please click the following link to enter the survey

https://www.surveymonkey.com/s.aspx?sm=GK3rZXB4w_2bTbvWWjEcEXPO_3d_3d
### 1. Where are you located?

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<th>Response Count</th>
</tr>
</thead>
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<td>Institution/Company</td>
<td>100.0%</td>
<td>1,151</td>
</tr>
<tr>
<td>Address 1</td>
<td>94.8%</td>
<td>1,091</td>
</tr>
<tr>
<td>Address 2</td>
<td>33.9%</td>
<td>390</td>
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<td>City/Town</td>
<td>98.7%</td>
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<td>State/Province</td>
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<td>520</td>
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<tr>
<td>ZIP/Postal Code</td>
<td>97.0%</td>
<td>1,116</td>
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<tr>
<td>Country</td>
<td>100.0%</td>
<td>1,151</td>
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<tr>
<td>Email Address</td>
<td>100.0%</td>
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*answered question 1,151
skipped question 0*

### 2. Your field of expertise

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<td>Expertise areas</td>
<td>99.6%</td>
<td>1,128</td>
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<tr>
<td>Size of your group</td>
<td>96.7%</td>
<td>1,095</td>
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*answered question 1,132
skipped question 19*
### 3. Is Nanoscience or Nanotechnology relevant to your research and development?

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<th>Count</th>
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<td>Yes</td>
<td>94.6%</td>
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<td>No</td>
<td>5.4%</td>
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**answered question** 1,151

**skipped question** 0

### 4. Please tick any in-house facilities which you can access in your organisation

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<th>Percent</th>
<th>Count</th>
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<td>Molecular beam epitaxy</td>
<td>21.8%</td>
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<tr>
<td>PVD/CVD thin film deposition</td>
<td>34.9%</td>
<td>382</td>
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<td>Ion implantation</td>
<td>12.1%</td>
<td>132</td>
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<td>Optical lithography (contact/projection)</td>
<td>29.4%</td>
<td>322</td>
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<td>Electron beam lithography</td>
<td>27.6%</td>
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<td>Focused ion beam system</td>
<td>26.7%</td>
<td>292</td>
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<tr>
<td>Reactive ion etching</td>
<td>22.7%</td>
<td>249</td>
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<tr>
<td>Ion milling</td>
<td>16.6%</td>
<td>182</td>
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<tr>
<td>TEM/SEM</td>
<td>72.2%</td>
<td>791</td>
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<td>Scanning probe microscopes</td>
<td>61.0%</td>
<td>668</td>
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<tr>
<td>Thin film measurements</td>
<td>52.3%</td>
<td>573</td>
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<td>Wire bonding/flip-chip bonding</td>
<td>19.3%</td>
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<td>Packaging</td>
<td>6.9%</td>
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<tr>
<td>Design and modelling tools</td>
<td>29.4%</td>
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<tr>
<td>Biology lab</td>
<td>33.2%</td>
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<td>Other (please specify)</td>
<td>32.2%</td>
<td>353</td>
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**answered question** 1,095
5. Please rate the following technologies in your current and future research/development

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<th>Technology</th>
<th>Very important</th>
<th>Important</th>
<th>Not important</th>
<th>Don't know</th>
<th>Rating Average</th>
<th>Response Count</th>
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<td>Material growth, thin film deposition</td>
<td>46.9% (503)</td>
<td>31.7% (340)</td>
<td>15.6% (167)</td>
<td>5.9% (63)</td>
<td>1.00</td>
<td>1,073</td>
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<tr>
<td>Nanowires, Nanotube and nanoparticles synthesis</td>
<td>38.6% (419)</td>
<td>33.9% (368)</td>
<td>20.9% (227)</td>
<td>6.6% (72)</td>
<td>1.00</td>
<td>1,086</td>
</tr>
<tr>
<td>Micro-Nanofabrication including lithography and pattern transfer</td>
<td>31.9% (332)</td>
<td>27.6% (287)</td>
<td>31.5% (328)</td>
<td>8.9% (93)</td>
<td>1.00</td>
<td>1,040</td>
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<tr>
<td>Inspection including TEM, SEM and other metrology tools</td>
<td>55.5% (614)</td>
<td>35.0% (388)</td>
<td>6.6% (73)</td>
<td>2.9% (32)</td>
<td>1.00</td>
<td>1,107</td>
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<tr>
<td>X-ray Characterisation (XRD/SAXS/Spectroscopy)</td>
<td>62.4% (691)</td>
<td>27.2% (301)</td>
<td>7.7% (85)</td>
<td>2.7% (30)</td>
<td>1.00</td>
<td>1,107</td>
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<tr>
<td>Bioprocessing</td>
<td>14.7% (147)</td>
<td>25.0% (251)</td>
<td>45.7% (458)</td>
<td>14.6% (146)</td>
<td>1.00</td>
<td>1,002</td>
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answered question 1,151
skipped question 0

6. Which of the following groups do you belong to ?

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<th>Group</th>
<th>Response Percent</th>
<th>Response Count</th>
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<td>Users of large scale facility =&gt; please skip page 3 of the survey</td>
<td>57.8%</td>
<td>647</td>
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<td>Supporting scientists of large scale facility =&gt; please skip page 2 of the survey</td>
<td>16.0%</td>
<td>179</td>
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<tr>
<td>None of above =&gt; please skip page 2 and 3 of the survey</td>
<td>26.3%</td>
<td>294</td>
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answered question 1,120
skipped question 31
### 7. Are you a large scale facility user?

<table>
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<th>Facility</th>
<th>Frequent user</th>
<th>Sporadic user</th>
<th>Potential user</th>
<th>Never</th>
<th>Response Count</th>
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<tbody>
<tr>
<td>Synchrotron radiation source</td>
<td>53.1% (346)</td>
<td>32.4% (211)</td>
<td>14.3% (93)</td>
<td>0.0%  (0)</td>
<td>651</td>
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<td>Neutron source</td>
<td>41.6% (228)</td>
<td>28.5% (156)</td>
<td>29.4% (161)</td>
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<td>548</td>
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<tr>
<td>High power lasers</td>
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<td>12.4% (43)</td>
<td><strong>79.8% (276)</strong></td>
<td>0.0%  (0)</td>
<td>346</td>
</tr>
<tr>
<td>Other (please specify)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>69</td>
</tr>
</tbody>
</table>

**Answered question** 703  
**Skipped question** 448

### 8. Which particular experiments have you performed in large scale facilities (e.g. spectroscopy, diffraction, imaging, etc.)?

<table>
<thead>
<tr>
<th>Experiment</th>
<th>Response Percent</th>
<th>Response Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Synchrotron radiation source</td>
<td><strong>83.3%</strong></td>
<td>565</td>
</tr>
<tr>
<td>Neutron source</td>
<td>59.9%</td>
<td>406</td>
</tr>
<tr>
<td>Free electron laser/high power laser</td>
<td>12.7%</td>
<td>86</td>
</tr>
<tr>
<td>Others (please specify)</td>
<td>10.9%</td>
<td>74</td>
</tr>
</tbody>
</table>

**Answered question** 678  
**Skipped question** 473

### 9. If sample preparation requires micro/nanofabrication, where do you have them prepared?

<table>
<thead>
<tr>
<th>Facility</th>
<th>Response Percent</th>
<th>Response Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local in-house facility</td>
<td><strong>75.6%</strong></td>
<td>471</td>
</tr>
<tr>
<td>Other laboratories</td>
<td>47.5%</td>
<td>296</td>
</tr>
<tr>
<td>Commercial foundry</td>
<td>10.3%</td>
<td>64</td>
</tr>
<tr>
<td>None of above (please specify)</td>
<td></td>
<td>27</td>
</tr>
</tbody>
</table>

**Answered question** 623  
**Skipped question** 528
### 10. Please rate the importance of following facilities in your sample preparation

<table>
<thead>
<tr>
<th>Facility</th>
<th>Very important</th>
<th>Important</th>
<th>Not important</th>
<th>Not applicable</th>
<th>Rating Average</th>
<th>Response Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thin film deposition</td>
<td>47.3% (319)</td>
<td>25.6% (173)</td>
<td>15.3% (103)</td>
<td>11.9% (80)</td>
<td>1.00</td>
<td>675</td>
</tr>
<tr>
<td>Patterning (lithography and etching)</td>
<td>25.9% (168)</td>
<td>23.4% (152)</td>
<td>32.7% (212)</td>
<td>18.0% (117)</td>
<td>1.00</td>
<td>649</td>
</tr>
<tr>
<td>Inspection and metrology</td>
<td>36.2% (243)</td>
<td>33.8% (227)</td>
<td>18.9% (127)</td>
<td>11.0% (74)</td>
<td>1.00</td>
<td>671</td>
</tr>
<tr>
<td>Packaging</td>
<td>6.0% (37)</td>
<td>14.4% (89)</td>
<td>53.6% (331)</td>
<td>25.9% (160)</td>
<td>1.00</td>
<td>617</td>
</tr>
<tr>
<td>Design and Modelling</td>
<td>18.7% (121)</td>
<td>38.2% (247)</td>
<td>28.6% (185)</td>
<td>14.5% (94)</td>
<td>1.00</td>
<td>647</td>
</tr>
<tr>
<td>Bioprocessing</td>
<td>10.9% (68)</td>
<td>17.2% (107)</td>
<td>41.2% (256)</td>
<td>30.7% (191)</td>
<td>1.00</td>
<td>622</td>
</tr>
</tbody>
</table>

** answered question 721
** skipped question 430

### 11. What large scale facilities do you support?

<table>
<thead>
<tr>
<th>Facility</th>
<th>Response Percent</th>
<th>Response Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Synchrotron radiation source</td>
<td>50.2%</td>
<td>113</td>
</tr>
<tr>
<td>High power lasers</td>
<td>6.2%</td>
<td>14</td>
</tr>
<tr>
<td>Neutron scattering source</td>
<td>43.6%</td>
<td>98</td>
</tr>
<tr>
<td>None of above (please specify)</td>
<td></td>
<td>32</td>
</tr>
</tbody>
</table>

** answered question 225
** skipped question 926
12. Which particular experiments have you performed in large scale facilities (e.g. spectroscopy, diffraction, imaging, etc.)?

<table>
<thead>
<tr>
<th>Experiment Type</th>
<th>Response Percent</th>
<th>Response Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Synchrotron radiation source</td>
<td>70.7%</td>
<td>152</td>
</tr>
<tr>
<td>Neutron source</td>
<td>47.9%</td>
<td>103</td>
</tr>
<tr>
<td>Free electron laser/high power laser</td>
<td>11.2%</td>
<td>24</td>
</tr>
<tr>
<td>Others (please specify)</td>
<td>12.6%</td>
<td>27</td>
</tr>
</tbody>
</table>

answered question 215

skipped question 936

13. Do you need micro-nanofabrication and inspection tools in your work?

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Response Percent</th>
<th>Response Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>68.8%</td>
<td>176</td>
</tr>
<tr>
<td>No</td>
<td>30.2%</td>
<td>76</td>
</tr>
</tbody>
</table>

answered question 252

skipped question 899

14. Please rate the importance of following facilities in your work

<table>
<thead>
<tr>
<th>Facility Type</th>
<th>Very important</th>
<th>Important</th>
<th>Not important</th>
<th>Not applicable</th>
<th>Rating Average</th>
<th>Response Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thin film deposition</td>
<td>49.6% (115)</td>
<td>33.2% (77)</td>
<td>10.8% (25)</td>
<td>6.5% (15)</td>
<td>1.00</td>
<td>232</td>
</tr>
<tr>
<td>Patterning (lithography and etching)</td>
<td>29.0% (64)</td>
<td>30.3% (67)</td>
<td>29.4% (65)</td>
<td>11.3% (25)</td>
<td>1.00</td>
<td>221</td>
</tr>
<tr>
<td>Inspection and metrology</td>
<td>42.6% (98)</td>
<td>32.6% (75)</td>
<td>14.8% (34)</td>
<td>10.0% (23)</td>
<td>1.00</td>
<td>230</td>
</tr>
<tr>
<td>Packaging</td>
<td>6.6% (13)</td>
<td>19.2% (38)</td>
<td>47.5% (94)</td>
<td>26.8% (53)</td>
<td>1.00</td>
<td>198</td>
</tr>
<tr>
<td>Design and modelling</td>
<td>25.7% (58)</td>
<td>38.9% (88)</td>
<td>24.8% (56)</td>
<td>10.6% (24)</td>
<td>1.00</td>
<td>226</td>
</tr>
<tr>
<td>Bioprocessing</td>
<td>15.8% (32)</td>
<td>27.6% (56)</td>
<td>31.0% (63)</td>
<td>25.6% (52)</td>
<td>1.00</td>
<td>203</td>
</tr>
</tbody>
</table>

answered question 251

skipped question 900
15. Do you support distributed European nanoscience foundries co-located with Large scale facilities?

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>78.6%</td>
<td>21.4%</td>
</tr>
</tbody>
</table>

Response Count: 799, 218

If your answer is "No", please specify your reason

answered question | 1,017
skipped question | 134

16. What are the basic requirements for such a foundry (please choose all that apply)?

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Percentage</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thin film growth</td>
<td>68.0%</td>
<td>560</td>
</tr>
<tr>
<td>Optical lithography</td>
<td>43.7%</td>
<td>360</td>
</tr>
<tr>
<td>Electron beam lithography</td>
<td>53.1%</td>
<td>437</td>
</tr>
<tr>
<td>Focused ion beam</td>
<td>54.1%</td>
<td>445</td>
</tr>
<tr>
<td>Pattern transfer (etching &amp; deposition)</td>
<td>47.1%</td>
<td>388</td>
</tr>
<tr>
<td>Sample packaging</td>
<td>21.1%</td>
<td>174</td>
</tr>
<tr>
<td>Inspection</td>
<td>52.4%</td>
<td>431</td>
</tr>
<tr>
<td>Design and modeling</td>
<td>43.1%</td>
<td>355</td>
</tr>
<tr>
<td>Bioprocessing</td>
<td>29.3%</td>
<td>241</td>
</tr>
<tr>
<td>Data repository (process recipes)</td>
<td>29.8%</td>
<td>245</td>
</tr>
<tr>
<td>Other (please specify)</td>
<td>82</td>
<td></td>
</tr>
</tbody>
</table>

answered question | 823
skipped question | 328
17. What type of foundry services would you like to have?

<table>
<thead>
<tr>
<th>Response</th>
<th>Percent</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct access (hands-on)</td>
<td>74.7%</td>
<td>645</td>
</tr>
<tr>
<td>Remote (work done by foundry staff)</td>
<td>57.5%</td>
<td>496</td>
</tr>
<tr>
<td>Other (please specify)</td>
<td></td>
<td>33</td>
</tr>
</tbody>
</table>

answered question: 863
skipped question: 288

18. Would you like to have on-site training?

<table>
<thead>
<tr>
<th>Response</th>
<th>Percent</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>56.8%</td>
<td>573</td>
</tr>
<tr>
<td>No</td>
<td>43.2%</td>
<td>436</td>
</tr>
</tbody>
</table>

answered question: 1,009
skipped question: 142

19. If yes, what training courses the Nanoscience foundry should provide?

<table>
<thead>
<tr>
<th>Response Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>404</td>
</tr>
</tbody>
</table>

answered question: 404
skipped question: 747
20. Would you like to be kept informed about the progress of NFFA project?

<table>
<thead>
<tr>
<th>Response</th>
<th>Response Percent</th>
<th>Response Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>83.5%</td>
<td>819</td>
</tr>
<tr>
<td>No</td>
<td>16.5%</td>
<td>162</td>
</tr>
</tbody>
</table>

answered question 981

skipped question 170