

Executive Summary for Bioimaging UK Strategic Priorities

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Imaging in the UK

Imaging is now the dominant form of analysis of molecules, cells, and tissues across the Life Sciences. The methodology is used in basic research for biological discovery, in biotech and pharmaceutical research for drug discovery, lead characterisation and development, and preclinical and clinical studies for diagnosis and treatment.

Imaging is by its very nature dependent on advanced hardware and expert personnel. Significant investments by UK Research Councils and charities have built a number of world-class imaging facilities in academic departments and institutes across the UK. Critically, the facilities at any one institution are usually defined by its experiment priorities. In most cases, UK life scientists have access to the imaging infrastructures necessary to support their immediate work. However, *over the last decade enormous leaps have been made in imaging technology with advances in resolution, speed and signal processing*. The expense and technical sophistication of these systems is increasing, *making it impractical to build and run these new technologies at every site in the UK*. The result is that any one site will have specific sets of expertise, and rarely does one site have all the capabilities necessary in modern biological and biomedical sciences. For this reason, *there is a critical need to define the hardware and personnel imaging infrastructure, the access policies, and the sustainable mechanisms* that underpin much of UK science now and in the future.

The scale of this challenge is immense. The technologies are expensive, sophisticated and in many cases still in development. Using the systems properly and effectively takes trained personnel. Many produce enormous datasets that stretch current abilities to store, and process and understand digital data. *The UK bioimaging community strongly agrees that solutions for building and staffing the infrastructures, enabling access to them, and processing the data they produce are urgently needed and will be the foundation for maintaining the UK's research competitiveness.*

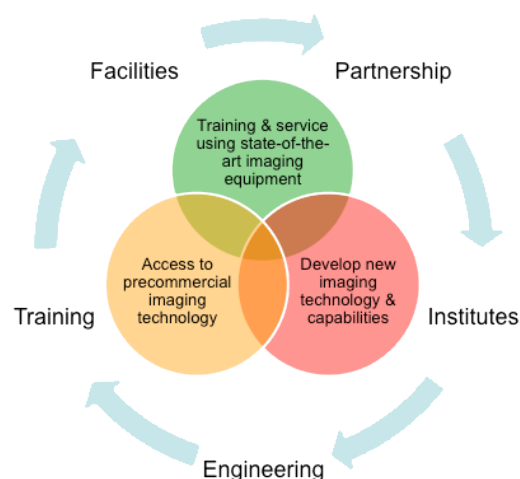
This document summarises our efforts in building BioImagingUK, a grassroots initiative to define strategic priorities, access policies, and sustainable practices for UK imaging science. That effort has built an aligned, committed consortium of imaging scientists and technologists who have contributed to a clear, public statement of strategy and policy for bioimaging in the UK.

We note that this is a global issue for research and is being addressed in Europe by the *EuroBioImaging* ESFRI project (<http://www.eurobioimaging.eu/>), which aims to interact with *national imaging communities* rather than individual institutions.

BioImagingUK

BioImagingUK was founded *to collect, coordinate, and represent strategic statements and policies of the UK imaging community*, particularly to *EuroBioImaging* and to initiate the coordination and implementation of a UK based imaging infrastructure. The aims of BioImagingUK are:

1. To **develop and exploit new imaging technologies** – driving development of and access to state-of-the-art imaging instrumentation.
2. To devise and help implement mechanisms to enable **shared access to the general and specialized expertise** based in life sciences imaging laboratories and facilities throughout the UK.
3. To engage our departments, universities, and funding bodies to develop **career models for the personnel** that develop, maintain, and enable advanced imaging technology for the life sciences.
4. To define **new training programmes**, to provide the foundation for the next advances in life sciences imaging within the UK.
5. To work inclusively to define short and long-term strategy statements to our research funding bodies, in order to help **articulate funding requirements and priorities**.



BioImagingUK Current Activities

Currently, BioImaging UK is unfunded and is simply a consortium of imaging scientists from across the UK committed to delivering imaging infrastructure for UK science. Despite this BioImagingUK has achieved a significant level of engagement and commitment, as demonstrated by its major output—*a series of strategy documents written by its members, defining current status and future priorities and strategy*. These documents are completely open and visible at [BioImagingUK Working Groups](#).

Members of BioImagingUK are intimately involved in the EuroBioImaging project: Jason Swedlow and Paul French participate in the EuroBioImaging's Advanced Light Microscopy Work Packages and other members of BioImagingUK have participated in the EuroBioImaging stakeholders meetings. ***There is therefore a strong and working linkage between the activities of BioImagingUK and EuroBioimaging.***

BioimagingUK has held a series of [meetings](#) where priorities and tasks have been defined and distributed among its members. All documents, events, and coordination are publicly available on the [BioImagingUK Wiki](#). Through 2009 – 2010 these activities have achieved:

- a ***national mailing list*** for BioimagingUK.
- an ***open wiki*** for members of BioimagingUK to contribute to strategy and policy documents (<http://www.bioimaginguk.org>)
- a ***comprehensive list of imaging facilities***, available technologies and contacts across the UK
- a series of ***priority subjects*** for imaging and assignment of working groups towards those topics
- a series of ***strategy documents*** written by members of the community that define the current status and future priorities for imaging in the UK.

Members of BioImagingUK include academic staff across many levels of career establishment and imaging scientists and imaging technologists thus its output provides a comprehensive and thorough statement of the assessment of various strategic directions.

BioImagingUK Strategic Priorities

Each of the BioImagingUK strategy documents addresses critical issues defined by the UK imaging community and was produced by a [Working Group](#), a panel of interested scientists with expertise in that domain. All are available on-line and reproduced there in PDF form. Some of the highlights of these documents are:

- The newest techniques for ***super-resolution, in vivo and high-throughput imaging are critical resources*** that must be made widely available to retain the competitiveness of UK Sciences.
- The development of ***regional and/or national imaging facilities*** should consider the needs of the ***whole community*** and balance the appropriateness of central facilities with the scientific need for access to those facilities. Mechanisms to ***distribute*** world-leading expertise within UK (and European) institutions ***outside*** regional/national centres should be developed – perhaps through a network of fellowships linked to regional/national centres.
- Training efforts to develop new personnel skilled in standard imaging technology are well established in many UK institutions but there is an unmet need to provide experts in ***emerging advanced imaging modalities*** to permit them to be applied to biomedical applications. There needs to be an ***appropriate career structure*** in place for such imaging experts.
- All centres and participants highlight the ***need for better software tools for data analysis management and access*** in order to deliver the full benefit of data collected on the UK's imaging platforms
- Identifying points of overlap and ***synergy between medical imaging and cell and tissue biology communities remains a challenge***. With Euro-BioImaging, BioImagingUK has identified points of overlap where these two normally separated communities can collaborate. Both highlight the need for ***improved probe development and data management and analysis tools*** and represent a key strategic direction that the UK scientific community can initiate.

BioImagingUK Future actions

A number of important actions have been designated for the immediate future:

- Devise a UK roadmap for the development, management and distribution of (access to) advanced imaging capabilities and expertise
- Run a national workshop for the UK bioimaging community to develop this roadmap and stimulate discussion between medical and biological imaging communities, research sponsors and imaging facility, academic and research staff.
- Obtain funding for a BioImagingUK administrator to facilitate the website log, document discussions and progress, arrange meetings, manage outreach and industrial interactions and liaise with EuroBioImaging administration. This could be a part-time position with another organisation.