

BiImagingUK UCL Meeting

**BiImaging Update
Euro-BiImaging Node EoI Call
MRC Lab, UCL, London
April 12, 2013**

BiImagingUK Community

Organising Committee

- Jason Swedlow (Dundee)
- Paul French (Imperial College)
- Kurt Andersen (Beatson)
- Nick Long (Imperial)
- Tony Gee (Kings)
- Lucy Collinson (LRI/CRUK)
- David Hawkes (UCL)
- Paul Verkade (Bristol)

BiImagingUK Community

Thanks!!!

Andrew Vaughan
MRC Lab

UK Science– World Leading & Growing

World-leading UK research

- £3bn invested p.a. in UK research

2011 BIS Report

- International Comparative Performance of the UK
- “The UK’s share of the world’s top 1% of most highly cited papers, which indicates its share of the highest quality published research, was 13.8% in 2010, 2nd only to the US. “
- “The UK’s field-weighted citation impact, an indicator of quality is 2nd only to and closing in on the US... [w]ithin the UK, its constituent countries reflect the UK’s overall positive trend in field-weighted citation “

Biological & Medical Imaging– Strategic Investment

Major investments in biological & medical imaging

- EPSRC Medical Imaging :
Current Grant Portfolio (2011): £79M
MRC & NIHR: ~ £75M
- Wellcome Trust Brain Imaging:
2% of total funding 1990 – 2009
- EPSRC/CRUK Cancer Imaging:
£50M 2008 – 2013
Cancer Imaging Initiative 2013 - ??
- MRC/BBSRC/EPSRC (2012)
Next Generation Optical Microscopy: £25M
- RCUK Framework for Capital Investment

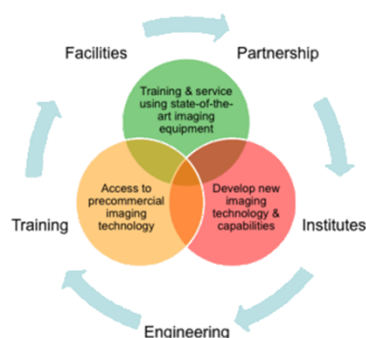
Total investment hard to quantify, so strategic impact analysis difficult

What is BioImagingUK?

Mission & Scope

Aims & Activities

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**.



<http://bioimaginguk.org> (see *Meetings, Working Groups & Documents*)

Unfunded, grassroots consortium of imaging scientists

BioImaging in the UK

RCUK Framework for Capital Investment 2012:

“There are many exciting new advances in the complementary imaging technologies...[a] national programme of infrastructure investment is needed to establish national capability in these next generation technologies to maintain the UK at the scientific cutting edge. *Bioimaging UK* is one example of an investment for a distributed bioimaging infrastructure proposal that will provide the latest technologies in distributed technical hubs for academic and industrial collaborative access, with an underpinning open-access data repository to enable comparative studies and generate research efficiencies.”

(emphasis added)

BioImagingUK Strategy Meeting

A UK Roadmap for Imaging?

Wellcome Trust, Euston Road

July 2-3, 2012



Why a Strategy Meeting (I)?

Background

Not a true scientific meeting (sorry!)

Imaging for Biological & Medical Research

- depends on *sustainable and usable* technical development, hardware, & expertise
- e.g., Probes, Specimen delivery, Image acquisition, Processing & analysis, Sharing & Publication.

Each requires

- Infrastructure & tools
- Expertise and know-how
- Sustainable implementation and development

Each of these steps requires significant *initial* and *ongoing* investment

Why a Strategy Meeting (II)?

Current Success/Future Delivery

Overall Goal: deliver the best, most important, most effective science possible, given the available investment

Technology needed to deliver this science must be the best, most appropriate for the scientific goals & needs.

The status quo (largely) delivers: UK delivers highest research metric/investment

Looking to the Future:

Over the next 10 years, how do we deliver research imaging technology in UK?

- provide necessary infrastructure to underpin world-class science
- keep pace with growing complexity & costs (equipment, personnel & tech development)

Why a Strategy Meeting (III)?

The Questions...

Overall Goal: deliver the best science most important, most effective science possible, given the available investment.

Will the status quo (i.e., response-mode funding and PI-led resources), deliver this goal *over the next 10 years*?

➤ The UK currently achieves highest metric performance per amount spend.

Two Questions:

1. Are there technologies whose performance, utility, etc. will improve if delivered in a coordinated strategic manner, & thus improve the science they underpin?
2. If there are *any at all*:
 - Can we identify them?
 - Can we agree that the UK scientific community (scientists, funders, institutions) should define a national imaging roadmap and strategy to define and address their funding, provision, delivery & sustainability.

BioImagingUK Strategy Meeting

Exec Summary

- I. *Bioimaging facilities*** are needed in the UK – including National Facilities, Centres of Excellence, and, critically, Department or Institute level facilities. These serve different complementary roles and an active, world-class, scientific infrastructure requires multiple levels to be developed and sustained.
- II. *Training programmes*** that cover all aspects of bioimaging - EM, optical, ultrasound, X-ray CT, MRI, PET/SPECT, detector technology, probe development, image processing and analysis, modeling, and data management - are the foundation for continued world class performance of UK science. Training programmes that build a sustainable pool of scientific and technical talent must be developed and, for at least some fields, coordinated on regional or national levels.
- III. *Career structures and opportunities*** for bioimaging staff must be developed, to nurture and sustain the critical expertise needed to design, build, run and further develop bioimaging infrastructure and technologies.

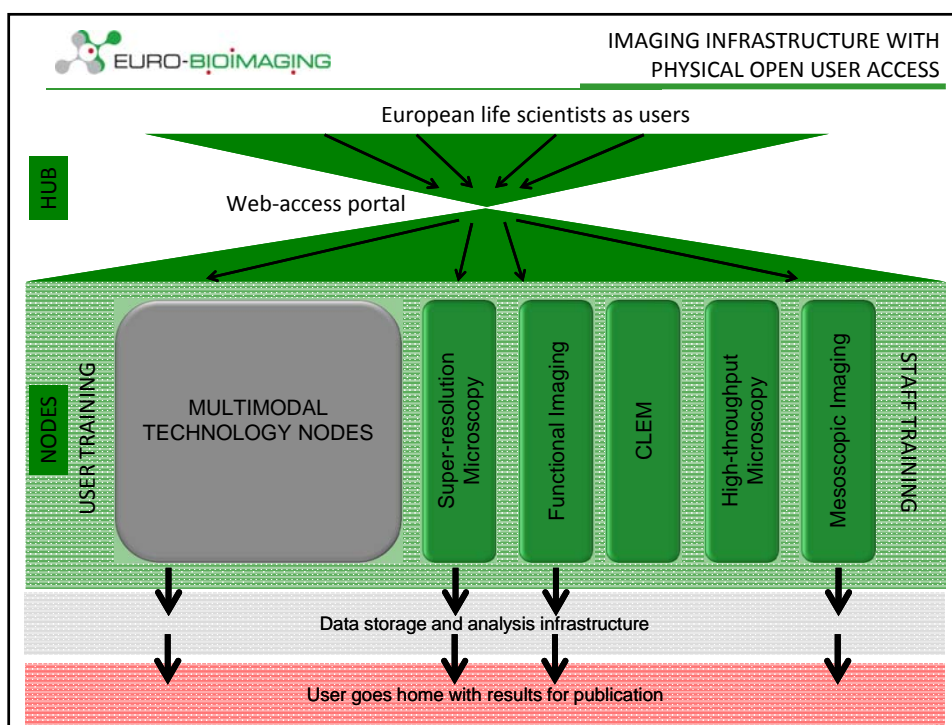
BiolMagingUK Next Steps

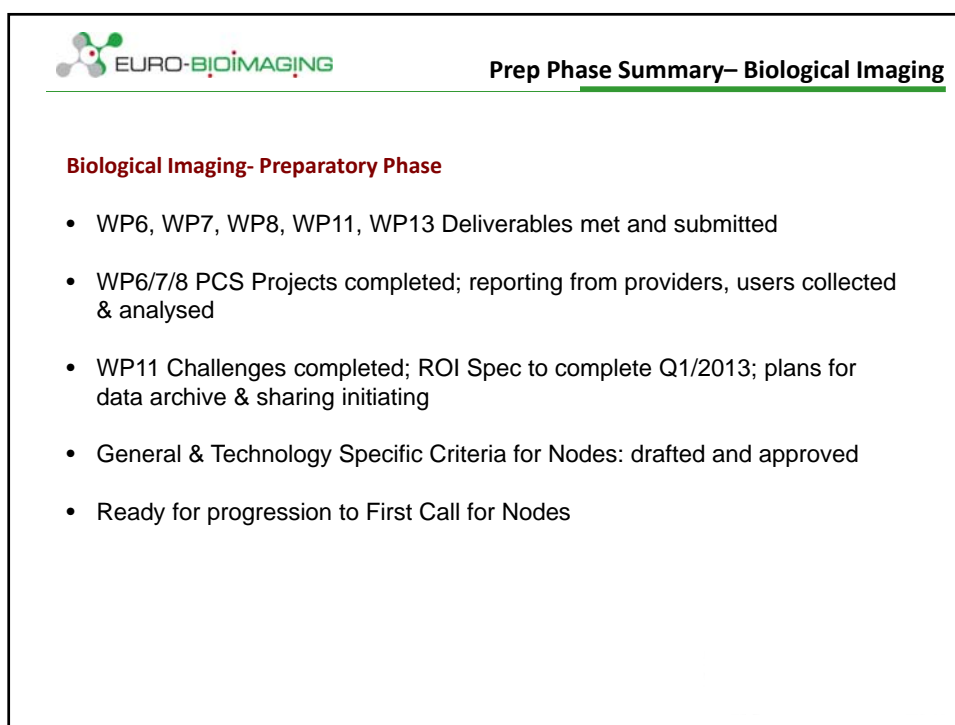
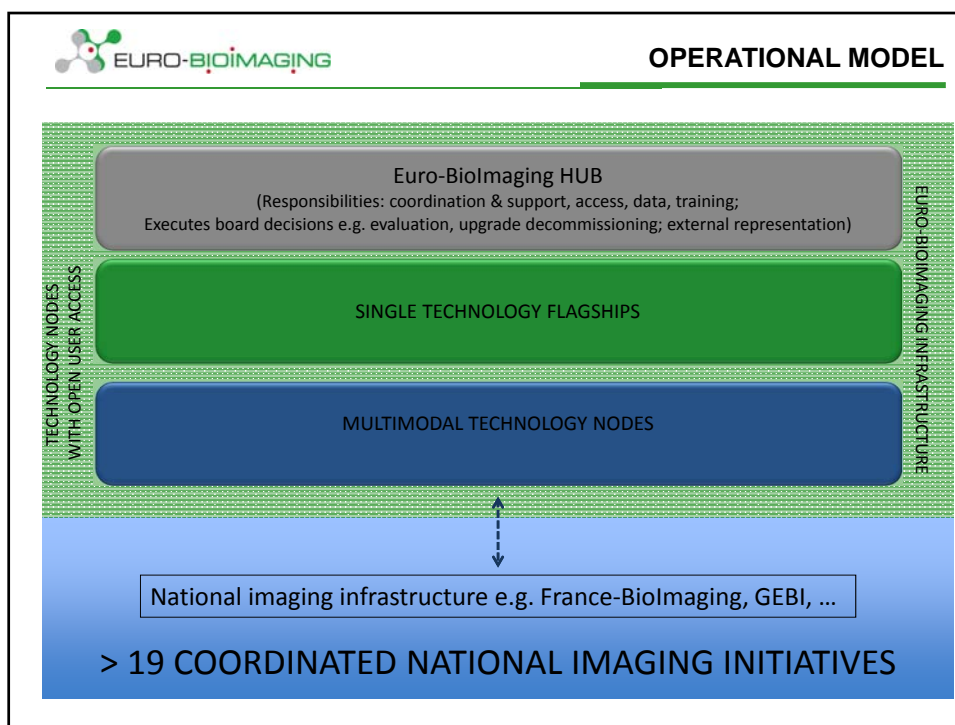
Meeting with RCUK & Wellcome Trust:

- Paul French & Jason Swedlow, March 15, 2013
- Strategy Meeting and Summary very important
- Appearance on RCUK Capital Framework a major step
- Articulation of an open grassroots community vision critical and unique
- MRC Next Gen outcomes recognised “community” concept

Next Steps

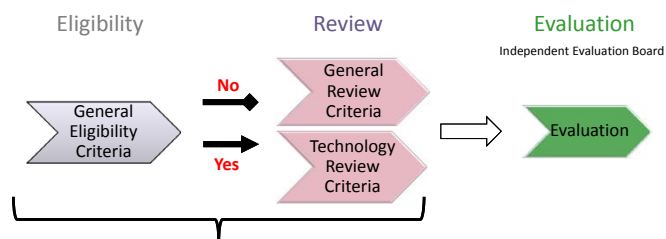
- Expand the community (e.g., plants, biomedical imaging)
- “What is a Model Node?”– report to RCUK
- “Network” Funding?
- Euro-BiolMaging Node EoI Call
 - BBSRC, MRC to offer conceptual support
 - Support working towards complementary Node applications (i.e., this meeting)
 - Shared EoI applications list w/ applicants, UK funders, & Euro-BiolMaging





1st Open Call for Euro-BioImaging Nodes

Criteria and Evaluation Process



Criteria are guidelines for Node applicants to describe the best **integrated service package for the user**



General Criteria

General Eligibility Criteria

- Applicant demonstrates the **user need** for new capacity (Letters of Intent from 50% of external users but max. 30 letters)
- Applicant guarantees to provide **open access** for Euro-BioImaging users to at least 50 % of new capacity (comprises instrument time, staff capacity, storage capacity, ...)
- Applicant demonstrates existing **communication** with national/regional funders for infrastructure capacity upgrade
- The applicant demonstrates that the single-sited or multi-sited Node will constitute a **legal entity**, which in its entirety will become part of Euro-BioImaging and as such a legal contractual partner of Euro-BioImaging
- Applicants from **ESFRI Countries** are eligible.



General Criteria

General Review Criteria

- Applicant describes and demonstrates **scientific and technical excellence** and the suitability, quality and geographic coverage of its academic environment.
- Applicant demonstrates its **European significance**.

Biological Imaging Technologies

Type of Node		Technology	Facilities										Training				
Multi-modal	Flagship		1. Wet Lab	2. Cell Culture Facility	3. Probes	4. Animal Facility	5. Model Organisms	6. High Biological Safety Level	7. Workstations - Desk, ICT access	8. Data Storage - Images	9. Accommodation	10. Methodological set up	11. Facility Induction	12. Technical assistance to run instrument	13. Image acquisition	14. Image processing and analysis	15. Project Planning
Yes		General ALM technologies	Priority														
Yes		Spinning Disc Confocal Systems	High	High	High	Med.	Med.	Med.	High	High	Med.	High	High	High	High	High	Med.
Yes		Laser Scanning Confocal Systems	High	High	High	Med.	Med.	Med.	High	High	Med.	High	High	High	High	High	Med.
Yes		Decomulation widefield microscopy	High	High	High	Med.	Med.	Med.	High	High	Med.	High	High	High	High	High	Med.
Yes		Multiphoton Systems	High	High	High	Med.	Med.	Med.	High	High	Med.	High	High	High	High	High	Med.
Yes		Total Internal Reflection Fluorescence Microscopy (TIRF)	High	High	High	Med.	Med.	Med.	High	High	Med.	High	High	High	High	High	Med.
Yes		Fourier Transform Infrared imaging	High	High	High	N/A	N/A	N/A	High	High	Med.	High	High	High	High	High	Med.
Yes		Electron Microscopy	High	High	Med.	N/A	N/A	N/A	High	High	Med.	High	High	High	High	High	Med.
*	Yes	Functional Imaging	High	High	High	Med.	Med.	Med.	High	High	Med.	High	High	High	High	High	High
	Yes	High-throughput Microscopy	High	High	Med.	N/A	N/A	N/A	High	High	Med.	High	High	High	High	High	High
	Yes	Correlative Light and Electron Microscopy	High	High	High	Med.	Med.	Med.	High	High	Med.	High	High	High	High	High	High
*	Yes	Super-resolution Microscopy	High	High	High	Med.	Med.	Med.	High	High	Med.	High	High	High	High	High	High
*	Yes	Mesoscopic Imaging	High	High	Med.	High	High	Med.	High	High	Med.	High	High	High	High	High	High

1st Open Call: Jan - Apr 2013

- **1st Call** focuses on technologies that will provide **physical open access** to biological and medical imaging technologies. Also calls for Nodes for Data Infrastructure (Challenges) and Population Imaging (Data Sharing and Archive)
- **Applicants have to meet** the general eligibility and will be reviewed by technology specific node **criteria**
- **Additional imaging technologies** will be added in **regular calls** following the Euro-BioImaging technology identification process (user need, infrastructure model, feasibility/PCS, open call)



Evaluation & decision on Node applications

1. **Independent Evaluation Board of European and international science and technology experts** evaluates all applications according to the published criteria for Nodes.

Nodes are eligible, if they meet the eligibility criteria and will be reviewed for European significance by the review criteria.

2. **Funders decide** if they invest into their successful applicant(s) for constructing and operating the Euro-Biolmaging node
3. **Euro-Biolmaging governing board representing all participating countries decides** on inclusion of Nodes into the European infrastructure.

Euro-Biolmaging & the UK (I)

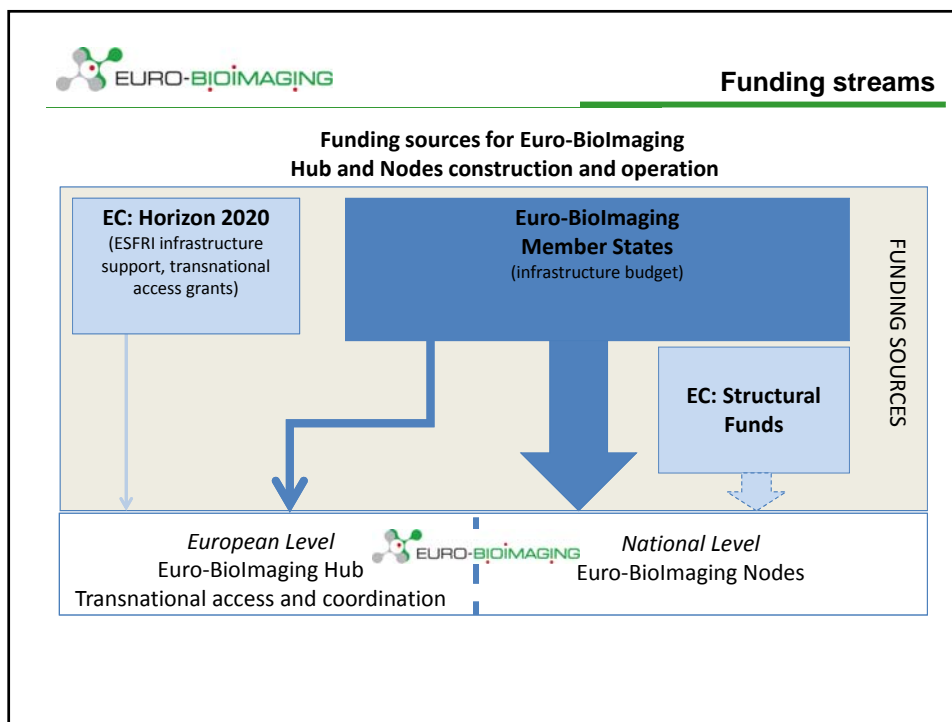
- Several (>10?) UK facilities preparing Node applications
 - Each requires LoS from UK funding entity
 - Each guarantees 50% of new capacity for external access
- Many of Euro-Biolmaging's (advanced technology construction & access, training, etc.) align well with UK goals and reqs for scientific excellence & leadership
- Other EU members (e.g. FR, DE, FI, NL, etc.) moving ahead with national coordination (e.g., Ministry of Science as single Euro-Biolmaging Node)
- How do UK scientists access advanced imaging technology as the available resources grow?
 - will my postdoc go to Birmingham, London, Paris, Utrecht, or Heidelberg?
- What financial resources are available to support Euro-Biolmaging Nodes?

Euro-Biolmaging & the UK (II)

- Attempt to coordinate applications
 - BiolmagingUK Meeting of all potential applicants (this meeting)
 - Define complementarity, rationalise competition as necessary
 - List of applicants, shared with all applicants, UK funders, Euro-Biolmaging
- Future funding?
 - What does Node status mean?
 - Is it useful to create UK value in this status?
 - Who pays? The (evolving) Euro-Biolmaging model:
 - National funders fund "Construction"
 - National funders contribute to central European fund for access and maintenance
 - H2020 funding for access
- Management & Review
 - What is the relationship between UK's Nodes and Euro-Biolmaging?

The UK's Position

- Are current & future UK investments enhanced by strong commitment to Euro-Biolmaging?
- Will existing & new investments and facilities compete with others in EU?



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Euro-Biolmaging & the UK (III)

- Euro-Biolmaging Node Applications
 - without a clear funding mechanism
 - with a Strategic Framework
 - With a strong foundation in BiolmagingUK
- Next discussions
 - Assume we form a "network" (or whatever)
 - Assume we have Nodes
 - What next?