Working Group on a Distributed Facility Model for Advanced Electron Microscopy in the Physical Sciences

Access and Networking Models

Pete Nellist/Ian MacLaren

Motivation for a distributed approach

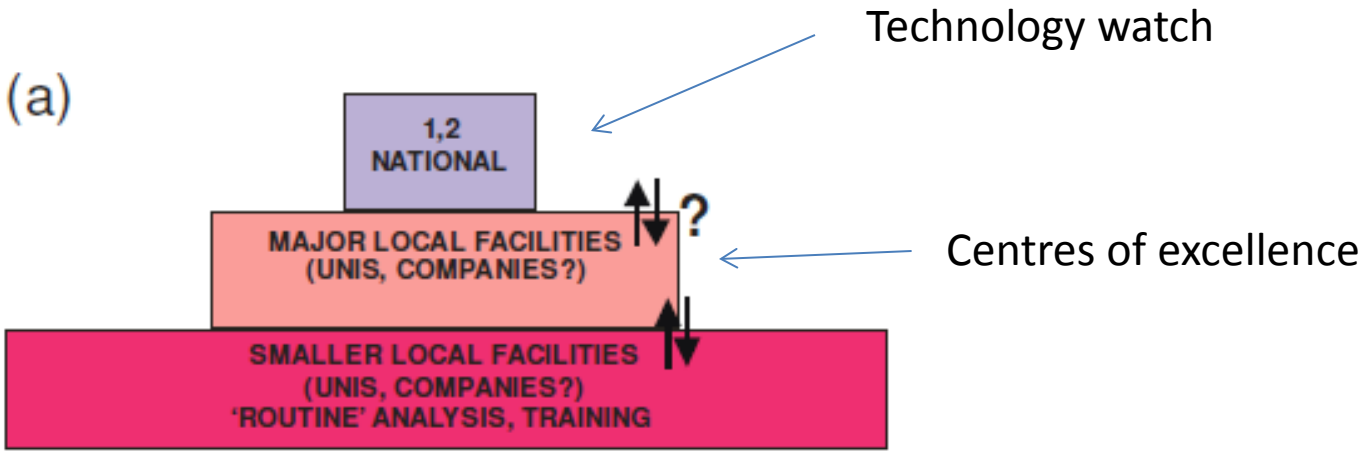
- To support the sustainability of advanced EM capabilities and maximise their output
  - Lab leader survey noted that usage of instruments limited by availability of support staff (55%) and availability of existing instruments (55%)
    - Longer term funding routes for staff (research support and technical) and maintenance costs.
  - User survey suggests that there is unfulfilled demand in more advanced capabilities (AC-(S)TEM, EELS, FIB, cryo-SEM and cryo-TEM, in-situ), and that users are sticking to their own institution.
  - Lack of available expertise cited for restricting access to advanced capabilities
    - Need to enable access to advanced capabilities across institutions

Challenges for a distributed facility

- Who decides what capability goes to which institution.
- Who gets access?
  - How is the science reviewed?
  - Facilities want to focus on doing good science and control access to their facilities.
- How does the facility become sustainable?
  - Payment of access charges raises the issue of VAT.
  - Free at point of access undercuts those aiming to cost recover through charging (lab leader survey).
- How can key staff be retained?
  - Career structures for staff.
- How can the capability be upgraded?

Background

- The 2009 community meeting identified a layer cake model:



(Bio)ImagingUK catalogue of facilities

- A basic list of imaging facilities has been hosted at York for some time:

https://www.york.ac.uk/biology/technology-facility/imaging-cytometry/uk-lm-facilities/

- The proposal from BioImaging UK and myself is to extend this to a more detailed online catalogue
- To include all microscopy and imaging facilities
- Probably to be hosted by RMS
- How to keep up to date?

Centres of excellence

- The proposal is for a funding mechanism to:
  - Provide advanced capabilities to a wide user base
  - Create a mechanism to sustain advanced capabilities
- An institution, or a consortium of institution, could bid to become a Centre of Excellence in a particular EM capability.
- The institutions(s) offer a number of days access
  - Can receive funding for
    - Staffing
    - Upgrades to existing instruments, but not new instruments.
    - Running costs

Centres of excellence

- The Centre is prefunded.
- The proposals for access are reviewed by the hosting institution.
  - A oversight panel monitors usage across centres of excellence.
- For users the centre is free at point of access.
- Estimated costs per centre £200-300k (running costs) over 3 years.
  - Applicants can bid for matching capital?

Possible CofE themes

- Specimen preparation
- [STEM imaging (including spectrum imaging)]
- [High energy-resolution EELS]
- HRTEM imaging
- Diffraction contrast
- Tomography
- Quantitative diffraction
- In-situ gas environment
- In-situ liquid
- In-situ electrical and mechanical manipulation
- Lorentz microscopy
- Holography
- LEEM

- BioImagingUK suggestions
  - Correlative Light and Electron Microscopy (CLEM)
  - Cellular Electron Tomography
  - Analytical Electron Microscopy
  - Cryo FEG SEM

Advantages of CofE approach

- Provides longer term support for facilities
  - Staff retention
  - Instrument upgrades
- Extracts maximum benefit from capital investments
  - Widens access
- Is a source of expertise for training

Disadvantages of CofE approach

- Removes competition
- Free at point of access undercuts other providers
- Creates an administrative burden
  - Reviewing proposals
  - Applying for CofE funding
- Potentially reduces innovation and technique development(?)

Lab leaders network

- Sharing of best practice.
- Monitor operation of networking and coordination activities (catalogue, centres of excellence)
- Maintain “evidence of impact” records
- Update roadmap and advise funding agencies
- Cost £10k per year

Questions

- Centres of excellence
  - Are they a good idea?
  - How long should they be funded for?
  - Priority list of capabilities?
    - Should specimen preparation be a separate CofE?
- Lab leaders network
  - Are people interested?
- Coordination of funding schemes across RCs