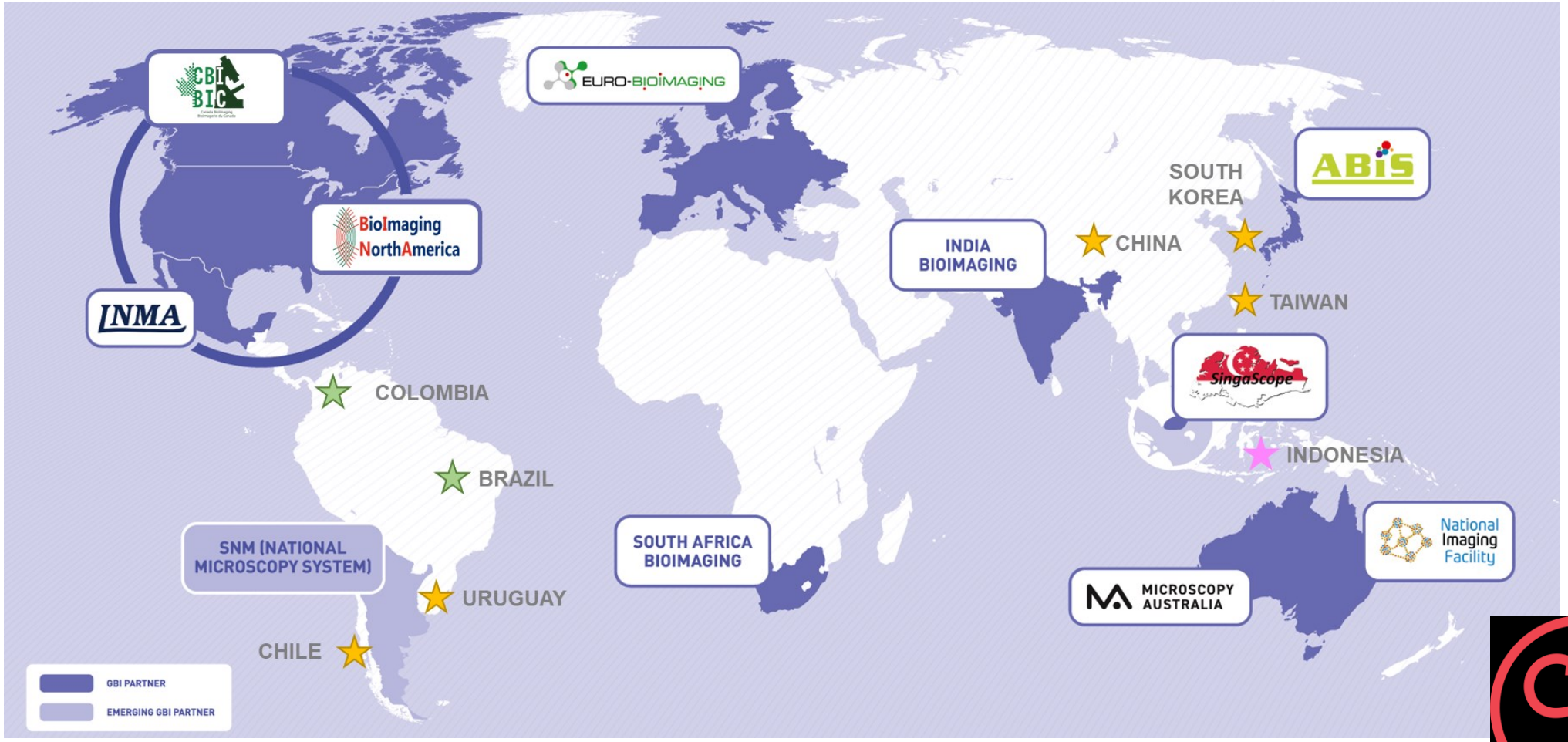
Global BioImaging Recommendation for Measuring Imaging Facility Impact

Claire M. Brown, McGill University, BINA Co-Chair

GL BAL
BI IMAGING
growing collaboration

AN INTERNATIONAL NETWORK OF CUTTING-EDGE BIOIMAGING FACILITIES AND COMMUNITIES

Global BioImaging (GBI) Network Today



★ Expression of Interest to join in 2019 ★ Expression of Interest to join in 2020 ★ Participation in 2020 EoE V

Working Groups

1. **Career Development for imaging core facility staff** – Graham Wright (SIN)
2. **Image Data Management** – Jason Swedlow (EUR), Shuichi Onami (JPN)
3. **Societal impact of Imaging Research Infrastructures** – Claire Brown (CAN), Antje Keppler (EUR)
4. **Quality Management in imaging facilities** – Julie Rothacker (AUS)
5. **Increasing the involvement of the biomedical community** – Graham Galloway (AUS)

- Development of international recommendations
- Shaping workshop and training programs
- Identification of new trends and community needs
- Broader community engagement

Societal impact of Imaging Research Infrastructures Working Group

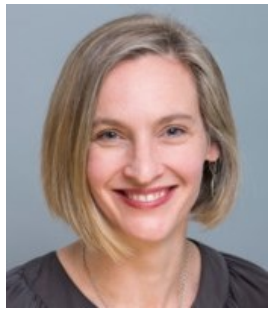
Co-Chairs

Claire M. Brown
McGill University

Antje Keppler
Global BioImaging
EMBL

Members

Gleb Grebnev
Global BioImaging
EMBL



Lisa Yen
Microscopy Australia

Jean Salamero
Institute Curie

Federica Paina
Global BioImaging
EMBL

Saba Salehi
National Imaging Facility, Australia

Laurence Lejeune
Independent Consultant

Noni Creasey
The University of Queensland

Spencer Shorte
Institute Pasteur Korea

Keshmarthy Sacadevan
SingHealth Singapore

Where can we have the most impact?

- Global BioImaging Network Metrics and Assessment
  - Too complex, different level of investments in science and technology, diverse funding models and mechanisms.

- National Metrics and Assessment
  - Lack of national databases with information, different funding models, institutions function with different management and staffing structures.

- Imaging Facility Metrics and Assessment
  - Need for **awareness** of importance of imaging scientists and imaging facilities.
  - Facilities may not know what is best to measure to show impact.
  - Facilities need guidelines and tools to measure metrics.
  - Feasible within 1-year with a group of volunteers.

What can we recommend?

- A **framework** of relevant key performance indicators (KPI) and socio-economic indicators (SEI).
- Provide an indication of **how easy or difficult each metric might be** to gather information and measure.
- Provide a **common set of guidelines** for the community that will act as a resource and a tool for demonstrating value and importance of these facilities to stakeholders (e.g. institution, funding bodies).
- Ranking of metrics **in order of importance** as ranked by the working group members.
- However, the choice of indicators and their significance will be **dependent on the mission and goal**.

  For example,
  - A regional or national centre may prioritize outside clients so the # of external users is important.
  - A highly specialized facility within an institution may not permit outside clients.
- This recommendation should act as a **guide** for imaging facility managers and/or directors to assist in **measuring their impact**.

Key Performance Indicators (KPIs)

Key Performance Indicators (KPIs) are measured parameters used to determine the **value and evolution of a facility** over time.

KPIs should be measured in an ongoing way but at a minimum be **measured annually**.

In our perspective, KPIs are not meant to be used to compare facilities with each other but to **measure continuous improvement**.

KPIs can provide a **comprehensive understanding** of the **quality** of the infrastructure (people and instruments) including many factors that are not typically evaluated.

Key Performance Indicators (KPIs)

Top 10 KPIs

INFRASTRUCTURE AND PERSONNEL

1. Personnel
2. Infrastructure (instruments/software/services)

FACILITY PERFORMANCE

3. Facility Users
4. Diversity of Users/Quality of Training
5. User Training
6. User Satisfaction
7. Publications (Facility Staff and Facility Users)
8. Collaborative Publications (Facility Staff and Users)

FINANCIAL PERFORMANCE

9. Charge Back Revenue (User Fees)
10. Grant Funding

Key Performance Indicators (KPIs)

The KPI list is structured to provide a **definition** and **description** of the KPI, along with an **indication of the level of complexity to measure each KPI** from an imaging facility's perspective.

Green - relatively easy to measure or collection information

Yellow - moderate difficulty to measure or collect information

Red - difficult to measure or collect information

FACILITY PERFORMANCE

3 Facility Users

User Base

The main mission of an infrastructure is to give access to users. It is essential to evaluate the evolution of their usage over time. Regular monitoring helps anticipate future planning challenges such as access allocations when use increases or forecasting financial issues should usage decrease.

Measurement Example: number of users month/instrument/service, % time of usage per user/month/instrument, number or different types of users (PIs/industry users/graduate students)

Progression of User Base

It is important to measure how the facility changes/progresses over time.

Measurement Example: measured annually, number of internal academic users (PIs/researchers/graduate students), number of external academic users (PIs/researchers/graduate students), number of industry users (trained on equipment or full service projects)

Key Performance Indicators (KPIs)

The KPI list is structured to provide a **definition** and **description** of the KPI, along with an **indication of the level of complexity to measure each KPI** from an imaging facility's perspective.

Green - relatively easy to measure or collection information

Yellow - moderate difficulty to measure or collect information

Red - difficult to measure or collect information

4 Diversity of Users/Quality of Training

Scientific area of study (departments, institutions, programs)
This will measure the internal visibility, the interdisciplinary collaboration, the inter-university collaboration and collaboration with industry. The variety of institutional and departmental origin of users is a powerful indicator of the recognition, visibility and quality of the infrastructure.

Measurement Example: Distribution of user base university/faculty/department, Distribution of users (map) local/regional/national

Jobs facility users find based on the influence of facility training/experience
Despite being an important metric, it remains very difficult to evaluate how much influence a given core facility has on a particular individual career path. Nevertheless this kind of data can be the basis for a strong argument and indication of the broader core facility impact.

Measurement Example: % users using imaging in their current job, testimonies from users.

Socio-Economic Indicators (SEIs)

Socio-Economic Indicators (SEIs) are measured parameters used to determine the **social and economic value and impact of a facility**.

Research infrastructure enables **high quality research outcomes** that in turn have an impact on broader socio-economic factors.

Assessing impact through SEIs is a powerful way to **demonstrate value to key stakeholders** (e.g. funders, institutions) to maintain long-term funding/partnerships.

SEIs are typically **more indirect, more difficult to measure**, and more difficult to link directly to microscope infrastructure and imaging scientists.

Socio-Economic Indicators (SEIs)

Top 10 SEIs

RESOURCES

1. Open Data Sharing
2. Standards and Quality Management
3. Education Resources for the Larger Community
4. Expert Advice to Support Public Policies
5. Public Education

HIGHLY QUALIFIED PERSONNEL

6. Imaging Scientists
7. Career/Job Creation

COLLABORATION

8. Collaboration with Industry/Intellectual Property
9. Industry Investments

PUBLIC VISIBILITY

10. Media

Socio-economic Indicators (SEIs)

- Research infrastructure enables high quality research outcomes that in turn have an impact on broader socio-economic factors.
- Assessing impact through Socio-Economic Indicators (SEIs) is a powerful way for imaging core facilities to demonstrate their value to key stakeholders (e.g. institutions, funders)

Green - relatively easy to measure or collection information

Yellow - moderate difficulty to measure or collect information

Red - difficult to measure or collect information

RESOURCES

1 Open Data Sharing

In the open Science world, especially in imaging, it is important to monitor to what extent one's open source data has been used. It is a work in progress to define procedures ensuring free access to some imaging data but also ensure proper credit tracking. Despite the difficulty, this type of validated and well defined data set will become critical.

Accession number for publicly available data.
Measurement Example: number open source datasets, number of time the data is accessed/used per year

Use of data for training
Measurement Example: number of data sets used for training, number of people trained using datasets, types of usage/scope of use (e.g. local, national, global)

Reuse of data for analysis/publication by the community
Measurement Example: number of publications using the data

Socio-economic Indicators (SEIs)

- Research infrastructure enables high quality research outcomes that in turn have an impact on broader socio-economic factors.
- Assessing impact through Socio-Economic Indicators (SEIs) is a powerful way for imaging core facilities to demonstrate their value to key stakeholders (e.g. institutions, funders)

Green - relatively easy to measure or collection information

Yellow - moderate difficulty to measure or collect information

Red - difficult to measure or collect information

HIGHLY QUALIFIED PERSONNEL

6 Imaging Scientists

Imaging scientists play a central role in their respective communities. They can be scientific directors, managers, post-doctoral fellows, engineers or technicians. For more specific examples of who imaging scientists are see www.imagingscientist.com. In general they are highly trained scientists and their role and career evolution needs to be reported and tracked over time since their careers reflect the quality of the facility and provides insight into the types of high quality jobs that the economy wants to promote.

Number of highly trained imaging scientists

Professional development of imaging scientists
Measurement Example: Advanced training courses, Membership in professional societies

Imaging scientist career progression and future job opportunities
Measurement Example: Continued advanced training courses, continued professional society involvement, jobs they move into from imaging scientist positions

Next Steps: GBI Recommendation

Publish **short communication** introducing recommendation, KPIs and SEIs and importance of quantifying impact of imaging facilities.

Publish **detailed recommendation** with top 10 KPIs and top 10 SEIs as supplemental document to the communication.

Collect **imaging facility surveys** from the community, create a GBI repository, promote the repository and distribute surveys, as needed.

Would there be a need from the community to **develop common community agreed upon surveys** on different topics?

Link GBI Recommendations to United Nations 17 Sustainable Development Goals - 2015

https://www.un.org/sustainabledevelopment/sustainable-development-goals/