

Advanced Bioimaging Data Management and Archiving for Life Sciences



Challenges

Modern life sciences research generates vast amounts of imaging data across multiple modalities, including light, electron, and cryo-electron microscopy. Managing, storing, and sharing these datasets presents significant challenges:

- **Data Volume:** Large-scale imaging projects can produce terabytes to petabytes of data.
- **Data Accessibility:** Researchers require secure, standardized access to raw and processed imaging datasets.
- **Reproducibility:** Ensuring reproducibility and reusability of imaging data is increasingly mandated by funding bodies and journals.
- **Integration:** Linking imaging data with associated molecular, genomic, and phenotypic information remains complex.

Keywords

#Bioimaging #Data Management #FAIR Data
#Image Archiving #Multi-omics Integration
#Machine Learning #Reproducible Research #Life Sciences

Technology

Dr. Matthew Hartley leads efforts at the [BiolImage Archive](#) to provide a robust platform for the deposition, storage, and dissemination of biological imaging data. Key technological features include:

- **Centralized Repository:** Secure, scalable storage of imaging datasets with rich metadata.
- **Standardization:** Support for community standards for image formats and metadata annotation, enabling interoperability.
- **Data Curation:** Expert curation ensures high-quality, reusable datasets.
- **Integration:** Links imaging data to molecular, genomic, and phenotypic datasets, facilitating multi-omics research.
- **Open Access:** Enables FAIR (Findable, Accessible, Interoperable, Reusable) principles for bioimaging data.

Internal EMBLEM Reference

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Key Inventor

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Applications

- Standardized deposition and curation of biological imaging datasets.
- Multi-modal imaging integration with molecular and phenotypic datasets.
- Training datasets for machine learning in bioimage analysis.
- Reproducibility support for preclinical and translational research.

Intellectual Property

The platform emphasizes open-access dissemination and data sharing in line with FAIR data principles.

Further Reading

[1] [Electron Microscopy Public Image Archive – EMPIAR](#)

[2] <https://www.ebi.ac.uk/about/teams/bioimage-archive/>

[3] <https://www.ebi.ac.uk/about/teams/its-infrastructure/data-centres/>

Seeking

- **Collaborations:** Partnerships with industry and academia to expand the dataset repository and integrate new imaging modalities. Opportunities for joint development of tools or enhanced services for imaging data management and analytics.
- **Funding and Support:** Collaborative grants or sponsorships to extend FAIR-compliant data infrastructure.

Commercial Opportunity

The BioImage Archive offers potential applications across multiple sectors:

- **Pharmaceutical and biotech companies:** Access to high-quality imaging datasets to accelerate drug discovery and preclinical research.
- **Academic and research institutions:** Standardized infrastructure for storing, sharing, and reusing imaging data.
- **AI and machine learning startups:** Use curated imaging datasets to train algorithms for image analysis and predictive modeling.
- **Scientific publishers and data services:** Integration into data pipelines for publishing reproducible and reusable datasets.

Benefits

- **Scalability:** Capable of storing terabyte-scale imaging projects.
- **Reusability:** Curated datasets ensure high-quality, reproducible research.
- **Open Access:** Supports FAIR principles for global accessibility.
- **Interoperability:** Facilitates multi-omics integration and computational analysis.
- **Community Engagement:** Aligns with international standards and practices in bioimaging.

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