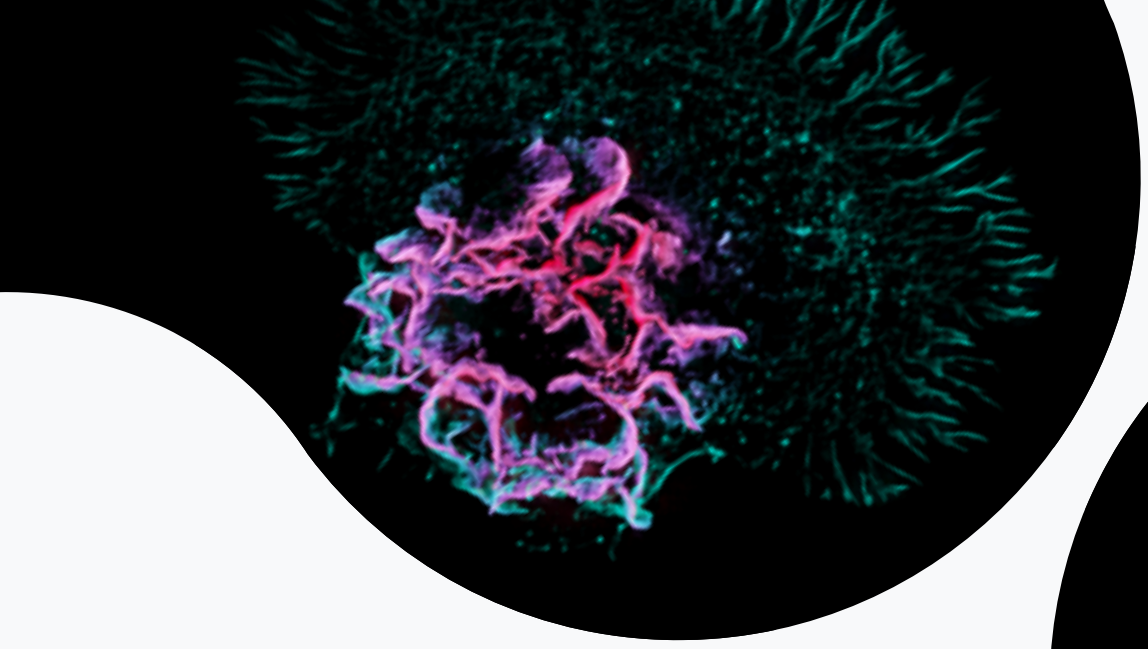
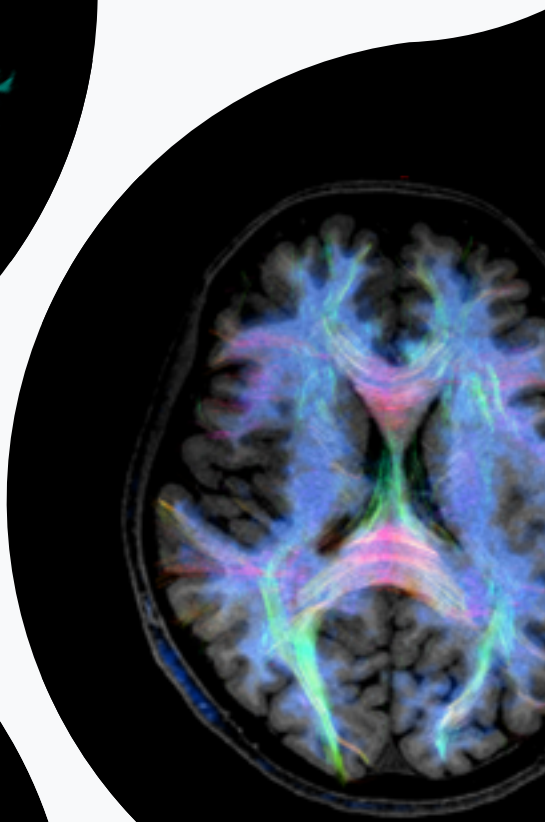
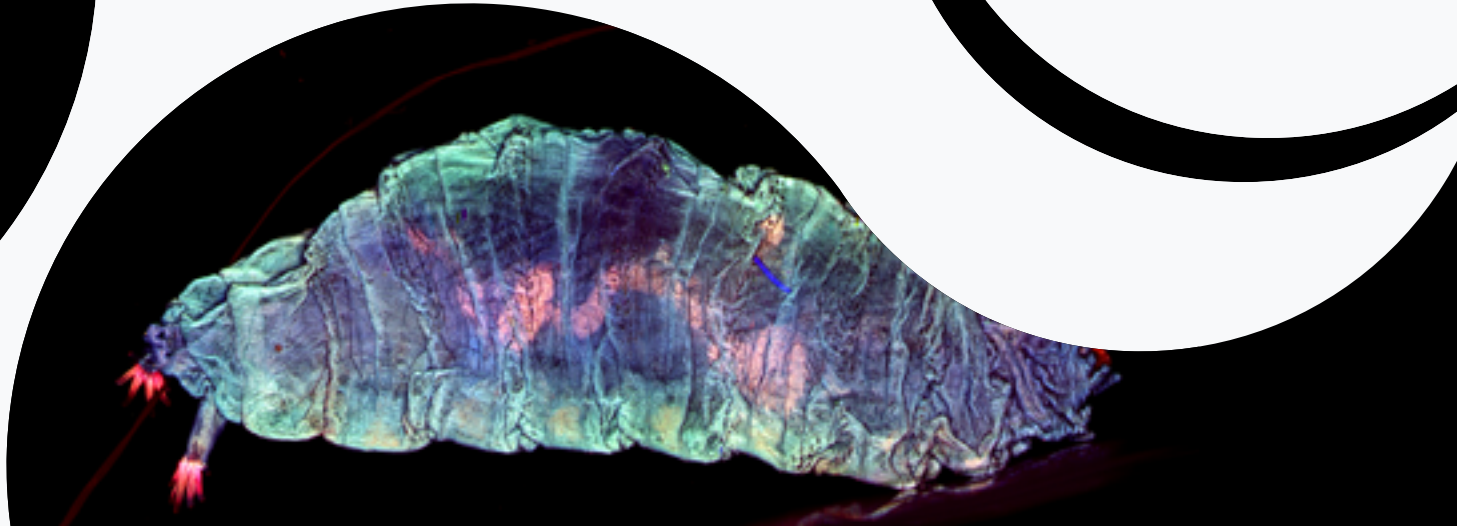




EUROBIOIMAGING

ANNUAL REPORT 2022



EURO-BIOIMAGING ERIC

We are the European landmark research infrastructure for biological and biomedical imaging as recognized by the European Strategy Forum on Research Infrastructures (ESFRI). Euro-BioImaging is the gateway to over 170 world-class imaging facilities across Europe.

image life,
discover the future

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FRONT COVER IMAGES

Top: *Stépán Cada & Petra Bačovská - 'Leukemic cell of B-cell origin is induced to attach to substrate, which limits its protrusions to form on its top' - Vitezslav Bryja, Laboratory of Cellular Communication, Institute of Experimental Biology, Faculty of Science, Masaryk University*

Middle: *Multi-Modal Molecular Imaging Italian Node - 'PET-MRI human brain'*

Bottom: *Outi Paloheimo - 'Larva of fruit fly'*

ABOUT US

FOREWORD FROM
EURO-BIOIMAGING DIRECTORS

John Eriksson
Director General

Antje Keppler
Section Director
Bio-Hub

Linda Chaabane
Section Director
Med-Hub

In this Annual Report we are excited to present another package of golden moments and capture our continuous pursuit to advance scientific discovery by offering cutting-edge imaging technologies and services.

In 2022, user access continued to increase significantly, giving a clear prognosis on how vital our role can be in the future in terms of supporting and advancing the European scientific community. Many of our user projects often exceed our wildest expectations, delving deep into the secrets of infections, human brain function, parasitic life cycles, employing pioneering 3D imaging of cells and tissues under normal and pathological conditions, or actively advancing marine life detection and providing imaging biomarkers for testing new therapies.

A landmark achievement this year was the inauguration of our pioneering image data services, including access to advanced analysis services by Euro-BioImaging Nodes and FAIR image data services by the Hub. The data services offer is a pivotal move towards embracing open science and ensuring data reproducibility.

In the sphere of securing external funding to support user access at the Euro-BioImaging Nodes, provide new and improved services and support the Nodes, 2022 was nothing short of spectacular. We experienced the launch of three EU-funded INFRASERV projects jointly with different Life-Science infrastructures that provide financial support for user access and pave the way for an access model providing long-term sustainability.

In addition, we secured significant grant proposals which bridge the gap between data acquisition and discovery and help us to employ and develop the full power of artificial intelligence. These successes, combined with achievements by our Node communities, are all clear signs of the inbuilt resilience, adaptability, tenacity, and true potential of our organization and the increased recognition of the key role imaging plays in modern life sciences.

In alignment with the strategic long-term goal to gain sustainability, our Node family has grown, with the inclusion of new Nodes from Slovenia and the UK, and three Node upgrades at EMBL, the Cellular Imaging Hungary Node and the MMMI Italian Node.

Having achieved the strategic objectives of the ramp-up phase, we shift our focus towards the goals at and beyond the horizon. Our ambition to enhance imaging-related services, support researchers and the imaging community, and foster technological and scientific innovation remains at the heart of our mission going forward.

In the pages that follow, we invite you to explore our achievements over the past year and share our vision for the future. We are confident that Euro-BioImaging, with its strengths and assets, will continue to grow, inspire the life science research community, and make a significant impact on European and global societies. With the Annual Report 2022, we welcome you again to explore and anticipate a future where the world of imaging is without borders!

INFRASTRUCTURE AT A GLANCE

Euro-BioImaging ERIC is the European Research Infrastructure Consortium for biological and biomedical imaging, awarded the landmark status by ESFRI and thus recognized as the implemented reference infrastructure in the imaging field. Euro-BioImaging was established as an ERIC in the end of 2019.

The distributed Euro-BioImaging infrastructure builds on a set of already existing national and international facilities of excellence in imaging technologies, the Euro-BioImaging Nodes, which provide physical or remote access to imaging technologies, deliver training and support the users at all the stages of their research projects with their experienced staff.

Every researcher, both from academia and industry, can apply for Euro-BioImaging services whenever they have a project requiring imaging technologies and expertise but do not have the equipment or the skills to perform the experiments at their home institute.

The Nodes are jointly coordinated by the Euro-BioImaging Hub, which provides general supporting services including the management of user access, policy and lobbying, community and skill building activities, and services for image data.

Access to Euro-BioImaging services takes place through the Euro-BioImaging web portal at:

www.eurobioimaging.eu

DID YOU KNOW?

To optimally support the specific user needs in the biological and biomedical imaging communities, and at the same time ensure integration and overall coordination, the Euro-BioImaging Hub has a tripartite structure, in which Finland hosts the Statutory Seat, Italy hosts the Med-Hub, and EMBL hosts the Bio-Hub and Euro-BioImaging's general data services.

MAP OF EURO-BIOIMAGING MEMBERS & NODES

Cities where Euro-BioImaging facilities are located

Full members

Observers

Finland, EMBL & Italy host the three Hub sites

KEY FIGURES 2022

17 MEMBERS (COUNTRIES & EMBL)

35 NODES

173 IMAGING FACILITIES

86 BIOLOGICAL IMAGING TECHNOLOGIES

24 BIOMEDICAL IMAGING TECHNOLOGIES

141 NEW USER PROJECTS

3 COORDINATING HUB SITES

HIGHLIGHTS OF 2022

FEB

Euro-BioImaging featured in iScience journal

Panel of Nodes meeting

MAR

ISIDORe project kick-off

10 user projects selected for funding in the pilot User Access Fund

EBIB Advisory Panel meeting

Med-Hub Director, Linda Chaabane, joined Euro-BioImaging

APR

1 Node candidate *(Flanders BioImaging)* & 1 Node upgrade *(EMBL)* approved

Euro-BioImaging received its ERIC 'plate'

MAY

6th Euro-BioImaging Board meeting

JUN

eRImote project kick-off

1st ISIDORe Open Call launched for SARS-CoV-2 research

JUL

3 INFRA-TECH call projects funded

Euro-BioImaging became the mandated organization for the ERIC Forum at the EOSC Association

Scientific Advisory Board meeting

SEP

4 Horizon Europe projects officially launched

The Equality Plan was published

Image data analysis services Proof-of-Concept Study launched

OCT

2 New Nodes *(UK Node, SiMBION)* & 2 Node upgrades *(Cellular Imaging Hungary, MMMI Italian Node)*

Smart Microscopy Workshop with EBIB & Euro-BioImaging Nodes

2 MoUs signed:

- *Institut Pasteur Montevideo*
- *Euro-BioImaging ERIC & Instruct-ERIC & EU-OPENSCREEN ERIC*

EBIB Advisory Panel & SAB meeting

NOV

7th Euro-BioImaging Board meeting

Panel of Nodes meeting

DEC

Technology reorganization & Proof-of-Concept Study went live on our web portal

OUR TEAM 2023

Euro-BioImaging ERIC is coordinated by the Hub Team. The Euro-BioImaging Hub consists of the Statutory Seat in Finland (Turku), a community-specific Bio-Hub for biological imaging at EMBL (Heidelberg), and a community-specific Med-Hub for biomedical imaging in Italy (Torino). Basic operation is covered by thirteen FTEs, funded by the Euro-BioImaging members. External funding through EU-funded Horizon Europe projects supports the staff delivering our tasks and services within those projects.

13
TEAM MEMBERS FUNDED BY MEMBER STATES

10
TEAM MEMBERS FUNDED BY EU PROJECTS

6
PART-TIME & IN-KIND PERSONNEL

John Eriksson
Director General
Statutory Seat | Turku

Antje Keppler
Section Director Bio-Hub
Bio-Hub | EMBL

Linda Chaabane
Section Director Med-Hub
Med-Hub | Torino

Johanna Bischof
Scientific Project Manager
Bio-Hub | EMBL

Erika Cerutti
Project Manager
Med-Hub | Torino

Marianna Childress-Poli
External Communication Officer
Bio-Hub | EMBL

Giuseppe Digilio
Scientific Advisor
Med-Hub | Torino

Dorothea Dörr
Scientific Project Manager
Statutory Seat | Turku

Ayoub El Ghadraoui
EU Project Manager
Bio-Hub | EMBL

Solveig Eriksson
Multimedia Producer
Statutory Seat | Turku

Camilo Guzmán
Scientific Officer - Quality Management of Biological Imaging
Statutory Seat | Turku

Pasi Kankaanpää
Senior Scientific Manager
Statutory Seat | Turku

Henok Karvonen
Multimedia Producer
Statutory Seat | Turku

Isabel Kemmer
FAIR Image Data Steward
Bio-Hub | EMBL

Anting Li
Personal Assistant to the Management
Statutory Seat | Turku

Dario Longo
Scientific Project Manager
Med-Hub | Torino

Rakesh Mahato
Software Developer
Statutory Seat | Turku

Aastha Mathur
Coordinator Image Data Services
Bio-Hub | EMBL

Buğra Özdemir
Image Data Specialist
Bio-Hub | EMBL

Claudia Pfander
Industry Board Coordinator
Bio-Hub | EMBL

Ilari Pulli
Coordinator
Statutory Seat | Turku

Feriel Ramdhane
Image Data Scientist
Med-Hub | Torino

Rachel Robinson-Lehtinen
Scientific Project Manager
Statutory Seat | Turku

Zorica Ruohonen
Project Specialist
Statutory Seat | Turku

Arina Rybina
Scientific Project Manager
Bio-Hub | EMBL

Jaanus Saarnak
Software Developer
Statutory Seat | Turku

Beatriz Serrano-Solano
EU Project Manager
Bio-Hub | EMBL

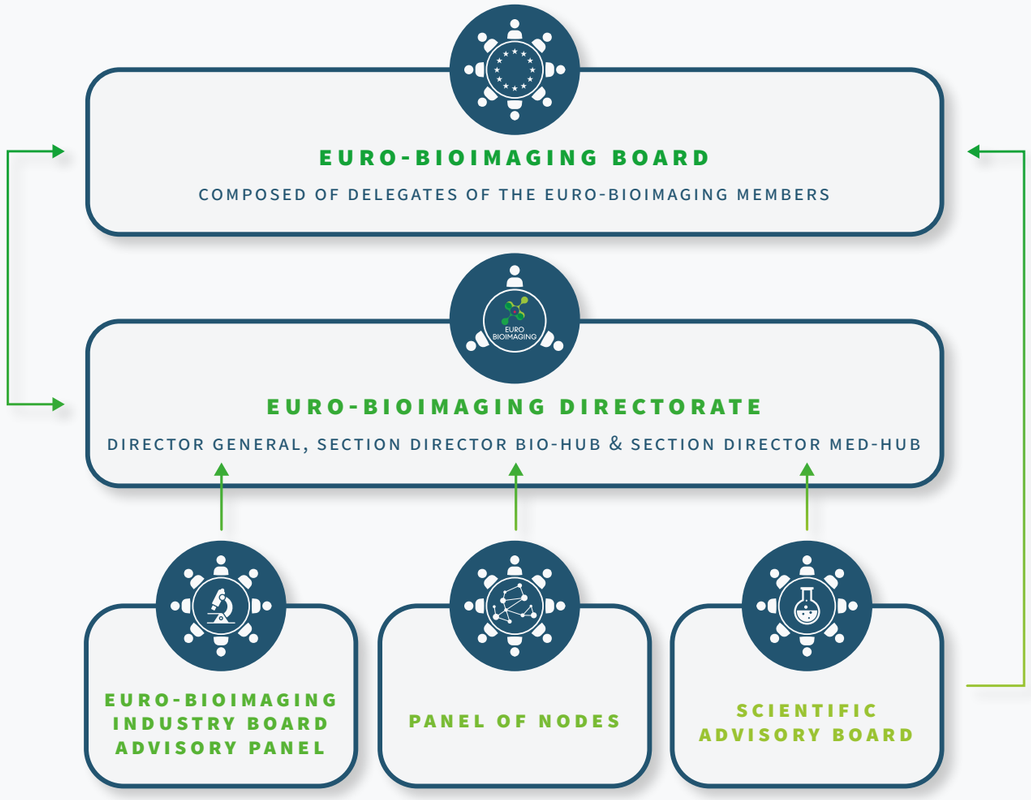
Susanne Vainio
Scientific Officer - Quality Management of Medical Imaging
Statutory Seat | Turku

Alessandra Viale
Scientific Project Manager
Med-Hub | Torino

GOVERNANCE

Euro-BioImaging is managed by its Hub and governed by the Euro-BioImaging Board. Our governance also includes a Scientific Advisory Board (SAB), to oversee the scientific, ethical, technical and quality management of the Euro-BioImaging ERIC activities. The Panel of Nodes, representing the individual Nodes, advises the Euro-BioImaging Directorate. In addition, the Industry Board Advisory Panel interacts with the Directorate on industry-relevant aspects.

OUR MULTI-FACETED GOVERNANCE



The Euro-BioImaging Scientific Advisory Board and Hub Team members at Seili Island, in the Turku Archipelago, Finland

EURO-BIOIMAGING BOARD & PANEL OF NODES

On November 8-9, members of the Euro-BioImaging Hub Team had the pleasure of meeting with the Euro-BioImaging Board and Panel of Nodes in Torino, Italy. Representatives from 32 Nodes - including the brand new UK & Slovenian Nodes - and all 17 Member States and Organisations were present in Torino and online. We were very pleased to have this time together to discuss the accomplishments and future strategy of Euro-BioImaging.

The Panel of Nodes in Torino, Italy

Director General John Eriksson, Chair Benny Geiger & Vice-Chair Jan Buriánek in Torino, Italy

The Euro-BioImaging Board and Hub Team members in Torino, Italy

INDUSTRY BOARD ADVISORY PANEL

On October 26, the Scientific Advisory Board and Industry Board Advisory Panel held their first joint meeting to discuss the upcoming Strategic Plan, Quality Management and future relations between different stakeholders.

SCIENTIFIC ADVISORY BOARD

Due to the pandemic, we were unable to meet in person with the Euro-BioImaging Scientific Advisory Board (SAB) during the first two years of Euro-BioImaging's operations. From July 25-26, SAB members from around the world (Australia, Japan, Canada and the United States) met in Turku, Finland and online, for an intense two days of discussions on strategy, operations, and trends in imaging. With their input, Euro-Bioimaging will remain cutting-edge and support the future of imaging in science.

The Euro-BioImaging Scientific Advisory Board members visiting the Turku PET Centre, Finland

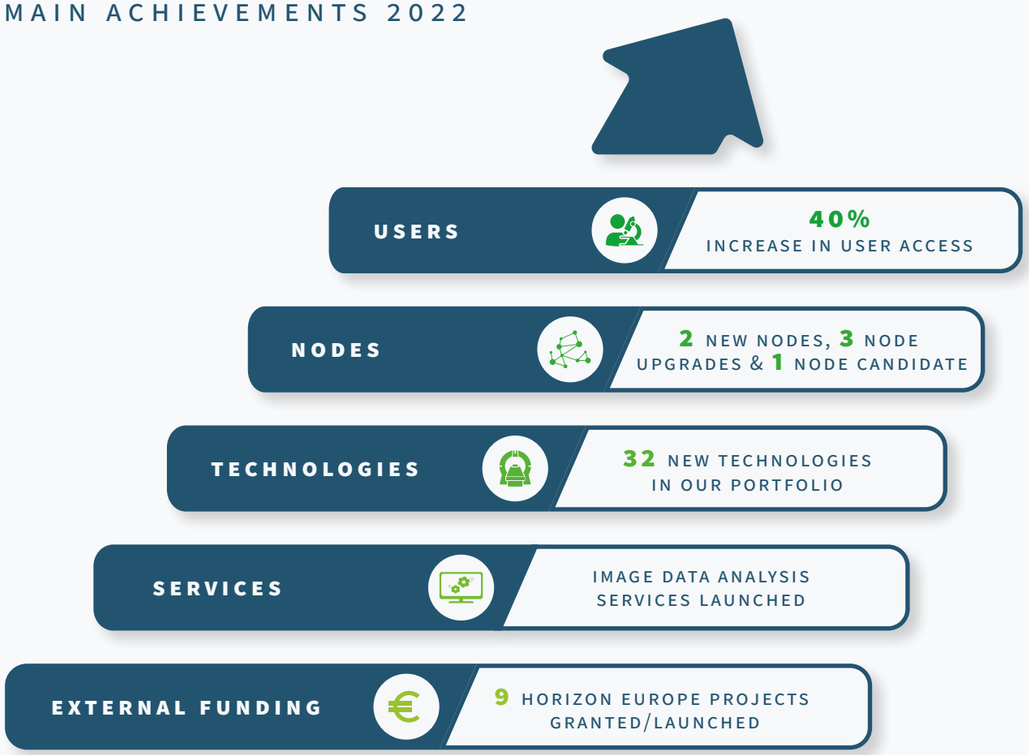
The Euro-BioImaging Scientific Advisory Board discussing with the Hub Team at Seili Island, Finland

ACHIEVEMENTS 2022

In our third year of operations, we continued to go above and beyond the goals we set for ourselves in our first Strategic Plan. In line with our mission of providing open access to imaging instrumentation, in this first 'post-pandemic' year of operations, we saw a 40% increase in user projects, including an increased level of transnational user requests. Furthermore, our infrastructure continued to expand. We now include 173 of the best imaging facilities in Europe within the Euro-BioImaging family. We also continued to reinforce our core services. A landmark achievement was the launch of our image data services, which include the provision of image analysis support on users' own data by the Euro-BioImaging Nodes and support for data FAIRification by the Hub. In parallel, we expanded our technology portfolio to include the latest developments in imaging technology and made access to our services more intuitive to potential users by updating the technology navigation on our web portal.

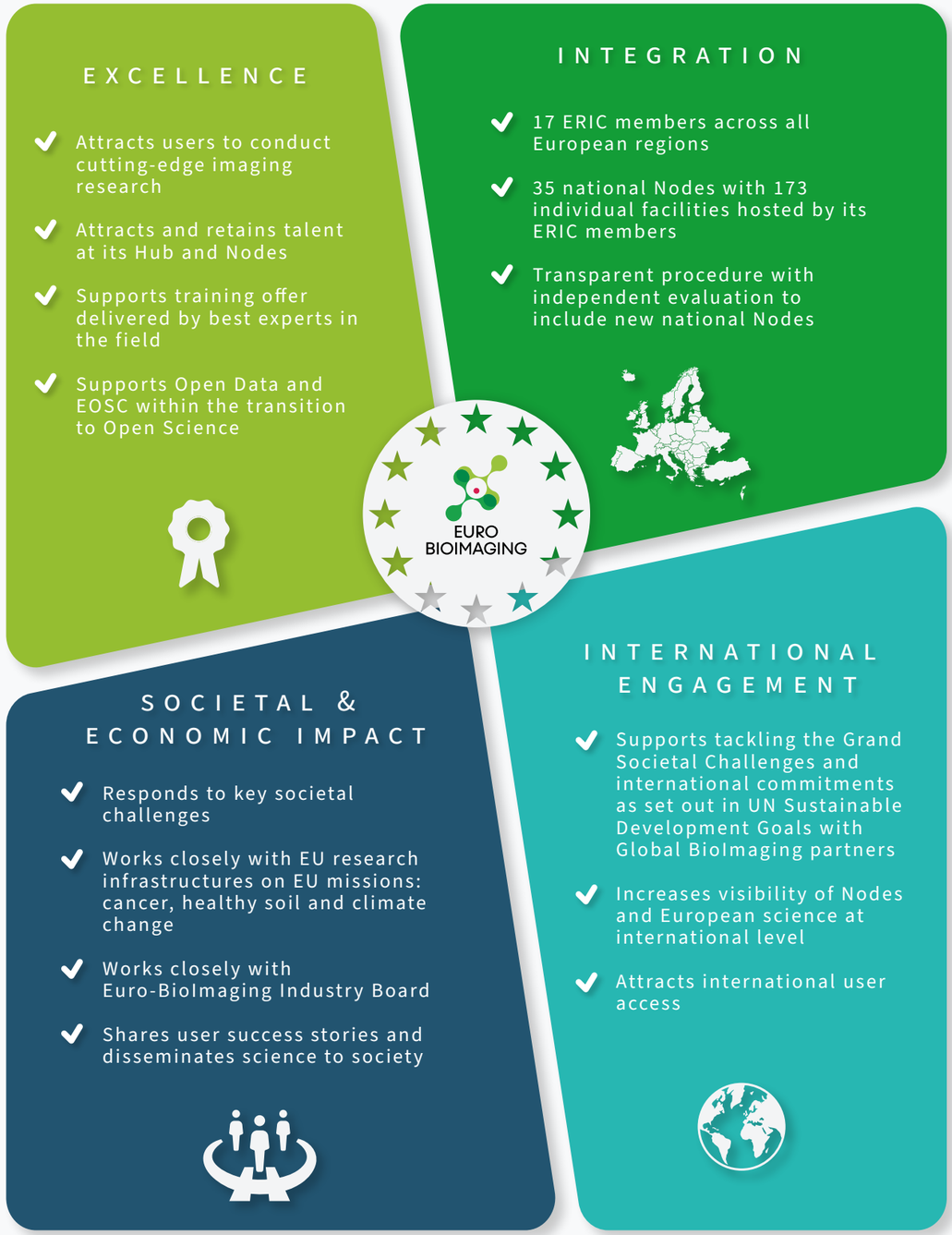
Finally, nine Horizon Europe projects with Euro-BioImaging involvement were either awarded or launched in 2022. These projects fund user access, support technology development, strengthen our data services, and position us strongly in the European Research Area. In order to implement these projects successfully, we participated in a number of kick-off meetings and shaped the outset for these projects. In the ISIDORe project we were able to fund the first user projects in infectious disease research in 2022. We also contributed actively to policy work and represented the imaging community and image data in the European Open Science Cloud (EOSC) initiatives and projects. Through these projects we aim to benefit all researchers using imaging for their science and to ensure that imaging technologies and expertise of both researchers and core facility staff are recognized by all stakeholders as crucial to underpinning excellent science.

MAIN ACHIEVEMENTS 2022



MISSION & VALUES

Euro-BioImaging's key mission is to enable European researchers, both from academia and industry, to benefit from innovative biological and biomedical imaging technologies, expertise, data services, and training essential for performing cutting-edge research. These services are available to every researcher who applies via our portal. In addition, Euro-BioImaging ERIC has a crucial role to play as an ESFRI Landmark, contributing to the overall competitiveness of the European Research Area.



CORE SERVICES

USER ACCESS

Every researcher, both from academia and industry, can apply for Euro-BioImaging services whenever they have a project requiring imaging technologies and expertise but do not have the equipment or skills to perform the experiments at their home Institute. Here's how it works:

INITIAL CONSULT

Potential users visit the Euro-BioImaging web portal to select a technology and a Node, or contact Euro-BioImaging directly to discuss their project and receive advice on technology and Node selection.

ACCESS REQUEST

After the technology and Node are selected, the user fills in the request form via the Euro-BioImaging web portal: **www.eurobioimaging.eu**

SCIENTIFIC ADVICE

Applications receive scientific advice from external experts to support project development. In certain cases, no scientific check is necessary and the proposal can be fast-tracked to the technical check.

TECHNICAL ADVICE

The selected Node confirms the technical feasibility of the planned work. Once the access request is granted, the Node contacts the users regarding practicalities.

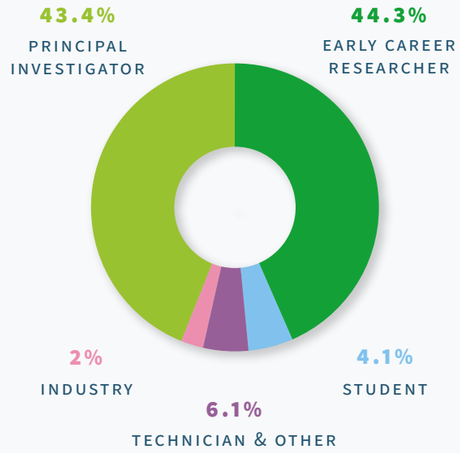
SERVICE PROVISION

A successful Euro-BioImaging access request unlocks the power of imaging technologies and provides the expertise that users need to apply state-of-the-art imaging equipment to their project and analyze their results.

ABOUT OUR USERS

Euro-BioImaging's core mission is to coordinate access to imaging technologies, image data services and training at its Nodes for all life scientists in Europe and beyond. We are proud to report a 40 percent increase in user access between 2021 and 2022. Below we share some statistics about Euro-BioImaging users. Don't miss reading about their projects in the *Excellent Science* section of this Annual Report.

USER CAREER STAGE



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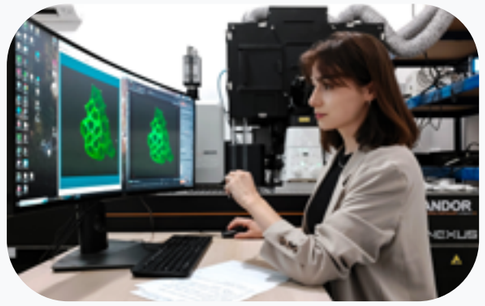
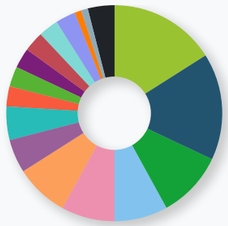
EURO-BIOIMAGING USERS IN 2022 - A 40% INCREASE SINCE 2021



Palina Nepachalovich is a first year PhD student studying lipid metabolism at TU Dresden and visited Euro-BioImaging's Sofia BioImaging Node in 2022

USER SCIENTIFIC DOMAIN



16% NEUROSCIENCE
16% CELL BIOLOGY
10% CANCER
8% METHOD & PROBE DEVELOPMENT
8% PLANT BIOLOGY
8% DISEASES & NEW TREATMENTS
5% DEVELOPMENTAL BIOLOGY
5% IMMUNOLOGY
3% GENOME BIOLOGY
3% MATERIAL SCIENCE
3% METABOLISM
3% MICROBIOLOGY
3% REGENERATIVE MEDICINE
3% INFECTIOUS DISEASE
1% CARDIOVASCULAR DISEASE
1% MARINE BIOLOGY
4% OTHER

OTHER DOMAINS:
PHYSIOLOGY, BIOPHYSICS, IMAGE DATA SERVICES, ENVIRONMENTAL BIOLOGY, PARASITOLOGY, ZOOLOGY, ARCHEAOLOGY

USER FEEDBACK

> **Euro-Bioimaging provides excellent opportunities for research exchange, facilitating the academic mobility for senior and young researchers.**
>
> - Biomedical imaging technology user

> **The main improvement would simply be to keep giving such an *excellent* service, both with top-quality well-maintained instruments, and *outstanding* human resources - knowledgeable and excellent teachers.**
>
> - Biological imaging technology user

TECHNOLOGIES

UPDATING THE TECHNOLOGY PRESENTATION

During 2022 we significantly expanded the Euro-BioImaging technology offer and launched a brand new, user-friendly technology presentation on the Euro-BioImaging website. Designed to make our technology portfolio more flexible and accessible, the new presentation is based on technology categories, making it easier for non-expert users to find the right imaging technology.

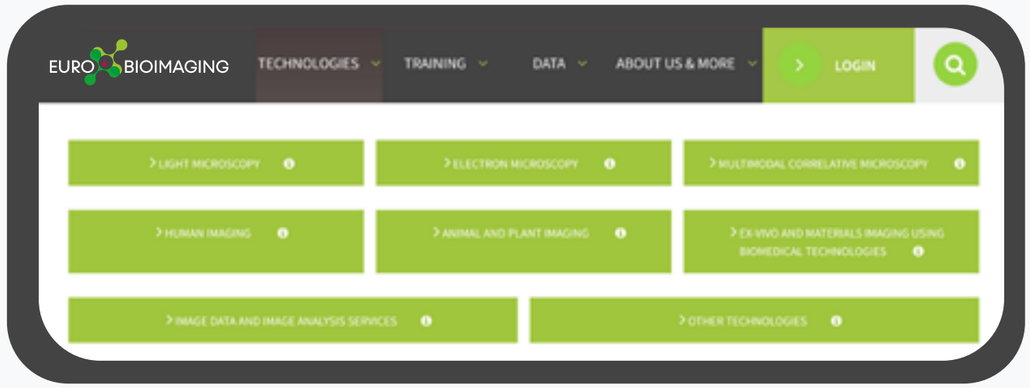
This large-scale, service-oriented reorganization was a long-term collaborative effort with our Nodes, based on the work of three expert groups – for light microscopy, electron microscopy, and biomedical imaging technologies. In total, 67 facility staff participated in regular meetings and in-depth discussions to develop the new categorization and presentation for all technologies on offer at Euro-BioImaging Nodes.

The tiered approach is easier to navigate and at the same time, the new technology organisation more equally represents the whole range of different technologies available at the Euro-BioImaging Nodes, giving equal weight to light and electron microscopy on the biological imaging side and highlighting the expanding range of applications of biomedical imaging, from plant and ex-vivo imaging to animal and human imaging applications. In the new presentation, the image data services launched in September 2022 are also visible.

EXPANDING THE TECHNOLOGY PORTFOLIO

Alongside the reorganisation of the technology presentation, in 2022 Euro-BioImaging significantly expanded its technology portfolio. In total, 32 new and cutting-edge technologies were introduced into proof-of-concept study status, provided across 15 Euro-BioImaging Nodes.

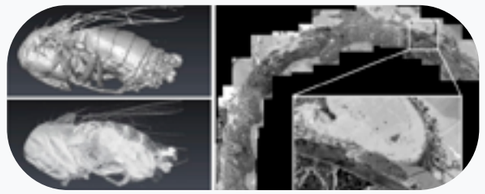
Many of these technologies are becoming available for the very first time in open access to a wide user base through Euro-BioImaging and they represent a significant expansion and deepening of our technology offer on multiple fronts.



www.eurobioimaging.eu/service

Here's an overview of the new technologies available and their potential applications. We are really proud to present this expanded service offer and extend access to a wealth of related expertise at the Euro-BioImaging Nodes to all researchers.

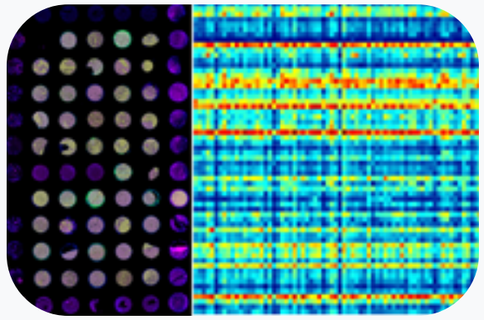
A continued growth of our Electron Microscopy portfolio brings on board a range of cryo-EM techniques, such as cryo-Electron tomography and cryo-FIB, as well as more correlative methods, such as Correlative X-ray Imaging and EM (CXEM), and cryo-Fluorescence Microscopy.



CXEM - Image courtesy of Nuno Luis (Schnorrer lab, IBDM) & Nicolas Brouilly (Electron Microscopy Facility, IBDM AMU/CNRS, France BioImaging)

Adaptive and support technologies, such as laser-based microdissection, Feedback Microscopy, and sample preparation methods, such as Tissue Clearing and Expansion Microscopy, are also included.

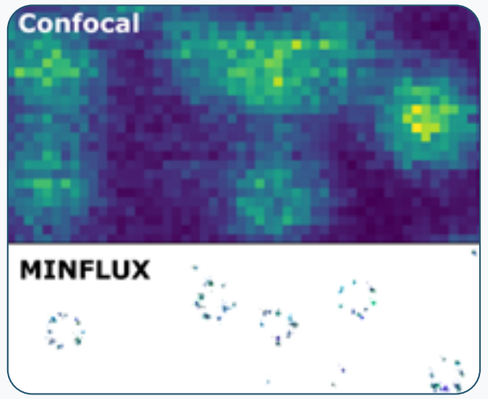
Spatial Transcriptomics is offered for the first time in open access - linking imaging and the -omics fields.



Spatial Transcriptomics - Image courtesy of Bioscience Technology Facility, University of York (UK Node)

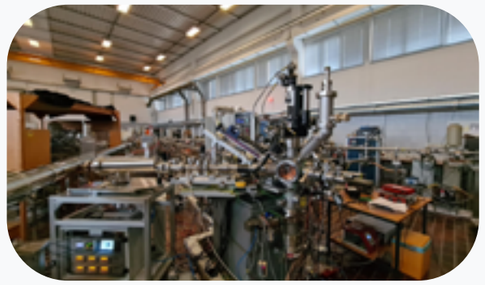
Microdissection - Image courtesy of Natalia Nowak, Nencki Institute (Polish Advanced Light Microscopy Node)

In light microscopy, a number of new and highly requested methods, such as MINFLUX, Single Particle tracking and Lattice Lightsheet microscopy are now available.

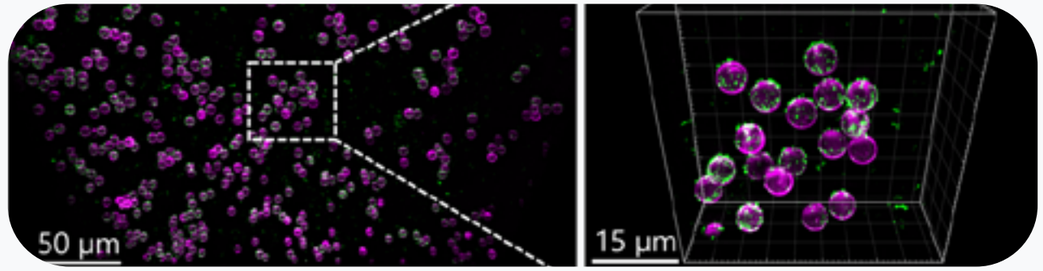


MINFLUX - Image courtesy of MINFLUX team at the Central Laser Facility - Octopus Cluster (UK Node)

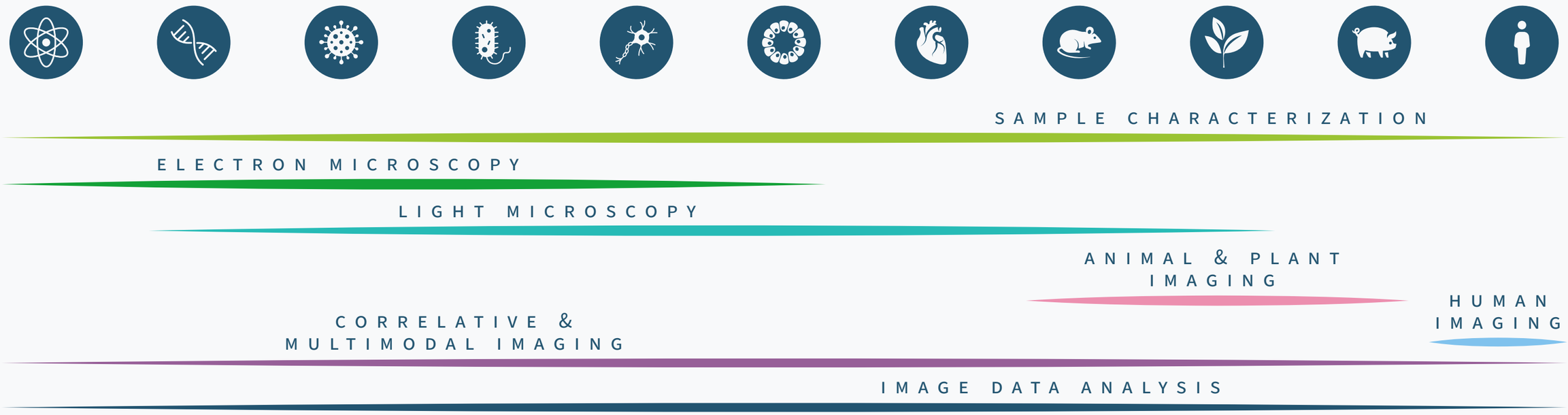
New methods for characterisation of physical and chemical properties of samples, such as µ-PIXE, push the range of imaging support we are able to offer into new domains, providing information on elemental and chemical compositions and changes in samples.



µ-PIXE imaging system for chemical imaging of biological tissue at the facility led by Primoz Pelicon at the Jožef Stefan Institute (SiMBION Node)



Lattice Lightsheet - Image courtesy of Steven Edwards, SciLifeLab (NMI Sweden Node)



DATA SERVICES

To support production of quality data, analysis methods and an extended data life cycle, Euro-BioImaging provides access to Image Data Services for the benefit of the whole imaging community. Together with the expert staff at our Nodes, we support the adoption of practices that yield FAIR image data and analysis workflows to help researchers get the most out of their imaging data and promote scientific rigour.

IMAGE ANALYSIS SERVICES AT NODES

With large image datasets, image analysis is becoming a bottleneck. To overcome this outset, Euro-BioImaging offers its users Image Data Analysis (IDA) as a service through expert Image Analysts at the Nodes. These services were already available in conjunction with access to imaging technologies at a Node, but in 2022 we introduced IDA as a standalone service on image data irrespective of where it was acquired.

In addition to directly supporting users with analysis of their data, many of our bioimage analysts are involved in developing and actively maintaining open image analysis tools and libraries, which serve Euro-BioImaging users as well as the global scientific community.

Users can contact our Nodes when they need:

- Biological and biomedical image data analysis support
- Image registration, segmentation, tracking and more
- Data workflows, bespoke analysis tools and machine learning methods
- Access to high performance computing and specialized software

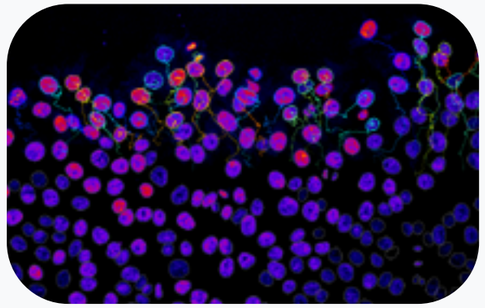


Image credit: G. Jacquemet (Cell Migration Lab, Åbo Akademi University), J.-Y. Tinevez (IAH)

BIOIMAGE MODEL ZOO · ELASTIX · FIJI · GALAXY · ILASTIK

MAMUT · NAPARI · OMERO · TISSUUMAPS · TRACKMATE · XNAT

Our Nodes make use of and contribute to the development of open tools and libraries for analysis and management of image data

IMAGE DATA SERVICES AT THE HUB

FAIR image data is a valuable resource for the scientific community. It not only ensures rigorous and reproducible science, but holds the potential to enable novel scientific discoveries and promote development of advanced analysis methods. At Euro-BioImaging, we support development of an ecosystem of FAIR bioimage data and tools.

We provide coordination and policy support, as well as guidelines, tools, and direct support for producing FAIR Image data and making it openly available. Our data services for the imaging community at large are supported by many data-centric European projects including those related to the European Open Science Cloud (EOSC).

F A I R

FINDABLE · ACCESSIBLE · INTEROPERABLE · REUSABLE

Representation in the European landscape

Euro-BioImaging represents the needs and interests of the image data community towards European funding and policy agencies through its membership in the EOSC-Association and its task forces. We also raise the visibility of image data research by participating in various cross-domain data projects.

Coordination with community initiatives

Community initiatives are responsible for a lot of valuable work around developing training materials and standards for data, metadata and tools. Euro-BioImaging serves as a central coordinating point, participating in various community initiatives and consolidating their efforts.

Technical support

Large and complex datasets require specialised solutions, including those supported by cloud resources, for efficient image data management and analysis. Euro-BioImaging, supported by European projects, provides technical solutions for cloud compatible image data formats and workflows for the global community.

FAIR Image Data Stewardship

Euro-BioImaging promotes and facilitates the adoption of FAIR practices which get implemented at our Nodes and the Hub. We offer resources, training and 1-on-1 guidance to FAIRify user data in all stages of the data lifecycle – from project planning to data deposition and reuse.

EU-FUNDED PROJECTS

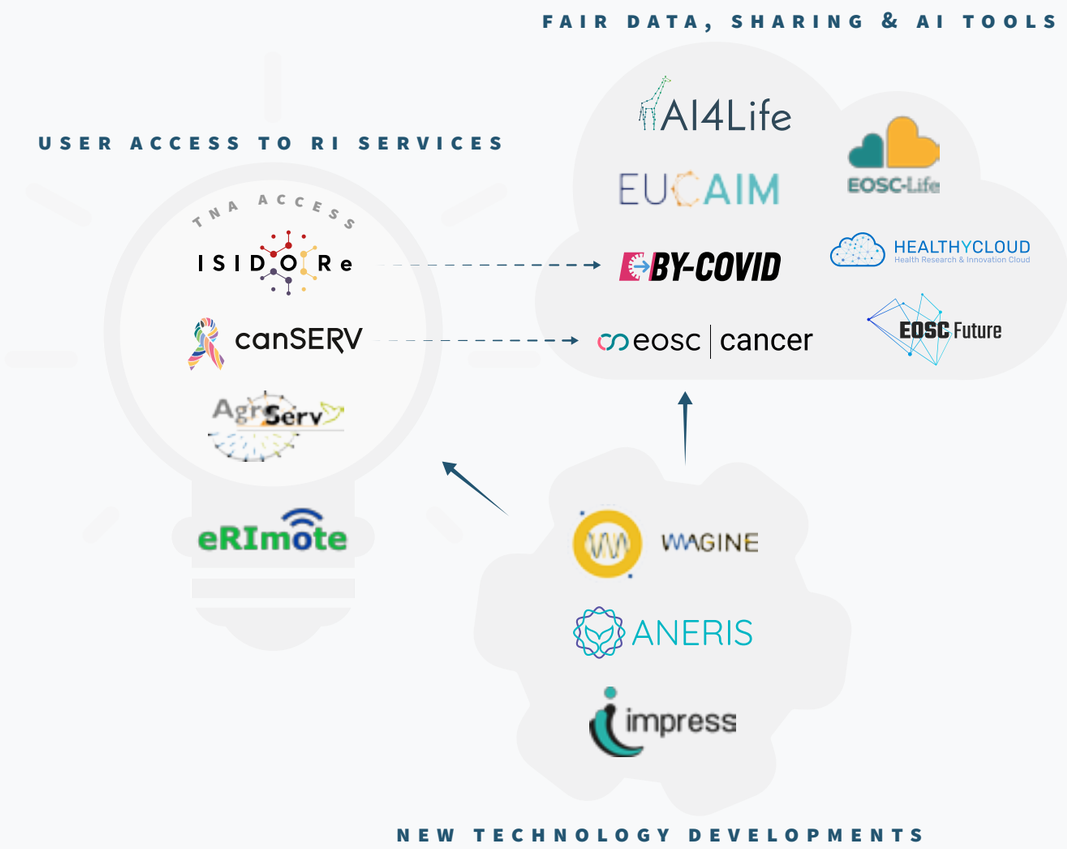
OVERVIEW

In early 2022, Euro-BioImaging was awarded a number of important Horizon Europe grants. The overwhelming success in the proposal process shows the strength of our infrastructure and the importance of imaging services in driving excellent science and solving a variety of global societal challenges.

Altogether, six funded projects in which Euro-BioImaging ERIC is a beneficiary kicked-off in 2022 (see *Highlights of 2022*, p. 8). We attended multiple kick-off meetings online and in person across Europe and embraced working with new colleagues across many different European RIs representing the full scope of scientific services. The received funding has allowed us to grow the Euro-BioImaging Hub team. In parallel, we continued proposal writing. In July 2022, we learned that three out of four of the INFRA-TECH proposals in which we were involved had also been funded.

We continue proposal writing and building new collaborations with project partners at kick-off meetings in 2023. With funded projects we are fulfilling our mission within the European Research Area and ensuring the future of our infrastructure. It is gratifying to see that these projects benefit multiple stakeholders, via **user access to RI services** (funding for users to access our Nodes or support remote and digital infrastructure services), **new technology developments** (supporting tomorrow's technologies and community adoption), and **FAIR data, sharing & AI tools** (contributing to AI, machine learning and cloud-based solutions for image data).

In the next pages, discover the projects Euro-BioImaging is involved in and how they benefit our stakeholders and community.



PROJECTS

PROJECT SPOTLIGHT

ISIDORe

ISIDORe is a Horizon Europe funded project (Grant Agreement #10104613), coordinated by ERINHA designed to effectively support research on infectious diseases and increase preparedness for pandemic.

In this project, Euro-BioImaging is coordinating and providing open access to a portfolio of cutting-edge biological and biomedical imaging services through 19 Euro-BioImaging Nodes across Europe.

In 2022, the first Open Calls from the ISIDORe project were launched. To date, ten users have benefitted from funded access to Euro-BioImaging within this context, to perform projects on a range of infectious disease topics from Malaria to monkeypox to SARS-CoV-2 and Dengue virus.

ISIDORe

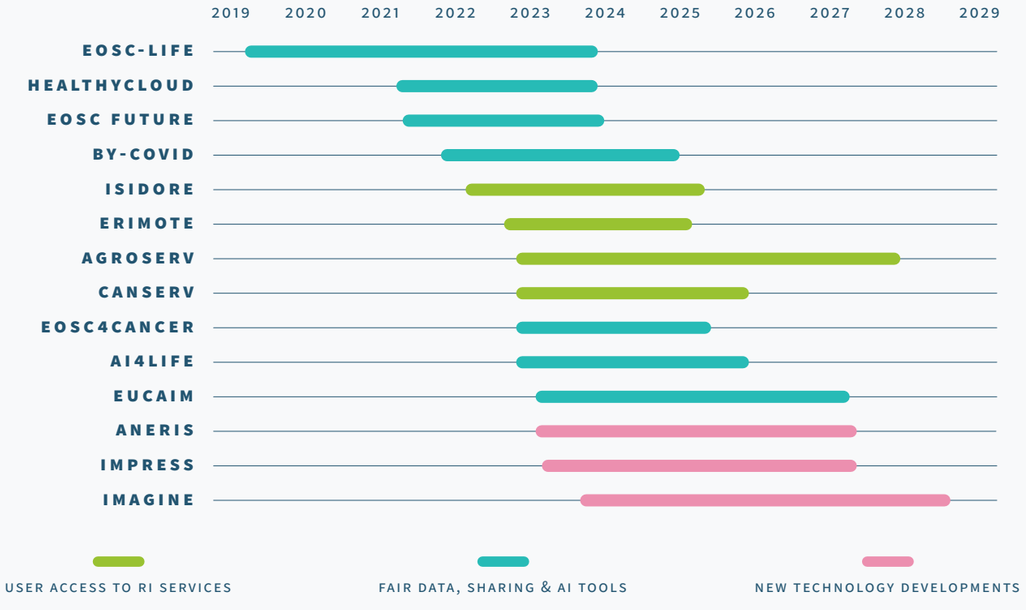
154
PROJECT PARTNERS

32
COUNTRIES INVOLVED

19
NODES OFFER IMAGING SERVICES

10
USERS TO DATE

PROJECT TIMELINES



EURO-BIOIMAGING'S ROLE IN EU-PROJECTS

AgroServ
Enhacing agroecology research by funding access to imaging services
www.agroserv.sciencesconf.org
GA #101058020

AI4Life
Developing advanced AI methods for image analysis and making them easily available to life scientists
www.ai4life.eurobioimaging.eu
GA #101057970

ANERIS
Developing image analysis tools for underwater imaging and training
www.aneris.eu
GA #101094924

BY-COVID
Providing image data stewardship service and making Covid-19 image datasets FAIR
www.by-covid.org
GA #101046203

canSERV
Funding user access to imaging services in cancer research
www.canserv.eu
GA #101058620

eosc | cancer
Providing a European-wide foundation to accelerate data-driven cancer research
www.eosc4cancer.eu
GA #101058427

EOSC Future
Developing tools and workflows for bringing image data to the cloud
www.eoscfuture.eu
GA #101017536

EOSC-Life
Building cloud-based tools and solutions for bioimaging data and promoting interoperability
www.eosc-life.eu
GA #824087

eRImote
Solutions for digital and remote service provision across research infrastructures
www.erimote.eu
GA #101057557

EUCAIM
Deploying a digital federated infrastructure of FAIR cancer-research related images
www.cancerimage.eu/
GA #101100633

HEALTHYCLOUD
Health Research & Innovation Cloud
Supplying image data and management tools for the health research and innovation cloud
www.healthycloud.eu
GA #965345

IMAGINE
Supporting community adoption and validation of innovative tools for imaging across scales
www.embl.org/about/info/imagine/
GA #101094250

impress
Developing new tools and applications in Transmission Electron Microscopy and training
www.e-impress.eu
GA #101094299

ISIDORe
Funding for imaging services in support of infectious disease management
www.isidore-project.eu
GA #101046133

EXCELLENT SCIENCE

OVERVIEW

In the Excellent Science section of our Annual Report, we are pleased to present highlights from several of our funded user projects.

In 2021-2022, Euro-BioImaging distributed over 130,000€ to users via two funding mechanisms, the pilot User Access fund (50,000 €) and the Italian User Access Fund (85,000 €). Combined with the ISIDORe Open Calls starting in June 2022, we have seen a clear increase in user applications. Together, these funds have boosted interest in Euro-BioImaging's imaging services and provided impetus to develop new collaborations between Nodes & users and strengthen existing ones.

We are only beginning to see the impact of these projects in terms of scientific output, technology transfer & development and career development for young scientists - the best is yet to come.

> **One of the selling points the career advisor told me to amplify was the grant I got from Euro-BioImaging and my stay in Maastricht. That project really showcased that I know and have experience with planning a research project from start to finish - from planning the project and getting the grant, to successfully executing the experiments. Plus, I was also able to use the preliminary results of this pilot study to demonstrate the feasibility of the research project in the application now.**
>
> - Maria Karolina Anderson, NTNU, Pilot User Access Fund grantee

COVID-19

Multiscale multimodal 3D analysis of cardiovascular alterations/ structural features in a rhesus macaque monkey model for COVID-19

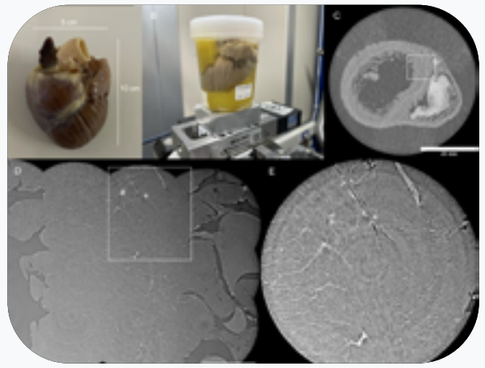
Angelika Svetlove is a PhD researcher, whose project focused on understanding the long-term cardiovascular burden of the SARS-CoV-2 virus and its impact on cardiac function. She applied for access at Euro-BioImaging's Node at the Elettra Synchrotron in Trieste via the ISIDORe project. The Phase Contrast imaging supported by the Node revealed features such as ventricular wall thickness, lumen volume, and the state of the heart valves. The high resolution CT scans provided information on the fiber orientation and the occlusion of the micro-coronary vessels. Subsequent two-photon microscopy was performed in the same area of the sample by making a targeted cutting with the help of the 3D reconstructed volume. Image analysis for the comparison of normal and diseased tissues is ongoing.

Funded by ISIDORe

NODE NAME
Phase Contrast Imaging
Flagship Node Trieste, Italy

USER HOME INSTITUTE
Max Planck Institute for Multidisciplinary Sciences, Germany

IMAGING TYPE
Synchrotron phase contrast tomography



Hierarchical scanning of entire monkey hearts, from sample preparation to imaging including a 'zoomed in' stitched plane (8 µm pixel) in the area of interest, demonstrating condensed myocardial band (#) and a coronary vessel (*)

CANCER

Mapping cholesterol in tissue to better understand prostate cancer

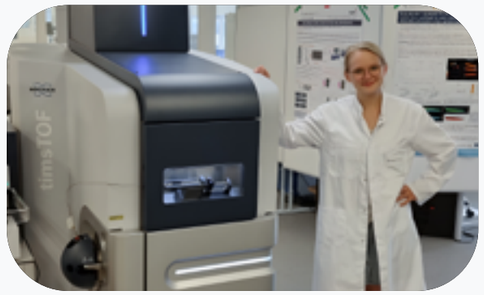
To explore the role of cholesterol in prostate cancer and specifically map what happens with cholesterol in prostate tissue, Maria K. Andersen applied for access to Euro-BioImaging's AMMI-Maastricht Node, where a highly sensitive MALDI2 MassSpec Imaging instrument is available. This method is able to detect sterols (like cholesterol) in tissue, while other imaging approaches are not. In her project, she developed and validated an approach using MALDI2 that can be used on a larger sample set to help understand the molecular mechanisms underlying prostate cancer development in patient samples. She was really happy with the results of her pilot project, and has applied for funding for a wide-scale project based on this method.

Funded by Euro-BioImaging Pilot User Access Fund

NODE NAME
Facility of Multi Modal Imaging AMMI Maastricht Node, Netherlands

USER HOME INSTITUTE
Norwegian Institute of Science & Technology (NTNU), Trondheim

IMAGING TYPE
MALDI-2-MSI



To spatially detect sterols, Maria K. Andersen used a timsTOF Flex instrument coupled with a MALDI-2 source

Intravital microscopy supports progress in nanomedicine

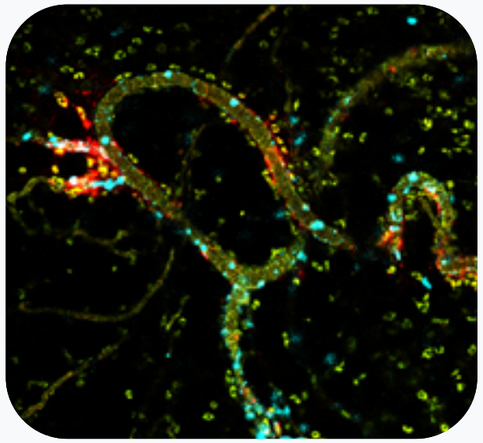
In a complex project involving multiple research institutes, Alexandros Marios Sofias, a principal investigator at RWTH Aachen University, aimed to specifically quantify the contribution of 'hitchhiking' as a mechanism for delivering nanomedicine formulations to the tumor microenvironment in triple negative breast cancer through circulating neutrophils. He applied for access to the Euro-BioImaging NORMOLIM Node in Trondheim where high resolution intravital microscopy equipment and expertise are available. This technique enables real-time monitoring of nanoparticle - immune cell engagement. In collaboration with our Node, he could visualize in real-time the contribution of neutrophils to the delivery of nanoparticles to solid tumors, providing evidence that the concept works on a tissue level and could be exploited in the development of clinically viable nanomedicine-based immunotherapies.

Funded by Euro-BioImaging Pilot User Access Fund

NODE NAME
NORMOLIM, Norway

USER HOME INSTITUTE
RWTH Aachen University, Germany

IMAGING TYPE
Intravital microscopy



Exemplary image of the tumor microenvironment visualized with intravital microscopy

NEUROSCIENCE

Using super resolution live cell imaging to understand cell death during stroke

In order to study the dynamic morphology of neurons during and after a stroke, particularly the processes of blebbing and cell death, Andrew Boyce, a postdoctoral fellow, applied to use a combination of live cell 3D stimulated emission depletion (3D-STED) microscopy and super-resolution shadow imaging (SUSHI) at France BioImaging's Bordeaux Node. This approach allowed him to move from studying cells in culture to the improved context of brain slices with induced injuries to mimic strokes. The approach developed during his visit proved to be effective for the panoptical visualization of brain tissue in vivo, and a preprint explaining the method is already available online.

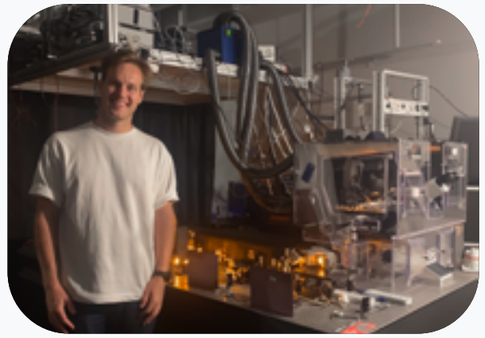
https://doi.org/10.21203/rs.3.rs-2198041/v1

Funded by Euro-BioImaging Pilot User Access Fund

NODE NAME
France BioImaging

USER HOME INSTITUTE
University of Calgary, Canada

IMAGING TYPE
STED & SUSHI



Andrew Boyce with the 3D-STED microscope at France BioImaging

Understanding Phantom Limb Pain

Ana Carolina Travossos's PhD project focuses on understanding the contribution of the primary somatosensory cortex to Phantom Limb Pain (PLP). To support her research she visited the Dutch High Field Imaging Hub where she acquired ultra-high-field functional magnetic resonance imaging (fMRI) data during piezoelectric stimulation of the arms of healthy participants. The collaboration also included data and methodological sharing (e.g., preprocessing and analysis). The 7T scanner provided images with higher signal-to-noise ratio, spatial resolution, and image quality compared to the system available at her home Institution, allowing her to gather more detailed and precise data for her research.

Funded by Euro-BioImaging Pilot User Access Fund

NODE NAME
Dutch High Field Imaging Hub

USER HOME INSTITUTE
University of Coimbra, Portugal

IMAGING TYPE
7T MRI

Carolina Travossos begins her project at the Dutch High Field Imaging Hub

PLANT BIOLOGY

Looking at stem photosynthesis with FLIM

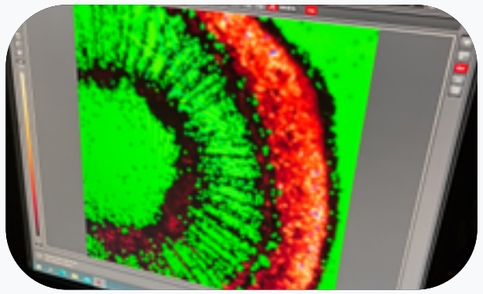
Photosynthesis occurs not only in leaves but also at the stem level for certain plants. The objective of Sara Natale's PhD research is to characterize differences in chloroplasts in the bark and wood as well as compare photosynthesis systems in the stem of *Fraxinus ornus*, a type of ash tree, in order to better understand how these plants cope with drought. She applied to use Fluorescence Lifetime Imaging (FLIM) at Euro-BioImaging's WISH Node to measure the chemical reactions going on inside the chloroplasts in fresh plant sample. FLIM allowed her to answer her research question in a very precise way and to gain a different perspective on the data with this method. She also acquired a new skill thanks to the experts at our Node.

Funded by Euro-BioImaging Italian User Access Fund

NODE NAME
Wageningen Imaging and Spectroscopy Hub (WISH), Netherlands

USER HOME INSTITUTE
University of Trieste, Italy

IMAGING TYPE
Fluorescence Lifetime Imaging (FLIM)



A closer look at chloroplasts involved in stem photosynthesis in Fraxinus ornus with FLIM

PARASITOLOGY

High-end Electron Microscopy to understand tapeworm life cycle & larval anatomy

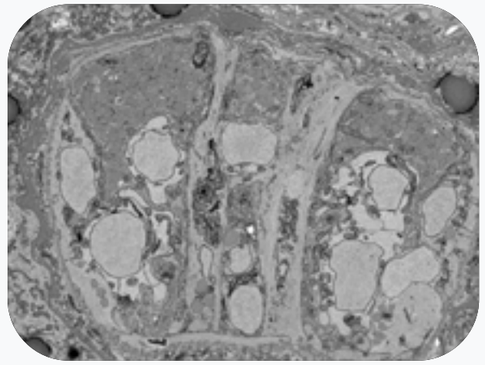
Despite the threat parasitic tapeworms pose to human and animal welfare, very little is known about the first larval stage of their life cycle. To better understand the larval anatomy and development, Uriel Koziol, a professor at the Universidad de la Republica, Montevideo, Uruguay, applied to use a high-end volume EM method at our FiAM Node in Helsinki. In close collaboration with the Node, Uriel prepared his samples, sent them by courier from South America to Finland, and was able to remotely join the imaging sessions. Thanks to this amazing volume EM approach and the expertise of the Node, he is confident he will be able to reconstruct the whole tapeworm larva and understand its development as a parasitic organism better.

Fully remote project &
Funded by Euro-BioImaging Pilot User Access Fund

NODE NAME
Finnish Advanced Microscopy Node

USER HOME INSTITUTE
Universidad de la Republica, Uruguay

IMAGING TYPE
Serial Blockface Scanning Electron Microscopy



Developing larva of Hymenolepis microstoma

DRUG DEVELOPMENT

Supporting the development of nanomedicines

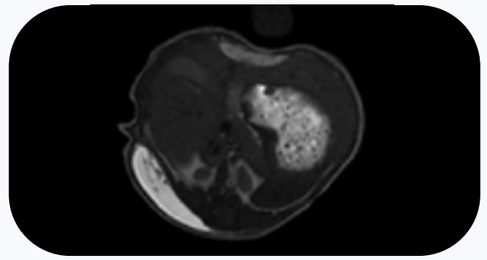
Prof. Francois Lux and his group at University of Lyon have been working on a polymer made of partially acetylated chitosan and functionalized with Gd-DOTAGA, a chelate which allows to follow in vivo the fate of the polymer after administration by MRI. This polymer has high potential for drug delivery. But before it can be translated to the clinic, he must show that the polymer is non-toxic, biodegradable, undergoes rapid renal excretion and is indeed taken up in tumors. The team at the MMMI Italian Node helped him in setting up a protocol to test his polymer on mice. The preliminary results are extremely positive and a second project is underway to test the potential for targeted immunotherapies.

Funded by Euro-BioImaging Italian User Access Fund

NODE NAME
Multi-modal Molecular Imaging Italian Node

USER HOME INSTITUTE
University of Lyon, France

IMAGING TYPE
MRI



MRI images provide information about distribution of the polymer in the different organs and tumor uptake

MARINE BIOLOGY

Meiofauna – the ocean's next frontier

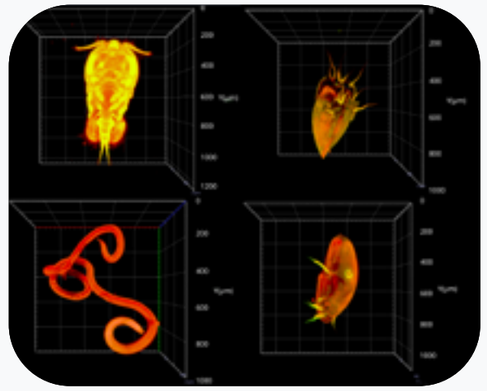
Valentin Foulon, a research engineer in marine biology, is part of the Blue Revolution program that aims to develop a taxonomic identification protocol for meiofauna. But meiofauna are hard to observe – too large to observe with traditional microscopes and yet too small to be seen with sufficient detail with the naked eye. So, Valentin contacted the Bretagne-Loire Node of France-BioImaging, in Nantes, where a range of high-end microscopes are available in open access. Using Single Plane Illumination Microscopy (SPIM) light-sheet microscopy, and with a new sample processed protocol developed in collaboration with the Nantes' facility, Valentin was able to image more than 200 marine meiofauna samples in full 3D. This immense dataset is now being processing for analysis with machine learning to identify the different species.

Funded by France BioImaging, as part of the Euro-BioImaging Pilot User Access Fund selected projects

NODE NAME
France BioImaging

USER HOME INSTITUTE
École Nationale d'Ingénieurs de Brest (ENIB), France

IMAGING TYPE
Single Plane Illumination Microscopy



Examples of 3D light-sheet imaging of meiofauna by Valentin Foulon

FROM OUR NODES

INTRODUCTION

Euro-BioImaging is a distributed infrastructure - our central activities are coordinated by our three Hub sites, but services are provided in the imaging facilities called 'Nodes'. By becoming a Euro-BioImaging Node, imaging facilities agree to provide open access to technologies, services and expertise to all Euro-BioImaging users, independent of where the users come from, their field of research or their level of expertise.

To become a Euro-BioImaging Node, facilities go through a rigorous application and review process in the Call for Nodes. They are evaluated by our Scientific Advisory Board on a wide variety of factors, including:

- Scientific and technical excellence
- European and national significance
- Technology maintenance and updates
- Access and service package
- Quality assurance
- User training
- Other technology-specific factors

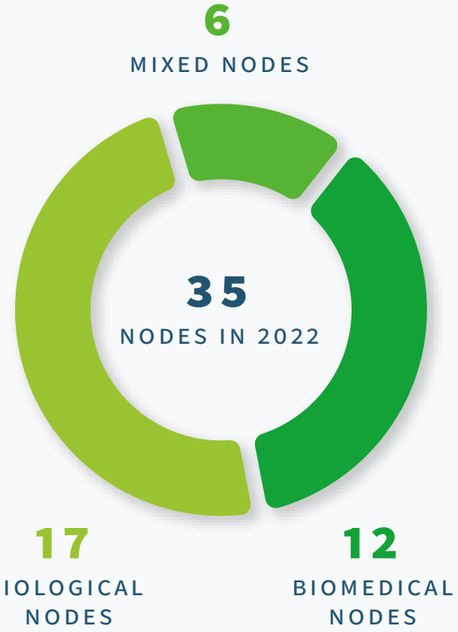
Following successful evaluation and approval by the Board, the Nodes join the Euro-BioImaging family by signing service level agreements that outline the services to Euro-BioImaging users.

After an intense period of growth between 2020 and 2021, the size of our Node family is stabilizing. In 2022, we welcomed two new Nodes, one Node candidate and three Node upgrades, which means our Node family is currently comprised of 35 Nodes and 173 facilities.

In addition to supporting user projects, our Nodes are active in European-funded research projects, support technological breakthroughs and organize outstanding training courses and conferences. They also engage in teaching on the Master's and PhD levels and perform outreach with students and the general public. In the following pages, discover just some of the activities that are taking place at our Nodes, as well as the new instruments they are offering in open access to support scientific advancement in the European Research Area and beyond.

Most requested Nodes by users in 2022:

- French BioImaging Node
- Finnish Advanced Microscopy Node
- Molecular Imaging Italian Node
- Advanced Light Microscopy Italian Node
- Euro-BioImaging EMBL-Node



"**Our Nodes are very diverse, but what they have in common is their dedication to high-quality imaging technologies and supporting their users in research.**

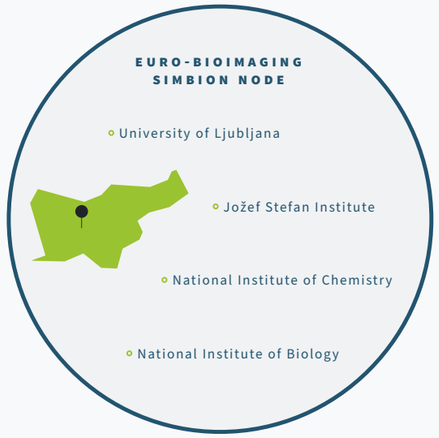
- Antje Keppler, Bio-Hub Section Director

NEW NODES & NODE UPGRADES

NEW NODES

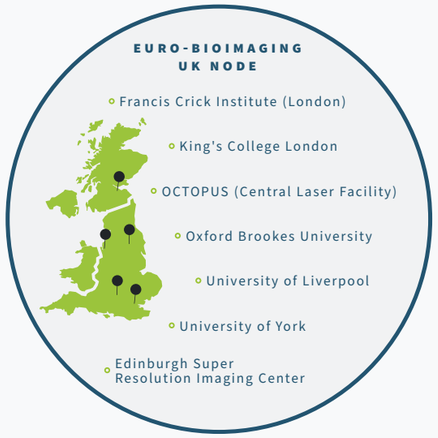
SiMBION Node

The SiMBION Node is a multimodal, multi-sited Node that brings together the Slovenian national research infrastructure resources in the field of bioimaging. The Node provides access to a wide range of biological and some biomedical imaging technologies, with a particular focus on high performance tissue elemental imaging platforms such as micro-PIXE, microXRF, as well as mass-spec associated techniques that include LA-ICPMS and MV-SIMS, significantly expanding the Euro-BioImaging technology portfolio in this domain.



UK Node

The UK Node offers open-access to a wide range of advanced biological imaging techniques including correlative, multi-modal, high-content and super-resolution. It is a multi-sited national infrastructure hosted by seven leading institutions spread across the UK. They all offer state-of-the-art imaging equipment, expertise, training and image data services. The technologies can be applied to a wide range of fundamental and translational research projects at molecular to cellular resolutions, in single cells to 3D, in vitro models and whole organisms.



NODE UPGRADES

EMBL Node

With inclusion of the EMBL Imaging Centre in the EMBL Node, advanced capacity becomes available in many cutting-edge light and electron microscopy approaches, with a particular focus on MINFLUX and Cryo-CLEM services.

Cellular Imaging Hungary

The Cellular Imaging Hungary Node expanded via the inclusion of the NanoBioImaging and Advanced Microscopy Facility at the University of Pécs, as a flagship for super-resolution, specialized EM applications, 3D-SMD, and Stimulated Raman Microscopy.

UPGRADE

Multi-Modal Molecular Imaging Italian Node

The MMMI Italian Node now includes the Bio Check Up facility in Naples, bringing on board expertise in the fields of imaging analysis, imaging data management, radiomics, oncogenomics and the application of artificial intelligence procedures.

TRAINING

With the advances in imaging technology, more and more new technologies are available to users, making training in the correct use of the technologies and the connected sample preparation and data analysis crucial. The Euro-BioImaging Nodes offer a wide range of training opportunities.

Training opportunities at Euro-BioImaging Nodes cover the full spectrum of technologies available from biological to biomedical imaging as well as sample preparation and handling, and image data analysis. Some courses are taught remotely and virtually, increasing their accessibility. As a general rule, the courses combine theory and hands on learning.

We want to highlight a joint training initiative from the Swedish NMI Node in collaboration with the Finnish Advanced Microscopy Node, two Nodes that worked together on an image analysis course this year. The plenary lectures involved trainers in Gothenburg, Sweden, in Turku, Finland, and online trainers in Japan, France and Switzerland. This was a great example of our Nodes working together to offer the best course for more students.

The training courses at the Euro-Bioimaging Nodes are:

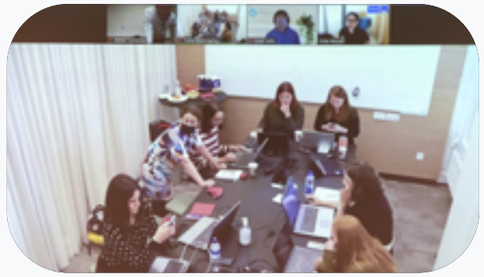
- Available for users, students and facility staff
- Taught in English
- Open for anyone to apply to

265+

TRAINING COURSES ORGANIZED BY NODES

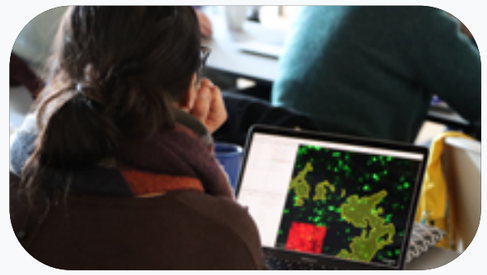
30

NODES OFFER TRAINING COURSES



The Swedish NMI Node organized a cross-site introductory image analysis course in collaboration with the FiAM Node with trainers from multiple countries and 24 students on site in Sweden and 13 students on site in Finland

France-BioImaging organized the 4th edition of its FBI-Advanced Training for microscopy users to learn more, with lectures and practical courses, about the most advanced imaging techniques



Danish BioImaging - DBI-INFRA Image Analysis Core Facility organized its first workshop with both life scientists and imaging core facility staff learning about the open source software QuPath

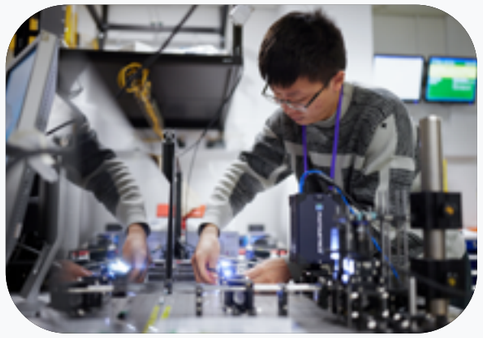
OUR NODES IN 2022

From training courses to outreach activities, new instruments and more, here we present a selection of photos and quotes from our Nodes to highlight their activities in 2022.

High school students at the 3DHISTECH Pannoramic Confocal slide scanner (University of Debrecen, Cellular Imaging Hungary Node)

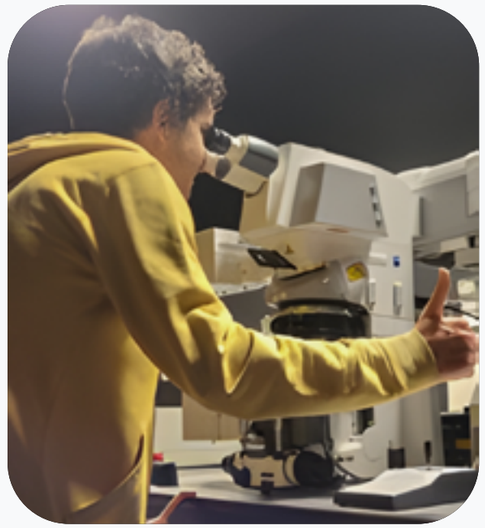
Ben Giepmans and Eric Reits share the news about successful NL-Bioimaging funding with the facility team, seven Nodes in the Netherlands benefit from this important grant

> **Microscopy Reactivation! We started repairs and investments to keep our instruments up and running. This will improve our offer for all of the users.**
>
> - Dr. Jędrzej Szymański, Coordinator of the Advanced Light Microscopy Node Poland



PhD student Hao Qiu aligning optics in the Octopus super-resolution development laboratory

> **In 2022, the research carried out at the Node resulted in high impact publications.**
>
> - Prof. János Szöllősi, Head of Cellular Imaging Hungary Node



High school student at the confocal microscope, during a school visit to a PPBI microscopy facility

France BioImaging celebrated 10 years in December 2022 in Nantes, France

In 2022, the EMBL Imaging Centre was inaugurated in a ceremony with local political leaders, it also became part of the Euro-BioImaging EMBL Node

> **We had a very busy period due to the start of a project aiming to realize a new, cutting-edge, beamline optimized for applications of Phase Contrast Imaging at our synchrotron laboratory.**
>
> - Giuliana Tromba, Phase Contrast Imaging Node

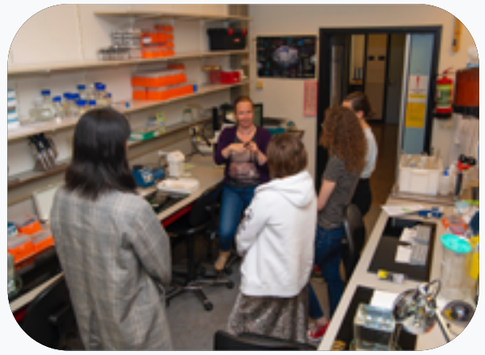
The CEITEC Cellim facility, part of the Brno Node, Czechia holds an annual imaging competition - this year's winner is pictured above

> **Happy and excited: Our Node was accepted into Euro-BioImaging!**
>
> - Prof. Dr. Primož Pelicon, SiMBION Node Coordinator

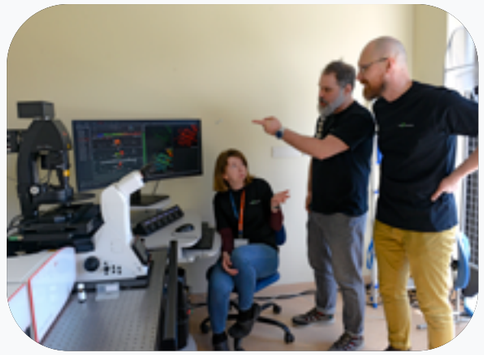
> **After the final COVID lockdowns and restrictions were lifted in spring 2022 scientists came back to the microscopy labs and now we have more user hours than pre-Corona.**
>
> - Mark Hink, LCAM Node

The DIMP NEUROMED team celebrates a good year

New ultra-high resolution U-CT system at the FiBI Node

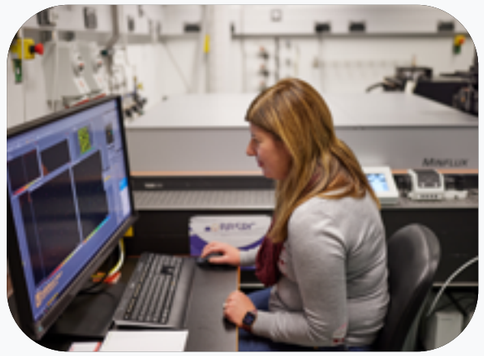


Dutch CLEM Node - B. Suzanne van Dijk (UMCU) and participants of the 2022 Utrecht Electron Microscopy workshops



A day in the life at the Polish Advanced Light Microscopy Node where the focus of the year was on maintenance and updates

> **2022 was the year of digital transformation at the Portuguese BIN Node!**
>
> - Joao Castelhano, PhD, Portuguese BIN Node



Highlights from 2022 at the OCTOPUS facility (part of UK Node) include completion of commissioning of the MINFLUX microscope, and continuing developments in cryo CLEM

> **The University of Liverpool was delighted to join Euro-Bioimaging as part of the UK Node in 2022. We're excited to have the opportunity to expand the accessibility of our world-class imaging services through a renowned network such as Euro-BioImaging.**
>
> - Prof. Ian Prior, Director of Liverpool Shared Research Facilities

> **Business as usual with an even higher intensity than before the pandemic, positive outlooks for future. Lots of energy in staff and users.**
>
> - Julia Fernandez-Rodriguez, NMI Sweden

An important grant from the Italian Ministry of Research was bestowed on the facilities of the Italian ALM and MMMI Italian Nodes - the team met in Naples to kick-off the SEE-Life project

> **We had a good year - our instruments are filled up with users and the NorMIC courses have turned out to be an essential training ground for our users.**
>
> - Oddmund Bakke, Head of NORMIC Node

PPBI staff member acquiring images of drosophila larvae using a multi-photon microscope

AUSTRIA

Austrian BioImaging/CMI

Node contact: Baubak Bajoghli
office@austrian-bioimaging.at

Website: www.austrian-bioimaging.at

22 FACILITIES	**>50** EXTERNAL USERS	**N/A** USAGE HOURS
>40 STAFF INVOLVED	**<5** TRAINING COURSES ORGANIZED	**<5** REMOTE USERS

HIGHLIGHTS

- In 2022, Baubak Bajoghli, Austrian BioImaging's new Director focused on setting the strategy for the next five years and beyond
- Brillouin Scattering Microscopy was added to the portfolio
- One national and two European co-fund grants for correlative multimodal imaging projects and three new cutting-edge imaging instruments were awarded to members of Austrian BioImaging/CMI
- A training course was organized for HREM

BULGARIA

Sofia BioImaging Node

Node contact: Stoyno Stoynov
stoynov@bio21.bas.bg

Website: dnarepair.bas.bg/eurobioimaging.bg/site/

1 FACILITY	**5** EXTERNAL USERS	**4,900** USAGE HOURS
9 STAFF INVOLVED	**0** TRAINING COURSES ORGANIZED	**N/A** REMOTE USERS

HIGHLIGHTS

- Two instruments to perform Fluorescence-lifetime imaging microscopy (FLIM) were installed (Leica Stellaris 8 Confocal Microscope Platform with Falcon FLIM, Zeiss machine updated with PicoQuant FLIM system)
- The new machines have incubators for live cell imaging and are equipped with a UV ablation system, for the induction of DNA damage and tracking cell response
- The Bulgarian National Roadmap for Research Infrastructures provided funding for six user projects at the Sofia Node

CZECHIA

Advanced Light and Electron Microscopy Node Prague CZ

Node contact: Aleš Benda
ales.benda@natur.cuni.cz

Website: www.czech-bioimaging.cz/euro-bi/

6 FACILITIES

280 EXTERNAL USERS

34,701 USAGE HOURS

29.5 STAFF INVOLVED

13 TRAINING COURSES ORGANIZED

4 REMOTE USERS

HIGHLIGHTS

- A high-capacity data storage connected to a computing cluster, a collaborative project among multiple large research infrastructures, has been put into operation, allowing the Prague Node to offer extended image data analysis services
- The Light Microscopy facility at IMG had the first user project for image analysis as a standalone service within Euro-BioImaging
- A sophisticated cryoCLEM workflow on cryoFIB lamella for cryoET of biological samples was implemented in collaboration with TESCAN
- Czech BioImaging received running cost funding from MEYS for the next 4 years (2023-2026)

CZECHIA

Advanced Light Microscopy and Medical Imaging Node Brno CZ

Node contact: Michal Mikl
michal.mikl@ceitec.muni.cz

Website: www.czech-bioimaging.cz/euro-bi/

4 FACILITIES

55 EXTERNAL USERS

15,160 USAGE HOURS

28 STAFF INVOLVED

9 TRAINING COURSES ORGANIZED

2 REMOTE USERS

HIGHLIGHTS

- In summer of 2022, the CELLIM-Ceitec MU facility organized a prestigious EMBO course focused on lightsheet microscopy
- At the ISI MR facility, attention was paid to mastering the experimental procedures for the application of focused ultrasound for blood-brain barrier permeability modification, and to the development of higher-quality methods for perfusion and metabolite quantification
- Multiple awards were bestowed on Radovan Jiřík and his team at the ISI MR for their work with MRI

CZECHIA

Center for Advanced Preclinical Imaging (CAPI)

Node contact: Ludek Sefc
sefc@cesnet.cz

Website: www.capi.lf1.cuni.cz/en

1 FACILITY

24 EXTERNAL USERS

1,210 USAGE HOURS

14 STAFF INVOLVED

6 TRAINING COURSES ORGANIZED

0 REMOTE USERS

HIGHLIGHTS

- Significant advances made within the JPND-funded NEUROPHAGE international collaboration project, developing novel approaches for the treamtent of Parkinson's disease
- Grant received for development of new tumor activable contrasts for fluorescence-navigated surgery

DENMARK

Danish BioImaging Infrastructure

Node contact: Clara Prats
cprats@sund.ku.dk
Sonia Garcia
sonia.garcia@sund.ku.dk

Website: www.dbi-infra.eu

5 FACILITIES

83 EXTERNAL USERS

33,020 USAGE HOURS

12 STAFF INVOLVED

9 TRAINING COURSES ORGANIZED

2 REMOTE USERS

HIGHLIGHTS

- Seven new instruments were implemented across Danish BioImaging (DBI) facilities
- A number of prestigious grants were awarded to members of DBI, including CZI funding to secure the sustainability of NEUBIAS, the bioimage analysts network
- The yearly cross-institutional PhD course took place, providing the opportunity for students to learn about available technologies and DBI facilities
- A list of bioimaging courses available at DBI was compiled
- Danish BioImaging Infrastructure has received funding from the Ministry of Higher Education and Science

EMBL

Euro-BioImaging EMBL Node

Node contact: Rainer Pepperkok
EuBI-EMBL-Node@embl.org

Website: www.eurobioimaging.eu/nodes/advanced-light-microscopy-facility-embl

4 FACILITIES

123 EXTERNAL USERS

63,287 USAGE HOURS

18.75 STAFF INVOLVED

11 TRAINING COURSES ORGANIZED

31 REMOTE USERS

HIGHLIGHTS

New instruments:

- JEOL JEM1400 Flash 120kV TEM
- Abberior MINFLUX
- ThermoFisher Krios G4, Aquilos with integrated light microscope
- Luxendo (Bruker) LCS SPIM
- Zeiss Axio Zoom V16
- NanoLive CX-A

Image analysis:

- MoBIE, a Fiji plugin for sharing and exploration of multi-modal cloud-hosted big image data, was launched

Projects:

- The Horizon Europe funded IMAGINE project awarded to EMBL, coordinating 21 partners including Euro-BioImaging

FINLAND

Finnish Advanced Microscopy Node (FiAM)

Node contact: Irina Belaia
contact-FiALM@eurobioimaging.fi

Website: www.eurobioimaging.fi/FiAM

9 FACILITIES

146 EXTERNAL USERS

57,000 USAGE HOURS

28 STAFF INVOLVED

14 TRAINING COURSES ORGANIZED

N/A REMOTE USERS

HIGHLIGHTS

New instruments:

- ONI Nanoimager for super-resolution microscopy (dSTORM/PALM, single-particle tracking, single-molecule FRET)
- Leica Thunder Imager 3D Cell culture
- Leica Stellaris 8 DIVE multiphoton confocal microscope

Image Analysis:

- FiAM develops Microscopy Image Browser and BioImage Analysis Toolbox

Projects:

- FiAM received the Blue Skies grant for developing Ocul-AR, the augmented reality mobile app to guide researchers and students in becoming independent microscopy users

FINLAND

Finnish Biomedical Imaging Node

Node contact: Jiri funda
jiri.funda@utu.fi

Website: www.eurobioimaging.fi/FiBI/

4 FACILITIES

217 EXTERNAL USERS

18,351 USAGE HOURS

111 STAFF INVOLVED

19 TRAINING COURSES ORGANIZED

36 REMOTE USERS

HIGHLIGHTS

New instruments:

- Human total-body PET/CT scanner (Siemens Vision Quadra)
- Ultra-high resolution U-CT system (MiLabs)
- MEG System (MEGIN TRIUX)
- Portable animal PET and CT scanners (Molecubes), R820 Tricolor Multichannel Fiber Photometry System (RWD)
- Several instruments were updated

Milestone:

- FiBI Training courses attracted over 1200 participants

FRANCE

French BioImaging Node

Node contact: Caroline Thiriet
caroline.thiriet@france-bioimaging.org
Alban Belloir
alban.belloir@france-bioimaging.org

Website: www.france-bioimaging.org

20 FACILITIES

786 EXTERNAL USERS

113,920 USAGE HOURS

371.5 STAFF INVOLVED

62 TRAINING COURSES ORGANIZED

22 REMOTE USERS

HIGHLIGHTS

New instruments:

- A new Scanning Electron Microscope equipped with an ion beam (Crossbeam 550, ZEISS) is now open to access at the Imagerie-Gif core facility to perform 3D imaging at high-resolution on biological samples

Image Analysis:

- Design & deployment of BioimageIT: a software to connect large image databases to image processing pipelines with metadata storage and processing respecting FAIR principles in data science

Milestones:

- France BioImaging celebrated 10 years of operation and scientific advances
- The Bordeaux Imaging Center was awarded the CNRS ‘Cristal collectif’ medal for their technical expertise, collective dimension, innovation & outreach

HUNGARY

Cellular Imaging Hungary

Node contact: Szöllősi János
szollo@med.unideb.hu

Website: www.eurobioimaging.eu/nodes/cellular-imaging-hungary

5 FACILITIES

15 EXTERNAL USERS

16,714 USAGE HOURS

9 STAFF INVOLVED

7 TRAINING COURSES ORGANIZED

0 REMOTE USERS

UPGRADE

HIGHLIGHTS

New instruments:

- BVC ATLAS 3D acousto-optical multiphoton microscope
- Visitron Spinning Disk Microscope upgrade with a 640 nm laser

Grants:

- Several outgoing grants were awarded to staff members/users of the Node by the National Research, Development and Innovation Office

Outreach:

- The University of Debrecen was active in presenting various microscopes and scientific projects to high school students of mathematics specialization
- A microscopy demonstration was also held at the ‘Researchers’ Night’ to the public

HUNGARY

Medical and Preclinical Imaging Hungary

Node contact: István Hajdu
hajdu.istvan@med.unideb.hu

Website: www.eurobioimaging.eu/nodes/medical-and-preclinical-imaging-hungary

5 FACILITIES

15 EXTERNAL USERS

2,500 USAGE HOURS

5.4 STAFF INVOLVED

3 TRAINING COURSES ORGANIZED

3 REMOTE USERS

HIGHLIGHTS

- Introduced ISOMED dose calibrator with touch screen monitor into the quality control laboratory
- Prof. Dr. László Galuska was honored with György Hevesy award from Hungarian Society of Nuclear Medicine
- Project awarded for radiolabeling of a new type pharmaceutical ingredients in collaboration with an industrial partner
- The Node is part of the UniSpace Hungary consortium of 17 Hungarian universities, for a continuing interdisciplinary scientific education program

ISRAEL

Israel BioImaging

Node contact: Michal Neeman
michal.neeman@weizmann.ac.il

Website: www.eurobioimaging.eu/nodes/israel-bioimaging

7 FACILITIES

20 EXTERNAL USERS

20,000 USAGE HOURS

30 STAFF INVOLVED

5 TRAINING COURSES ORGANIZED

0 REMOTE USERS

HIGHLIGHTS

- Node staff were involved in multiple projects, predominately funded by ERC and ISF

ITALY

Advanced Light Microscopy Italian Node

Node contact: Dr. Seetharaman Parashuraman
raman.sp@cnr.it

Website: www.eurobioimaging.eu/nodes/advanced-light-microscopy-italian-node/

5 FACILITIES

105 EXTERNAL USERS

41,092 USAGE HOURS

15.5 STAFF INVOLVED

5 TRAINING COURSES ORGANIZED

27 REMOTE USERS

HIGHLIGHTS

- SEE LIFE - StrEngthEning the ItaLIan InFrastructure of Euro-Bioimaging consortium was awarded, benefiting the facilities of this Node
- In 2022, the Node completed the setup of various systems, implemented software modules and consolidated or updated existing systems
- Node staff and users were engaged in several important European, Italian and internationally funded projects
- Node staff participated in three public engagement events with students

ITALY

Digital Imaging Multimodal Platform Neuromed - DIMP NEUROMED

Node contact: Prof. Nicola D'Ascenzo
nicola.dascenzo@neuromed.it
Dr. Emilia Belfiore

Website: www.neuromed.it/

1 FACILITY

2 EXTERNAL USERS

400 USAGE HOURS

14 STAFF INVOLVED

N/A TRAINING COURSES ORGANIZED

1 REMOTE USER

HIGHLIGHTS

- Installed a new hydroponic plant growth facility near the imaging systems to facilitate plant experiments
- Focused on the development of new systems to be included in the facility in 2023: A digital Helmet PET system and a digital portable AGRI-PET systems
- Initiated a cluster of European Projects related to plant imaging (Horizon 2020 Research and Innovation Staff Exchange Call: H2020-MSCA-RISE-2020 [101008114] and PETAL project)
- Involved in a Master Program in Medical Engineering, with a course on Positron Emission Tomography, offered at the Otto von Guericke University Magdeburg

ITALY

MMMI - Multi Modal Molecular Imaging Italian Node

Node contact: Enzo Terreno
enzo.terreno@unito.it

Website: www.mmmi.unito.it/

9 FACILITIES

28 EXTERNAL USERS

3,800 USAGE HOURS

34 STAFF INVOLVED

2 TRAINING COURSES ORGANIZED

62 REMOTE USERS

HIGHLIGHTS

New instruments:

- Photon Counting CT (Siemens NAEOTOM Alpha)
- Server for data reconstruction and storage (REMI Molecubes)
- Upgrade of EEG-fMRI
- PET/MRI, micro-CT, MS spectrometer for peptide characterization, automatic peptide synthesizer

Projects:

- SEE LIFE - StrEngthEning the ItaLIan InFrastructure of Euro-Bioimaging consortium was awarded
- PRISMAP Call 2022 - Project funded on 'Dual 152Tb/149Tb radiolabelling and preclinical validation of an AAZTA-FAPi ligand for diagnostic and theranostic applications'

ITALY

Phase Contrast Imaging Flagship Node Trieste

Node contact: Giuliana Tromba
giuliana.tromba@elettra.eu

Website: www.eurobioimaging.eu/nodes/phase-contrast-imaging-flagship-node-trieste

1 FACILITY

14 EXTERNAL USERS

600 USAGE HOURS

2.2 STAFF INVOLVED

3 TRAINING COURSES ORGANIZED

0 REMOTE USERS

HIGHLIGHTS

- During 2022 the Node installed and tested a novel setup for computed tomography of heavy and bulky specimens. The system covers a vertical range of 30 cm with excellent translation accuracy that allows helical scanning. Specimens such as the water-filled human chest phantom with the dimensions 75 cm x 45 cm x 28 cm and an overall mass of more than 45 kg have been successfully imaged with less than 40 sec per rotation.
- The Node welcomed a user project funded by the ISIDORe project

NETHERLANDS

Correlative Light Microscopy Dutch Flagship Node

Node contact: Judith Klumperman
J.Klumperman@umcutrecht.nl

Website: www.microscopie.nl/

3 FACILITIES

21 EXTERNAL USERS

27,000 USAGE HOURS

8 STAFF INVOLVED

3 TRAINING COURSES ORGANIZED

5 REMOTE USERS

HIGHLIGHTS

New instrument:

- Leica Stellaris with Falcon and RAMAN

Funding:

- Multiple grants received including for the Roadmap infrastructure 'Netherlands BioImaging Advanced Microscopy' from the Dutch Research Council (NWO) and Ministry of Education, Culture and Sciences (OCW)
- Domain TTW (Applied and Technical Sciences) Perspectief Program
- 3D NanoImaging (3DNI) – Nanoscale visual proteomics of cancer organoids

NETHERLANDS

Dutch High Field Imaging Hub

Node contact: Dennis Klomp
d.w.j.klomp-2@umcutrecht.nl

Website: www.eurobioimaging.eu/nodes/dutch-high-field-imaging-hub

5 FACILITIES

15 EXTERNAL USERS

6,470 USAGE HOURS

5 STAFF INVOLVED

2 TRAINING COURSES ORGANIZED

N/A REMOTE USERS

HIGHLIGHTS

New instruments:

- 14T MRI awarded by NWO. Massive boost for Medical Science to non-invasively study human anatomy, function, metabolism and biology in detail, led by David Norris, and supported by practically all MRI scientists worldwide. Thanks to Neoscan (HTS magnet), Tesla (gradient coil), Futura (patient interface), Wavetronica (RF transceiver arrays), AR-Benelux& Barthell (RF amps), Prodrive (gradient amps), and Philips (MRI back end) to build world's strongest whole body MRI system, planned to be operational at Radboud Nijmegen in 2026.

NETHERLANDS

Erasmus MC OIC - Advanced Light Microscopy Rotterdam Node

Node contact: Prof. Dr. A. B. Houtsmuller

Website: www.erasmusoic.nl

1 FACILITY

3 EXTERNAL USERS

18,000 USAGE HOURS

7 STAFF INVOLVED

4 TRAINING COURSES ORGANIZED

3 REMOTE USERS

HIGHLIGHTS

New instruments:

- Opera Phenix high content screening platform for fixed and live cell imaging

Milestones:

- The OIC is the lead core facility in the Convergence Flagship consortium CIFIC, to promote collaboration between the Erasmus MC and the TU-Delft
- The OIC participates in a NWO TTW-perspective grant awarded to Prof. Dr. S. Stallinga to develop a standing wave lightsheet microscope
- Node staff participated in the teaching curriculum of five BSc/MSc programs
- Supervised seven student projects and organized site-visits for high school students

NETHERLANDS

Facility of Multimodal Imaging - AMMI Maastricht

Node contact: Marc A.M.J. van Zandvoort
mamj.vanzandvoort@maastrichtuniversity.nl

Website: www.eurobioimaging.eu/nodes/facility-of-excellence-in-imaging---alm-and-molecular-imaging-node-maastricht

5 FACILITIES

46 EXTERNAL USERS

35,000 USAGE HOURS

14 STAFF INVOLVED

3 TRAINING COURSES ORGANIZED

N/A REMOTE USERS

HIGHLIGHTS

New instruments:

- Two-photon microscope with a robot (via MERLN Institute)
- 2x light sheet microscopes
- Two-photon-CARS benchtop
- Two-photon-CARS endoscope

Milestones:

- New ML1 and ML2 labs
- In collaboration with Nicola d'Ascenzo (NEUROMED DIMP Node), Marc van Zandvoort launched and is actively involved in the Euro-BioImaging Plant Imaging Expert Group
- Maastricht University recently introduced a new Master's degree programme in Optical, Physical, and Chemical Engineering

NETHERLANDS

High Throughput Microscopy Dutch Flagship Node

Node contact: Sylvia Le Dévédec
s.e.ledevedec@lacdr.leidenuniv.nl

Website: www.eurobioimaging.eu/nodes/high-throughput-microscopy-dutch-flagship-node

2 FACILITIES

15 EXTERNAL USERS

10,000 USAGE HOURS

4 STAFF INVOLVED

0 TRAINING COURSES ORGANIZED

0 REMOTE USERS

HIGHLIGHTS

Funded projects:

- European Food Safety Agency funded project on 'Interindividual variability of stress responses'
- Partner in the Horizon Europe Cancer Mission funded project DISCERN to identify risk factors for kidney, pancreatic, and colon cancer - three poorly understood cancer types

NETHERLANDS

Preclinical Imaging Centre (PRIME) - Molecular Imaging Dutch Node

Node contact: Amanda Kiliaan
amanda.kiliaan@radboudumc.nl
Wilma Janssen
wilma.janssen-kessels@radboudumc.nl

Website: www.radboudumc.nl/en/research/radboud-technology-centers/imaging/preclinical-imaging-center

1 FACILITY

2 EXTERNAL USERS

1,600 USAGE HOURS

7 STAFF INVOLVED

2 TRAINING COURSES ORGANIZED

N/A REMOTE USERS

HIGHLIGHTS

New instruments & upgrades:

- IRIS PET/CT scanner, MILabs U-SPECT-6/CT, MILabs optical scanner
- The 11.7T MRI system was upgraded with a CryoProbe
- For MR-guided focused ultrasound, an additional mouse brain transducer was acquired

Funding:

- 2022 NWO Roadmap - NL-BioImaging Advanced microscopy will provide 1.2M € for next-generation 3- and 4-photon intravital microscopy platform
- An NWO Perspectief grant will upgrade the SPECT/CT scanner with a high-end CT system

NETHERLANDS

Population Imaging Flagship Node Rotterdam

Node contact: Stefan Klein
s.klein@erasmusmc.nl

Website: www.populationimaging.eu/

1 FACILITY

0 EXTERNAL USERS

N/A USAGE HOURS

10 STAFF INVOLVED

1 TRAINING COURSE ORGANIZED

200 REMOTE USERS

HIGHLIGHTS

- Node staff actively participated in several large European consortia aimed at building and providing infrastructure to facilitate research on cancer using images: EuCanImage, EOSC4Cancer and canSERV
- The XNAT service developed by the Node is at the backbone of the EuCanImage cancer imaging archive
- The Node hosted an interactive tutorial about image data management and analysis tools at the RISE-MICCAI Winterschool on AI in Medical Imaging

NETHERLANDS

The van Leeuwenhoek Centre for Advanced Microscopy (LCAM)

Node contact: Mark Hink
m.a.hink@uva.nl

Website: www.lcam.nl/

3 FACILITIES

8 EXTERNAL USERS

20,000 USAGE HOURS

10 STAFF INVOLVED

6 TRAINING COURSES ORGANIZED

0 REMOTE USERS

HIGHLIGHTS

New instruments:

- Leica Stellaris 8 confocal
- Leica Thunder widefield
- ImageXpress Pico

Publications:

- Single-cell imaging of ERK and Akt activation dynamics and heterogeneity induced by G-protein-coupled receptors (PMID: 35107584)
- Reduction in PA28αβ activation in HD mouse brain correlates to increased mHTT aggregation in cell models (PMID: 36574405)
- A doxycycline- and light-inducible Cre recombinase mouse model for optogenetic genome editing (PMID: 36307419)

NETHERLANDS

Wageningen Imaging and Spectroscopy Hub (WISH) - ALM and Molecular Imaging Node

Node contact: Johannes Hohlbein
johannes.hohlbein@wur.nl

Website: www.eurobioimaging.eu/nodes/wageningen-imaging-and-spectroscopy-hub-(wish)---alm-and-molecular-imaging-node-wageningen

2 FACILITIES

18 EXTERNAL USERS

16,300 USAGE HOURS

3 STAFF INVOLVED

7 TRAINING COURSES ORGANIZED

2 REMOTE USERS

HIGHLIGHTS

New instruments & upgrades:

- Optical tweezer setup (Picoquant Microtime 200 + JPK Bruker optical tweezer unit)
- Stellaris Leica confocal
- LSM 710 Zeiss was repaired for RT computer, laser replaced and upgraded
- Upgrades on software were carried out to increase high throughput options
- Workstation was enlarged for data processing

NORWAY

NorMIC Oslo - Advanced Light Microscopy Node Oslo

Node contact: Oddmund Bakke
oddmund.bakke@ibv.uio.no

Website: www.mn.uio.no/ibv/english/research/infrastructure/facilities/life-science/imaging/normic/

2 FACILITIES

57 EXTERNAL USERS

16,849 USAGE HOURS

6 STAFF INVOLVED

2 TRAINING COURSES ORGANIZED

1 REMOTE USER

HIGHLIGHTS

New instrument:

- NIKON Crest V3 confocal spinning disk microscope
- NorMIC Oslo together with ALM platforms in the four major university cities assured Norwegian Research Council funding to purchase ALM equipment and fund three engineers

Milestones:

- Increased imaging storage capacity for ALM data at the Node and collaborating imaging platforms
- Organized a two week-long NorMIC imaging and image processing workshop
- Participated and co-organized the first BNMI symposium in Iceland

NORWAY

NORMOLIM, Norwegian Molecular Imaging Infrastructure

Node contact: Lili Zhang
Jin Li

Website: www.normolim.w.uib.no/

3 FACILITIES

24 EXTERNAL USERS

2,798 USAGE HOURS

8.5 STAFF INVOLVED

0 TRAINING COURSES ORGANIZED

0 REMOTE USERS

HIGHLIGHTS

- MR Core Facility at NTNU will participate in the ExMilk project (23.5M NOK) funded by ERC and NTNU
- The MR Core Facility at NTNU grew with two new employees in 2022

POLAND

Advanced Light Microscopy Node

Node contact: Jędrzej Szymański
j.szymanski@nencki.edu.pl

Website: www.eurobioimaging.eu/nodes/advanced-light-microscopy-node-poland

4 FACILITIES

48 EXTERNAL USERS

9,186 USAGE HOURS

8 STAFF INVOLVED

0 TRAINING COURSES ORGANIZED

0 REMOTE USERS

HIGHLIGHTS

New instrument:

- Confocal microscope with STED and light sheet functionality with white light laser source and 775 nm pulsed depletion laser

Funding:

- Got financial support from the Ministry of Education and Science of the Republic of Poland to maintain the infrastructure and user access
- Involved in the NEBI project, which aims to create the National Centre for Advanced Image Analysis in Biological and Biomedical Sciences - an advanced IT infrastructure for data collection and processing

PORTUGAL

Brain Imaging Network (BIN)

Node contact: Miguel Castelo-Branco
mcbranco@fmed.uc.pt

Website: www.uc.pt/en/brainimaging/

13 FACILITIES

7 EXTERNAL USERS

5,192 USAGE HOURS

9 STAFF INVOLVED

3 TRAINING COURSES ORGANIZED

3 REMOTE USERS

HIGHLIGHTS

- VNA system was installed at the new data center
- Portuguese BIN researchers were in the news: New technique for treatment of lung cancer; New approach to detect ateroslerotic plaques; Identified a brain region involved in early alzheimer; ICNAS, an example in Increasing Radiopharmaceutical Production with Cyclotrons
- The Node was involved in a number of training, educational and public outreach events
- Miguel Castelo-Branco was awarded the 2022 BIAL Award in Clinical Medicine

PORTUGAL

Portuguese Platform of BioImaging (PPBI)

Node contact: Paula Sampaio
sampaio@i3s.up.pt

Website: www.ppbi.pt/

13 FACILITIES

190 EXTERNAL USERS

95,439 USAGE HOURS

31.6 STAFF INVOLVED

35 TRAINING COURSES ORGANIZED

10 REMOTE USERS

HIGHLIGHTS

New instruments:

- Zeiss LSM900 & 980,
- Zeiss Celldiscoverer 7
- AKOYA Phenocycler
- 3i Marianas (BSL2)
- HCI Operetta CLS & Opera Phenix Plus
- Leica STELLARIS 8 STED FALCON
- High-end image analysis workstation

Funded projects:

- PLANTS4AGEING - Potential of Aromatic and Medicinal Plants in Cardiovascular Ageing
- OPTIMAR: OPTical Imaging of Molecular and signalling Activity in Real-time; application to flatfish metamorphosis

Training & outreach:

- Multiple EMBO and COST action courses, workshops (e.g. 'Microscopy in Focus') and public engagement activities

SLOVENIA

SiMBION Node

Node contact: Primož Pelicon
primoz.pelicon@ijs.si

Website: www.simbion.mf.uni-lj.si/en/home-2/

16 FACILITIES

12 EXTERNAL USERS

1,400 USAGE HOURS

3.5 STAFF INVOLVED

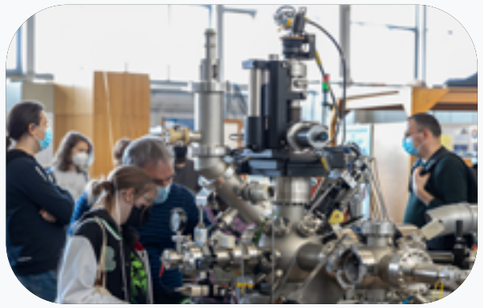
1 TRAINING COURSE ORGANIZED

4 REMOTE USERS

NEW

HIGHLIGHTS

- New high energy focused ion beam (JSI nanobeam) installed at Jožef Stefan Institute for micro-PIXE (elemental tissue imaging) and MeV-SIMS (molecular tissue imaging)



μ-PIXE imaging system at the Jožef Stefan Institute

SWEDEN

Swedish National Microscopy Infrastructure

Node contact: Hjalmar Brismar
brismar@kth.se

Website: www.nmisweden.se/

5 FACILITIES

175 EXTERNAL USERS

65,000 USAGE HOURS

32 STAFF INVOLVED

20 TRAINING COURSES ORGANIZED

50 REMOTE USERS

HIGHLIGHTS

New instruments:

- Zeiss ELYRA7 in each site (total two full systems)
- Abberior MINFLUX
- SECOM from DELMIC system to upgrade the SEM and a LSM 980 AiryScan
- Phenocycler Fusion and COMET

Funding:

- Node staff received a number of important grants to work on topics ranging from Smart Microscopy to MINFLUX to 3D Volume EM development
- The Node continued to be very involved in training and public outreach activities

UNITED KINGDOM

The UK Node

Node contact: Georgina Fletcher
georgina@rms.org.uk

Website: www.eurobioimaging.eu/nodes/uk-node

14 FACILITIES

120 EXTERNAL USERS

51,185 USAGE HOURS

46.6 STAFF INVOLVED

8 TRAINING COURSES ORGANIZED

19 REMOTE USERS

NEW

HIGHLIGHTS

New instruments:

- Leica SP8 upgraded with FALCON FLIM module to allow Tau STED
- Iridia 193nm laser (Teledyne)
- High Pressure Freezer, freeze substitution unit
- Cell Discoverer 7 Zeiss
- Momentum CT: Magnetic Particle Imager, Leica ASP300S Fully Enclosed Tissue Processor (histology)

STAKEHOLDERS & OUTREACH

STAKEHOLDERS

Euro-BioImaging is at the center of a network of stakeholders that includes our ERIC members, funders, research infrastructure (RI) partners, Nodes, users, industry partners, and a global community of researchers and imaging scientists. This puts us in a unique position to foster a strong, interdisciplinary collaboration environment striving towards open science. Through our actions with different stakeholders, we are involved in a number of activities that bring added-value for research, innovation, and technology and strengthen the overall competitiveness of the European research area - and beyond. In the next pages, discover some of the ways in which we interact with our stakeholders.

FLAGSHIP EVENTS

In 2022, Euro-BioImaging organized a number of flagship events for key stakeholders, namely Nodes, users, researchers, and members of the biological and biomedical imaging communities. We also attended a number of conferences, engaging with researchers and research infrastructure (RI) partners. We also engaged with Node staff, researchers and industry colleagues via our Expert Groups. In addition, we contributed to events organized by the Euro-BioImaging Industry Board and developed our international relations by working with stakeholders in Latin America. In these pages of the Annual Report, we present some highlights of the year. For attendance statistics for the online events we organised, see page 67.

VIRTUAL PUB

In 2022, Euro-BioImaging continued to organize the online Virtual Pub events, a free weekly lecture series, open to the entire imaging community. Topics include new biological and biomedical imaging technologies, image analysis, and other topics of interest to the imaging community. The Virtual Pub schedule also includes two monthly joint series, co-organised with the volumeEM community and COMULIS respectively.

42
VIRTUAL PUBS IN 2022

50
VIDEOS ON YOUTUBE

Virtual Pub playlist on YouTube

USER FORUM

Designed to highlight the importance of imaging to different research areas, the Euro-BioImaging User Forum takes place twice a year and features keynote presentations from prominent scientists as well as presentations from users at our Nodes. In 2022, we explored how imaging supports neuroscience and infectious disease research.

Both events attracted researchers, students, core facility staff, policy makers and industry representatives. We were pleased that the 'Fighting infectious diseases' event also attracted members of the ISIDORe project consortium. We recorded the events and the talks are available on our **YouTube channel**.

25+
COUNTRIES (PARTICIPANTS)

10
VIDEOS ON YOUTUBE

'At the Forefront of Neuroscience' playlist on YouTube

'Fighting infectious diseases' playlist on YouTube

CONFERENCES & EVENTS

28
COMMUNITY CONFERENCES

9
POLICY EVENTS

12
EVENTS WITH RESEARCH INFRASTRUCTURES

3
EVENTS ORGANIZED BY INDUSTRY PARTNERS

1
GENERAL PUBLIC EVENT

10
WORKSHOPS/COURSES/ SEMINARS

Susanne Vainio at the BioCity Symposium

European Researchers' Night with the NEUROMED Node

Aastha Mathur presenting at ELIXIR All Hands. Picture by Jonathan Tedds (@jtedds) on Twitter

Wolfgang Fecke (EU-OPENSCREEN), Antje Keppler and Ilari Pulli at the ISIDORe satellite event - ICRI 2022

The Euro-BioImaging Hub Team at ELMI2022

ESFRI 20 Years event

Antje Keppler at the France BioImaging 10-year anniversary meeting

Linda Chaabane at the IHI Kick-off & brokerage event

INDUSTRY RELATIONS

The Euro-BioImaging Industry Board (EBIB), which has grown to 15 members, continues to interact closely with the Euro-BioImaging Node community.

EBIB AT ELMI 2022

After two years of virtual meetings, it was time for in person networking again and the first big opportunity arose at ELMI 2022, which took place in Turku, Finland. While the Industry Board met to discuss EU projects, Node updates and the upcoming workshop, we also offered a 'Meet the Industry Board' session at the Euro-BioImaging booth for attendees to talk directly to EBIB representatives.

The Euro-BioImaging Industry Board at ELMI 2022

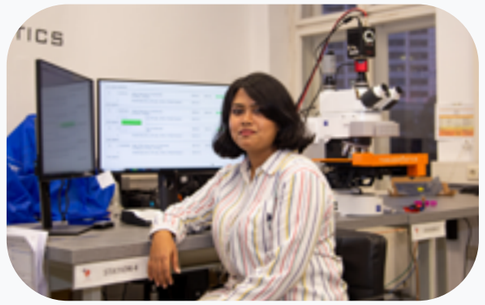
> **It's just great to meet the members of the imaging community face to face after a long time, to talk to each other and to exchange ideas about important topics such as training for imaging facility staff and equipment users.**
>
> - Martin Tewinkel, EBIB Chair in 2022

Industry Board Coordinator Claudia Pfander at ELMI 2022

TRAINING THE NEXT GENERATION OF EXPERTS

In autumn 2022, TissueGnostics and ZEISS welcomed the first MSc candidates for internships in collaboration with the Master's programme in Biomedical Imaging (BIMA) in Turku, Finland. The two selected students both cherished the opportunity to gain insights into working in the private sector and to apply their knowledge to the development of machine learning and AI solutions for imaging. Annesha Fariha even completed a joint thesis project between University of Turku and her company host. The participating companies meanwhile profited from gaining access to international talent with a unique educational background in imaging.

> **I have been exposed to so much [...] - it's been really eye-opening.**
>
> - Annesha Fariha, MSc student



Annesha Fariha doing her Industry Internship at TissueGnostic

> **We take internships very seriously. We see them as an opportunity to mentor and recruit the next generation of employees.**
>
> - Rudolf Jedletzberger, TissueGnostics

WORKING WITH THE COMMUNITY

While the MSc students benefit from career insights at industry, the transfer of knowledge can work both ways. In October, the Euro-BioImaging Industry Board organized a 1-day hybrid workshop with over 80 participants on the subject of 'Smart Microscopy' at the Imaging Centre at EMBL, Heidelberg.

The workshop brought together leading instrument and software providers with experts from the Euro-BioImaging Nodes for fruitful discussions around research needs, technical requirements and existing solutions for Smart Microscopy. As a direct result, a Smart Microscopy working group was established. The group will continue to work towards a common ontology for workflows, as well as on improving accessibility to this emerging field of microscopy for regular users. First results of the work of this group will be presented at ELMI 2023.

> **To increase the adoption of Smart Microscopy, academic and commercial sector have to team up to increase accessibility of instruments and workflows. That's why this mutual exchange is the first step.**
>
> - Workshop participants

A JOINT STRATEGY

Less visible, but equally important, the EBIB Advisory Panel was invited to give strategic input into the technology portfolio development and the next five-year plan of Euro-BioImaging in two separate meetings, while the Panel Chairs also represented the EBIB at the Panel of Nodes meeting. Euro-BioImaging very much appreciates the invested and constructive interaction with one of its main stakeholders and is looking forward to future events in 2023.

Smart Microscopy Workshop at EMBL, Heidelberg, October 13, 2022

Euro-BioImaging Industry Board member companies

EUROPEAN STAKEHOLDERS

EURO-BIOIMAGING IN ERIC FORUM

In 2022, the EOSC-Association invited the ERIC Forum to nominate a Mandated Organization to represent the common interests of ERICs regarding the European Open Science Cloud (EOSC) in the Association. Euro-BioImaging took on this responsibility from May 2022 to April 2023, as the first Mandated Organization for ERIC Forum. In ERIC Forum we chaired the relevant working group on EOSC, represented the Forum in the EOSC-Association General Assembly and participated in relevant high-level meetings for Mandated Organizations. These political activities increased ERIC Forum's role in the EOSC Association as well as Euro-BioImaging's visibility in the European Research Infrastructures' landscape.

Since February 2022, Euro-BioImaging Section Director Antje Keppler is the elected representative of the Life Science cluster in the ERIC Forum Executive Board. In October she was elected Chair of this Board by the General Assembly of the Forum.

During her term until December 2024, she plans to help ERIC Forum in increasing the visibility of ERICs in the European Research Area and support the Forum in European RI policy matters, finding common solutions for ERIC implementation and operation as well as supporting the newly granted ERIC Forum project.

> **"It is a great honor and an important responsibility to represent the ERIC community as Chair, speaking on behalf of the entire consortium to national funders, the European Commission and the European scientific communities at large.**
>
> - Antje Keppler, ERIC Forum Chair

COOPERATION WITH PARTNER RIS

A new, promising collaboration agreement among top-class life science research infrastructures was made official during the International Conference on Research Infrastructures (ICRI 2022) in Brno, Czechia, on October 21, 2022. This trilateral Memorandum of Understanding between Instruct-ERIC, EU-OPENSCREEN ERIC and Euro-BioImaging ERIC is designed to benefit the life science research community by building common pipelines for user access, and joining forces in training, external communication, FAIR data management, and funding opportunities. The three ERICs have successfully collaborated in the past, in particular in the H2020-funded projects BioMedBridges, CORBEL, RI-VIS, EOSC-Life as well as in delivering RI services in ongoing projects ISIDORe and canSERV.

Antje Keppler, Harald Schwalbe(Director of Instruct-ERIC) and Wolfgang Fecke (Director of EU-OPENSCREEN ERIC) with the new collaborative agreement between the three European ERICs at ICRI 2022

Antje Keppler is the new chair of the ERIC Forum. She follows in the footsteps of Francisco Colomer, JIVE ERIC Director, and works together with Allen Weeks, ELI-ERIC Director, the new ERIC Forum Vice Chair

INTERNATIONAL STAKEHOLDERS

BUILDING BRIDGES WITH LATIN AMERICA

Building on a joint meeting on RI collaboration between Uruguay and Europe including the Ambassadress of Finland (Buenos Aires, Argentina) and government representatives from the Agencia Uruguaya de Cooperación Internacional at the Institut Pasteur Montevideo (IPM) in late 2021, Euro-BioImaging and IPM have made concrete actions to strengthen their collaboration in 2022. Together, they applied successfully to the 4th call of the EU-LAC Interest Group STI for training and staff exchange opportunities for imaging facility staff, international user access and supporting the concept of Integrative Bioimaging Hubs in Latin America.

Following this, in September 2022, Euro-BioImaging attended and actively contributed to the Global BioImaging 'Exchange of Experience' conference in Montevideo, Uruguay, on the impact of imaging for society and for addressing the UN Sustainable Development Goals.

Finally, at the concluding session of the International Conference for Research Infrastructures 'ICRI 2022' in Brno in October, Euro-BioImaging ERIC and Institut Pasteur Montevideo signed a collaboration agreement to even further intensify and implement their objectives for collaboration and exchange. Our partners in Uruguay are also leading the regional network of Latin America Bioimaging (Argentina, Brazil, Chile, Colombia, Mexico, Peru, Uruguay), and here they help Euro-BioImaging to reach and work together also with imaging scientists across Latin America (see *Excellent Science* section).

Signature of the MoU between Euro-BioImaging ERIC and Institut Pasteur Montevideo, represented by Carlos Batthyány Dighiero and Antje Keppler

Euro-BioImaging participated in Exchange of Experience VII in Montevideo, Uruguay

Euro-BioImaging Med-Hub Director Linda Chaabane gave a presentation at EOE VII in Montevideo, Uruguay

Euro BioImaging Director General John Eriksson gave a video presentation at EOE VII in Montevideo, Uruguay

EXPERT GROUPS

Euro-BioImaging organizes a wide range of topic-oriented Expert Groups. With these Expert Groups, our mission is to increase collaboration and connections between our Nodes and give core facility staff the opportunity to share and advance their knowledge on many relevant topics. Several of the Expert Groups are also open to the wider imaging community - including Euro-BioImaging friends, partners and Euro-BioImaging Industry Board members. Visit our website to learn more: **www.eurobioimaging.eu/about-us/expert-groups**

TECHNOLOGY & DATA EXPERT GROUPS

- Light Microscopy
- Electron Microscopy
- Image Data
- Preclinical & Medical Imaging Data Management
- Plant Imaging

ADDITIONAL EXPERT GROUPS

- Remote Access & Training
- Communications
- Ethics in Biological & Biomedical Imaging
- Quality Management at Biomedical Imaging Facilities
- User Access Management Systems

EXPERT GROUP SPOTLIGHT

Image Data Expert Group

To support standalone Image Data Analysis (IDA) service provision, Euro-BioImaging started an expert group on Image Data in 2022. The founding objective of this group is to establish standardized procedure for user access towards IDA service provision. This regular gathering of expert bioimage analysts from the Nodes enables discussion around challenges in provision of these novel services and allows established Nodes to share their experience with Nodes that are starting to offer IDA services. Past discussions have included understanding the composition and costing models adopted by different Nodes and have served as an informal platform to get to 'Know the Nodes' that provide IDA services. These meetings are widely subscribed and attract Node staff, Industry Board partners as well as external experts in the area. Over time, we envision that additional topics related to data analysis workflows and image data management may be discussed in this group.

WEB & SOCIAL MEDIA

Online communication channels continued to be an important way to reach our stakeholders in 2022. We used social media, primarily **Twitter** and **LinkedIn**, to interact with a variety of partners, give visibility to imaging scientists and our Nodes, promote breakthroughs in imaging research, and advertise our Flagship events. We increased our followers on **YouTube** in 2022 by creating playlists with User Forum content, continuing to record and share Virtual Pub talks and creating short social media videos to promote imaging technologies and image data analysis services. We use these channels as well as our regular newsletters to drive traffic to our website. Finally we have a strong presence at our online events thanks to our growing virtual footprint. Below are our key numbers from January 2020 to January 2023.

WEBSITE

286,342

Page views since ERIC creation

SOCIAL MEDIA

NEWSLETTER

3

Regular newsletters - to three target audiences

5,000+

Cumulative recipients including Nodes, RI partners & Governance

30%

Average open rate for campaigns in 2021-2022

PARTICIPATION IN EURO-BIOIMAGING ONLINE EVENTS

4,219 Virtual Pub participants — **105 EVENTS**

680 User Forum participants — **4 EVENTS**

= 100 PEOPLE

Numbers from January 1st 2023

FINANCIAL INFORMATION

BUDGET

Euro-BioImaging ERIC is financed by the annual membership contributions from the ERIC members. **'Income membership contributions 2022'** shows the total membership contributions for the financial period (01.01.2022-31.12.2022). Euro-BioImaging Hub is formed by the Statutory Seat, the Bio-Hub and the Med-Hub. Euro-BioImaging Statutory Seat collects the annual membership contributions of Euro-BioImaging ERIC. **'Budget transfer'** indicates the agreed membership contribution budget shares transferred from the Euro-BioImaging Statutory Seat to the Bio-Hub and Med-Hub sections, respectively. Funds available at each Hub section are indicated separately. **'Expenses'** show the actual realized expenses by cost category during the financial period at each Euro-BioImaging Hub Section. **'Reserve funds'** indicate the funds that are available after the expenses for the financial period. This funding reserve will be warranted especially for liquidity required to buffer reimbursement delays incurred at the onset of funded Horizon Europe projects, and as reserve for proposals that require co-funding.

INCOME (€)	STATUTORY SEAT	BIO-HUB	MED-HUB	THROUGH THE ERIC
Membership Contributions 2022	**1,648,331.02**			**1,648,331.02**
Budget Transfer (Bio-Hub)	**- 600,899.00**	**600,899.00**		
Budget Transfer (Med-Hub)	**- 267,017.00**		**267,017.00**	
Income by Hub section	**780,415.02**	**600,899.00**	**267,017.00**	**1,648,331.02**

EXPENSES (€)	STATUTORY SEAT	BIO-HUB	MED-HUB	THROUGH THE ERIC
Human resources	**328,262.10**	**476,794.60**	**157,266.00**	**962,322.70**
Access reimbursement	**37,927.56**			**37,927.56**
External services *	**63,849.67**			**63,849.67**
Travel	**57,487.64**	**17,014.43**	**7,435.98**	**81,938.05**
Other travel **	**43,625.37**			**43,625.37**
Services	**54,911.28**	**6,585.68**		**61,496.96**
Financial and administration expenses	**3,581.22**			**3,581.22**
Other expenses	**163,711.82**	**11,446.23**	**54,311.56**	**229,469.61**
Total expenses	**753,356.66**	**511,840.94**	**219,013.54**	**1,484,211.14**

** Human resource expenses incurred at the University of Turku and were billed to the Euro-BioImaging ERIC Statutory Seat.*

*** Reimbursement of SAB members' travel and accommodation. Team travel and accommodation to Board Meeting, including per diems. EC Project travel pending final payment from EC.*

FUNDS (RESERVE, €)	STATUTORY SEAT	BIO-HUB	MED-HUB	THROUGH THE ERIC
Jan 1 - Dec 31, 2022	**27,058.36**	**89,058.06**	**48,003.46**	**164,119.88**
Jan 1 - Dec 31, 2021	**396,199.47**	**166,041.72**	**216,221.00**	**778,462.19**
Oct 29, 2019 - Dec 31, 2020 *	**765,474.81**	**407,350.97**	**7,178.72**	**1,180,004.50**
Total	**1,188,732.64**	**662,450.75**	**271,403.18**	**2,122,587.00**

** Statutory Seat allocation includes 25,051.39 of Med-Hub unspent funds of 2019.*

Costs booked on additional external funding sources at each Euro-BioImaging Hub section were as indicated.

COSTS BOOKED ON ADDITIONAL EXTERNAL FUNDING SOURCES DURING 2022 (€)	STATUTORY SEAT	BIO-HUB	MED-HUB
Costs covered by EC funding	**74,792.25**	**213,768.91**	
In-kind		**0.5 FTE (EMBL)**	**0.25 FTE (G. DIGILIO)**

Euro-BioImaging Hub Team Meeting, November 11, 2022 - Torino, Italy

Front row: Marianna Childress-Poli, Linda Chaabane, Antje Keppler, Johanna Bischof, Aastha Mathur, Rachel Robinson-Lehtinen, Pasi Kankaanpää, Alessandra Viale, John Eriksson, Rakesh Mahato. **Back row:** Solveig Eriksson, Ayoub El Ghadraoui, Buğra Özdemir, Dario Longo, Claudia Pfander, Ilari Pulli, Susanne Vainio, Camilo Guzmán, Erika Cerutti, Jussi Heimonen. (Isabel Kemmer, Arina Rybina and Beatriz Serrano-Solano missing from picture.)

THIS ANNUAL REPORT IS A PUBLICATION OF EURO-BIOIMAGING

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Many thanks to all of our colleagues and friends, at the Nodes and beyond, who contributed time, texts, images and more to this document!

BACK COVER IMAGE

Image by Frédéric Fercoq -
Unit Communication Molecules and Adaptation of Micro-organisms (MCAM, UMR 7245), Team Parasites and Free Protistes, Muséum National d'Histoire Naturelle, CNRS; Paris, France

'The image represents autofluorescence signals from Ornithonyssus bacoti, a blood-feeding mite'

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