AUSTRIAN
BIOIMAGING/CMI

ANNUAL 22/23 REPORT

ANNUAL REPORT

CONTENT

FOREWORD

2022 started with a heavy loss. Andreas Walter, who served as Operating Director of Austrian BioImaging/CMI, accepted a position at University of Applied Sciences in Aalen, Germany. As a consequence, the Steering and Managing Boards launched a recruitment process to cover the essential but now vacant position. Fortunately, a broad field of highly qualified applicants allowed a tough selection process, which resulted in negotiations with the most qualified candidate, Baubak Bajoghli from the University Hospital Tübingen. Excited by the spirit of our members, the superiority of their facilities and their scientific excellence, he accepted and started service in May 2022.
With great enthusiasm Baubak has initiated modernization of our web presence and triggered the involvement of Austrian BioImaging/CMI in interesting European projects and initiatives. Thus, despite its challenging start, 2022 became a prosperous year for us and saw a large number of successful events and innvovations. Please enjoy in the following pages the illustrated summary of the most important Austrian BioImaging/CMI facts and the milestones reached in 2022 and early 2023.

As a research group leader engaged in basic and translational research, I am aware how restricted access to advanced research infrastructures can affect research quality. My passion by open science, driven by personal experiences, led me to take on a leadership role at Austrian BioImaging/CMI.

Since May 2022, I have had the privilege of meeting all members of Austrian BioImaging/CMI, each with diverse backgrounds in molecular biology, medicine, physics, chemistry, or informatics. Despite their initial differences, they share a common passion with me: IMAGING. Listening to their feedback and expectations has been an exciting experience that significantly influenced my activities.
In 2022-2023, Austrian BioImaging /CMI focused on three main areas: (1) enhancing visibility through more relevant channels, (2) fostering opportunities for innovation, and (3) optimizing our network for synergistic and complementary goals. In this context, we have strengthened our collaboration with Euro-BioImaging across various dimensions, including knowledge exchange, cooperation in existing European programs, and exploring partnerships for upcoming Horizon Europe Calls.

Wolfgang Weninger

SCIENTIFIC DIRECTOR

Baubak Bajoghli

OPERATING DIRECTOR

WHO WE ARE

Austrian BioImaging/CMI

We are a consortium consisting of eight Austrian universities and research institutes, providing access to technologies and expertise in the field of biological and pre-clinical imaging.

Cutting-edge imaging technologies are one of the driving forces in basic and translational research and medicine. They enable scientists to visualize biological samples at various scales and quantify their structure, molecular dynamics, physical properties, and chemical composition with unprecedented precision. Imaging technologies help not only to address grand societal challenges but also allow breakthrough biological discoveries and their translation into medical application.

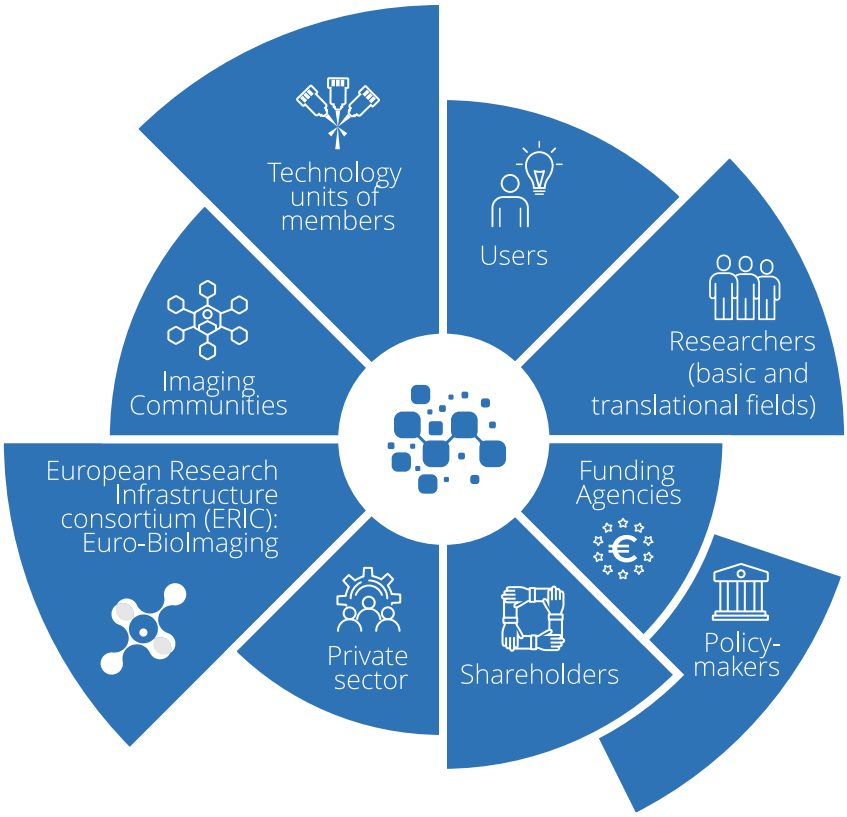
With the emergence of new frontiers of opportunity, one of the key challenges for scientists is to gain access to specific imaging technologies that are either not available at their home institutions or for which expertise is lacking. Austrian BioImaging/CMI was founded in response to this. As a consortium of eight universities and leading research institutions, it provides open access to 40+ imaging instruments spanning the entire resolution range of interests for biological and pre-clinical studies. In addition, it offers expertise for data visualization, training, and access to a large number of support facilities for all national and international researchers regardless of their affiliation. Now, researchers from both academia and industry can access to the imaging services through Austrian BioImaging/CMI whenever their projects require imaging technologies and expertise that are not available at their home institute.

In recognition of its outstanding role as a service provider with high quality standards, Austrian BioImaging/CMI also became the official Euro-BioImaging node of Austria in 2021. Through Euro-BioImaging, access is provided to trans-national users, international networks, and European funding opportunities are available for the services offered by the nodes.

OUR VISION

To make Austria a leading hub for cutting-edge biological and pre-clinical imaging

We aim to achieve this by fostering scientific excellence through collaboration between top research groups and state-of-the-art imaging facilities at the European level. By nurturing innovation and expertise, we aspire to redefine imaging capabilities and leave a lasting impact on scientific discovery.



Our stakeholders.

The stakeholder network is crucial for Austrian BioImaging/CMI. We are focused on building a strong identity in life science and pre-clinical imaging communities together with Euro-BioImaging. Our strategy includes supporting existing communities and creating new ones that align with the interests of Austrian BioImaging/CMI.

This involves researchers, technology unit members, institutions, universities, government, national and European funding agencies, industry and private sector, and affiliated universities and research infrastructures. Together, we are strengthening our visibility in the imaging field.

OUR MISSION

To provide a seamless access to our imaging technologies and facilitate knowledge exchange

Besides access to cutting-edge imaging technologies to all researchers across Europe, we promote the development of novel imaging tools and correlative multimodal imaging (CMI) pipelines, facilitating their implementation in biomedical research and clinical diagnostics.

OUR STRATEGY

To concentrate our efforts on 3 primary goals:

1. Enhancing **visibility** through impactful channels to strategically position ourselves for unparalleled recognition.
2. Optimizing **network** potential and harnessing synergy to achieve mutually reinforcing objectives.
3. Fostering **innovation and scientific excellence** by generating new opportunities.

ABOUT OUR

Imaging technologies and expertise

Thanks to our members' committment to excellence, researchers can now access +40 state-of-the-art imaging technologies that cover a wide range of spatial solutions - from molecules to large animals.

Austrian BioImaging/CMI is a multi-sited infrastructure consortium, encompassing 29 technology units across eight universities and research institutes. Predominantly located in Vienna (27 units) and Klosterneuburg (2 units), the consortium offers an extensive range of services. Of these, twenty-two units provide access to 40+ cutting-edge biological and pre-clinical imaging technologies, spanning the entire spatial resolution spectrum from the examination of chemical and physical properties, molecules, cells, tissues and organs to the morphology and phyisology of large animals such as horses or llamas.

Within this framework, six supportive technology units offer access to crucial resources, including human body donors, histology, morphometrics, hybrid imaging consulting, wet labs, animal housing, and a state-of-the-art hybrid operation room (OR) facility equipped with modern CT/PET/MRI scanners. Also, we are one of the few nodes in Euro-BioImaging that offer expertise in biomedical imaging informatics, particularly in machine learning and artificial intelligence. This comprehensive service makes Austrian BioImaging/CMI the exclusive Euro-BioImaging node providing a complete package to trans-national users conducting imaging experiments in Austria.

Austrian BioImaging/CMI further dintinguishes itself as a powerhouse in the European landscape with 14 technology units specializing in research and development of imaging technologies. These units actively engage in advancing imaging technologies for life sciences and the diagnosis of human diseases, and have established long-term collaborations with industry and start-ups in this sector.

The consortium's proficiency in correlative multimodal imaging (CMI) is a cornerstone of its expertise. Recognizing that no single imaging technology can provide a holistic view of a given sample, Austrian BioImaging/CMI takes advantage of the synergy between diverse imaging modalities as the future of bioimaging. Becasue integrative approaches and multiscale imaging contribute to a mechanistic understanding of diseases and organisms, providing structural insights into molecular machines, molecules, and underlying mechanisms. The CMI approach uses well-established technologies like Positron Emission Tomography (microPET), Autoradiography, Magnetic Resonance Imaging (microMRI), and Computed Tomography (microCT), as well as novel biomedical imaging approaches like X-Ray Fluorescence Spectroscopy (microXRF) and High-Resolution Episcopic Microscopy (HREM). Notably, showcase studies from our members have successfully combined up to seven imaging modalities for a single sample. While the current focus is on technical feasibility, these approaches hold great promise for life science and preclinical investigations.

To fulfil its mission, Austrian BioImaging/CMI expanded its technology portfolio within Euro-BioImaging in 2022-2023, which included the addition of Brillouin Scattering Microscopy (BSM) at the Medical University of Vienna (MUW) and Plant Phenotyping at VBCF. The latter is fully integrated into AgroSERV, a current European funding program supporting access to research infrastructures in the field of agricultural research.

8

IMAGING FACILITIES

14

GROUPS IN R&D OF IMAGING TECHNOLOGIES

7

SUPPORTIVE FACILITIES

EURO BIOIMAGING

46

TECHNOLOGIES THAT WE OFFER AT EURO-BIOIMAGING

+60

STAFF INVOLVED

+380

PUBLICATIONS BY MEMBERS 22-23

OUR IMPACT

As one entry point, we provide access to our 40+ cutting-edge imaging technologies and expertise to all researchers in Europe.

As Node of Euro-BioImaging, we are eligible to apply for Horizon Europe funding programs supporting research infrastructures.

Within our national and European networks, we foster the development of synergistic and innovative research projects.

Our communication and outreach efforts raise awareness among stakeholders about the expertise and strength of our members in the fields of biological and pre-clinical imaging.

ASSOCIATION WITH

Euro-BioImaging ERIC

Euro-BioImaging is a European research infrastructure for biological and biomedical imaging, acknowledged by the European Strategy Forum on Research Infrastructures (ESFRI). The Euro-BioImaging infrastructure is fully distributed and operates through a coordinated Hub, encompassing 41 internationally renowned imaging facilities known as nodes, spread across 18 countries and EMBL. Austrian BioImaging is the Austrian node since 2021.

ONE VOICE FOR IMAGING IN EUROPE

Being part of the one European network, Austrian BioImaging is actively engaged in knowledge exchange and communication with other nodes. This involvement includes participation in various meetings, such as panel of nodes, all-hands node meetings, and Euro-BioImaging Board, which serves as the ultimate decision-making instruments. In addition, Euro-BioImaging organizes the online Virtual Pub events, which are a free weekly lecture series open to the entire imaging community. Topics include new biological and biomedical imaging technologies, image analysis, and other subjects of interest to the imaging community. User-Forum takes place twice a year and showcases keynote presentations from distinguished scientists, along with contributions from users at nodes of Euro-BioImaging.

Image: All-hands node meeting, Heidelberg, 2023

ACTIVE IN SIX EXPERT GROUPS TO SHAPE THE IMAGING COMMUNITY

To facilitate the sharing and advancement of knowledge on various relevant topics among core facility staff, Euro-BioImaging has established ten expert groups covering different areas. In 2022-2023, members of Austrian BioImaging/CMI participate in following expert groups:

1. **Electron microscopy Group**
Austrian Representative: Katy Schmidt (University of Vienna)

2. **Communication Group**
Austrian Representative: Baubak Bajoghli (Austrian BioImaging/CMI)

3. **Plant imaging Group**
Austrian Representative: Jakub Jez (VBCF)

4. **Ethics Group**
Austrian Representative: Thomas Wanek (Medical University of Vienna)

5. **Image analysis Group**
Austrian Representative: Katja Bühler (VRVis)

6. **Pre-clinical and medical imaging data management Group**
Austrian Representative: Thomas Wanek (Medical University of Vienna)

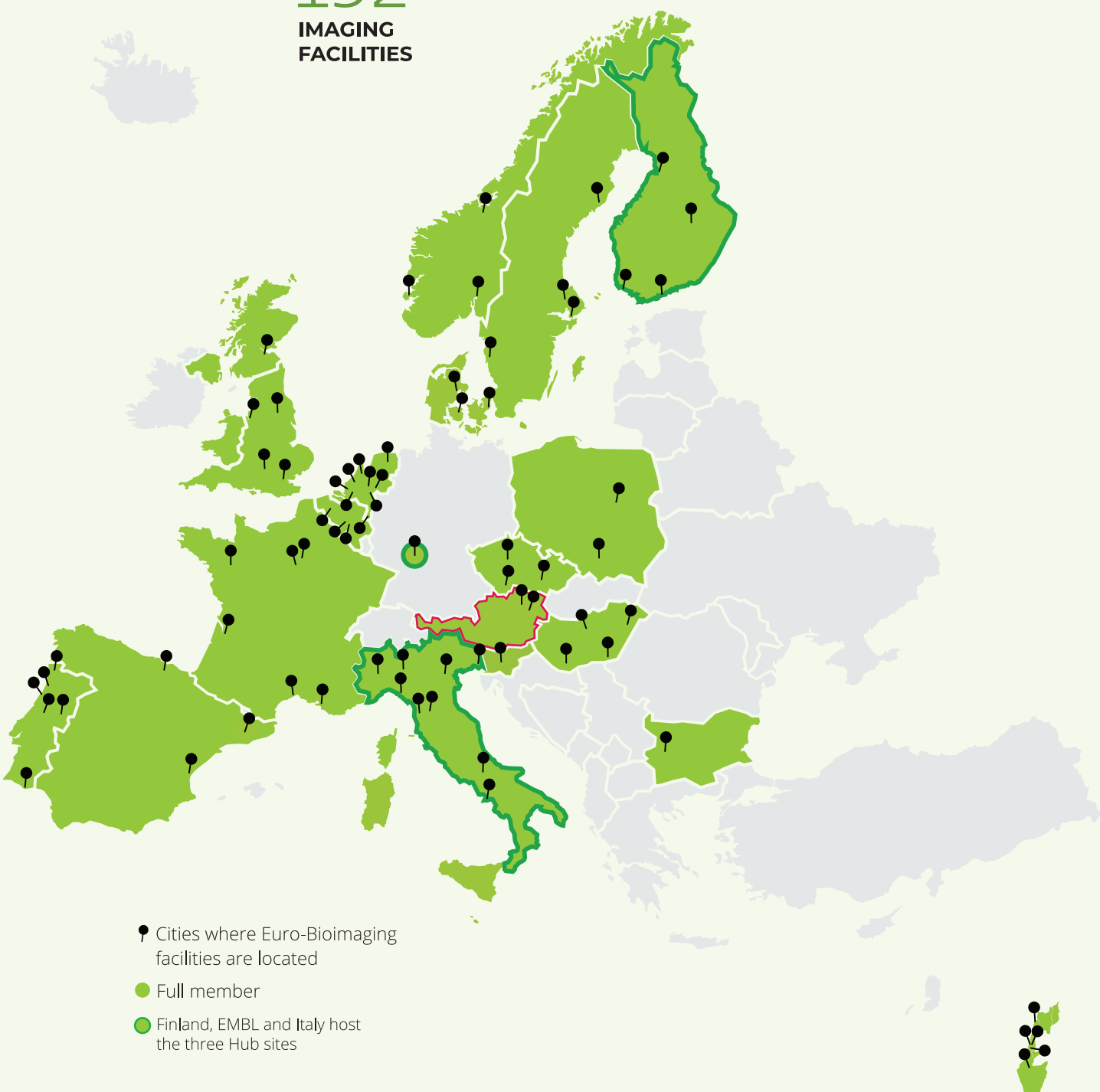
19 *
MEMEBERS (18 Countries & EMBL)

24
BIOMEDICAL IMAGING TECHNOLOGIES

41
NODES

86
BIOLOGICAL IMAGING TECHNOLOGIES

192
IMAGING FACILITIES



*Last update: 01.2024

INVOLVEMENT IN HORIZON EUROPE projects

The research infrastructure (RI) programs under Horizon Europe aim to empower Europe by providing world-class and accessible RIs as part of an integrated European research and technology landscape. At present, Austrian BioImaging/CMI is involved in three INFRA-SERV programs through Euro-BioImaging, and has submitted two projects for 2024.

The RIs work program of Horizon Europe revolves around five key destinations: (1) Development of European research infrastructure (INFRADEV); (2) FAIR European Open Science Cloud (EOSC) ecosystem; (3) Services to advance frontier knowledge (INFRASERV); (4) Development of the next generation of instruments, tools, and methods (INFRATECH); and (5) Collaboration without boundaries (INFRANET). ERIC members can directly apply for these programs and only Austrian BioImaging/CMI-listed imaging technologies/services in the Euro-BioImaging portfolio are eligible. All scientists regardless of their affiliation, area of expertise or field of activity are able to apply for access to cutting- edge facilities, equipment, and resources that they do not have access to in their institutions or at a national level.

ISIDORe
2022-2025

ISIDORe is a large-scale EU initiative funded through the HERA incubator call to support studies of epidemic-prone diseases - ranging from basic research to vaccine development.

Total project budget

EUR 21 million

Involved members (# of technologies)

MUW (1)
TU Wien (1)
Vet-Med Uni (1)
VRVis

CanSERV
2022-2025

This program provides cutting edge, interdisciplinary and customised services for supporting oncology-related research across the entire cancer continuum, from basic research up to clinical trials.

Total project budget

EUR 15 million

Involved members (# of technologies)

MUW (5)
TU Wien (3)

AgroSERV
2022-2027

This program brings together all actors of the agriculture system, including farmers, researchers, policy makers etc., and provides them access to a wide range of services from different European RIs.

Total project budget

EUR 15 million

Involved members (# of technologies)

MUW (1)
VBCF (1)

Our benefits...

as a service-provider...

- Reimbursement of actual costs
- Attraction of new users
- Strengthening research capacity
- Visibility at European level

as a researcher...

- Free access to RIs & expertise
- Free choice of services
- Free short-term use
- International cooperation

Agri-PET/MRI
2023-2027

This project will implement the first real-time in-field portable multimodal multiscale PET-MRI, which has the potential to support and shape the essential priorities in the future EU digital agriculture policy.

Total project budget

EUR 3 million

Involved members (# of technologies)

VRVis (1)

Euro4Access
Submitted in 03.2023

The project is focused on providing democratised access to individual RI services, while also increasing the integration of cross-RI services for basic research. This proposal is officially on the waitlist.

Requested budget

EUR 5 million

Involved members (# of technologies)

MUW (12)
VBCF (2)
TU Wien (6)
Vet-Med Uni (3)
Uni Wien (2)

PaedSERV
Submitted in 03.2023

The aim of this project was to accelerate prevention, diagnosis, and treatments for paediatric populations through services built on the synergies of RIs. This proposal was not approved.

Requested budget

EUR 14.5 million

Involved members (# of technologies)

MUW (5)
VRVIs (1)

HIGHLIGHTS & ACTIVITIES

2022-2023

05/2022 | Appointment of the new Operating Director

Former Austrian BioImaging Operating Director, Andreas Walter, moved to Germany as a professor at FH-Aalen, Baubak Bajoghli, a group leader at the University Hospital Tübingen, became the new Operating Director of Austrian BioImaging/CMI.

10/2022 | USER-FORUM Fighting infectious Diseases

Kareem Elsayad (MUW) presented a project about blood plasma viscosity in COVID-19 patients using Brillouin Scatterin Microscopy.

11/2022 | Euro-BioImaging and Panel of Nodes Meetings

Representatives from 32 nodes and all 17 member States discussed the accomplishments and future strategy of Euro-BioImaging in Turino, Italy.

09/2022 | International HREM workshop

Wolfgang Weninger and Stefan Geyer organized a workshop for High Resolution Episcopic Microscopy (HREM) at MUW on 6-7 September.

10/2022 | 1st Innovation Meeting

This initiative of Austrian BioImaging/CMI aims to bridge the gap between life scientists and researchers developing imaging tools. The first innovation event was held between LBS and MUW. The topic of the meeting was "Microscopic Elasticity and Viscosity in Traumatology: Relevance & Measurement Techniques".

11/2022 | Steering Board Meeting and General Assembly at MUW

Austrian BioImaging/CMI discussed its strategy for the next years. Brillouin Scattering Microscopy from MUW was accepted by members of the General Assembly as a new imaging technology.

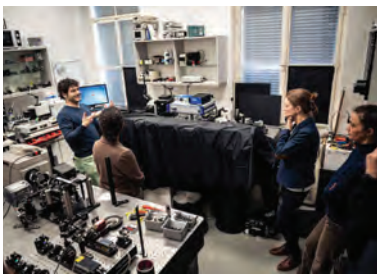
Steering Board Meeting 2022 (from left to right: Katja Bühler, Baubak Bajoghli, Paul Slezak, Johannes Fröhlich, Michaela Fritz, Wolfgang Weninger, Daniele Soroldoni, Martin Glösmann, Martina Marchetti-Deschmann and Michael Sixt).

03/2023 | Visit of Euro-BioImaging directorate in Vienna

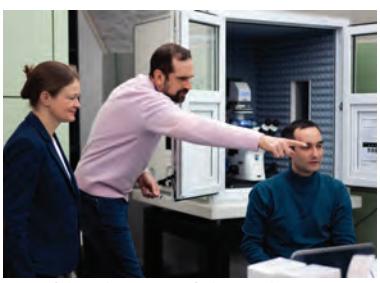
Linda Chaabane (Director Med-Hub) and Antje Keppler (Director Bio-Hub) visited three groups at TU Wien and three groups at MUW in Vienna and gave a talk to members of Austrian BioImaging/CMI and Medical Imaging Cluster (MIC).

Visit of the TU Wien (from left to right: Giuseppe Digilio, Martina Marchetti-Deschmann, Alessandra Viale, Linda Chaabane, Antje Keppler, and Baubak Bajoghli).

Visit of the Center for Biomedical Research and Translational Surgery at MUW (From left to right: Linda Chaabane, Wolfgang Weninger, Bruno Podesser, and Alessandra Viale).



Visit of the laboratory of Kareem Elsayad at MUW.



Visit of the laboratory of Philipp Thurner at TU Wien.

01/2023 | Approval of a BMBWF grant for imaging technologies

Martin Glösmann (Vet-Med Uni) and Wolfgang Weninger (MUW) have received a grant for procurement of three imaging technologies.

03/2023 | 18th EMIM in Salzburg, Austria

In the "Austrian Session", Wolfgang Weninger presented Austrian BioImaging/CMI and Martina Marchetti-Deschmann talked about her current study. In another session organized by Euro-BioImaging, Katja Bühler presented the biomedical image informatics that VRVis offers via Austrian BioImaging/CMI to all researchers.

The "Austrian Session" at EMIM2023.

The "Euro-BioImaging Session" at EMIM2023.

04/2023 | All-hands nodes meeting, Heidelberg

Representatives of 35 nodes met for two days to present their nodes, discuss the needs of imaging community and problems that need to be solved.
Baubak Bajoghli introduced Austrian BioImaging/CMI and 3 Flagship facilities at MUW, Vet-Med Uni and VBCF to the Euro-BioImaging community.

EMBL, April, 2023

05/2023 | 8th Board Meeting of Euro-BioImaging, Turku

8th meeting of the Euro-BioImaging Board was about the 5-year strategy plan and long-term sustainability. As the decision-making body within the consortium, the Board consists of scientific and ministry representatives from 17 ERIC members.

Turku, May, 2023

06/2023 | Launch of the new Austrian BioImaging website

Austrian BioImaging/CMI launched its new website with many new features (see page 22).

https://austrian-bioimaging.at

04/2023 | Workshop BioImaging and the Open Science Cloud

During this workshop, the cooperation with the European Open Science Cloud (EOSC) and the Euro-BioImaging Industry Board was explored. The main topic of the workshop was FAIR and Open data.

EMBL, April, 2023

05/2023 | Austrian BioImaging/CMI Strategy Meeting

Austrian BioImaging/CMI, along with its shareholders and representatives from BMBWF, FFG, and John Eriksson, Director General of Euro-BioImaging, discussed the long-term strategy, sustainability, and strengthening of cooperation with Euro-BioImaging in the upcoming Horizon Europe programs.

Vienna, May, 2023

06/2023 | Presenting the node to the imaging community in Salzburg

To fulfill the mission of expansion, at the invitation of Sebastien Couillard-Despres from Paracelsus Medical University in Salzburg, Baubak Bajoghli presented the advantages of Austrian Bioimaging and the existing projects.

07/2023 | Approval of EU project EVOLVE

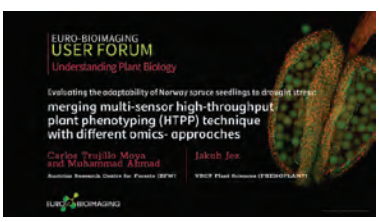
This project aims to strengthen Euro-BioImaging nodes with training possibilities, services, communication and outreach.

09/2023 | International HREM workshop

Wolfgang Weninger and Stefan Geyer organized a workshop for High Resolution Episcopic Microscopy (HREM) at MUW.

10/2023 | User Forum-Understanding Plant Biology

Jakub Jez (VBCF) presented the PHENOPlant facility with a showcasing a project from two researchers of Austrian Research Centre for Forests (BFW).



07/2023 | Approval of EU project Agri-PET/MRI

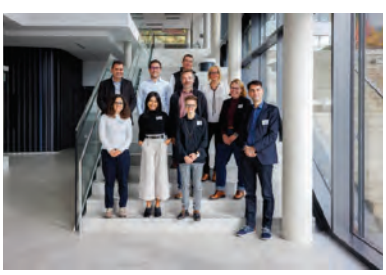
This project aims to integrate an AI-based image analysis application with PET/MRI technology specifically designed for plants. The VRVis takes on the task of developing AI-based applications for image analysis.

09/2023 | WWTF-Open Research Data Workshop

Baubak Bajoghli was invited to give a talk about open access to research infrastructures, bioimaging data sharing and reusability.

10/2023 | Technology Transfer workshop -WP12 IMAGINE EU project

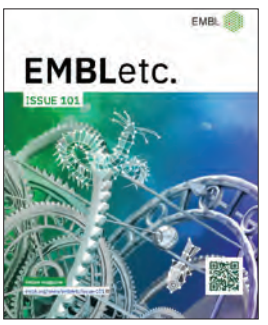
Austrian BioImaging/CMI was invited to participate in a workshop organized by the WP12 of the IMAGINE EU project. The aim of the workshop was to develop pipelines and precedures to bring new instrumentation developed in WP1-5 to the market.



Imaging Center, EMBL-Heidelberg

11/2023 | Interview at EMBLetc. online magazine

In this interview, B. Bajoghli discusses his passion for imaging and his work straddling basic and translational research. He also discusses the impact of access to imaging technologies on scientific achievements.



Link to the interview

11/2023 | Approval of the project “VIRAL” in the JRA program of ISIDORe

Austrian BioImaging/CMI is involved in this joint research activity program with 2 technology units from MUW.

11/2023 | 9th Board Meeting of Euro-BioImaging (remote)

The financial and strategical plans for 2024-2028 were presented and approved by the member states.

12/2023 | General Assembly of Austrian BioImaging/CMI

B. Bajoghli presented the accomplishments and activities in 2023 to the members of technology units. He also provided comprehensive insights into existing European programs and upcoming Horizon Europe calls in 2024.

12/2023 | PHOENIX Group Science Award 2023

B. Bajoghli was awarded for his contribution to a study on the development of a first-in-class small molecule inhibitors of the Hsp90 for the leukemia treatment.

PRESENTATION @ MEETINGS

Interaction with research communities

Active engagement with research communities and the effective showcasing of our expertise and services at national and international meetings as well as workshops stand as pillars of our mission.

6.10.2022 | Baubak Bajoghli (Austrian BioImaging/CMI) : "An overview about Austrian BioImaging". **Euro-BioImaging User-Forum: Fighting infectious Diseases**.

6.10.2022 | Kareem Elsayad (MUW) : "The properties of blood plasma viscocity in COVID-19 patients". **Euro-BioImaging User-Forum: Fighting infectious Diseases**.

18.11.2022 | Martina-Marchetti-Deschmann (TU Wien) : "Multimodal imaging and omics analysis to charachterize senescent cells". **Euro-BioImaging Virtual Pub**

14.03.2023 | Wolfgang Weninger (MUW) : "Expanding the biomedical horizon with correlated multimodal imaging as provided by Austrian BioImaging". **EMIM, Salzburg**

14.03.2023 | Martina-Marchetti-Deschmann (TU Wien) : "Multimodal imaging and omics analysis to charachterize senescent cells". **EMIM, Salzburg**

16.03.2023 | Katja Bühler (VRVis) : "Getting the most out of your imaging data with Euro-BioImaging". **EMIM, Salzburg**

24.03.2023 | Richard Haindl (MUW) : "Optical Coherence and photoacustic microscopy in organoids and small animals". **Euro-BioImaging Virtual Pub**

18.04.2023 | Baubak Bajoghli (Austrian BioImaging/CMI) : "We are more than imaging across scales from molecules to lamas". **Euro-BioImaging All-hands node meeting, Heidelberg**

03.05.2023 | Baubak Bajoghli (Austrian BioImaging/CMI) : "Access to advanced imaging technologies – a new strategy for funding your project". **Austrian Cluster for Tissue Regeneration, Linz**

26.06.2023 | Baubak Bajoghli (Austrian BioImaging/CMI) : "A new strategy for funding your imaging project". **German Society of Zoology**

28.06.2023 | Baubak Bajoghli (Austrian BioImaging/CMI) : "Austrian BioImaging/CMI – our mission, your benefit, our synergies". **Paracelsus Medical University, Salzburg**

30.06.2023 | Bruno Podesser (MUW) : "Role of imaging in the future of Cardiovascular research and drug and device testing". **Euro-BioImaging Virtual Pub**

15.09.2023 | Baubak Bajoghli (Austrian BioImaging/CMI) : "Unlocking the potential: Open access to research infrastructures, share of bioimaging data, and reusability". **WWTF-Workshop**

10.10.2023 | Baubak Bajoghli (Austrian BioImaging/CMI) : "Austrian BioImaging/CMI: our network and your benefits". **Austrian Biooptics Facilities Meeting, Graz**

12.10.2023 | Jakub Jez (VBCF) : "PHENOPlant at VBCF and technooogies offered by Austrian BioImaging/CMI". **Euro-BioImaging User-Forum: Understanding Plant Biology**

24.11.2023 | Orestis Andriotis (TU Wien) : "Spatially resolved nano- and micromechanics of biological tissues and tissue components". **Euro-BioImaging Virtual Pub**

HIGHLIGHTS

Research publications from our node

More than **380 publications in 2022-2023** underscore the strengths of our node in basic and translational research, as well as the development of cutting-edge imaging technologies. From this extensive collection, we present here 10 exemplary research works that have either implemented or advanced specific imaging technologies within their respective fields of research.

TISSUE ENGINEERING

Changes in Elastic Moduli of Fibrin Hydrogels Within the Myogenic Range Alter Behavior of Murine C2C12 and Human C25 Myoblasts Differently

Front Bioeng Biotechnol. May. 2022
Imaging technology: **Atomic Force Microscopy**

Significance: This collaborative work, led by Techschl-Woller and with contributions from Philipp Thurner, Orestis G. Andriotis (TU Wien), and Heinz Redl (LBG), explores the impact of apparent elastic modulus and culture type on cellular behavior and the myogenic outcome in skeletal muscle tissue engineering approaches. The findings underscore the significance of adjusting 3D culture parameters when transitioning from murine to human cells in skeletal muscle tissue engineering.

IMAGING METHODOLOGY

An optimized workflow for microCT imaging of formalin-fixed and paraffin-embedded (FFPE) early equine embryos

Anat Histol Embryol. Sep. 2022
Imaging technology: **µCT**

Significance: Led by Martin Glösmann and Stephan Handschuh (Vet-Med University), this study presents an innovative imaging procedure enabling the visualization of embryo morphology and organ development in unstained FFPE samples. The research delves into the nuanced relationship between sample mounting techniques and image quality, offering crucial insights for optimizing microCT imaging of unstained FFPE specimens.

IMMUNITY

Multitier mechanics control stromal adaptations in the swelling lymph node

Nature Immunology, Aug. 2022
Imaging technology: **3D light-sheet microscopy**

Significance: The group of Michael Sixt (IST-Austria) characterizes the biomechanics of lymph node swelling on the organ scale. They found that mechanical load on the conduit network and subsequent fibrobalst reticular cells of the T-zone (TRC) mechanosensing are central to expansion of the TRC network and lymph node growth.

MOUSE PHENOTYPING

Detailed characterizations ofcranial nerve anatomy in E14.5 mouse embryos/fetuses and their use as reference fordiagnosing subtle, but potentiallylethal malformations in mutants

Front. Cell Dev Biol. Nov. 2022
Imaging technology: **HREM**

Significance: This study led by Wolfgang Weninger and Stefan Geyer (Medical University of Vienna) focuses on providing detailed 3D information on the regular cranial nerve anatomy of prenatal mice, which is often lacking. Through advanced imaging techniques, the researchers created reference data, examining 152 wild-type mice and 18 mutants of specific null lines. The results not only offer highly detailed anatomical descriptions of cranial nerves but also demonstrate the potential for diagnosing abnormalities.

DATA ANALYSIS / DEEP LEARNING

Employing similarity to highlight differences: On the impact of anatomical assumptions in chest X-ray registration methods

Comput. Biol. Med. March. 2023
Imaging technology: **Medical imaging (X-ray)**

Significance: Led by Katja Bühler (VRVis), this work tackles limitations in current deep learning methods for chest X-ray analysis, focusing on enhancing the comparison of current images with previous ones for improved detection and interpretation. The developed method demonstrates its potential to enhance the accuracy of chest X-ray comparisons, highlighting the importance of introducing more robust evaluation metrics in this domain.

NANOMEDICINE

Degradable Bottlebrush Polypeptides and the Impact of their Architecture on Cell Uptake, Pharmacokinetics, and Biodistribution In Vivo

Small, June. 2023
Imaging technology: **Near infrared fluorescence imaging**

Significance: This study led by Ian Teasdale with contributions from the Manfred Ogris group (University of Vienna), provides valuable insights into the impact of molecular architecture on the in vivo performance of nanomedicines, overcoming limitations in current polymer-based nanomedicine approaches.

IMMUNITY

Monomeric agonist peptide/MHCII complexes activate T-cells in an autonomous fashion

EMBO reports, Nov. 2023
Imaging technology: **Super-resolution microscopy**

Significance: In this collaborative project, the group led by Gerhard J Schütz and Mario Brameshuber (TU Wien) use quantitative single molecule live cell microscopy to reveal that peptide/MHC class II complexes as monomeric, highly expressed, randomly distributed and predominantly fast diffusing entities on APC surfaces. These complexes activate cognate T-cells in a peptide-specific manner without any significant contribution from endogenous bystander pMHCIIs.

AGEING/METABOLISM

PCYT2-regulated lipid biosynthesis is critical to muscle health and ageing

Nature Metabolism, March 2023
Imaging technology: **Brillouin Scattering Microscopy**

Significance: The group led by Kareem Elsayad (Medical University of Vienna) participated in a project led by Josef Penninger (IMBA), which they elucidated the pathophysiological role of the PCYT2 gene in muscle health, connecting PCYT2-synthesized lipids to severe muscle dystrophy and aging. Scans using BLSM revealed a reduction in the surface stiffness of myofibers isolated from Myf5Cre-Pcyt2 mice compared to controls.

TECHNOLOGY DEVELOPMENT

Imaging brain tissue architecture across millimeter to nanometer scales

Nature Biotechnology, Aug. 2023
Imaging technology: **STED**
Electron microscopy

Significance: The group of Johann Danzl (IST-Austria) and with contributions from Philipp Velicky presents the development of Comprehensive Analysis of Tissues across Scales (CATS), a revolutionary technology designed for mapping brain tissue architecture across a wide range of scales, from millimeter regions to nanometer synaptic levels.

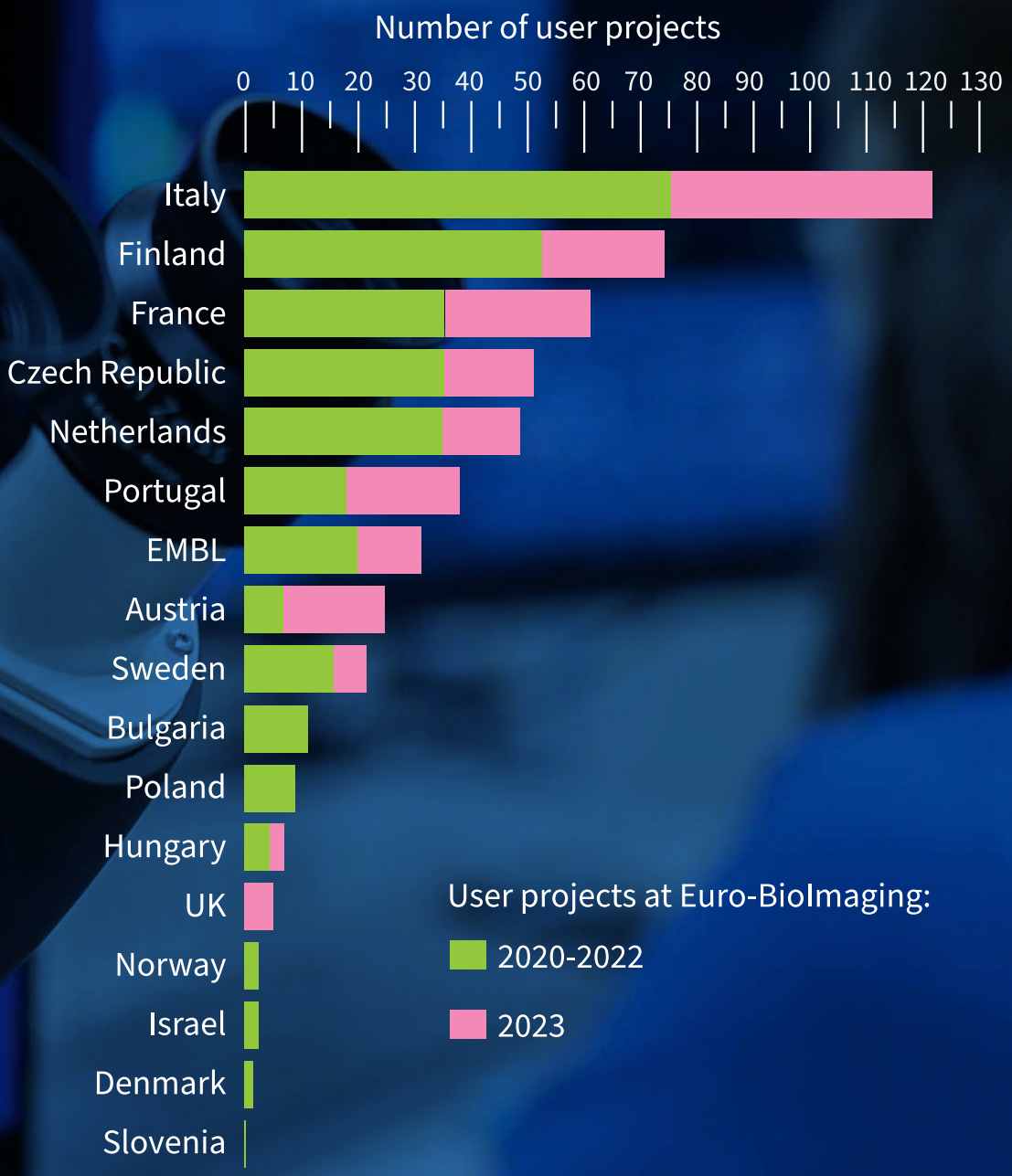
IMAGING DEVELOPMENT

Ultrasound-Induced Reorientation for Multi-Angle Optical Coherence Tomography

Nature Communication, accepted in Dec. 2023
Imaging technology: **OCT**

Significance: In this collaborative project, the team of Wolfgang Drexler (Medical University of Vienna) present the development of ULTrasound-Induced reorientation for Multi-Angle-OCT (ULTIMA-OCT), a novel technique designed to address the challenge of imaging mature organoids and spheroids, which are often too opaque for traditional Optical Coherence Tomography (OCT). This advancement allows for multi-angle views, overcoming the opacity limitation and enhancing the imaging capabilities of OCT.

Our position in comparison to other national nodes *



*Euro-BioImaging Nodes have different sizes and capacity levels, reflecting the organisation of national imaging communities. Nodes from the UK and Slovenia joined Euro-BioImaging in 2022.
Source: Euro-BioImaging Board report 12.2023

OPEN ACCESS

User access proposals

The core mission of Austrian BioImaging/CMI is to provide access to state-of-the art imaging technologies for all life scientsts in Europe. We are proud to report an increase in user access from 8 to 25 between 2022 and 2023.

Compared to other Euro-BioImaging nodes, Austrian BioImaging currently falls in the mid-range in terms of registered user projects (see chart left). However, it's important to highlight that several European nodes, including those in Italy, Finland, France, and the Czech Republic, receive substantial financial support from their respective governments, enabling them to provide diverse funding opportunities for both national and transnational users. To elevate Austria's position as a leading hub for biological and pre-clinical imaging, Austrian BioImaging/CMI is working to persuade the national government to provide similar support.

Apart from our communication, one key reason for the increase of the number of projects was the decision that external users of our technology units should be registered on the Euro-BioImaging web portal. This move helps underline our commitment and strong capacity in hosting external projects at national and European levels. Also, it supports our users in identifying potential European funding possibilities for their projects.

25

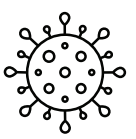
PROJECTS FOR AUSTRIAN BIOIMAGING REGISTRED AT EURO-BIOIMAGING

64%

TRANS-NATIONAL USERS

10

NUMBER OF TECHNOLOGY UNITS REQUESTED BY USERS



1

ACCEPTED PROPOSAL FROM ISIDORE PROJECT

OUR EFFORT IN

Communication and Outreach (C&O)

Austrian BioImaging/CMI also operates as a bridge connecting the scientific community and research infrastructures (RIs). This positioning allows it to play a critical role in disseminating essential information between these two fundamental pillars of the scientific landscape, thereby contributing to the advancement of science and technology.

Austrian BioImaging/CMI understands the diversity of perspectives within its members; each stakeholder, whether it be an academic institution, a research facility, or an individual scientist, may have distinct needs, goals, and expectations. To address this diversity effectively, Austrian BioImaging/CMI employs a highly **target-oriented communication** strategy.

A prime example of this strategy is the active engagement of consortium members. By fostering a dynamic and inclusive environment where members can share their experiences, insights, and concerns, Austrian BioImaging/CMI ensures that it is well-informed about the specific needs and expectations of its constituents. This foundational understanding serves as the basis for connecting consortium members with suitable EU projects and potential cooperation partners in Euro-BioImaging.

@ SOCIAL MEDIA

YOUTUBE

Austrian BioImaging/CMI has started its own YouTube channel since June 2023, which aims to provide information about imaging technologies that our node provide and explain the new funding opportunities.

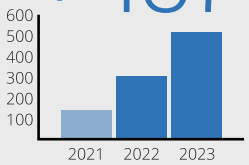
LINKEDIN

In 2022-2023, Austrian Bioimaging/CMI has intensified its activities on LinkedIn with information about node activities, scientific achievements, opportunities for workshops and funding.

+120

CONTRIBUTIONS/POST ON AUSTRIAN BIOIMAGING'S LINKEDIN SINCE MAY 2022

+407



FOLLOWER ON AUSTRIAN BIOIMAGING'S LINKEDIN SINCE MAY 2022

Our C&O efforts.

Members (Technology units)

Coordinate access projects

Exchange knowledge

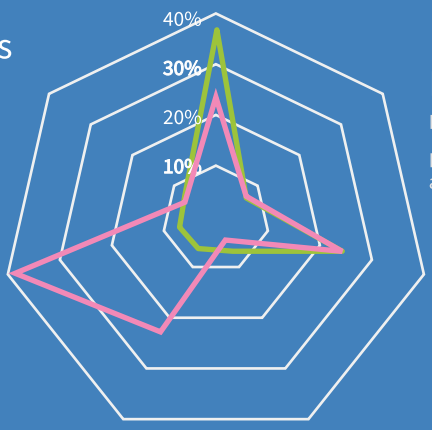
Provide information about new [funding] opportunities

Scientific presentations

Talks at national and international meetings

Lectures about bioimaging

Workshops



Decision-makers

Networking

Raising their awareness of European policy and its impact on RIs.

Funding bodies

Exploring new possibilities to suppprt the RIs.

Horizon Europe & FFG calls

Researchers (users)

Networking

Raising their awareness of new funding opportunities

Euro-BioImaging

Increase our visibility at European level

Coordinate trans-national user projects

Take part in Horizon Europe projects

Exploring new [funding] possibilities for our members

Industry

Networking

Cooperation between members and private sector

05-12.2022 (71 recorded actions*)
01-12.2023 (166 recorded actions*)

* emails and phone calls are excluded

> “ TO ENSURE IMPACTFUL RESULTS, AUSTRIAN BIOIMAGING RECORDS ITS COMMUNICATION AND OUTREACH EFFORTS.

VISIBILITY

A new informative website

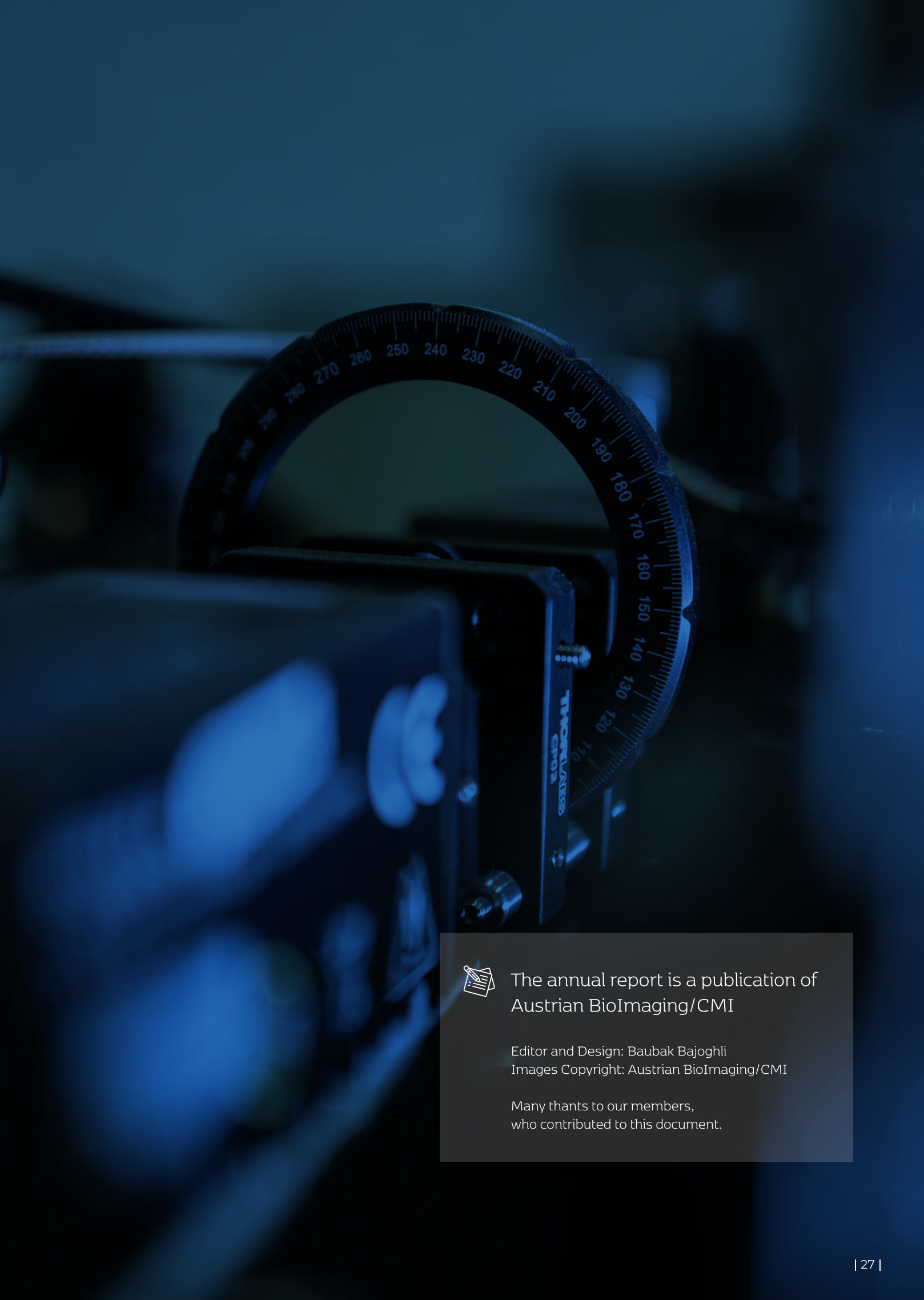
Link to the website

To enhance its visibility and promote cross-disciplinary cooperation, Austrian BioImaging/CMI has developed a new website. Featuring a portfolio with advanced filters, research information, an info-wall, and information about open European calls, the new website should empower scientists to maximize the benefits of Austrian BioImaging/CMI.

Through personal communication with members of Austrian BioImaging/CMI, it became clear that the existing website lacked sufficient information and represented a weakness in showcasing all expertise (see table below). Hence, we decided to create a new website that provides information about the imaging technologies and services that members offer, but also highlights our strong expersite in the research and development of imaging technologies and correlative multimodal imaging (CMI) pipelines. Above all, the new website should serve as a community hub for all stakeholders.
The project started in September 2022. Over the course of 10 months, the work was divided into two main tasks: website design and development on one hand, and gathering information about the expertise, research, imaging technologies, services that members offer as well as taking pictures of technology units on the other hand. At the end, members of Austrian BioImaging/CMI had the opportunity to provide feedback on the content and imaging technologies on the new website before it went public on 15.6.2023.
Baubak Bajoghli has designed and developed the website, with the final project phase receiving support from IT-experts at VBCF.

	old website	new website
General information	Elementary	Improved
Portfolio for imaging technologies	Selective	Comprehensive
Portfolio for support facilities	Selective	Comprehensive
Possibility for search in the portfolio	N.A.	Basic+Advanced Filter
Number of CMI-pipeline showcases	3	8
A section for research and development	N.A.	Yes
Info-wall	3 Categories	3 Categories + Filter
A section for publications	N.A.	Yes
Information about funding possibilities	N.A.	Yes
Direct submission of proposals	N.A.	Yes
Email address	N.A.	Yes

N.A., not available



The annual report is a publication of Austrian BioImaging/CMI

Editor and Design: Baubak Bajoghli
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Many thants to our members,
who contributed to this document.

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