

Much more than the sum of our parts

EMBL programme hits its stride as EMBL works with partners to strengthen European science and the novel discoveries it affords

From the beginning, EMBL has been about togetherness.

In 1974, 10 countries came together because they believed in the need and the potential for a European life sciences research organisation. Together, they supported this endeavour, and the institute that sprung up from this union likewise yielded benefits for all. Over the years, the number of member states has grown, as have the partners that expand what EMBL can do. When I look back on 2023, the basis of so much of what we have accomplished comes down to the extraordinary cooperation both within EMBL, and outside it with our member states, alumni, donors, and a huge network of collaborators around the world.

“Alone we can do so little; together we can do so much.”

From Helen Keller, the noted disability rights advocate, these words still ring true, especially at EMBL. Partnership and collaboration expand what we do collectively, but also individually. And it's not just about swapping skill sets. Our perspective expands too. Partnerships multiply our capacity with mutual benefits for one another but also for scientific quests that go far beyond our own work as we build tools that help others. Our partners do allow us to do much more.

This past year, Latvia and Estonia formally joined us as member states. Scientific partners such as Latvia's Biomedical Research and Study Centre and the University of Tartu in Estonia will only serve to make EMBL stronger. Likewise, Serbia became our latest prospect member state, and we look forward to exploring this relationship and sharing knowledge and expertise with its scientific organisations.

In 2023, the Traversing European Coastlines (TREC) expedition began. A major new initiative in EMBL's 'Molecules to Ecosystems' Programme, EMBL's Advanced Mobile Lab took TREC sampling to the next level, bringing new, cutting-edge technology to the field for us, as well as for new and established partners. Group leaders early in their EMBL careers, such as Gautam Dey, Flora Vincent, Hanh Vu, and Michael Zimmermann, seized these new opportunities – many of which would not be possible without this unique field sampling.

The rewards of world-class research, services, and training

This annual report connects to many stories of EMBL's progress in 2023, including these highlights:

- EMBL Heidelberg researchers uncovered new drug combinations to fight multidrug-resistant staph infections.
- EMBL-EBI was part of a consortium that expanded the human reference genome such that it better captures population diversity, with the data now being freely available via Ensembl.
- At EMBL Barcelona, the Haase group built a mammary gland *in vitro* to help better understand how cancer drugs affect humans and their reproductive health.
- Structural biologists benefited from a new EMBL Hamburg Spitrobot that simplifies sample preparation for time-resolved crystallography, as well as upgrades to the small-angle X-ray scattering (SAXS) beamline at EMBL Grenoble and ESRF.
- A new study on retinal function from the Asari group at EMBL Rome offered insights to inform the future development of prosthetic retinas.



Additionally, in EMBL's training mission, our already highly impactful postdoctoral fellowship programme expanded to more fully integrate member state research assets and take advantage of the life-in-context focus (LinC) of our Programme. We selected the first cohort of EIPOD-LinC fellows, and I am excited to see where their research leads. Also notable, we are spreading awareness about the importance of coastal ecosystems around Europe thanks to TREC, as part of our Science Education and Public Engagement (SEPE) activities. Last year also saw the opening of the bilingual World of Molecular Biology exhibit in Heidelberg, providing beautiful and interactive displays intended to inspire and inform visitors about molecular biology's relevance to everyday life.

AI in the foreground

Given the huge interest in AI and the potential opportunities it can offer in the life sciences, EMBL decided to host a roundtable for member state political and scientific leadership about AI advances in biology and healthcare, spurring discussion on ethical considerations. Former EMBL staff scientist Kashif Sadiq founded a start-up – DenovAI – for broader, faster, and cheaper antibody discovery using advanced machine learning – a great testimony to how fundamental research parlay into AI applications. AlphaFold and a new algorithm called Foldseek Cluster allowed researchers to analyse over 200 million predicted protein structures, providing new insights into the evolution of human immunity proteins.

EMBL is about people

During 2023 we said goodbye to several wonderful long-standing EMBL colleagues and eminent scientists who retired, including Stephen Cusack, Anne Ephrussi, Toby Gibson, and Janet Thornton. They are some of EMBL's scientific giants, whose shoulders we stand on! While this year repeated its economic and energy cost challenges for the organisation, new research and new services persevered, thanks to our committed, resilient EMBL family. We saw many of our group leaders and scientists across EMBL embrace our Programme, stretching themselves as they explore new directions and embark on a new era of life sciences. We also saw an organisation committed to doing its work sustainably as energy savings exceeded expectations, and our labs received LEAF certifications for new, more sustainable operations.

I'm proud of, but even more so, impressed by, the remarkable stories we have at the end of 2023. In the face of challenges, we have come together. Through this power of collaboration, our curiosity is stoked, our science is stronger, and together, we are making the world a better place.

Edith Heard, FRS
Director General

Research

To perform excellent fundamental research

EMBL's research aims to understand the basis of life at a molecular level and in the context of different environments. Seven research themes offered significant, diverse findings and milestones in 2023:

Molecular Building Blocks: Researchers created an AI tool that speeds up analysis of cryo-electron tomography data while gathering more details about cells' inner workings.

Multicellular Dynamics: New retinal research could pave the way for prosthetic retinas of the future. Additionally, EMBL scientists continued to find new ways to push the frontiers of big data analysis in biological imaging.

Microbial Ecosystems: Scientists found new drug combinations to fight antimicrobial resistance, and other researchers harnessed marine microbes to promote a circular bioeconomy.

Infection Biology: Bioinformaticians developed a new tool that allows scientists to analyse millions of viral genomes all at once (see page 7), and structural biologists shed light on the molecular activation of the final 'switch' that triggers inflammatory responses.

Human Ecosystems: A cancer cell 'decathlon' explored how to better predict tumour aggressiveness and metastasis, and other researchers developed new paradigms to study environmental impacts on reproduction in mammals and disease risks in their offspring.

Planetary Biology: The TREC expedition launched, joining molecular biologists with other disciplines, as other researchers used an unprecedented stem cell zoo to compare six different mammalian species' developmental times.

Theory@EMBL: The Barcelona Collaboratorium for Modelling and Predictive Biology continued to involve more researchers, promoting theory and mathematical modelling, strengthening interactions between disciplines.



TREC: A two-year mission begins, studying human impacts on Europe's seas and coastal regions

With a focus on coastal habitats and their species diversity, pollution issues, and the changing climate, TREC aims to initiate a new era of coastal ecosystems exploration. EMBL scientists Peer Bork, Rainer Pepperkok, and Detlev Arendt championed a collective vision to combine EMBL's expertise with collaborators'. The vision blended local partners' existing knowledge of local ecosystems and processes with EMBL's latest technological developments to examine life across scales.

Having begun in March 2023, TREC will examine the biodiversity and molecular adaptability of life at the

molecular level. We sampled 28 regions at 65 sampling sites in those first 10 months.

"We live on an extremely interconnected planet, so our health and sustainability on Earth depends on life in the ocean," said Flora Vincent, EMBL Group Leader and TREC Scientific Coordinator who designed its sampling in shallow waters. *"Understanding how ocean biodiversity is going to change in the future is actually taking care of our future."*

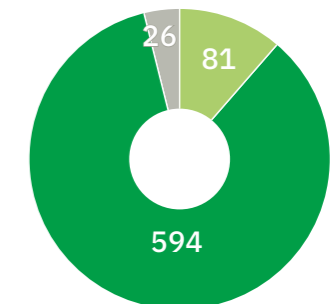


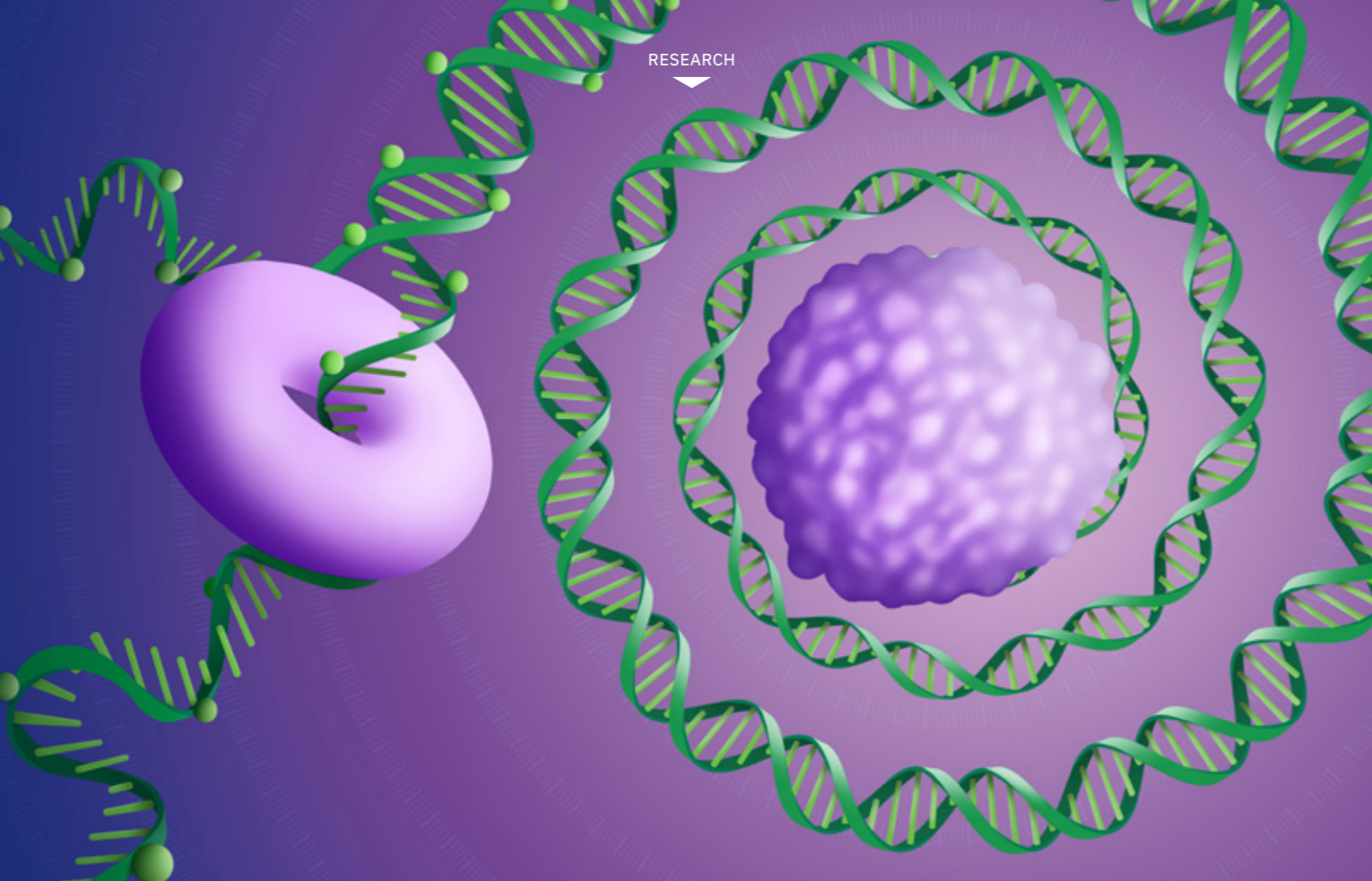
Collecting sediment samples on a field trip in August, 2023. Credit: Joanna Zukowska/EMBL

COLLABORATIVE SCIENTIFIC PUBLICATIONS

In 2023, EMBL researchers produced **701** publications, mostly in collaboration with scientists within EMBL member or associate member states, as shown on this chart.

- By EMBL
- By EMBL in collaboration with organisations in member or associate member states
- By EMBL in collaboration with organisations in non-member states only





In 2023, EMBL researchers showed how long-read genomic sequencing seems to detect some DNA mutations better than short-read genomic sequencing. Credit: Joana Carvalho/EMBL (www.embl.org/news/science/the-long-read-for-cancer)

COLLABORATIVE GRANTS

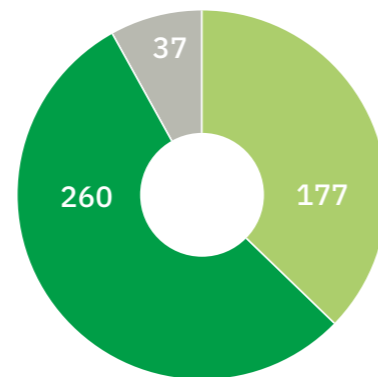
Beyond EMBL's member state funding, external grants support activities often done in collaboration with scientists beyond EMBL. These charts broadly break down the type of grants EMBL held in 2023.

474 grants:

Research grants: 321

Infrastructure grants: 124

Training and outreach grants: 29



- By EMBL
- By EMBL in collaboration with organisations in member or associate member states
- By EMBL in collaboration with organisations in non-member states only

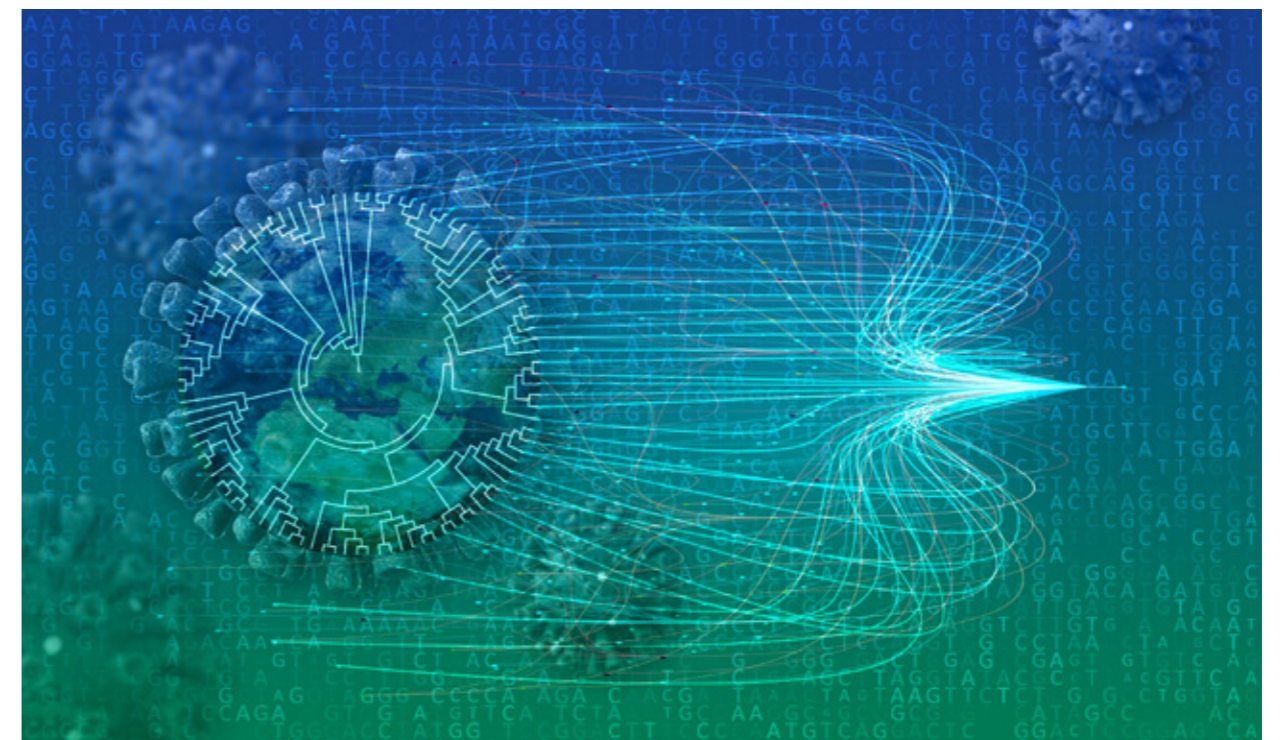
MAPLE: a phylogenetic tool for pandemic-scale genome data

With the huge abundance of genomic data generated from life science experiments, processing large datasets remains a challenge in the field of bioinformatics. During the COVID-19 pandemic, limited capabilities of existing bioinformatics tools meant that large amounts of data could not be analysed all at once, restricting analysis.

To address this problem, a team led by EMBL-EBI researchers developed a new bioinformatics tool that allows scientists to analyse millions of viral genomes all at once on large-scale genomic datasets – larger datasets than previously thought possible.

The new method – MAXimum Parsimonious Likelihood Estimation (MAPLE) uses new mathematical approximations to develop an algorithm that works specifically on closely related genomes, enabling rapid reconstruction of phylogenetic trees – a crucial step for understanding viral evolution and epidemiological spread.

“New tools such as MAPLE can be a valuable addition to the bioinformatics community’s arsenal, helping researchers to process viral data faster and more efficiently for evolutionary analysis,” said Nick Goldman, EMBL-EBI Group Leader.



Phylogenetic tool for pandemic-scale genome data. Credit: Karen Arnott/EMBL-EBI

Scientific Services

To offer access to research infrastructures and vital services to scientists in EMBL member states and beyond

EMBL's scientific services encompass over 40 bioinformatics and data resources and over 20 experimental services in structural biology, imaging, genomics, proteomics, metabolomics, *in vivo* gene editing, chemical biology, and mobile labs.

Each year, EMBL researchers find new ways to improve both the technological offerings to users as well as the way service is provided, such as enabling open access to an impressive array of bioinformatics tools. The year 2023 was no exception.

Experimental services and facilities: EMBL coordinated a European Union grant (IMAGINE), which promises to lead to next-generation imaging technology to probe the structure and function of biological specimens in their natural context. Additionally, EMBL brought cutting-edge technology directly to the field, helping researchers carry out advanced sample preparation, metadata acquisition, and analysis immediately after sample collection, thanks to its new Advanced Mobile Laboratory and the TREC expedition.

Molecular data services: EMBL-EBI launched the Global Biodiversity Portal – an open-access data portal that will consolidate genomic information from different biodiversity projects within the Earth BioGenome Project. (See page 10.) Additionally, the HoloFood project launched the world's first freely accessible data portal with comprehensive biomolecular data on microbial diversity in the chicken and salmon gut. Researchers can now study how changes in diet affect animal health – data which will be useful in developing better animal feed.



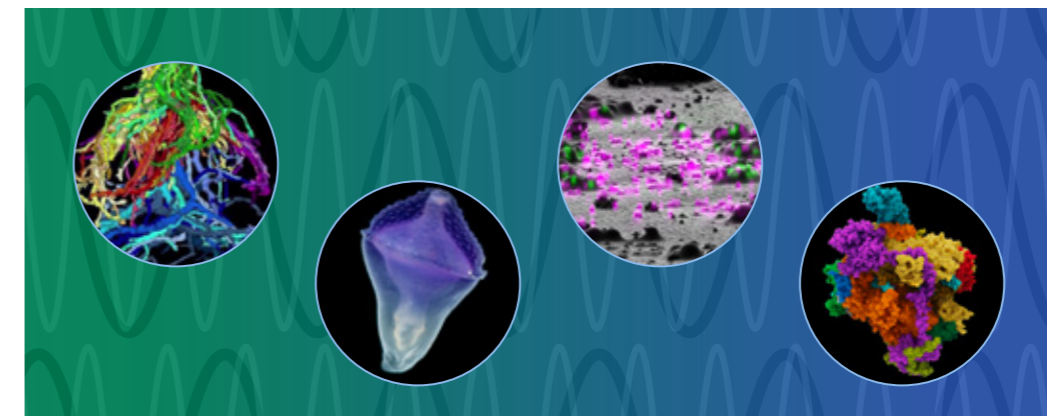
IMAGINE-ing next-generation technology to help biologists

EMBL and scientists from 22 partner organisations in 13 countries began an ambitious project to build next-generation imaging technologies that probe the structure and function of biological specimens across scales in their natural context.

Known as the IMAGINE project, the five-year endeavour is part of a €10 million Horizon Europe research and innovation programme grant from the European Union. The project includes researchers, tech developers, service providers, tech transfer experts, and companies, so ideas can flow smoothly to realisation-of-concept and open innovation.

Leading European technology developers will collaborate to connect as many technologies as possible in robust correlative or connected workflows. Additionally, IMAGINE will include new approaches that join up several imaging modalities and AI-powered image analysis, along with new ways to manage large amounts of data.

“Through this collaborative effort, we aim to build the imaging tools that take research to the next level,” said Jan Ellenberg, IMAGINE coordinator, Head of EMBL's Cell Biology and Biophysics Unit, and EMBL Imaging Centre Head.



EMBL researchers and collaborators have begun an impactful innovation-development journey, thanks to a European Commission 'IMAGINE' grant. Credit: Creative Team/EMBL

WORLD-CLASS EXPERIMENTAL SERVICES

EMBL experimental services support academic and industry users in Europe and beyond.

3,900

Experimental services users



561

Scientific publications enabled



The Global Biodiversity Portal: enabling biodiversity research worldwide

In 2023, EMBL-EBI launched the Global Biodiversity Portal – a centralised, open-access data portal that will consolidate genomic information from different biodiversity projects within the Earth BioGenome Project to aid conservation and biodiversity efforts.

In an era where biodiversity is under threat from various environmental pressures, there is an urgent need for centralised, accessible, and actionable data. These data allow researchers to understand the genetic factors that make a species unique, including its vulnerabilities and strengths in adapting to changing environmental conditions. The information also has direct applications in agriculture and bioengineering; understanding plant genomes helps the development of more resilient crops and more efficient biofuels.

“The Global Biodiversity Portal is designed to act as a ‘super portal’, pulling together sequencing data from biodiversity projects worldwide into a centralised, friendly interface,” said Peter Harrison, Genome Analysis Team Leader at EMBL-EBI. “This allows users to effortlessly search for all the information they need about the species they are interested in.”



The Global Biodiversity Data Portal. Credit: Karen Arnott/EMBL-EBI

OPENLY ACCESSIBLE DATA RESOURCES

EMBL-EBI maintains the world’s most comprehensive range of freely available and up-to-date molecular data resources. Developed in collaboration with scientists worldwide, these open databases, tools, and software can be accessed by anyone around the world.



The HoloFood Data Portal is the first of its kind, exploring how microbes in chicken and salmon guts may be altered by different feeds. This data can help develop better feeds that reduce environmental impacts.. Credit: Karen Arnott/EMBL-EBI using stock imagery from Anttoniart/stock.adobe.com and Inna/stock.adobe.com (www.embl.org/news/science/holo-food-data-portal)



Training

To train scientists, students, and visitors at all levels

EMBL training aims to foster scientific inquiry and share knowledge among scientists, students, and visitors at all levels in the life sciences. Each year, EMBL also provides important science education programmes and public engagement activities.

Courses, conferences, and scientific visitors: A conference about organisms and their environment explored how molecular and cellular biology can be pointed in an ecological direction. Elsewhere, at the EMBL Imaging Centre, a job shadowing programme shared customised world-class microscopy expertise, offering scientific visitors hands-on experience with EMBL's state-of-the-art technology.

PhD and postdoc fellow training and support: As 43 new PhDs graduated from EMBL, the organisation also led a new regional infrastructure management training, based on its ARISE fellowships, to exchange information and expand technology access with members of the Health + Life Science Alliance Heidelberg Mannheim.

Science education and public engagement: Outreach projects like science days and Nexus Island, a new game-based workshop, engaged participants and gave a taste of the research life. Additionally, EMBL's newly opened exhibit, 'The World of Molecular Biology', served as a nexus for politicians, researchers, and philanthropists.



Federal Research Minister Bettina Stark-Watzinger visits EMBL exhibition 'The World of Molecular Biology'

Building a bridge between science and society is the primary goal of a new exhibit at the EMBL Imaging Centre titled, 'The World of Molecular Biology' – a significant undertaking that would not have been possible without generous public and private support in Germany.

It was with this in mind that representatives from political, research, and philanthropist communities joined Germany's Minister of Education and Research Bettina Stark-Watzinger to partake in a dialogue between science and civil society.

'The World of Molecular Biology' encourages people to actively engage with scientific research and its significance for everyday life – for example, through fundamental insights into the development and prevention of cancer.

"Research is the cure of tomorrow. Molecular biology in particular lays the foundation for new therapeutic approaches and can provide us with real game changers," Stark-Watzinger said.

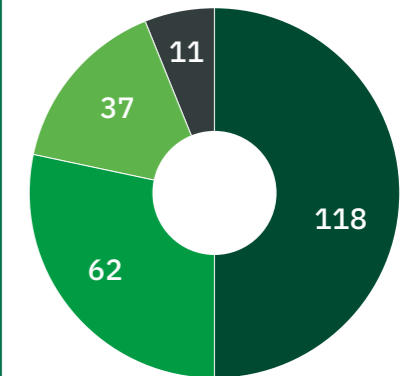
"This is why the Federal Ministry of Education and Research is committed to communicating this exciting research and is funding this EMBL exhibition with almost €2 million as part of the National Decade Against Cancer. It shows why basic research is so important for a better understanding of cancer, for example."



MULTIDISCIPLINARY POSTDOC PROGRAMMES

52
New postdocs

228
postdocs*



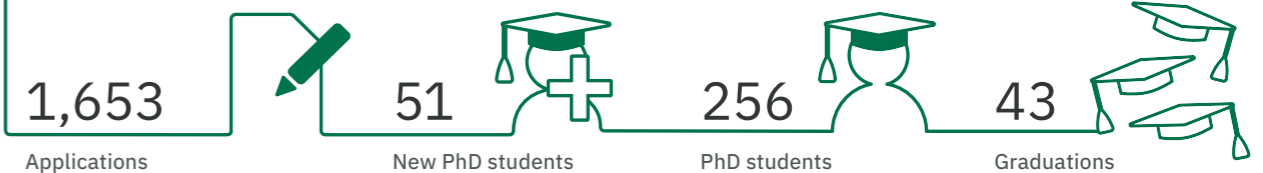
- Classical stream
- EIPOD programme
- Personal merit fellowship
- Site-specific programmes

46

Postdocs departing in 2023

*Does not include former PhD students finalising their projects via a bridging postdoc contract.

EMBL'S INTERNATIONAL PHD PROGRAMME



Sharing scientific expertise

COURSES AND CONFERENCES

8,676 participants from 99 countries

attended courses and conferences hosted by EMBL sites

74.3% of participants were from EMBL member or associate member states



COURSES

46 courses

100% of courses rated as 'very good' or 'excellent' by the majority of participants



CONFERENCES

25 conferences

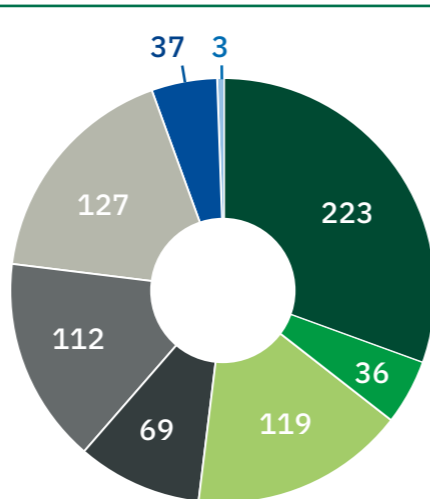
100% of conferences rated as 'very good' or 'excellent' by the majority of participants



EMBO/EMBL conference highlights the continued importance of EMBL's broadened scope that looks at 'life in context'. Credit: Sandra Krahl

SCIENTIFIC VISITORS

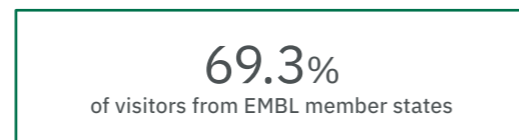
726 visitors



- Master's students and trainees
- Master's graduates
- Visiting researchers
- Visiting technical experts
- Visiting postdoctoral fellows
- Visiting predoctoral fellows
- Visiting group leaders
- Non-scientific visitors

69.3%

of visitors from EMBL member states



CONNECTING COMMUNITIES

EMBL's public engagement is aimed at fostering a pipeline of scientists and building community awareness of the role molecular biology plays in understanding ourselves and the planet.



These numbers include public engagement activities delivered as part of the TREC project



EMBL's World of Molecular Biology provides visitors – like those shown here, from Ruđer Bošković Institute and the University of Zagreb – with hands-on educational activities, such as these virtual reality headsets that shed light on the initial cell division that occurs in new embryos. Credit: Massimo Del Prete/EMBL (www.embl.org/news/lab-matters/building-a-broader-european-science-community)

Innovation & Translation

To engage in technology transfer and industry relations

EMBL's strengths in research, services, and training make it a perfect industry partner and a breeding ground for research that sows the seeds for technology transfer. EMBL's tech transfer arm, EMBLEM, is pivotal to that success.

Translating EMBL science: A new EU-funded project, Fragment-Screen, is expected to accelerate drug discovery and development, bringing in expertise from EMBL Grenoble and EMBL-EBI. Additionally, the new start-up DenovAI is now harnessing advanced machine learning for broader, faster antibody discovery.

Partnerships and training: A summer school helped 20 PhD and postdoctoral fellows learn more about R&D-related industry careers. Additionally, EMBL and ZEISS looked forward with a new long-term agreement that should accelerate imaging technology development that advances life science research.

Using artificial intelligence to discover therapeutic antibodies

An EMBL alumnus founded a start-up – DenovAI Biotech – for broader, faster, and cheaper antibody discovery that harnesses advanced machine learning and computational biophysics.

Kashif Sadiq's company will create a platform in the field of *de novo* protein design, a computational approach to design proteins from scratch, rather than using a known structure – an approach that could dramatically broaden the scope of antibody therapy to many diseases.

The company will primarily develop an AI-powered biophysics solution that can discover potential antibodies and small protein biologics and suggest which of these could be used therapeutically.

"This type of approach has not been taken before." Sadiq said. "We have seen major advances in the field of therapeutic antibodies, from increased antibody library sizes to function-oriented discovery, but the process of developing new drugs is still incredibly slow, vastly expensive, and inefficient. With the support of AION Labs and its partners, we are developing a state-of-the-art solution that could disrupt the whole field, cutting discovery timelines from months to days."



TECH TRANSFER IN NUMBERS

EMBL's innovation and translation activities include industry collaborations, public-private partnerships, forums for knowledge exchange, invention disclosures, and the creation of spin-off companies. EMBLEM, EMBL's technology transfer arm, enables much of this, and in 2023 it helped develop and conclude collaborations between **62** industry partners and **33** EMBL scientists.

€17,798,000

income



619

licence, collaboration and service agreements concluded



29

inventions disclosed



10

priority patent applications filed



21

patents granted



Integrating European Life Sciences

To foster collaboration between scientific communities in Europe and around the world

This EMBL mission stems from the principle that institutional collaborations, strategic alliances, and partnerships underpin scientific excellence across borders and disciplines. In 2023, EMBL welcomed two new full members (Latvia and Estonia) and a prospect member state (Serbia) – a testament to EMBL's recognised leadership and an acknowledgment of the value and benefit of supporting and engaging with EMBL.

When scientists work together like this, science progresses and discoveries become more possible and provide added perspective. The Traversing European Coastlines (TREC) expedition, which began this year, served as an important source for scientific collaboration, bringing EMBL's state-of-the-art research equipment and know-how to member states. It also connected to the wider public across member states and with political stakeholders, such as Spain's Secretary General for Research Raquel Yotti (shown at right) and Estonian President Alar Karis (on right in bottom photo).

A few other highlights include: a new agreement with UNESCO that enables cooperation to aid open science, capacity building, and talent development in developing countries, particularly Africa; a renewed Nordic EMBL Partnership for Molecular Medicine that will build more interconnected hubs to tap complementary expertise and enable novel collaborations; and the first of many gatherings to come with government, industry, and academia representatives that explore how to leverage the power of AI and machine learning for life sciences in Europe.



AI in biology and health: opportunities and challenges

EMBL hosted a roundtable with high-level representatives from government, industry, and academia to discuss opportunities and challenges in harnessing AI for the life sciences.

The discussion explored the potential impact of AI advances for the life sciences, with applications in pharmaceutical and healthcare sectors. In addition, participants discussed how these opportunities could be realised within and for Europe and looked at ways to leverage existing strengths and synergies to ensure Europe is a global leader for AI in life sciences. This also included bioethical considerations, such as

ensuring diversity in datasets to train AI models and non-discriminatory modelling.

“From the start, we, together with EMBL-EBI, have worked closely with the user community on the AlphaFold education online course,” said Anna Koivuniemi, Head of Google DeepMind Impact Accelerator. *“We believe that even more progress can be made if we help researchers globally to understand how to apply AI tools like AlphaFold in practice.”*



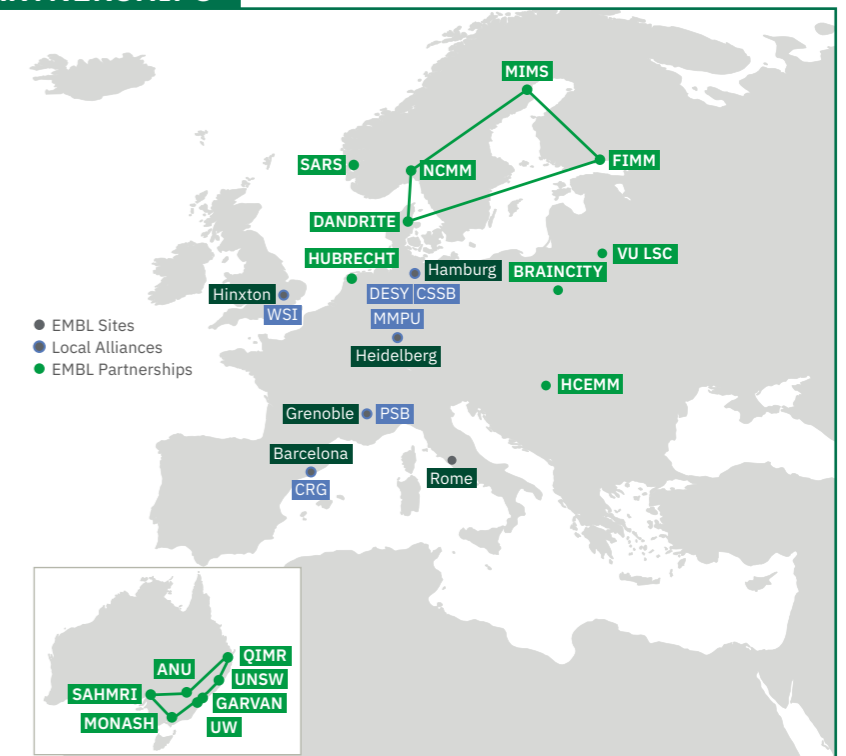
MEMBER STATES AND PARTNERSHIPS

EMBL member states and associate member states

Austria | Belgium | Croatia
Czech Republic | Denmark
Estonia | Finland | France
Germany | Greece | Hungary
Iceland | Ireland | Israel
Italy | Latvia | Lithuania
Luxembourg | Malta
Montenegro | Netherlands
Norway | Poland | Portugal
Slovakia | Spain | Sweden
Switzerland | United Kingdom
Australia

EMBL prospect member states

Serbia



People, Processes, and Places

In 2023, EMBL's diverse personnel spanned roles involving research, scientific services, technical or scientific support, training and outreach, administrative support, and other general support, such as communications.

The EMBL community goes far beyond those currently working and studying here. Our alumni, who go on to have wide-ranging impacts around the world, are the greatest evidence of the unwavering strength and influence of EMBL as a world-class scientific institute. EMBL supports and celebrates its alumni, updating them on EMBL opportunities, resources, and networks to benefit our special community and European life sciences.

EMBL is apt to lead in many areas, making it an exemplary place to work, study, or do world-class research.



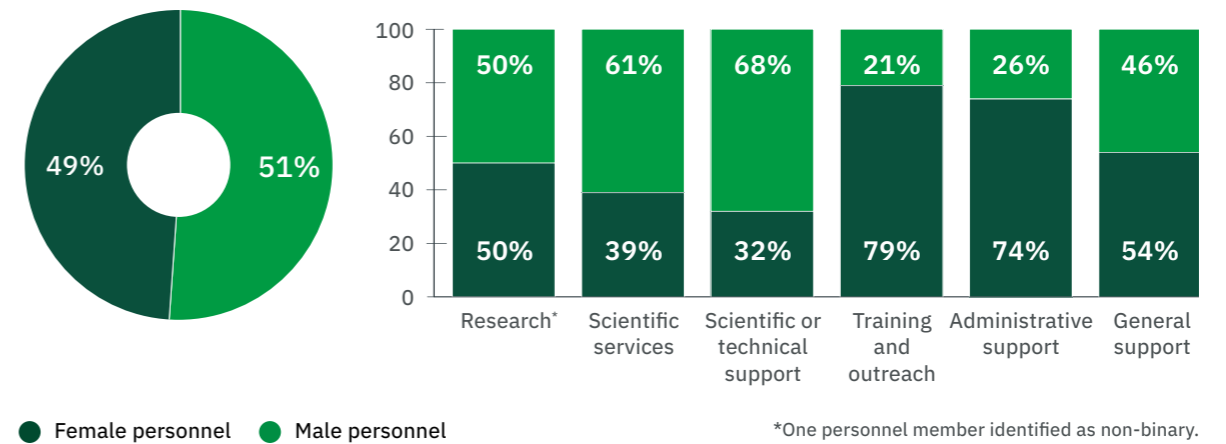
Equality, Diversity, and Inclusion

From 2022, when EMBL published a five-year Gender Equality Plan, the organisation's Equality, Diversity, and Inclusion (EDI) office has continued to work within and outside of EMBL to further the organisation's understanding and implementation of this plan. Internally, in 2023, the team provided guidance on inclusive recruitment, led workshops

that engaged more than 120 EMBL colleagues, and established a new EDI collection in EMBL's Szilard library. Outside of EMBL, the EDI team created EDI-themed panels for scientific conferences, served as consultant to European partners with less mature EDI structures, and contributed to EDI knowledge exchange among European scientific networks.

GENDER DISTRIBUTION AT EMBL

EMBL aims to be transparent about its gender distribution. While gender distribution is balanced across the organisation as a whole, the EDI strategy aims to balance the inequalities seen in some staff categories.



Bioethics

A new EMBL Ethics Academy will now provide a range of courses within the broad areas of bioethics, data and tech ethics, and workplace ethics. Additionally, EMBL's 23rd Science and Society Conference looked at the historical context of the intersection between

research and ethics, as well as the fast pace of emerging ethical challenges in life sciences. The conference used two case studies – technology ethics and organoid research – to spur discussion.



Credits: Creative Team/EMBL, adobestock.com

Sustainability

Throughout 2023, EMBL staff continued to reduce the organisation’s environmental impacts. The Sustainability Office helped roll out the Laboratory Efficiency Assessment Framework (LEAF), setting and achieving the goal of having all wet research and service labs signed up for LEAF in 2023 – 82 in total having joined and 70% having achieved a certification. Additionally, EMBL set a target to reduce energy use by 15% in 2023 compared to 2021 and ultimately reduced total energy consumption by 19%.

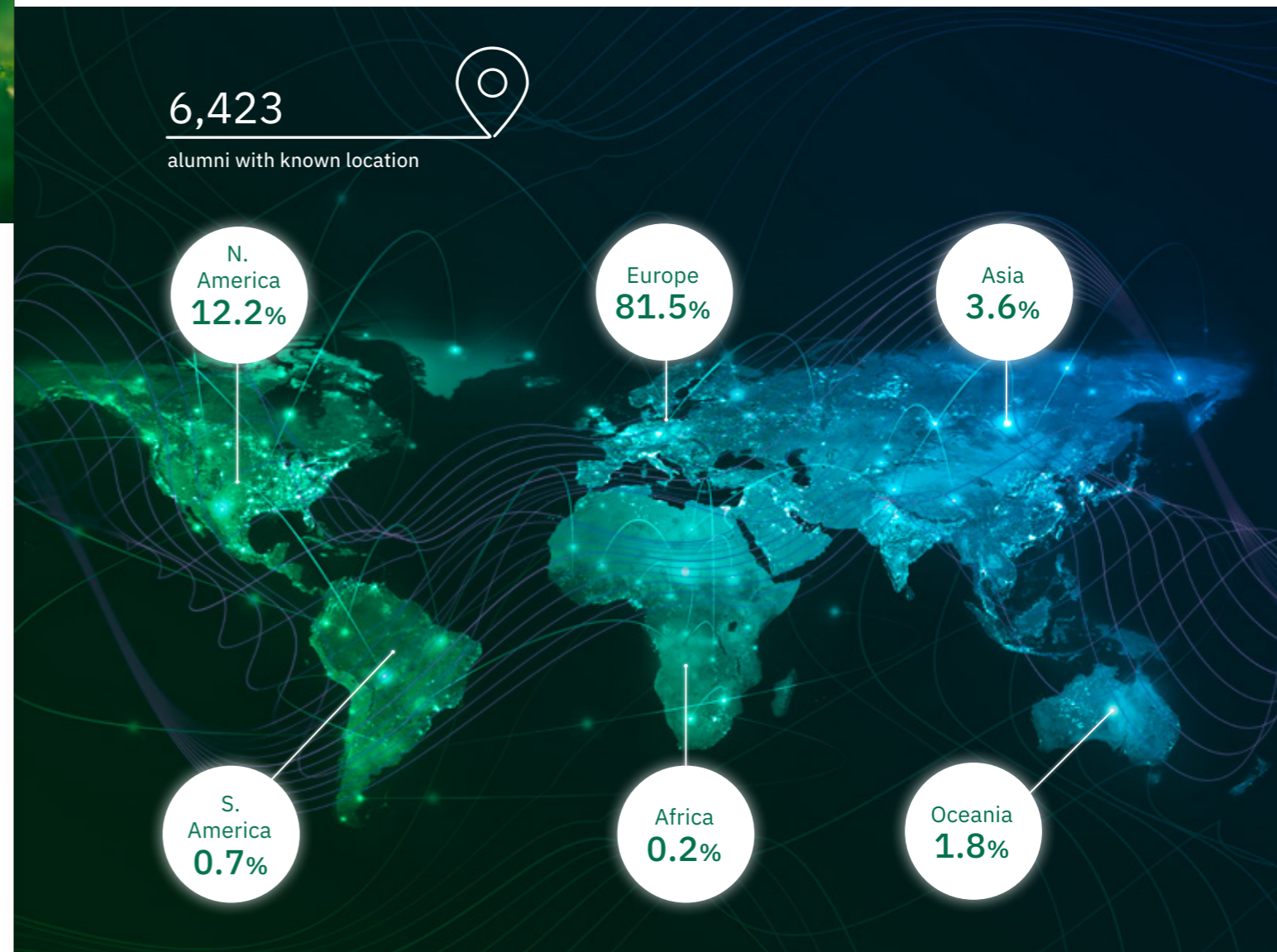
A MORE SUSTAINABLE EMBL

EMBL-wide energy-saving measures significantly reduced total energy usage compared to 2019 – the baseline year for EMBL’s sustainability strategy. The results reflect EMBL’s commitment to reduce its environmental impact and embrace sustainability practices.



EMBL Alumni Relations

EMBL’s alumni are a network of highly trained scientists and other professionals, 82.5% of whom live in EMBL member states or associate member states. These alumni bring the EMBL model of research to member state institutions and help to connect local scientific communities with EMBL’s research, services, and training. In 2023, approximately 1,335 alumni engaged in approximately 2,500 activities across EMBL sites as ambassadors, participants, volunteers, and donors.



Credits: Creative Team/EMBL, adobestock.com

Farewell to EMBL's 'living legends'

During 2023, EMBL said goodbye to some long-standing colleagues and living legends – Stephen Cusack, Anne Ephrussi, Toby Gibson, and Janet Thornton.

Professor Dame **Janet Thornton** is one of the world's pioneers in structural bioinformatics. She served as director of EMBL-EBI (2001–2015) and led the growth of the institute from 160 to over 600 people. Her research group there studied the biology of proteins and ageing, and she has been a leading voice on many topics, including science in Europe, open data, and women in science.



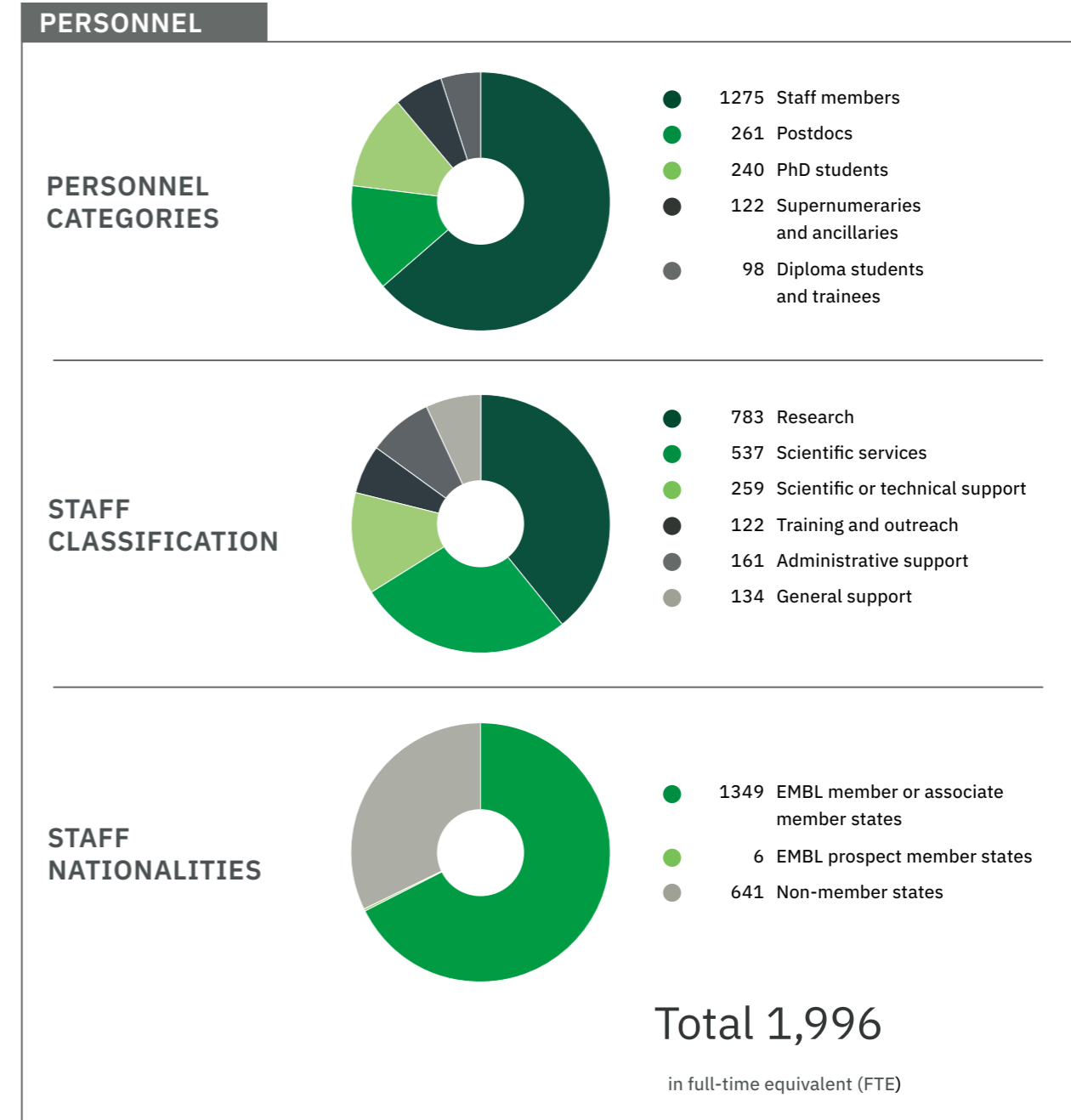
Joining EMBL Grenoble in 1977 as a postdoc, **Stephen Cusack** went on to become one of the world's most respected structural biologists, known for his work on RIG-I, the innate immune receptor that recognises when one is infected with an RNA virus. Another major breakthrough was obtaining the crystal structure of the influenza polymerase in 2014, and he served as EMBL Grenoble's Head from 1989 to 2022.

In 1992, **Anne Ephrussi** launched her EMBL research group. Using the *oskar* gene as a model, her team focused on understanding how RNA molecules are transported and their translation regulated in animal development, and how the germ plasm forms and induces germline formation. She was head of EMBL's Developmental Biology Unit from 2007 to 2021 while also overseeing EMBL's training mission during a large part of that time.



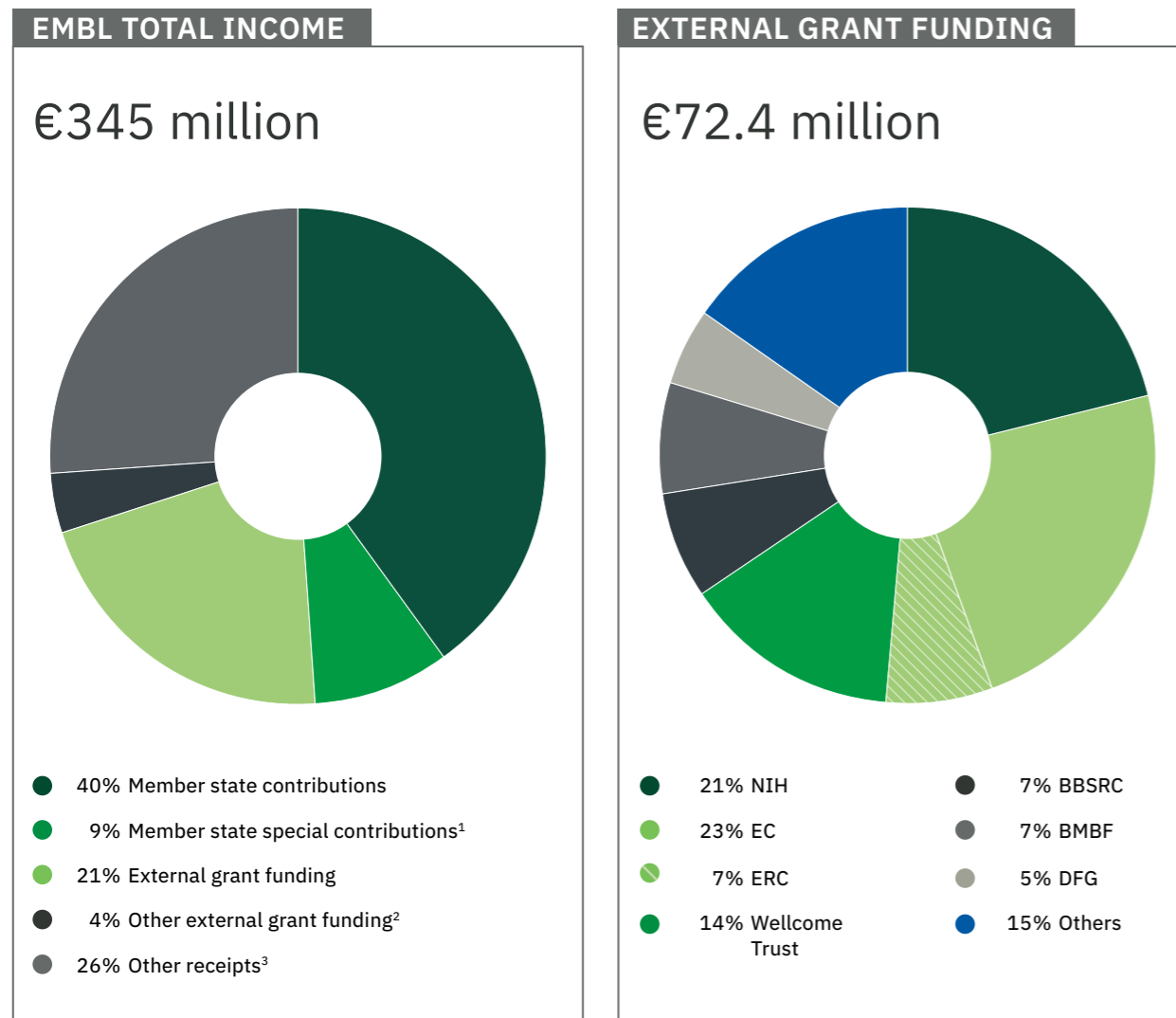
Starting his EMBL research group in 1986, **Toby Gibson** has been a globally recognised biochemist best known for his work with another EMBL alumnus Des Higgins on Clustal, a series of computer programs used in bioinformatics that enhance sequence analysis. Gibson's co-authored papers describing Clustal are among the most cited scientific papers of all time as this work underpins a good deal of disease-related research.

Personnel statistics



Financial report

Member states provide the majority of EMBL funding, with additional external support from a wide range of grant-endowing bodies and philanthropic contributions.



1. Includes additional contributions from the UK government for the Technical Hub and European Data Centre on the EMBL-EBI campus.
2. Includes ELIXIR member state contributions.
3. Includes items such as philanthropic donations, contributions from EMBO, course and conference fees, internal tax, and income from the Heidelberg canteen, cafeteria, and guesthouses.

MEMBER STATE CONTRIBUTIONS

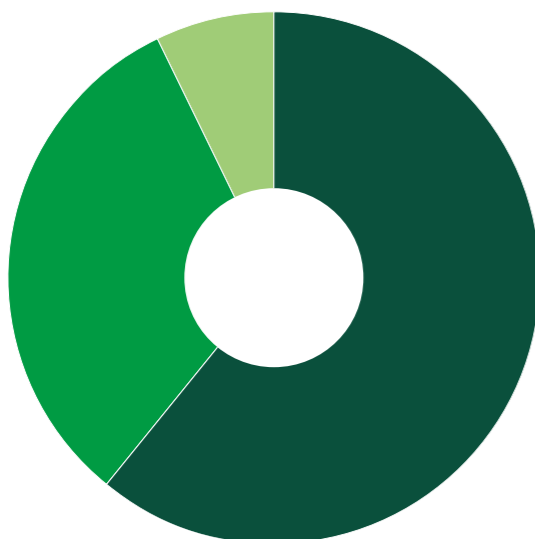
	× €1,000	%	× €1,000
Ordinary contributions			
Austria	2,966	2.2	
Belgium	3,604	2.7	
Croatia	381	0.3	
Czech Republic	1,538	1.2	
Denmark	2,461	1.8	
Estonia	61	<0.1	
Finland	1,759	1.3	
France	18,622	13.9	
Germany	27,690	20.7	
Greece	1,360	1.0	
Hungary	989	0.7	
Iceland	176	0.1	
Ireland	1,744	1.3	
Israel	2,867	2.2	
Italy	13,812	10.3	
Lithuania	307	0.2	
Luxembourg	328	0.3	
Malta	100	0.1	
Montenegro	34	<0.1	
Netherlands	6,282	4.7	
Norway	2,816	2.1	
Poland	3,247	2.4	
Portugal	1,491	1.1	
Slovakia	704	0.5	
Spain	9,751	7.3	
Sweden	3,822	2.9	
Switzerland	4,990	3.7	
United Kingdom	19,819	14.8	
	133,721	100	
Currency adjustment			
for sterling adjustments			(1,311)
Entry fees			
Estonia			45
Lithuania			66
Poland			733
			844
Associate member state contributions			
Australia			3,507
			3,507
Additional contributions			
United Kingdom			31,238
			31,238

EMBL TOTAL EXPENDITURE

EMBL's expenditure prioritises research, scientific services, and training activities – all of which are geared towards collaborating with, scientifically supporting, or training member state scientists.

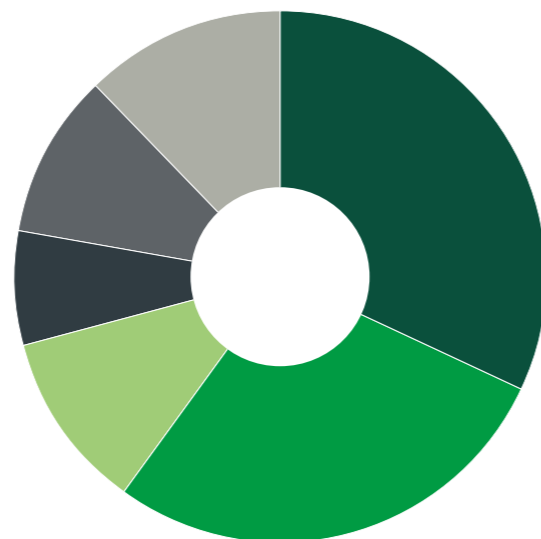
€347 million

EXPENDITURE



- 61% Staff costs
- 32% Operating costs
- 7% Equipment expenditure, including depreciation

EXPENDITURE BY AREA OF ACTIVITY

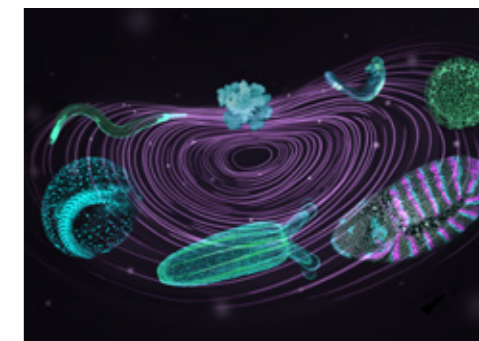


- 32% Research
- 28% Scientific services
- 11% Scientific or technical support
- 7% Training and outreach
- 10% Administrative support
- 12% General support

EMBL Unit Reviews

Each year, international experts review different parts of EMBL's research, service, and training units. In 2023, the reviewed units included:

EMBL's Developmental Biology Unit: This unit is focused on understanding the origin, development, and evolution of organisms and their communities. It aims to explore the rich diversity and complexity of living systems, taking into account natural context. Using a highly interdisciplinary approach, researchers study a wide range of organisms, including collectives of bacteria as well as unicellular and multicellular eukaryotes, integrating cutting-edge experimental tools, computational analysis, modelling, and conceptual theory.



Credits: DB Unit, Creative Team/EMBL

EMBL's European Bioinformatics Institute Services: EMBL-EBI develops and maintains a full range of data resources and data analysis tools essential for supporting life science research. In fact, its numerous community databases, tools, and software constitute the world's most comprehensive range of freely available, up-to-date molecular data resources. Additionally, these same tools help translate basic research into innovations in fields like drug manufacturing and agriculture.



Credits: Jeff Dowling/EMBL-EBI

EMBL Hamburg: EMBL Hamburg operates an integrated facility for applications in structural biology, which includes three state-of-the-art beamlines at the PETRA III synchrotron ring. Many external research groups access its infrastructures and expertise as research services. Research here uses different structural biology techniques for applications in challenging projects, mostly in the field of infection research, such as host/pathogen interactions, translocation and secretion systems, and unravelling mechanisms of the infection process.



Credits: Kinga Lubowiecka/EMBL



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