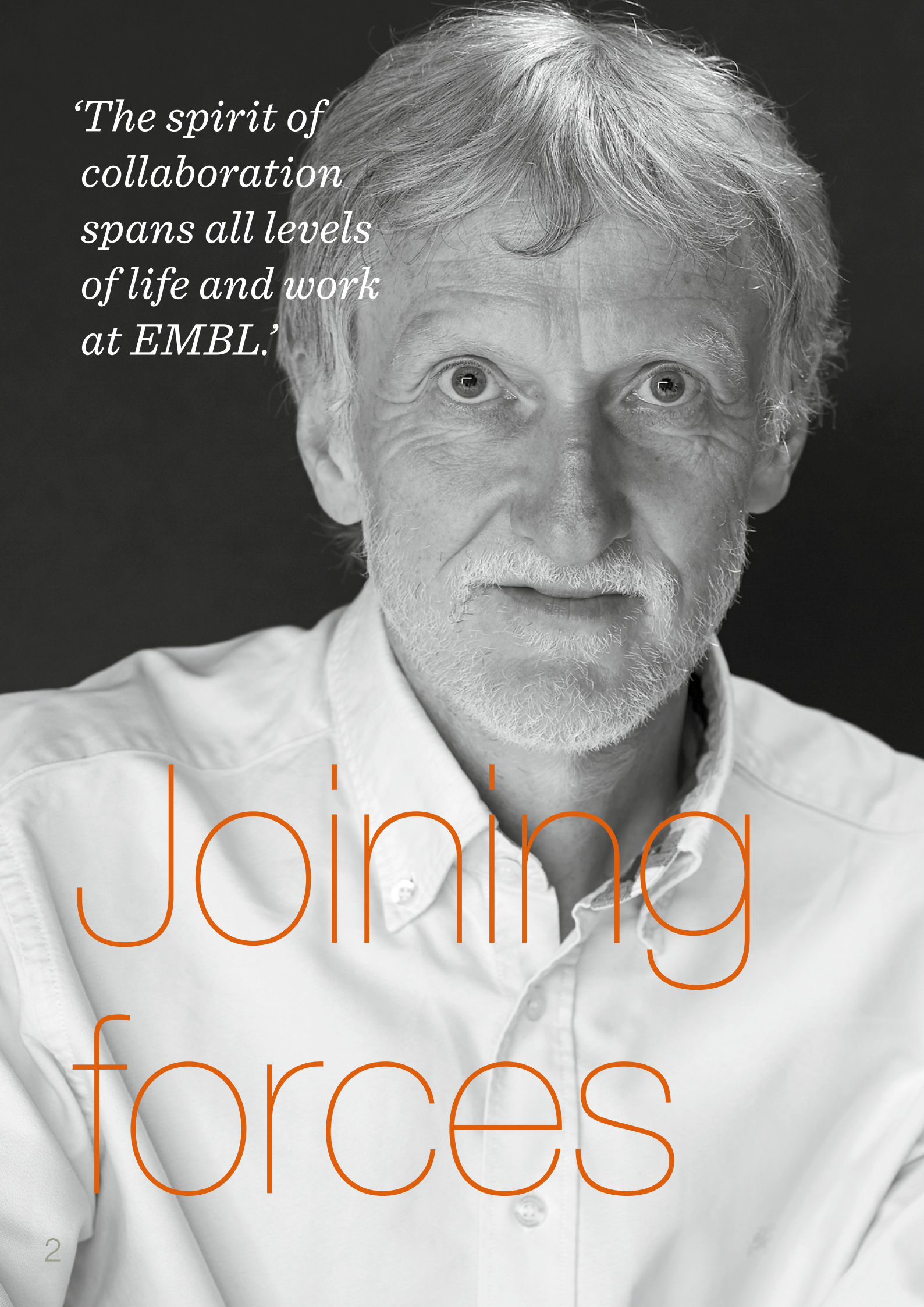


2013
2014

Annual Report

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*‘The spirit of
collaboration
spans all levels
of life and work
at EMBL.’*

Joining forces

One theme runs through this year’s annual report: joining forces. As part of EMBL’s continuous drive to foster research excellence and integrate life sciences internationally, the EMBL family has continued to grow.

I am pleased to welcome the Czech Republic as the 21st EMBL member state, Argentina as our second associate member state, and the Slovak Republic as the first prospect member state. In joining forces with these countries, we strengthen the ties within the European life science community and with our colleagues in Latin America.

In recent years, EMBL has embraced and led projects that promote the establishment of new research infrastructures to respond to the challenges of ‘Big Data’ by pooling resources across Europe. It is rewarding to see these ventures take shape, as we did in 2013 when ELIXIR was launched, with its hub housed in the new EMBL-EBI South Building. It is clear that ELIXIR, Euro-BioImaging and other European Strategy Forum on Research Infrastructures (ESFRI) projects will play a key role in enabling European researchers to continue to perform cutting-edge research.

The spirit of collaboration spans all levels of life and work at EMBL, as is exemplified by the many scientific findings only made possible by interdisciplinary teams. The collaborative, good-humoured spirit that distinguishes the Laboratory was epitomised by Christian Boulin, Head of Core Facilities and Services, who sadly passed away in April 2014. Christian was an ideal colleague, constructive, unselfish and committed to the success of everyone at EMBL, and will be sorely missed.

As we mark EMBL’s 40th anniversary, on behalf of the institute, I would like to thank everyone who has collaborated with EMBL throughout the years. Thanks to you, the Laboratory has been constantly at the forefront, and we strive to build upon that legacy as we meet the challenges and opportunities of this era of Big Data. I hope you will join us in celebrating our path so far, and look forward to the next 40 years of working together.

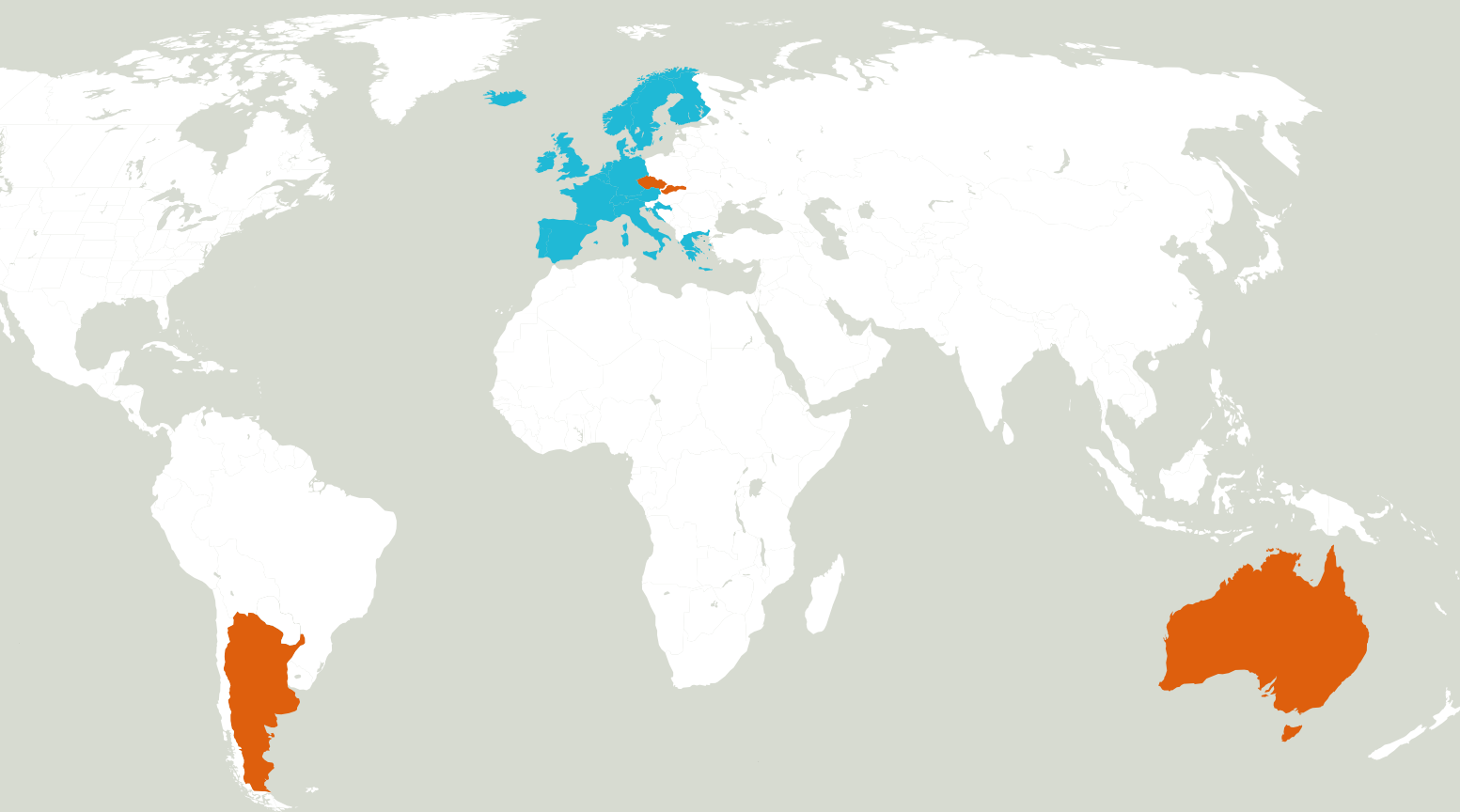


Iain Mattaj

Key Events

New (associate/prospect) member states:
Argentina, the Czech Republic, Slovakia

Renewal associate
membership Australia



EMBO turned 50



ELIXIR formally established



EMBL turned 40
EBI turned 20



EMBL-EBI's South Building opened



EMBLEM turned 15



PhD Programme turned 30



40 Years of History



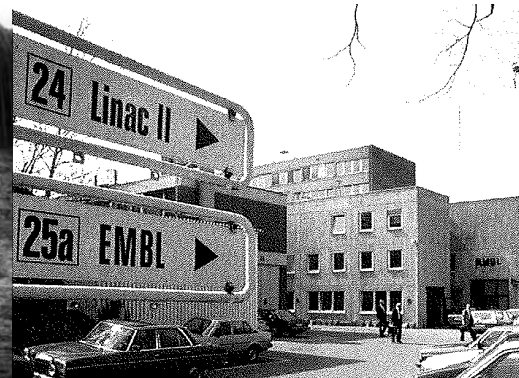
4 July 1974

EMBL becomes a legal entity. Sir John Kendrew is appointed as the first Director General.



9 July 1975

The EMBL Headquarters Laboratory in Heidelberg is founded and construction begins.



21 April 1975

An agreement is signed to establish an EMBL outstation at the Deutsches Elektronen-Synchrotron (DESY) synchrotron ring in Hamburg, Germany.



3 March 1976

A second outstation is founded at the site of the Institut Laue-Langevin in Grenoble, France.



1980

The EMBL Data Library is established – the first central depository of nucleotide sequence data in the world (precursor to EMBL-EBI).



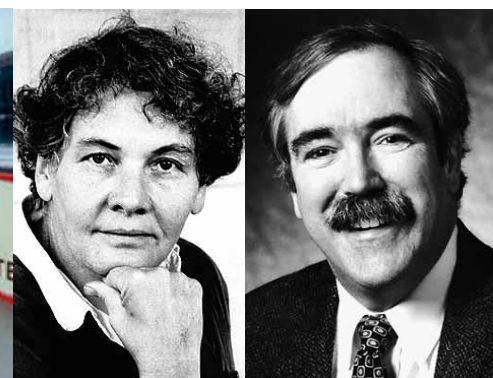
1 October 1983

The EMBL predoctoral training programme is established.



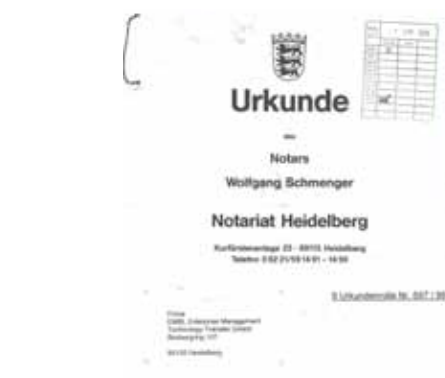
26 July 1994

The EMBL Data Library transitions to EMBL-EBI, located on the Wellcome Trust Genome Campus in Hinxton, UK, alongside the major DNA sequencing efforts of the Sanger Centre.



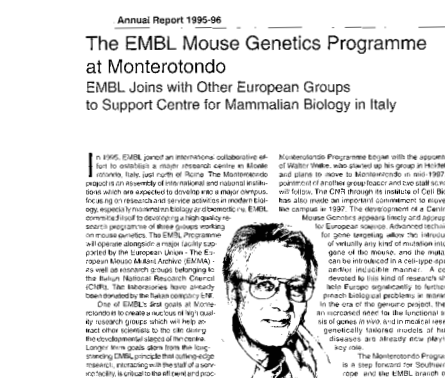
9 October 1995

Christiane Nüsslein-Volhard and Eric Wieschaus receive the Nobel Prize for Medicine for the first systematic genetic analysis of embryonic development in the fruit fly – research conducted at EMBL Heidelberg.



26 May 1999

EMBLEM GmbH, EMBL's technology transfer arm, is established.



29 June 1999

The EMBL Monterotondo outstation is founded, located near Rome, Italy. EMBL launches a new programme in mouse biology at the site.



9 March 2010

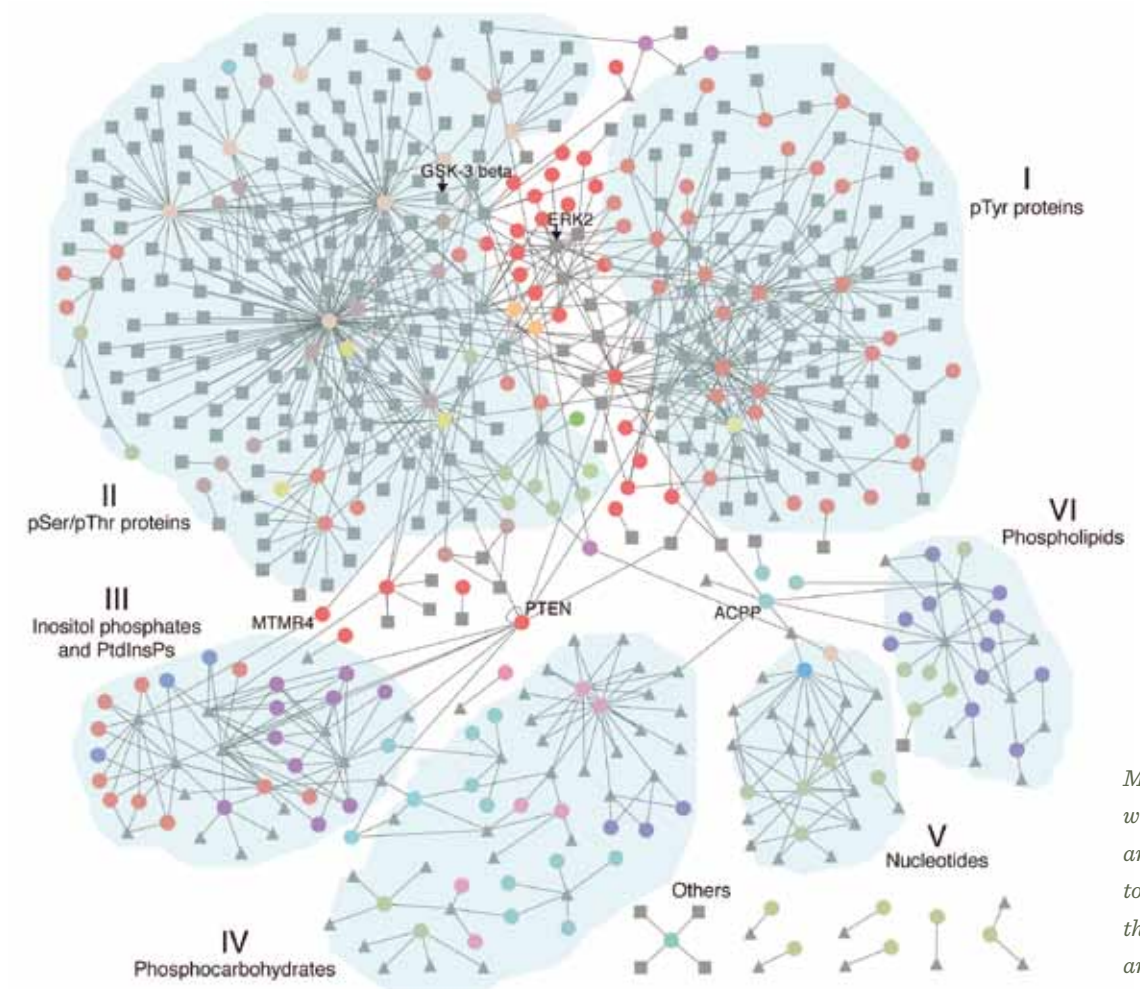
Opening of the Advanced Training Centre, a European hub for world-class scientific courses, conferences and workshops at the Heidelberg headquarters.

Research Highlights

Whether it's cells or people joining forces, in research at EMBL collaboration is the name of the game.

Directors' Research

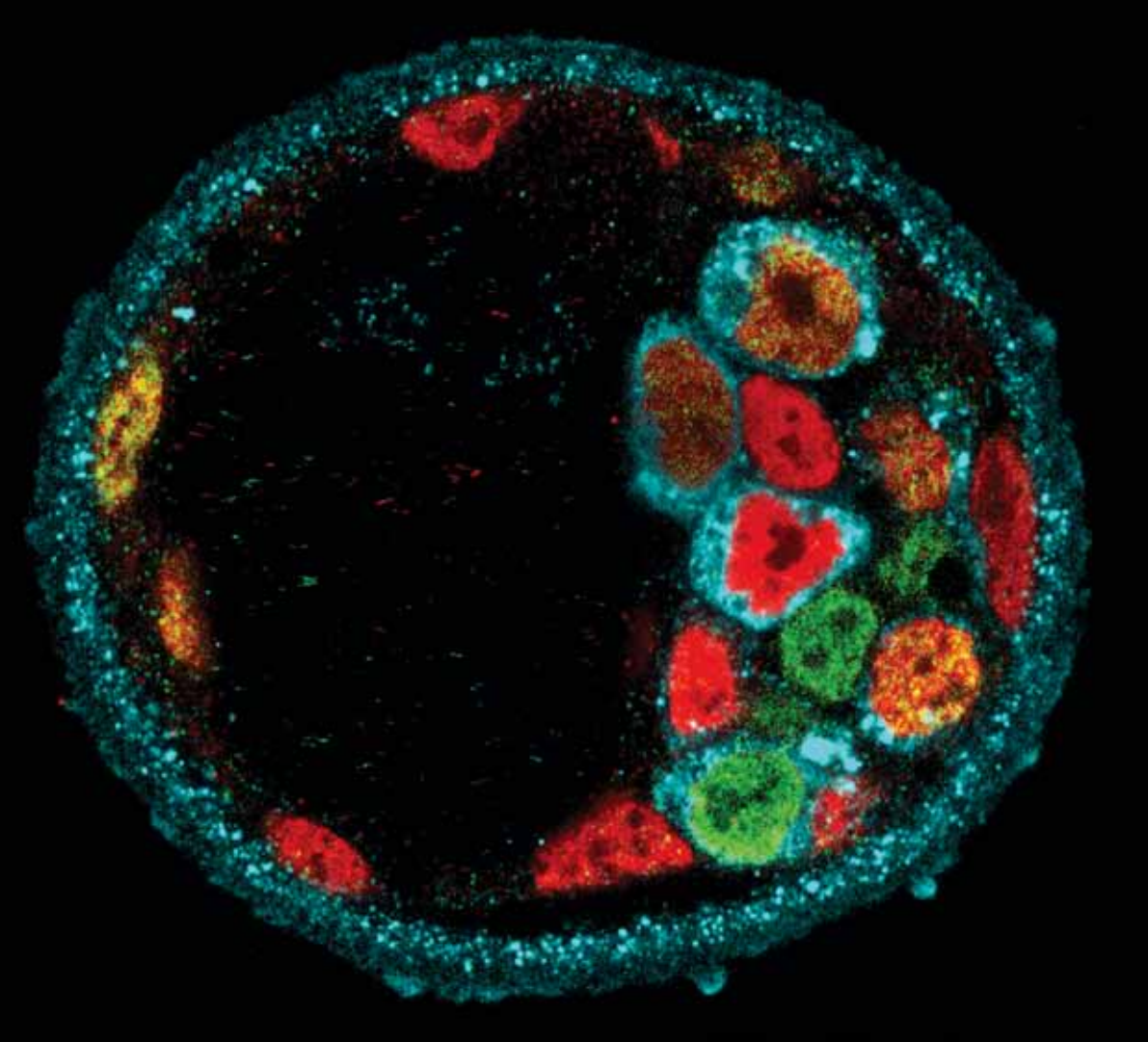
Maria Leptin's group combined efforts with Eileen Furlong's lab, and found that being influenced by a snail doesn't always equate to slowing down. The scientists discovered that the Snail family of transcription factors, which have been known for a quarter of a century as gene repressors, can also activate genes. The findings indicate that Snail itself likely joins forces with other transcription factors, and point to new avenues for studying its key roles in both development and tumour metastasis. Published in *Genes & Development* in January, the study was among the most-read articles on the journal's website in the first month after publication.



Maja Köhn teamed up with Janet Thornton and Matthias Wilmanns to compile the network of the human phosphatases and the molecules they interact with.

Genome Biology

Obtaining an overview of interactions between molecules requires a great deal of interaction between people. To collate data generated through multiple studies in a multitude of ways and make it available in a user-friendly format, Maja Köhn teamed up with Janet Thornton at EMBL-EBI and Matthias Wilmanns at EMBL Hamburg. Drawing on the strength of the EIPOD Programme, the groups developed DEPOD, a free online database of phosphatase interactions that enables researchers to pinpoint exactly which molecules a phosphatase – a type of protein that's essential for cells to react to their environment – acts upon in human cells. This overview of interactions might also help explain unforeseen side effects of drugs. Another collaboration stemming from the Genome Biology Unit illuminates how interactions across different levels can conspire to bring about devastating results. Working with Stefan Pfister at the German Cancer Research Centre (DKFZ), Jan Korbels group found that Group 3 medulloblastoma – a paediatric brain tumour with the poorest prognosis – is linked to a variety of large-scale genetic rearrangements that all have one thing in common: they bring a gene called GFI1B close to so-called 'super-enhancers' – stretches of DNA that dramatically increase the activity of nearby genes.



Colour-coded fate: the green cells in this mouse embryo will likely form the animal's body, while the red and blue ones will give rise to the placenta and other extra-embryonic tissues, the Hiiragi group have found.

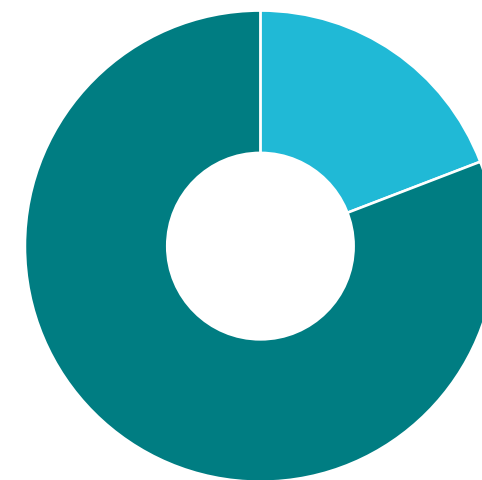
Developmental Biology

Many of the most successful collaborations result from the coming together of individuals of different backgrounds, skills and expertise. A prime example is a functioning human body, with its skin cells, muscle cells, stomach cells, and more. But for such a collaboration to arise, cells first have to become distinct from each other. Two studies in the Developmental Biology Unit have brought insight into different levels of this specialisation.

Takashi Hiiragi's group discovered that the fate of a cell in a mammalian embryo isn't fixed at the start. The group found that, starting with random variation, cells gradually change until they split into the two populations that develop into either the foetus or 'extra-embryonic' tissues such as the placenta.

Stefano de Renzis' group discovered that, to quickly smooth out their surface, cells in the fruit fly embryo 'suck in' long tubes of membrane in a specialised type of endocytosis. The same strategy could explain how the smooth cells on your skin become different from the 'tentacled' cells that line your intestine.

Scientific publications in 2013



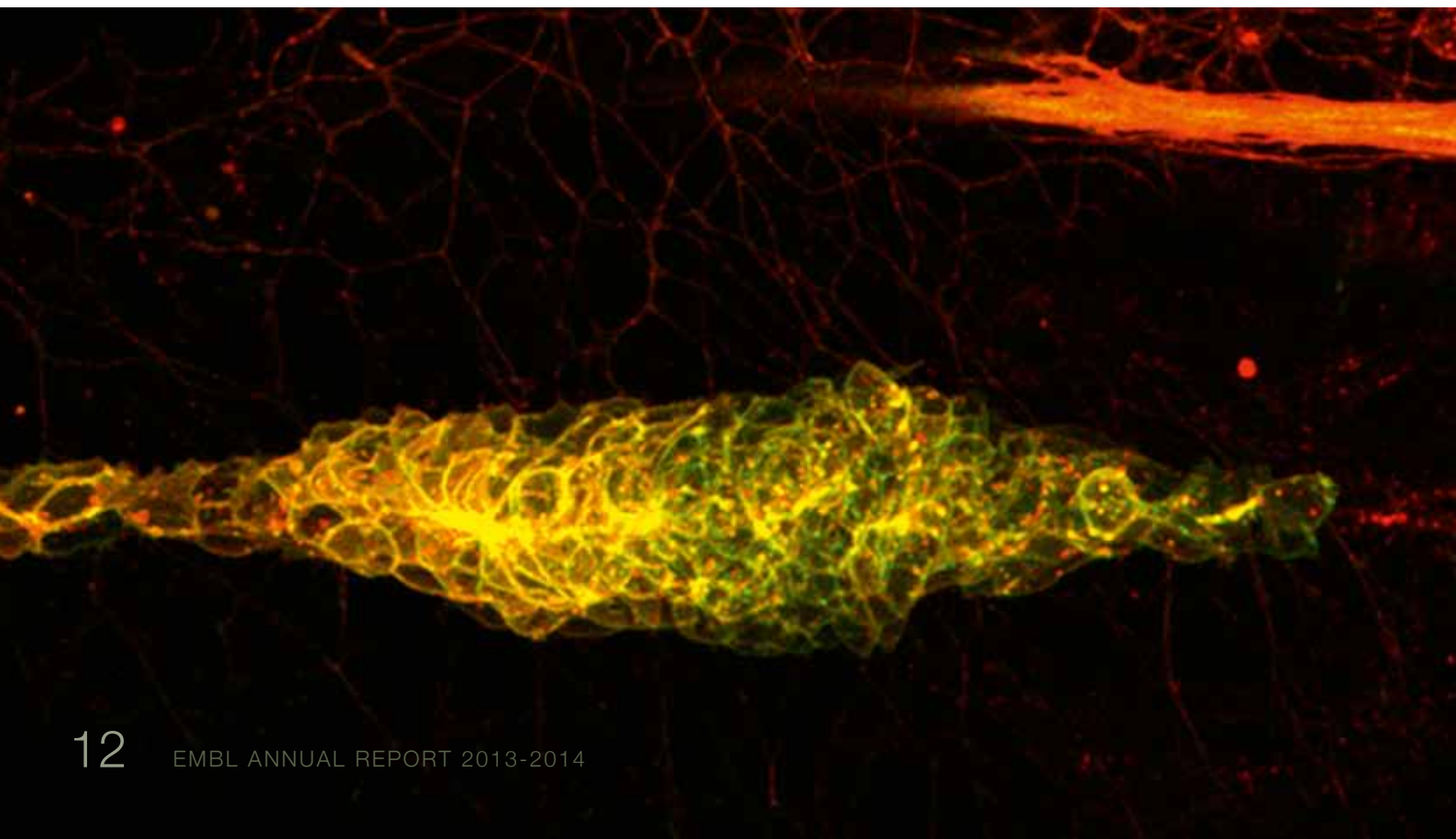
Cell Biology and Biophysics

The spirit of collaboration fostered at EMBL extends beyond our five sites. By hosting visiting scientists from the University of Lisbon, Portugal, Rainer Pepperkok's group were able to apply their RNA-interference-based screening technique (see AR 2012/13, p. 64) to research on cystic fibrosis. With their complementary skill-sets and expertise, the team were able to identify a promising potential drug target for cystic fibrosis, and uncovered a large set of genes not previously linked to the disease.

Another study from the Cell Biology and Biophysics Unit is a further example of proximity fostering discovery. Darren Gilmour's group tapped into a technique developed 'just down the hallway', in the lab of Michael Knop (now at the DKFZ-ZMBH Alliance in Heidelberg): a tag that changes colour as a protein ages. Thanks to this tag, and to data analysis expertise from Wolfgang Huber's group, they elegantly demonstrated that cells in a zebrafish embryo determine which direction they move in by effectively erasing the path behind them. The findings, published in *Nature*, could have implications not just for development but also for cancer and metastasis.

Technological developments play a key role in science, and sometimes they can even provide a fresh perspective on an old problem. Jan Ellenberg's group turned to super-resolution microscopy, and have developed a method to combine thousands of images to reach a level of unprecedented precision. This enabled them to solve a decade-old controversy over how copies of a Y-shaped building block are arranged to form a ring in the nuclear pore. The work, published in *Science*, was complemented by an independent study by Martin Beck's group (see below).

Thanks to a tag developed 'down the hall', the Gilmour group uncovered how migrating cells in the zebrafish embryo keep to one direction.



Structural and Computational Biology

Looks can be deceiving. The nuclear pore is always pictured as a perfect circular ring but in reality this ring is very flexible, capable of expanding and bending to allow the passage of large molecules and withstand twisting. Martin Beck's group have uncovered clues to this flexibility, by determining the conformation of one of its main building blocks and how it is arranged. The group's work, which featured on the cover of *Cell*, complements and supports the findings made by Jan Ellenberg's lab.

Two other studies from the Structural and Computational Biology Unit showcase the use of different approaches to study a single topic – in this instance, the building of ribosomes. Christoph Müller's group used X-ray crystallography to study the three-dimensional structure of RNA polymerase I, the molecular machine that makes essential RNA components of ribosomes. Meanwhile, using nuclear magnetic resonance, Teresa Carlomagno's group discovered that for one of these components to be correctly folded, pairs of tags called methyl groups have to be added to the RNA in a specific order.

To study interactions between proteins and lipids, Anne-Claude Gavin's group developed a new approach to fish proteins out of a cell with any bound lipids still attached. While testing this method, they found that a group of proteins linked to conditions such as metabolic syndrome and some cancers don't bind to cholesterol as previously thought. Instead, they ferry another lipid, phosphatidylserine, from the site where it is produced inside the cell to where it is needed at the cell membrane.

EMBL-EBI

Scientists studying gene activity and regulation get invaluable help from bespoke computer programmes. But with a variety of software options out there, deciding which to use can be a challenge. Paul Bertone coordinated an ENCODE-affiliated international initiative to systematically assess the different software packages available for analysing gene expression. The results, published in two papers in *Nature Methods*, may inspire the development of new computing approaches to handle current and future technologies in the field.

Some partnerships seem to withstand the tests of time. Paul Flicek's group, working with collaborators at the University of Cambridge, UK, found that over the course of evolution in closely related mammals, certain clusters of transcription factors continue to work in concert, providing both genetic and evolutionary stability.

EMBL Grenoble

The way scientists think about the evolution of transcription factors is itself changing, thanks partly to work by Andrew McCarthy's group and collaborators at the Centre National de Recherche Scientifique (CNRS). By comparing structural information, they showed that a transcription factor called LEAFY seems to have evolved different forms that control specific genes by going through an intermediate, multitasking phase. This evolutionary path represents an alternative to the most common way for transcription factors to evolve, which involves making a copy of themselves. This copy can then be altered and take on new roles without compromising its original task.

Daniel Panne's group, meanwhile, has uncovered a different kind of role change. They discovered that the gene that encodes a protein called p300, which normally prevents cells from becoming cancerous, can turn into an oncogene – a gene that causes cancer. The finding, published in *Nature Structural and Molecular Biology*, stems from the first three-dimensional structure of the protein's active core, and implies that p300 could be a viable drug target.

EMBL Hamburg

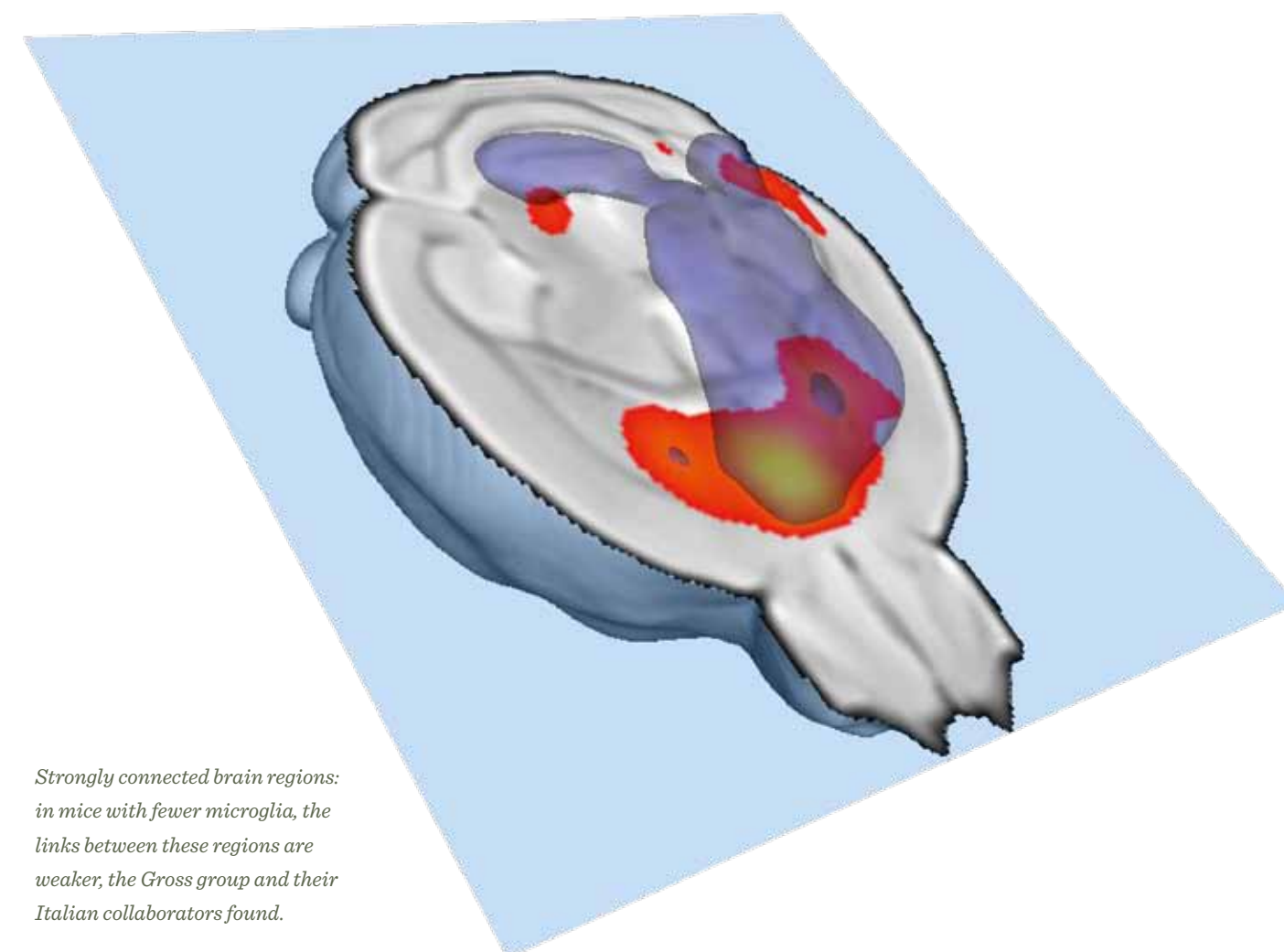
Choosing a partner is an important decision, both for people and for molecules. Matthias Wilmanns' group engineered two versions of a transcription factor called MafB with opposing partnership preferences. One form binds primarily to copies of itself, whereas the other tends to bind to a different molecule, cFos. This new concept for transcription factor design could enable scientists to selectively control genes by driving specific molecular partnerships.

Also at EMBL Hamburg, Thomas Schneider's team drew on the old adage 'strength in numbers'. Working with neighbouring colleagues at the German Synchrotron Research Centre (DESY) and also researchers at the University of Lübeck, Germany, they developed a strategy for determining a molecule's three-dimensional structure from several micrometre-sized crystals. Their new technique overcomes the need for large crystals and the problem of crystal quality deterioration due to radiation damage. Using this new approach, the team analysed the protein procathepsin B from the parasite *Trypanosoma brucei* – a promising potential drug target for sleeping sickness – and confirmed a structural model that had been previously obtained using free-electron laser radiation.

EMBL Monterotondo

In two independent studies published in *Nature Neuroscience*, Cornelius Gross' group has shed light on how the brain shapes our social interactions. They found that – at least in mice – different types of fear are processed by distinct groups of neurons. Fear of predators and fear of aggressive members of their own species triggered different circuits in the mice's brains – a finding that could have implications for addressing phobias and panic attacks in humans.

And working with colleagues in Italy at the Istituto Italiano di Tecnologia, Genova, and La Sapienza University in Rome, Cornelius' group identified, for the first time, a way in which the decreased functional connectivity seen in the brain of many people with autism can arise: by cells called microglia failing to trim connections between neurons.



Strongly connected brain regions: in mice with fewer microglia, the links between these regions are weaker, the Gross group and their Italian collaborators found.

Services

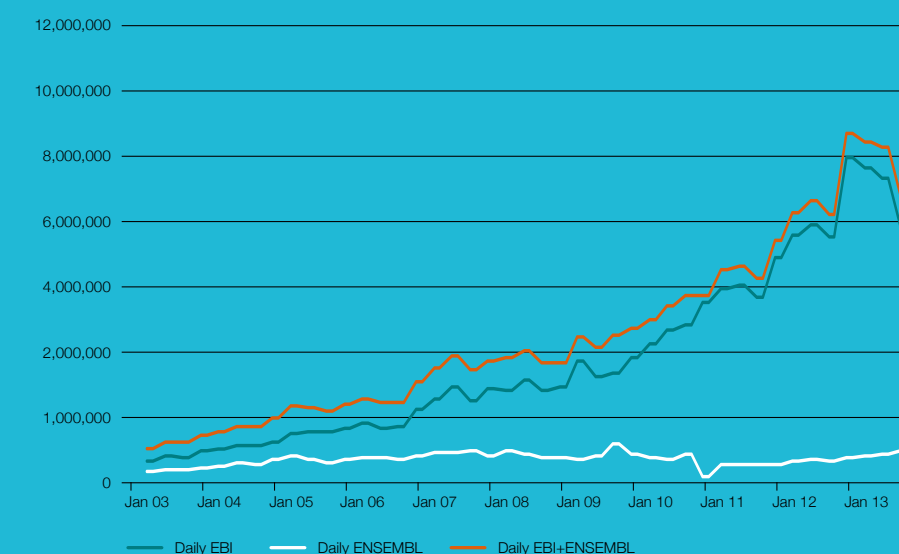
*From software to instrumentation,
EMBL serves the scientific community
in member states and beyond.*

Bioinformatics Services

EMBL-EBI hosts Europe's most comprehensive biomedical data resources and makes them freely available to the scientific community in ways that promote scientific progress. The data are heavily used by scientists in our member states and around the world. In 2013 there were on average almost 9 million web hits on the services per day; up from 5.3 million in 2011 and 7 million in 2012. Continuing the trend from previous years, all core data resources have grown substantially in 2013, so the data storage doubled from 3.7 petabytes in January 2013 to 7.4 petabytes in November 2013. To be able to cope with this continuous growth in storage capacity and to develop a sustainable strategy for the future, EMBL-EBI appointed Steven Newhouse, founding director of the European Grid Infrastructure, as the new Head of Technical Services. In addition, EMBL-EBI launched the innovative data-compression software and toolkit, CRAM, which dramatically reduces the

Usage of EMBL-EBI websites

Requests per day, 2003 through 2013 (quarterly)

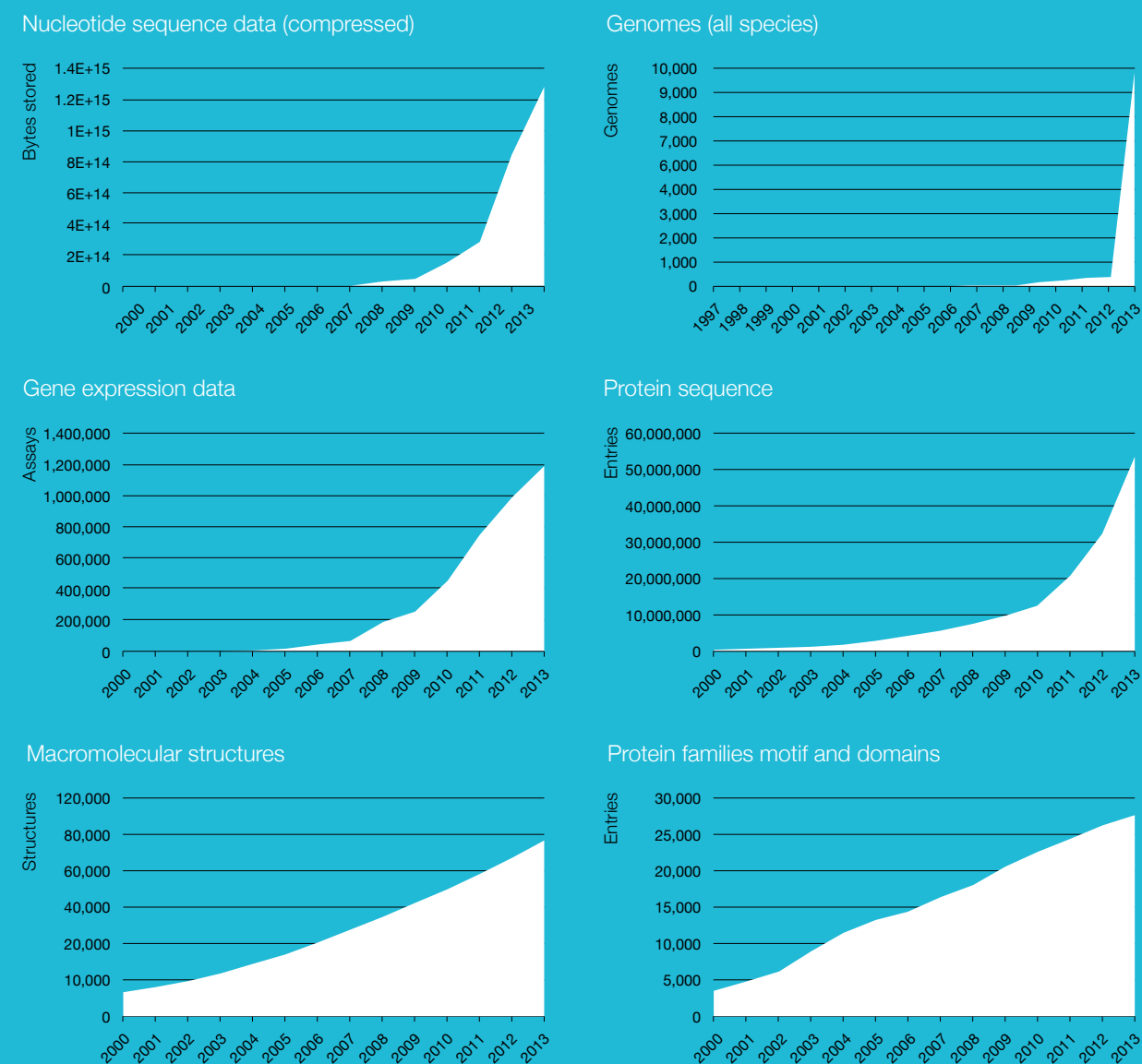


*In 2013 there were on average
9.8 million requests per day on
EMBL-EBI services, compared
to 9.2 million in 2012.*

amount of space required to store a full genome sequence. This format has been embraced by the Wellcome Trust Sanger Institute and, in the future, CRAM will be provided on Illumina sequencing machines as an output option. In addition to providing services, EMBL-EBI staff contribute to the success of consortia producing large datasets, such as the GEUVADIS consortium. This has produced the largest-ever dataset linking human genomes to gene activity at the level of RNA, adding a functional interpretation to the 1000 Genome Project's catalogue of human genomes.

EMBL-EBI is continuously updating, improving and expanding its databases and tools to provide the best possible service to researchers. For this reason, we were proud to accept the donation of a large collection of patented chemical structures – SureChem – from Digital Science, a MacMillan company. It is the first time a world patent chemistry structure collection of this size has been made publicly and freely available. The resource has been renamed SureChEMBL and has been linked to the ChEMBL database that now hosts 15 million bioactive compounds, many of which are of commercial or clinical relevance. Another example is the launch of the baseline Expression Atlas, which marks an important step towards building the 'expression fingerprint' for each different cell type and capturing it in a fully scalable Atlas. In collaboration with industry partners, EMBL-EBI has further created a platform that supports Semantic Web technologies, providing easy links between related but differently structured information and enabling the meaningful and intuitive sharing of molecular data amongst different applications. Finally, it is important to state that as the number of new developments is vast it is not possible to include all of them in this annual report and more examples can be found in the EMBL-EBI annual report.

Growth of EMBL-EBI resources



In 2013 all of our core data resources grew substantially. The cost of generating data continues to fall, and innovative ways of storing it are beginning to have traction. Because of the increasingly rapid uptake of sequencing technologies, the nucleotide sequence databases at EMBL-EBI have a doubling time of less than one year.

EMBL Heidelberg and EMBL-EBI are paving the way for the use of cloud computing in the life sciences. EMBL, together with CERN and ESA and many leading IT companies, is one of the leading partners of the FP7-funded 'Helix Nebula – the Science Cloud' project. EMBL is developing one of the three pilot applications in the cloud, which aims at cloud-supported analysis of large and complex genomes across a range of organisms. This will facilitate genomic assembly and annotation, allowing a deeper insight into evolution and biodiversity across a range of organisms.

Structural Biology

Modern crystallography started around 100 years ago when Max von Laue and father and son William and Lawrence Bragg discovered how X-rays are diffracted by crystals. To celebrate this breakthrough, the United Nations declared 2014 the International Year of Crystallography. The analysis of these X-ray diffraction patterns has always been a key facet of EMBL activities. During the 1970s, the EMBL Hamburg Unit at the German Synchrotron Research Centre (DESY) undertook pioneering synchrotron radiation experiments and built the first beamlines that were used by external life scientists from around the world. The tremendous socio-economic impact of 40 years of operation of the now closed DORIS synchrotron ring was reviewed and celebrated during the so-called 'DORIS Days' on 14 and 15 May 2013 in Hamburg.

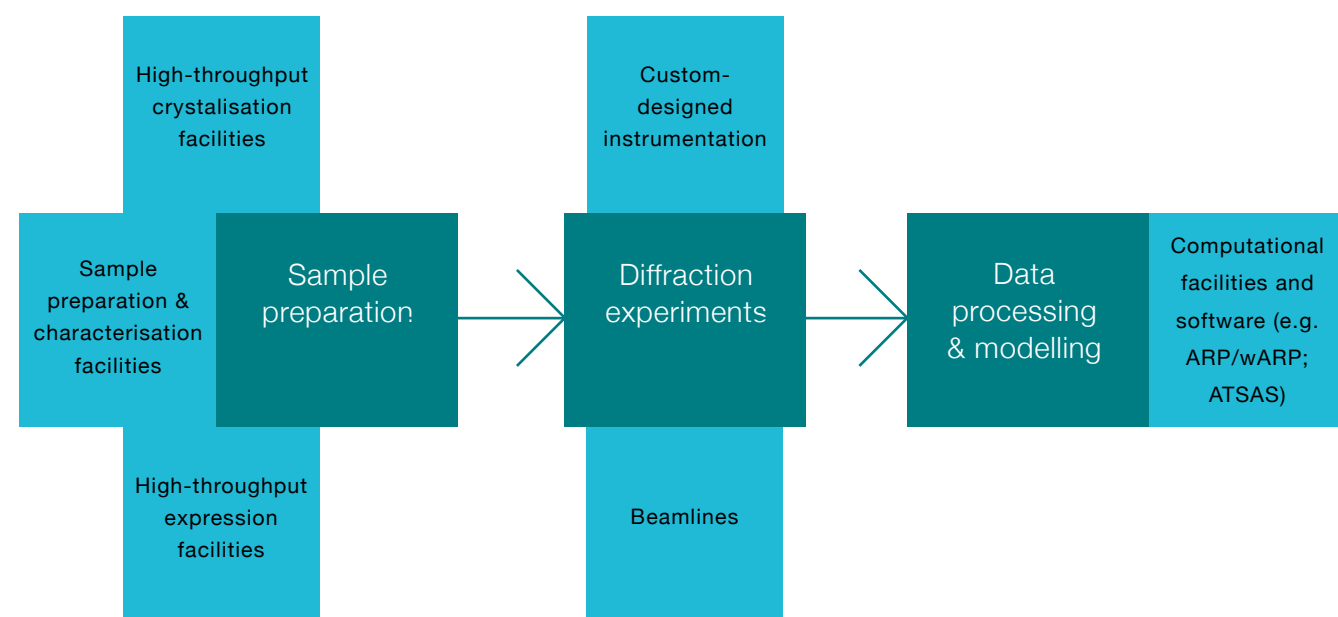
X-ray crystallography is now used regularly to determine the three-dimensional structure of biological molecules to gain a better understanding of the structure and function of these molecules within their biological context. EMBL Grenoble and Hamburg continue to develop and provide access to cutting-edge beamlines for crystallography. Following the closure of the DORIS ring, EMBL Hamburg is now operating three high-intensity beamlines at the remodelled PETRA III ring at DESY, which has been converted into a dedicated high brilliance synchrotron source. The Grenoble teams work with the European Synchrotron Radiation Facility (ESRF) to make the powerful X-ray sources available for applications in the life sciences. In 2013 EMBL Grenoble and Hamburg jointly registered almost 3000 beamline user visits.

EMBL Grenoble and Hamburg have also been essential contributors to the development of small angle X-ray scattering (SAXS), automated data acquisition, computational services and software packages, which have been implemented at beamlines worldwide. Many of these developments have benefited from collaborations between EMBL Grenoble and Hamburg. On 2 April 2014, the ESRF, DESY and EMBL Directors General joined in celebrating the very successful 10-year EMBL Grenoble–Hamburg bilateral cooperation, with its predominant focus on the development of synchrotron instrumentation.

EMBL Hamburg

In 2013, EMBL Hamburg finalised the construction and commissioning of three state-of-the-art synchrotron radiation beamlines for applications in structural biology at the synchrotron storage ring PETRA III. Within the first year of operation, the beamlines were used by almost 800 external researchers for close to 300 research projects. Several high-resolution structures arising from these studies have already been published in leading scientific journals, and it has been demonstrated that these beamlines have the ability to close the gap to emerging Free Electron Laser facilities. A similar record has been achieved for small angle X-ray scattering applications.

Structural Biology Services



From sample preparation to data analysis, services for EMBL's structural biology users go beyond beamlines, and are available onsite and through remote access.

EMBL Hamburg not only provides access to the beamlines, but also to complementary facilities for sample preparation and characterisation and data evaluation and a dedicated training programme. Since 2011, EMBL Hamburg has coordinated an EC grant 'BioStruct-X' that allows transnational access to 11 research sites – most of them offering synchrotron radiation beamlines – to hundreds of researchers across Europe. During the first year, applications for 500 proposals were received of which 334 were supported. In addition, during 2013 EMBL Hamburg organised four advanced training courses and scientific conferences.

EMBL has also joined with eight research partners to set up the new Centre for Structural Systems Biology (CSSB) on the DESY campus. The CSSB is an interdisciplinary centre bringing together state-of-the-art structural biology, infection biology and systems biology approaches. On 4 September 2013 the ground-breaking ceremony for the CSSB building took place. Matthias Wilmanns, Head of EMBL Hamburg, was appointed founding director by the CSSB Kuratorium in early 2014.

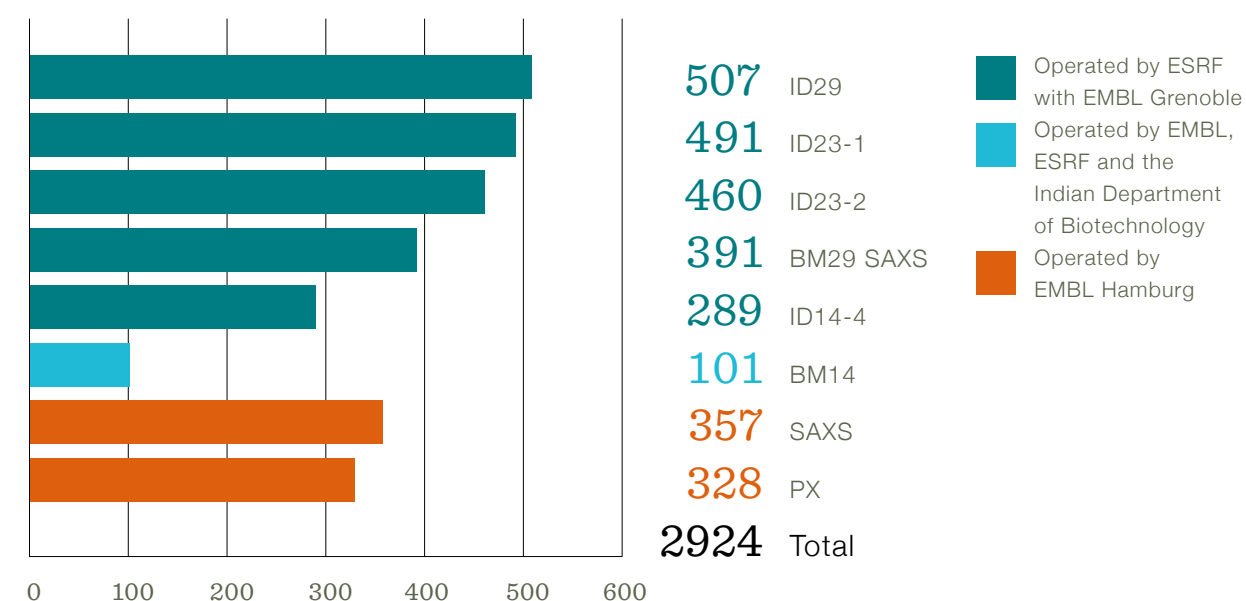
EMBL Grenoble

In Grenoble, the ESRF is in the second half of phase I of its upgrade programme, which entails the construction of five new beamlines, the refurbishment of many existing beamlines and major new developments in synchrotron radiation instrumentation. As part of this programme, the old MX beamlines are being shut down and new beamlines are being built in collaboration with EMBL Grenoble teams. The new MX beamlines, MASSIF

and ID30B, should become available during 2014-2015. Despite the resources dedicated to the construction of new beamlines and the availability of fewer operational MX beamlines, output has remained high with the 10 000th structure produced using the Grenoble structural biology beamlines being deposited in the Protein Data Bank in February 2014. In December 2013, we witnessed the end of an era as the last user experiment was carried out at ID14-4 after 15 years of service. To mark the substantial contribution of ID14 to structural biology – for instance, contributing to the Nobel prize-winning determination of the structure of ribosomes – a one-day symposium was held on 3 February 2014 as part of the ESRF Users' meeting.

The highly automated ESRF crystallography beamlines are currently equipped with EMBL-designed high-precision micro-diffractometers and frozen crystal sample changers. EMBL and ESRF also jointly run a new SAXS instrument that is equipped with a custom-designed small-volume automatic sample changer.

Users of EMBL Beamlines during 2013



Core Facilities

EMBL Heidelberg operates seven Core Facilities, which are central components of EMBL's research network. They offer cutting-edge technology and services in the areas of advanced light microscopy, electron microscopy, genomics, proteomics, protein expression and purification, flow cytometry, and chemical biology and are heavily used by all research Units at EMBL as well as by external academic users from our member states.

The Core Facilities are heavily involved in all of the missions of EMBL. They not only provide services but are also involved in research; method and technology development; training; industry relations and international projects. They also give advice and help to other facilities in our member states. For example, Core Facility staff co-organised 15 out of 21 courses that took place at the EMBL Advanced Training Centre in 2013. In addition, they are active in supporting training activities in our member states.

To further share their expertise, the EMBL Core Facilities became one of the founding members of the 'Core for Life' alliance. Core for Life was established as an excellence alliance of life science core facilities in Europe with the aim to bundle expertise and resource access.

The Core Facilities also successfully took part in the Euro-BioImaging proof of concept study. Finally, our Core Facilities act as consultants to industry and further develop instruments or methods: for example, the Genomics Core Facility published an application note for automated preparation of complete sequencing libraries together with Hamilton and New England Biolabs.

To guarantee that the Core Facilities are able to offer the services requested by our researchers, regular investments are needed. For example, to address growing demand on the sequencing service, the Genomics Core Facility in Heidelberg added an Illumina HiSeq 2000 sequencer and a Beckman liquid handling robot FXp to increase its capacity. At the end of 2013, the Electron Microscopy Core Facility installed the Zeiss FIBSEM, which opens up a new era of three-dimensional ultrastructure imaging. The Advanced Light Microscopy Facility installed a gated STED system from Leica on a loan-basis. The Protein Expression and Purification Core Facility further optimised the workflows for parallel processing of samples for small-scale protein expression testing and purification. The Chemical Biology Core Facility implemented a new platform for high-throughput cell-based screening. In the Proteomics Core Facility, the implementation of workflows for quantitative proteomics was finalised allowing comparative proteome profiling with high sensitivity.

A survey of Core Facility users conducted in December 2013 showed that they are very satisfied with the technologies offered and the support from staff. The positive feedback was in accordance with the review of a panel of external experts who rated the overall service level as outstanding (page 54).

Technology

Development and Transfer

EMBL's innovation-fostering environment breeds cutting-edge technologies, and strong links to industry return the benefits to society.

Technology Development

A good example of technology development at EMBL has been Selective Plane Illumination Microscopy (SPIM). The technology was developed at EMBL in the group of Ernst Stelzer and led to a first patent application filed in 2002. An exclusive license was granted to Zeiss and resulted in the launching of the first commercial SPIM microscope, the ZEISS Lightsheet Z.1. This is well-suited to three-dimensional imaging of transparent tissues or whole and living organisms as specimens are exposed only to a thin plane of light, and so photobleaching and phototoxicity are minimised. As of 2007, Lars Hufnagel has been among those pushing the evolution of the SPIM technology and developing the next generation of SPIM microscopes. His group created the MuVi-SPIM microscope, for which a commercial prototype has been developed and is being directly marketed to academic laboratories via EMBLEM. During the past year, Lars, Jan Ellenberg and their colleagues

have for the first time developed a SPIM microscope that allows the imaging of live mouse embryos.

Another recent example is the development of a paramagnetic bead-based method for proteomics sample preparation by Jeroen Krijgsveld and Lars Steinmetz and their EIPOD fellow Christopher Hughes. This method overcomes the shortcomings of current procedures, which show significant limitations with regard to reagent compatibility, sensitivity, and throughput. The so-called Single-pot Solid-phase-enhanced Sample preparation method (SP3) allows for time-efficient and cost-effective enrichment of proteins or purification of peptides for downstream analysis in high-throughput automated set-ups, thus significantly facilitating next-generation proteomics research. EMBLEM has filed a European patent application covering key aspects of this technology in early 2014 and there is already interest from industry.

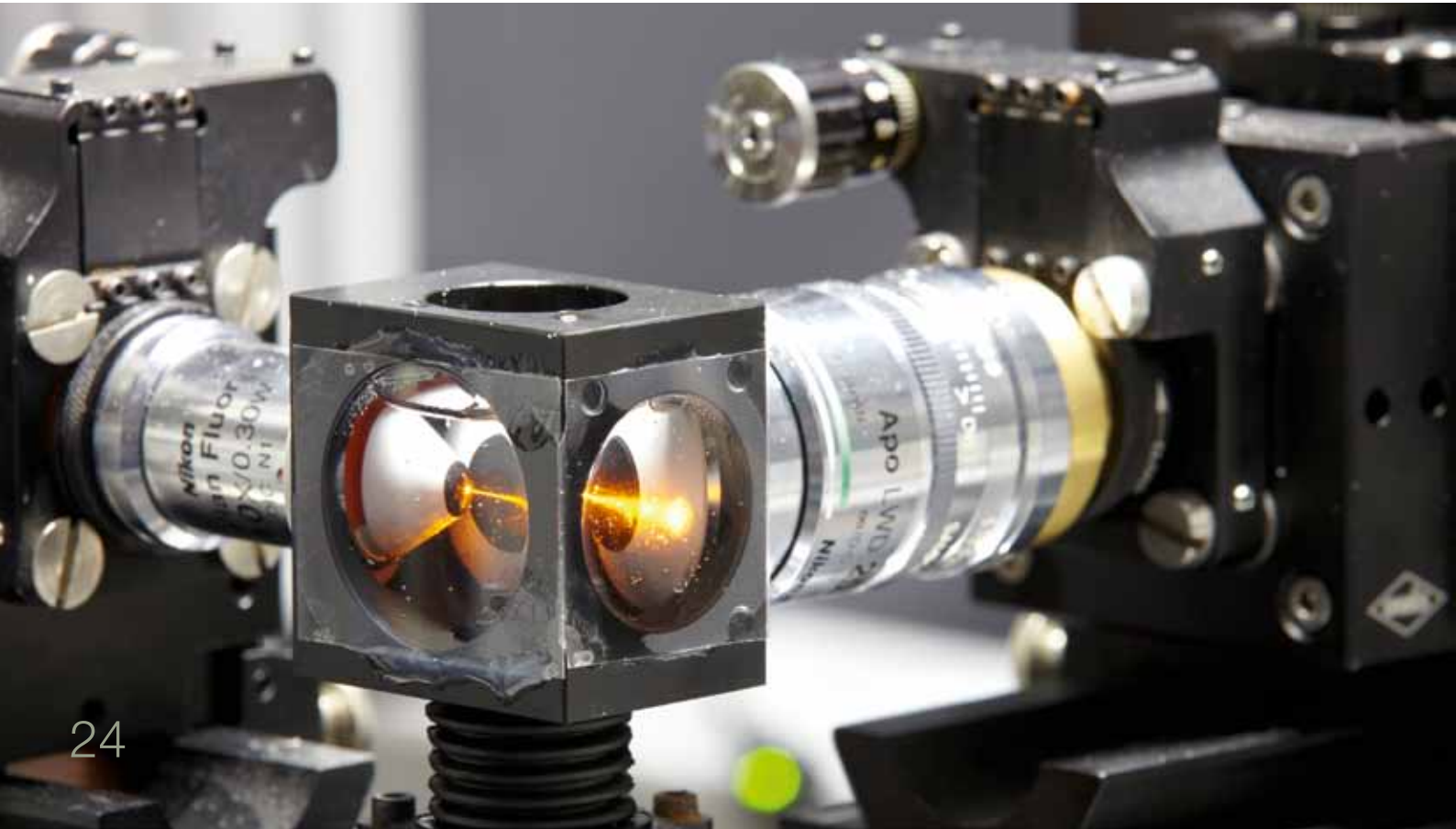
The next generation of SPIM microscopes includes MuVi-SPIM, developed by the Hufnagel group – a commercial prototype is being marketed via EMBLEM.

Technology Transfer (EMBLEM)

The technology transfer activities of EMBL are carried out exclusively by EMBLEM Technology Transfer GmbH, the wholly owned limited liability company of the institute. Established in 1999, EMBLEM is celebrating its 15th anniversary this year with a strong track record of successes and achievements including a record turnover in the past fiscal year of over €5 million. EMBLEM’s pro-active technology transfer approach ensures the rapid commercial development of promising innovations while simultaneously securing the free dissemination of knowledge for basic research purposes.

Industry Relations

EMBL has a history of collaborations with industry and small businesses to ensure that EMBL’s knowledge and technologies are disseminated to society. The Corporate Partnership Programme continues to be a catalyst for advanced training in the lab, and EMBL is delighted to welcome GlaxoSmithKline to this flourishing initiative. In addition EMBL, together with EMBLEM, constantly searches for new ways of collaborating. In 2013, the ‘EMBL Science Days’ were initiated and organised by EMBLEM. These events bring together selected EMBL scientists and industry researchers in pre-defined scientific topics to foster exchange and future collaboration. The events so far – with Merck, GSK and Promega – have been extremely well received and have already triggered numerous new interactions.



EMBLEM Technology Transfer in numbers

	In 2013	Total 1999-2013
Invention Disclosures	48	689
Number of EMBL Inventors on Record	Not applicable	503
License & Collaboration Contracts Concluded	329	> 2,500
Priority Patent Applications Filed	21	282
Copyrights	2	98
Patents Granted	13	> 150
Number of Commercial Licensees	Not applicable	> 250
Start-Ups Created	0	16
Income	€ 5,600,000	€ 52,500,000

Another new format launched was the Innovation & Translation Initiative to develop strategic alliances. In this frame, the EMBLEM team supported the defining, negotiating and concluding of a pioneering public-private research initiative between GSK, the EMBL-EBI and the Wellcome Trust Sanger Institute, named the Centre for Therapeutic Target Validation (CTTV). The aim of the initiative is to harness the power of 'Big Data' and genome sequencing to improve the success rate for discovering new medicines. The CTTV aims to address a wide range of human diseases and will share its data openly in the interests of accelerating drug discovery.

Training and Outreach

*Patrick Vallance, GSK
President for Pharma
R&D, at an 'EMBL
Science Day'.*



Thanks to the enthusiasm of all its staff, EMBL is known for excellence in training at multiple levels: from those at secondary school to PhD students to principal investigators.

Internal Training

Since the inception of the EMBL International PhD Programme (EIPP) 30 years ago some 850 students have graduated and jump-started their careers at EMBL. Over the years the programme has steadily attracted more and more applicants and continues to gain in popularity. In 2013, the number of applications passed the 2000 mark, a 20% increase compared with 2012. To be able to process this ever-growing number of applications a new online recruitment tool is being developed.

In recent years the Postdoctoral Office has been dedicated to the communication and presentation of the Postdoctoral Programme. In 2013, a brochure was produced and these efforts have resulted in another year

Internal training in numbers

EMBL International PhD Programme

	2013
Number of applications	2242
New PhD students joining EMBL	46
Graduations	43
Total number of PhD students	242

EMBL Postdoctoral Programme

	2013
Number of EIPOD applications	136
New EIPODs joining EMBL	23
Number of EIPOD postdocs	79
Total number of postdocs	251



of steady growth in numbers. The EMBL Interdisciplinary Postdoctoral (EIPOD) Programme remains a successful and highly valued initiative and in 2013 welcomed the first group of 23 postdocs that are supported by the second EC FP7 Marie Curie Actions COFUND grant.

External Training

Over the 10 years of its existence, the EMBL International Centre for Advanced Training (EICAT) has expanded our ability to serve scientists across Europe with an attractive, cutting-edge programme of courses and conferences. During 2013, the EMBL Course and Conference Programme continued to grow, presenting 13 conferences and 45 courses across all EMBL sites, reaching more than 5000 scientists. And this growth is set to continue, with the largest Course and Conference Programme to date planned for EMBL's 40th anniversary year. In 2014 around 6000 visitors are expected to attend 20 conferences and 18 training courses at the EMBL Advanced Training Centre (ATC) in Heidelberg, with many further training courses at the outstations planned. The development of the scientific vision for external training and the EMBL Course and Conference Programme will be a key task for the new Scientific Coordinator, Jürgen Deka.

In 2013, the courses and conferences taking place at the ATC attracted participants from 78 different countries, with approximately 80% of

participants coming from EMBL member states. October 2013 saw the largest conference to date at the ATC with 473 delegates attending the EMBO|EMBL Symposium: The Non-Coding Genome. EMBL and its partners in the Corporate Partnership Programme also aim to support participants travelling from countries in need of scientific strengthening to training activities at the ATC: in 2013 a total of 191 CPP fellowships were awarded. Successful courses and conferences were also held at the EMBL outstations in Grenoble, Hamburg, Hinxton and Monterotondo; for example, the 11th International Conference on Biology and Synchrotron Radiation held in September 2013 was the largest conference to date organised by EMBL Hamburg. The training programme at EMBL-EBI continues to evolve in response to demand from emerging research communities, and provided a curriculum covering the full spectrum of EMBL-EBI activities and actively involving more than 140 EMBL-EBI staff members. In 2013, in addition to the on-site courses, EMBL-EBI ran 250 events in 28 countries, helping thousands of people make the most of public data resources. Tailored to industry, the EMBL-EBI industry programme allows discussion of shared challenges and ran in 2013 nine training workshops, which serve to facilitate the discovery of new therapeutics, vaccines, consumer goods and agricultural products. 'Train online', the e-learning resource launched in 2011, also served over 82000 unique IP addresses in 2013. In addition, EMBL-EBI has developed, tested and implemented a process for supporting trainers outside EMBL-EBI to deliver high-quality training based on the EMBL-EBI model, which was successfully rolled out in Australia in 2013.

A snapshot of successful courses and conferences

	Participants
Largest conference ever at EMBL Heidelberg:	
EMBO EMBL Symposium: The Non-Coding Genome (9-12 October 2013)	473
Largest conference ever at EMBL Hamburg:	
11th International Conference on Biology and Synchrotron Radiation (BSR; 8-11 September 2013)	327
Key course at EMBL Monterotondo:	
Laboratory Animal Science Course FELASA accredited (26 April 2013)	20
Highest traffic to Train Online:	
Number of unique visitors in October 2013	10,900



in the initial communications to promote the new Centre for Therapeutic Target Validation based at the Wellcome Trust Sanger Institute / EMBL-EBI campus.

In 2013, the Science and Society Programme and the European Learning Lab for the Life Sciences (ELLS) had a busy year. ELLS recently launched the EMBL School Ambassadors Programme. EMBL scientists are visiting schools in Europe and share their experiences of working as a researcher with the aim of providing a more concrete idea of the various opportunities and types of careers in the sciences and to share insights on exciting developments in life science research. The Science and Society Programme brought the EMBL Forum, the multi-disciplinary seminar series that has run uninterrupted since 1998, to Grenoble and Monterotondo. Two special symposium events also took place at the outstations in 2013. From Habit To Addiction: A Slippery Slope? was the seventh in a series of EMBL-EBI public meetings. The aim of this meeting was to construct an image of addiction by having expert speakers give talks and take part in discussions. The second symposium, Regenerating the Body: The Future of Medicine, took place in Grenoble. In front of a packed auditorium, a set of experts contrasted the reality of regenerative medicine against the public reaction this relatively new field generates. The joint EMBO/EMBL Science and Society conference this year was entitled Public and Private Health – Genomics, Medicine and Society. This time the conference focused on how the use of genomic information may benefit individual and public health. Three highly successful lecture events took place in 2013 within the Heidelberg Forum – Biosciences and Society. This initiative aims to promote public understanding of science and was launched by the EMBL in collaboration with the German Cancer Research Centre (DKFZ) and the University of Heidelberg in 2001.

Outreach

EMBL's outreach programme pools activities organised by the Office of Information and Public Affairs (OIPA), the EMBL-EBI training and outreach teams, the European Learning Lab for the Life Sciences and the Science and Society Programme.

EMBL expanded its social media presence and started a twitter account, @EMBLorg, to increase EMBL's visibility and to better interact with our target audiences online. An example of social media bringing the Laboratory and the outside world closer together is the EMBL 2014 calendar, which showcases the vision and creativity of scientific endeavour and draws people's attention to our anniversary year. For this calendar, scientists from across the Laboratory submitted over 100 images, and from a shortlist of 20 our facebook friends selected the 12 to be featured.

Outreach highlights in 2013 included an open day on the EMBL Grenoble campus and a visit of 25 international journalists, both jointly organised by the campus partners in Grenoble. EMBL Hamburg again took part in the Night of Science which attracted 18000 visitors to the DESY site and 3000 of them visited the EMBL stand.

At EMBL-EBI, the external relations team organised the opening ceremony and exhibition for the new South Building on 28 October with guests of honour Rt Hon David Willetts MP and Professor Patrick Vallance. Interactive displays and vibrant graphical elements were designed specifically to engage the guests with the excitement of cutting-edge life-science research. The EMBL-EBI external relations team also took the lead

Integrating Life Sciences

in Europe and Across the World

From revising membership plans to exploring new forms of collaboration, fostering, strengthening and building upon links throughout the international life science community is a key part of the EMBL vision.

Member State Relations

To strengthen the relationship between EMBL and its member states, the EMBL Director General and Director of International Relations met with high level member states' representatives including the Irish Minister of State for Research and Innovation Sean Sherlock; the President of the Portuguese Foundation for Science and Technology Miguel Seabra; the President of the Italian Research Council Luigi Nicolais, the Spanish Secretary of State for Research, Development and Innovation Carmen Vela; the Minister of Economy of the Regional Government of Catalonia Andreu Mas-Colell and the Greek Secretary General for Research and Technology Christos Vasilakos. In addition, EMBL, EMBO and the Faculty of Sciences of the University of Lisbon co-organised a scientific event which highlighted

The Czech Republic became EMBL's 21st member state, and the Slovak Republic joined the new prospect membership scheme.

molecular biology in Portugal and EMBL. The event brought together 230 scientists, including EMBL scientists, EMBL alumni and many young Portuguese researchers.

At the EMBL 2013 Winter Council meeting, an application from the Australian Government to renew its associate membership beyond the first 7 years was unanimously endorsed. The renewed associate membership period will start in 2015 and different meetings took place to continue and strengthen the successful cooperation between EMBL and Australia, including a visit to the EMBL headquarters by Branch Manager, Research and Higher Education Infrastructure, Department of Education of the Australian Government, Ms Ditta Zizi.

After the positive review by the EMBL Scientific Advisory Committee (SAC) of the proposal for establishing a new outstation in Spain focusing on Tissue Biology and Disease Modelling, the EMBL Administration started developing a financial plan and draft host site agreement in collaboration with the Spanish partners. Council delegates visited the current EMBL-CRG partnership unit for Research in Systems Biology to discover how the proposed outstation could contribute to furthering our knowledge of human diseases through the development of novel human model systems, new methodologies for three-dimensional mesoscale microscopy and the modelling of complex multicellular systems.

EMBL's Expanding Membership

The Czech Republic ratified the EMBL Membership Agreement and this will enter into force upon the deposit of the ratification instrument with the Swiss Government. EMBL has established many scientific links with the Czech life science community. In 2013, there were scientific visits by directors and group leaders from the national life science research infrastructure laboratories CEITEC and BIOCEV, as well as a visit of CEITEC administrators.

Director of International Relations Silke Schumacher visited Malta, where she met with key representatives of the scientific community and the Minister of Education and Employment Evarist Bartolo. Subsequently, with the support of the scientific community, Malta sent a formal application for membership of the EMBC and EMBL for decision at the EMBC and EMBL 2014 Summer Council meeting.

With the aim of further integrating the molecular biology community in Europe and globally, the EMBL Council adopted a new scheme on prospect membership and revised its associate membership scheme. Prospect membership of EMBL is valid for a period of 3 years and is available to European countries that are considering becoming EMBL member states. As a prospect member state the country has an observer status in the EMBL Council, its scientists get full access to EMBL's facilities and services, and the country's early career researchers become eligible for internal



Building on Argentina's long-standing research relationship with Europe, the associate membership will further facilitate interaction between the Argentinean and European molecular biology communities.



scholarships in the PhD and Postdoctoral Programmes. At the same time, EMBL will work with the relevant national bodies to raise the visibility of EMBL in the prospect member state and promote cooperation between the EMBL faculty and national researchers. This has already resulted in the Slovak Republic becoming the first EMBL prospect member state in February 2014.

Acknowledging that excellent science is a global endeavour, EMBL revised its associate membership scheme to actively promote knowledge-sharing and ambitious cooperation activities over large distances. The terms of the associate membership scheme were simplified and aligned with EMBL's full membership to support cooperation with non-European countries on the principle of reciprocal responsibility and benefit. The revision of the scheme on associate membership of EMBL resulted in a unanimous approval at the 2013 Winter Council Meeting of the Argentinian application to become the second associate member. Building on Argentina's long-standing research relationship with Europe, the associate membership will further facilitate interaction between the Argentinean and European molecular biology communities. During a 2-day inaugural and scientific event on 22-23 April 2014, EMBL Director General Iain Mattaj and the Minister of Science, Technology and Productive Innovation Lino Barañao, signed an agreement granting the status of associate member state of EMBL to Argentina.

EMBL Partnerships

The EMBL Australia Partner Laboratory Network is steadily developing. The South Australia Health and Medical Research Institute (SAHMRI) was launched with support of the university partners – Adelaide, South Australia and Flinders University – as well as the South Australian State Government. SAHMRI will host a node of the Australian Partner Laboratory Network and two group leaders have already been recruited following a competitive international call. In addition, Graham Cameron, as Director of the EMBL Australia Bioinformatics Resource (BRAEMBL), made significant progress in refining the BRAEMBL initiative, which will provide training and user support for the bioinformatics services.

The past year has also been exciting for the Nordic EMBL Partnership for Molecular Medicine with many activities and exchanges between the different nodes and EMBL. In the past year, the newest node, DANDRITE, successfully started to implement the EMBL scientific and operational model, recruiting two new young group leaders as well as PhD and postdoctoral fellows.

In addition, EMBL hosted several visits by young investigators, administrators and training coordinators from all four Nordic nodes. They exchanged good practices, discussed new projects, the potential for joint activities and learned about training and career opportunities at EMBL. Finally, 150 representatives – ranging from PhD students to principal investigators from EMBL and its four Nordic partners – met at the Oslo

150 representatives from EMBL and its four Nordic partners exchanged knowledge and expertise at the annual meeting of the Nordic EMBL Partnership.



Science Park during September 2013 for the annual meeting of the Nordic EMBL Partnership to exchange knowledge and expertise.

On 4 June 2013 the 10th anniversary of the Partnership for Structural Biology (PSB) was celebrated. This partnership has recently received fresh impetus with the move of the Institut de Biologie Structurale (IBS) onto the European Photon and Neutron Science campus in Grenoble together with all the other partners.

Cooperation Agreements

To strengthen research links with institutes in its member states, over the course of the past year EMBL has entered into agreements envisaging scientific exchange and collaboration with: the Karolinska Institutet, Sweden, in the context of the CSSB in Hamburg; and the Universitätsklinikum Hamburg-Eppendorf (UKE), Germany. The agreement with UKE also included an agreement for the joint award of PhD degrees. This collaboration was celebrated with an official launch event to boost interactions between EMBL and UKE faculty.



The ELIXIR hub is housed in the new EMBL-EBI South Building.

European Research Infrastructures

EMBL is closely involved in the Biological and Medical Science projects on the European Strategy Forum on Research Infrastructures (ESFRI) roadmap, which is the European platform to explore new initiatives for the development of European research infrastructures.

ELIXIR

ELIXIR moved into its implementation phase after the ELIXIR Consortium Agreement (ECA) entered into force with its public launch in Brussels on 18 December 2013. The formal launch included a signing ceremony, a series of talks on ELIXIR and a networking and poster session. The launch was attended by ELIXIR members and high-level national and European funders, including the Director General for Research and Innovation of the European Commission's DG Research, Robert-Jan Smits. Since June 2013 the ECA has been signed by EMBL, UK, Sweden, Switzerland, Czech Republic, Estonia, Norway, Netherlands and Denmark. The ELIXIR Nodes in these countries have also now been established. France and Belgium also signed the Memorandum of Understanding to participate, which is the first step towards full membership of ELIXIR.

The ELIXIR Programme and Financial Plan for 2014-2018 were developed over the course of the year. After adoption by the ELIXIR Board, they will form the basis for ELIXIR's activities over the coming 5 years. On the operations side, a Technical Coordinator's group was formed, which will develop ELIXIR's technical strategy on issues including cloud computing and interactions with other e-infrastructures. The Collaboration Agreement template was approved in April 2014 and will form the basis for the services that will be run by the ELIXIR Nodes over the coming years.

Euro-BioImaging

Euro-BioImaging is set to become an international organisation that will give European researchers open access to innovative biological and medical imaging technologies, and allow them to benefit from the expertise, services, image data management and training that are essential for performing cutting-edge research. The distributed pan-European infrastructure will be empowered by a strong supporting and coordinating Hub, which will provide the single entry point for the user who will be guided to the requested imaging technology provided by the Euro-BioImaging Nodes.

The preparatory work, coordinated by EMBL, is coming to an end in 2014 and over 100 proof-of-concept studies carried out in 2013 have demonstrated the value of the Euro-BioImaging's infrastructure model. These studies have already resulted in the rapid publication of over 40 scientific papers within a year.

Further Broadening our Horizons

In 2013, a strong scientific delegation presented the successful joint projects between EMBL and researchers supported by the Russian Foundation for Basic Research (RFBR) at the annual FEBS meeting in St. Petersburg. In addition, in early 2014, RFBR, EMBL and EMBO signed a new Memorandum of Understanding, which foresees a furthering of the existing cooperation that has been in place since 2010. Finally, in early 2014, after meticulous planning, the experimental equipment of the shut down DORIS beamlines was transferred successfully from Hamburg to the Kurchatov Institute in Moscow.

Since 2010, EMBL and India have been engaged in a very successful cooperation in the field of structural biology, jointly operating beamline BM14 in cooperation with ESRF. BM14 has been a boon to the Indian structural biology community as was evident at the 42nd National Crystallography Seminar held in New Delhi in November 2013. To discuss the continuation of this alliance and also to explore new collaborative opportunities, EMBL's Director of International Relations visited India during October 2013. She met with the Secretary of the Department of Biotechnology and other key representatives of the Indian Government, and also with prominent members of the Indian life science community in New Delhi, Bangalore and Hyderabad to discuss possible synergies and collaborative opportunities.

South Africa, which is already closely collaborating with EMBO/EMBC and has an observer status at the Conference, has indicated their wish to step up their engagement with EMBL.



EMBL and EMBL-EBI joined the Global Alliance, a large-scale, international effort to enable the secure sharing of genomic and clinical data.

At the beginning of 2013, 71 imaging facilities from 19 countries expressed their interest in becoming Euro-BioImaging Nodes. The large majority of facilities was evaluated positively by an independent high level international review board and many of these potential future Nodes are currently being upgraded (€202 million have already been invested) or are negotiating financial support for participation in Euro-BioImaging with their national funding agencies.

At the end of 2013, the Intergovernmental Working Group representing 21 European countries and EMBL agreed on the Euro-BioImaging Memorandum of Understanding. On 31 March 2014, the Euro-BioImaging Interim Board was created with representatives from EMBL and delegates from the 11 European countries (Belgium, Czech Republic, Finland, France, Israel, Italy, Poland, Slovakia, Spain, The Netherlands, UK) who had signed the Memorandum of Understanding. The Interim Board takes on the responsibility for infrastructure implementation including the decision on the final legal and governance structure, the hub-hosting country, finance plan and user access policy. Its work will be based on the recommendations developed in the preparatory phase.

BioMedBridges

BioMedBridges forms a cluster of biomedical science research infrastructures on the ESFRI roadmap and spans many disciplines from structural biology and genomics to translational research and clinical trials. In December 2013 the project completed the first half of its 4-year period. A comprehensive assessment of the legal and ethical landscape surrounding data sharing and integration was completed and an online tool now assists researchers with necessary contractual templates and supporting documentation. A first set of data integration tools has made existing data more accessible, enabling their full potential to be realised while at the same time raising all infrastructures to a higher level of data interoperability readiness.

Under the BioMedBridges umbrella and led by ELIXIR and EU-OPEN-SCREEN, the infrastructures involved in the project together with AnaEE and LifeWatch published a paper on the principles of data management and sharing. This important document, which paves the way for efficient and sustainable use of the infrastructures but emphasises that while data sharing and re-use should be encouraged where possible, enabling supporting policies and suitable technical infrastructure must be put in place.

Other Collaborations

Building on successful existing cooperation, EMBL and the European Commission (EC) signed a new Work Plan in November 2013 for the period 2014-2015, which looks towards the new European funding programme for research and innovation, namely Horizon 2020. The Work Plan has also identified areas – such as research infrastructures, mobility of researchers, and international cooperation – in which the EC and EMBL have agreed to cooperate towards the completion of the European Research Area (ERA). In addition to its direct interactions with the EC, EMBL maintains close links with the EC as a member of EIROforum, a partnership between eight of Europe's largest inter-governmental scientific research organisations. EIROforum prepared a joint position paper on the Commission's Progress Report on the implementation of the ERA. The EIROforum position was discussed with the Research Working Party of the EU Council, which comprises representatives of all EU member states. In addition, EIROforum was asked to comment on a draft of a European Charter for Access to Research Infrastructures, which was drafted by the EC.

EMBL and EMBL-EBI have joined the Global Alliance, a large-scale, international effort to enable the secure sharing of genomic and clinical data. 70 organisations in Asia, Australia, Africa, Europe, North America and South America supported the White Paper, circulated in 2013, which asks for the creation of a common framework that supports data analysis and protects the autonomy and privacy of participating individuals.

EMBL-EBI became one of the first members and integrators of ORCID. ORCID is an open, non-profit, community-based effort to provide a registry of unique researcher identifiers and a transparent method of linking research activities and outputs, such as publications, to these identifiers. The Europe PubMed Central service, which is managed by EMBL-EBI, has developed a tool to allow authors to select and export their articles to ORCID and in so doing, create or enhance their bibliographies.

EMBL and Stanford University, CA, USA, signed a Memorandum of Understanding for the establishment of a Life Science Alliance with the objective to increase collaboration and exchange of researchers for the benefit of the life science communities in Europe and the USA.

EMBL Alumni

Ambassadors of the EMBL model, culture and spirit, EMBL's more than 6000 alumni play a pivotal role in the institute's continued success.

A body of highly trained scientists, science communicators and administrators, EMBL alumni help EMBL to establish and strengthen collaborations and partnerships; offer career resources, advice and recruitment opportunities; participate in and organise courses and conferences; and provide invaluable feedback to the institute at all levels. They also help to fulfil the alumni association's mission, formulated in 2013, 'to advance EMBL and the relevance of life science research in the scientific community and society at large, by fostering connections between the Laboratory, the alumni and the public.'

Strong interactions with alumni are an institutional priority. The alumni have increased their level of engagement in the past year bringing them, their work and their institutions more visibility through the various EMBL news channels, online resources and platforms as well as events held at EMBL and alumni institutes. The ongoing efforts in tracking and reaching alumni have contributed to the success of this engagement. Their known whereabouts

has increased from 58% to 62% in the past year, and membership from 39% to 44%, with double the number of alumni joining the EMBL Alumni Association compared with the previous year.

Thanks to our donors Roland Specker and EMBLEM, respectively, the EMBL Alumni Association now offers two prestigious prizes in the name of its first two Director Generals, both of which celebrate and support the careers of EMBL alumni. These are the John Kendrew Award for Young Scientists, which was introduced in 2008 and for which the prize award was raised to €5000 in 2013; and the new Lennart Philipson Award that will be given for the first time in 2015 and which honours contributions in translational research in human health and/or technology innovation. It is also valued at €5000.

The winner of the 2014 John Kendrew Award is Martin Jinek, a former Structural and Computational Biology Unit PhD student from the Czech Republic. Martin was chosen in recognition of the impact of his academic research on technology development in academia and the biotech industry. His collaborative work in the development of RNA-guided gene targeting has helped change the way that genomes are engineered.

General donations and sponsorships, by EMBLEM as well as by local sponsors, have allowed the Alumni Association to increase the number of events organised



Martin Jinek, winner of the 2014 John Kendrew Award

Event	Venue	Date
Local chapter France	Institute Curie, Paris	7 June 2013
John Kendrew Award Ceremony	EMBL Heidelberg	14 June 2013
Local chapter Germany	EMBL Heidelberg	29 June 2013
Local chapter Greece	Dilofo, Ioannina	30 June 2013
EMBL staff-alumni run against cancer	NCT, Heidelberg	12 July 2013
Life science event in Portugal	University of Lisbon	18 July 2013
Local chapter Netherlands	The EMBO Meeting, Amsterdam	23 September 2013
Local chapter UK	Boathouse and EMBL-EBI, Cambridge	25 September and 21 November 2013
Core Facilities local chapter Ireland	University College Cork	22 October 2013
Rhein-Neckar-Kreis Stammtisch 'regulars'	Various venues in Heidelberg	23 October 2013, 18 December 2013, 19 February 2014

Administration

By efficiently developing and deploying resources, EMBL's Administration strives to free the minds of staff to focus on the task at hand.

The activities of EMBL Administration span budgetary, financial and purchasing matters; human resources; grants and external funding management; facilities management; health and safety; and development of administration IT systems.

Highlights of administrative activities and projects undertaken during the past year include:

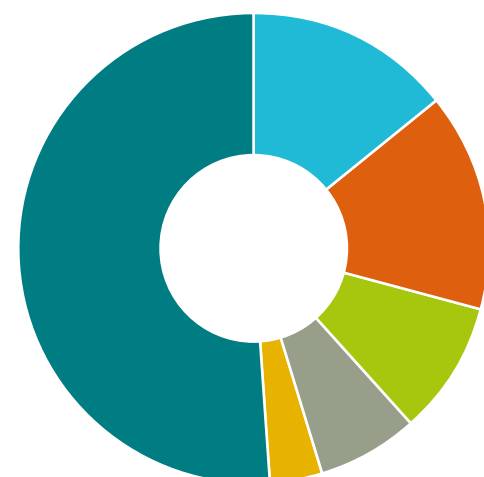
- The Badge of 'Excellence' that was awarded to EMBL by the European Commission. This HR Excellence in Research Award acknowledges progress in implementing the European Charter for Researchers and the Code of Conduct for Recruitment of Researchers and aims to improve employment, career development and working conditions of researchers in an open, sustainable European labour market.
- The Council working group on terms and conditions of employment at EMBL reported its findings to the 2013 Winter Council meeting. Based on a survey of 14 national and international organisations, the Working

Group concluded that EMBL's terms and conditions of employment are appropriate to enable EMBL to attract and retain highly qualified staff. The recommendation to align some conditions with practice in other organisations, in order to remain an attractive and competitive employer, was accepted by Council.

- EMBL has improved substantially the conditions of employment of EMBL fellows. Since January 2014, they are full members of the EMBL pension scheme. In addition, fellows are now entitled to the EMBL unemployment and accident at work insurance.
- An initiative to improve efficiency of administrative processes, gradually replacing manual paper-based tasks, commenced with the introduction of electronic time recording in January 2014.

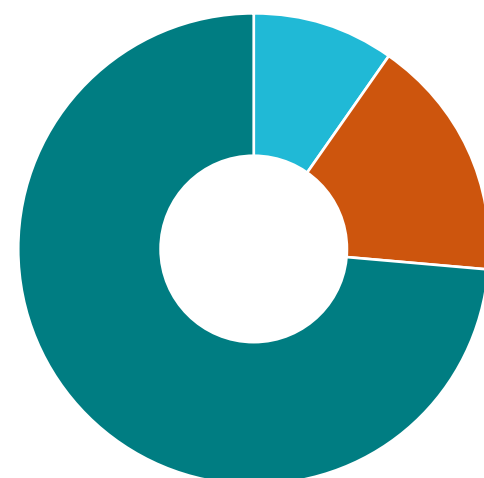


Personnel Statistics



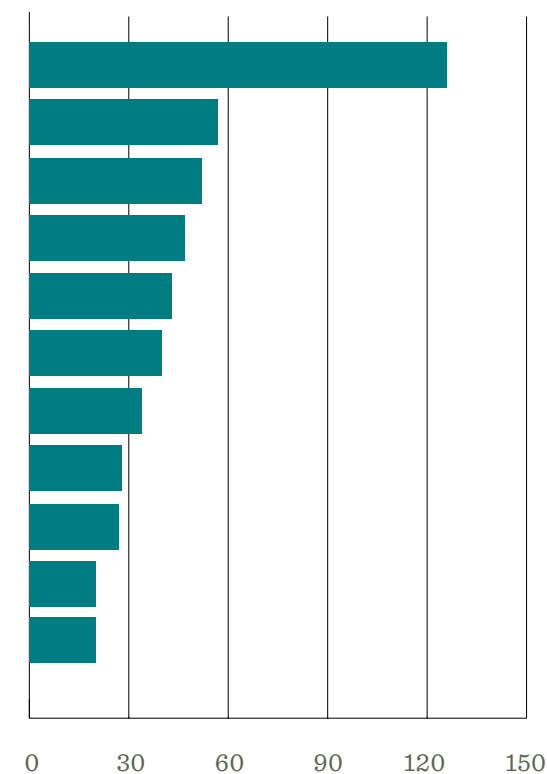
Personnel
on 31 December 2013

902	Staff
251	Predocs
261	Postdocs
164	Visitors
119	Supernumeraries and ancillaries
63	Diploma students and trainees
1760	Total



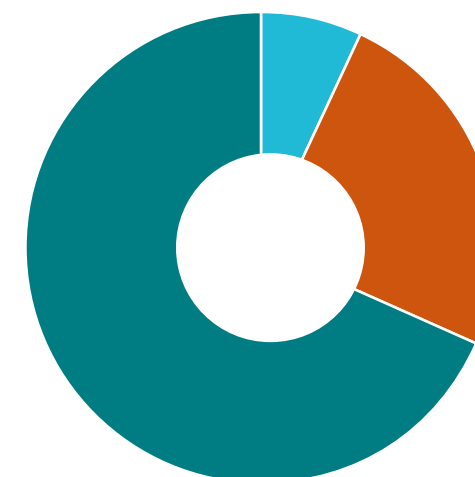
Staff Nationalities

1300	EMBL member states
168	European non-member states
292	Rest of the world
1760	Total



Visitors to EMBL units
during 2013

126	EMBL-EBI Hinxton
57	Cell Biology and Biophysics
52	Structural and Computational Biology
47	Core Facilities
43	Genome Biology
40	EMBL Monterotondo
34	EMBL Hamburg
28	Others
27	Developmental Biology
20	Directors' Research
20	EMBL Grenoble
494	Total



Visitors' Nationalities

338	EMBL member states
34	European non-member states
122	Rest of world
494	Total

Financial Report

Income/expenditure statement

Income

x € 1,000

	2013	2012
Member state contributions		
— Ordinary contributions	97,277	94,842
— Currency adjustment for Sterling contributions	189	—
— Associate member state contributions	501	501
— Additional contributions	22,457	7,732
Internal tax	29,871	23,303
External grant funding	40,160	36,613
Other external funding	1,923	1,612
Other income	14,044	16,226
Total income	206,422	180,830

Expenditure

Staff costs	113,772	105,135
Operating costs	72,875	56,884
Equipment expenditure incl. Depreciation	16,573	16,686
Total expenditure	203,220	178,705
Surplus (deficit) for the year	3,202	2,125

External grant funding

	2013		2012	
	x € 1,000	%	x € 1,000	%
ANR	221	0.6	363	1.0
BBSRC	2,422	6.0	2,156	5.9
BMBF	1,565	3.9	2,447	6.7
BW	89	0.2	103	0.3
DFG	1,634	4.1	1,362	3.7
EC	13,597	33.9	14,017	38.3
ERC	3,307	8.2	1,821	5.0
FINOVI	48	0.1	106	0.3
HFSP	66	0.2	212	0.6
HUMBOLDT	262	0.7	65	0.2
MRC	114	0.3	153	0.4
NIH	9,030	22.5	7,192	19.6
VW Foundation	17	0.0	(1)	0.0
Wellcome Trust	5,447	13.6	4,455	12.2
Others	2,342	5.8	2,163	5.9
Total	40,160	100%	36,613	100%

Other external funding

EMBL-EBI industry support	716	37.3	703	43.6
Elixir	1,058	55.0	558	34.6
Other external funding	149	7.7	352	21.8
Total	1,923	100%	1,612	100%

EMBL budget 2013

€ 206 milion

Member state contributions

	2013		2012	
	x € 1,000	%	x € 1,000	%
Austria	2,121	2.2	2,068	2.2
Belgium	2,617	2.7	2,551	2.7
Croatia	292	0.3	285	0.3
Denmark	1,693	1.7	1,650	1.7
Finland	1,352	1.4	1,318	1.4
France	15,457	15.9	15,070	15.9
Germany	19,835	20.4	19,338	20.4
Greece	1,761	1.8	1,717	1.8
Iceland	88	0.1	85	0.1
Ireland	1,255	1.3	1,224	1.3
Israel	1,012	1.0	986	1.0
Italy	11,897	12.2	11,599	12.2
Luxembourg	224	0.2	218	0.2
Netherlands	4,514	4.6	4,401	4.6
Norway	2,335	2.4	2,276	2.4
Portugal	1,128	1.2	1,100	1.2
Spain	8,016	8.2	7,815	8.2
Sweden	2,675	2.8	2,608	2.8
Switzerland	2,646	2.7	2,580	2.7
United Kingdom	16,362	16.8	15,952	16.8
Total	97,277	100%	94,842	100%
Currency adjustment				
for Sterling contributions	189		—	
	189		—	
Associate contributions				
Australia	501		501	
	501		501	
Additional contributions				
from UK Government	22,457		7,052	
from Germany	—		680	
	22,457		7,732	

Reviews of Scientific Units

Research and Service Units are evaluated every four years by members of the Scientific Advisory Committee and additional experts. The following section features summaries of the scientific reviews and presents the Director General's responses to the review reports.

EMBL Cell Biology and Biophysics Unit Review

The Cell Biology and Biophysics Unit at EMBL Heidelberg was reviewed on 15 and 16 May 2013 by a panel of 17 international experts, including five members of SAC and an observer from EMBL Council. The review was chaired by Andrew Murray from Harvard University.

Evaluation Summary

The quality of the research, training, and leadership of the Cell Biology and Biophysics (CBB) Unit were all ranked as outstanding. All of the groups and teams work on problems of genuine importance. Both individually and collectively, they have made impressive progress both in research and technology development. The Panel was impressed by the cohesiveness of the CBB Unit and the strength of the interactions within the Unit, with other parts of EMBL and with the external research community. The combination of technological advances and biological discoveries made by the CBB Unit has had a major impact at EMBL, throughout Europe, and around the world. The quality and quantity of the research carried out during the review period was outstanding. Highlights include completion of two large systematic projects, which identified genes regulating mitosis and cell division, and protein secretion and cholesterol metabolism. Other highlighted accomplishments were: a new microscope that makes it possible to record the development of intact animals with unprecedented temporal and spatial resolution; the application of a novel in vivo reporter of protein turnover to understand collective cell migration; making chemical reagents to perturb and report on phospholipid metabolism; understanding collective cell movements in *Drosophila* development; and novel insights into the entry of material into cells via endocytosis.

The CBB Unit has continued to play an important role in EMBL's scientific training mission by mounting courses in advanced methods in Cell Biology and a new course aimed at introducing physicists and engineers to biology. A biennial meeting in Chemical Biology is viewed as the premier meeting in its field.

Since the last review, there have been substantial changes in the Unit. The Unit leadership, which was shared by Eric Karsenti and Jan Ellenberg, is now solely Ellenberg's, and five group leaders have left the Unit and been replaced by four new ones. Jan Ellenberg has proved to be an outstanding Head of Unit. He has assembled an outstanding group of scientists and encouraged them to form a community that has strong interactions within the Unit, throughout EMBL, and with the larger scientific community. His ability to simultaneously complete a very large project, lead international

efforts to develop microscopy resources in the Euro-BioImaging project, and provide detailed mentorship to individual group leaders is impressive.

A number of groups will leave the CBB Unit over the next five years and plans for the future will involve a balance between searches for the best young scientists and attempts to build expertise in particular areas. Two that were discussed were image analysis and human disease. Amongst the panel, there was some concern that the emphasis on technology development and high throughput projects could be perceived as a weakening of the Unit's commitment to hypothesis-based and mechanistic research.

The Panel identified two areas of concern. First and similar to the most recent review, the Head of Unit and the Director General are strongly encouraged to mount the strongest efforts to broaden the pool of applicants for positions in the CBB Unit with the aim of recruiting outstanding female group leaders. Second, was a concern that group leaders and their students and postdocs may have become overly concerned with publishing work in the highest impact journals. They are encouraged to consider the merit of earlier publication of solid papers in good journals, in particular to foster the career development of the PhD and postdoctoral fellows, and to try to avoid lengthy and distracting reviewing processes.

Response to the Panel's Recommendations

I thank the Review Panel, and in particular the chair, Andrew Murray, for their excellent report and for the efficiency with which they dealt with the complexity of reviewing the work of thirteen groups and teams in the limited time available. A new agenda item was added to this review, with a poster session allowing fellows from the Unit to present their work to the Panel. This was regarded as a success by all who participated and will therefore be part of the review procedure in future.

I am delighted with the Panel's very positive opinion of the diverse activities of the Unit and of the Head of Unit, Jan Ellenberg. I agree with this positive assessment. Nevertheless, three important issues are raised for consideration and I will respond to each of those in turn.

There are no female group or team leaders in the CBB Unit. This is an issue of which the EMBL leadership is very aware and one that was also mentioned in the last review. While there are some research areas in which EMBL is active (Bioinformatics, aspects of Structural Biology technology development) where a low percentage of senior female scientists is a general phenomenon, this is not the case for Cell Biology. The current Head of Unit has put effort into encouraging female applicants for positions in CBB (and indeed an unsuccessful offer was made to a female candidate during the last group leader search) but the situation has not yet changed. We will redouble our efforts, including following the specific recommendations of the Panel that are not already part of our search process, in future recruitments.

Concern was raised in the Panel about the publication strategy of members of the Unit. They worry that individual groups may be putting too much effort into publishing their work in the so-called ‘major’ journals. This is a problem that extends far beyond EMBL (and indeed beyond the life sciences) and I will take some time to explain and respond to the concern for the benefit of non-specialists interested in EMBL’s research.

Why do researchers wish to publish in the journals with the highest impact? Quite simply, because it is good for their career prospects. Many organisations involved in research evaluation, whether they be funders who award fellowships or fund research grants or organisations who employ researchers, utilise journal impact factors as one of the metrics to evaluate candidates who apply to them. This is done largely because of the ease of using impact factors as a metric, in spite of the fact that it is widely realised that a journal’s impact factor is a very imperfect reflection of the performance of an individual scientist who has published in that journal. But why does this create a problem? In recent times, in particular in the last decade, it has become more and more difficult to have a manuscript accepted by one of the ‘major’ journals. Authors are being forced to add more and more data to a single publication, often through numerous rounds of revision, before their manuscript is accepted for publication. It is no longer unusual for the manuscript review process to drag on for considerably more than a year. This can be a significant distraction for the authors who need to move on to the next stage of their research. It also means that the fixed term stipend of a fellow or contract of a group or team leader can come to an end before the decision on publication is taken. Since most postdoctoral fellowship and PI position applications depend on the number and quality of manuscripts published by the individual, this can be disadvantageous, although the Panel noted a lack of concern among the fellows in the Unit with the current situation.

The advice of the Panel is to discuss with the researchers in the Unit whether the current balance of between publishing in journals of highest impact and other very good journals is the most advantageous one. I intend to pursue this matter both with the Units and in a general discussion at the next faculty retreat.

The final matter raised was the balance between large-scale projects and detailed mechanistic studies being carried out in the Unit. As a biochemist myself, I have some sympathy with those Panel members who expressed concern about this, but for several reasons I do not currently share that concern with regard to CBB. The Cell Biology and Biophysics Unit was created by merging a technology development Unit (Cell Biophysics) with a ‘wet lab’ research Unit (Cell Biology). The aim of the Unit is to maintain a balance between these activities and at present some of the technology development (including projects the Panel singled out for special praise) is in the area of high-throughput methods. Naturally, this means that some of the research projects being pursued use this technology. However when I

look at the members in the Unit, including two of the three research group leaders recruited during the review period, it is my opinion that most of them are pursuing detailed mechanistic studies. When biochemistry is the most appropriate tool, several of them (particularly Haering, Schultz and Nedelec) make use of it and have the expertise to either collaborate with or mentor their colleagues.

Finally, I am very happy with this overwhelmingly positive evaluation, and with the Panel’s opinion that the Unit’s performance is outstanding in all aspects under review.

Professor Iain W. Mattaj, FRS
Director General

31 May 2013

EMBL Core Facilities and IT Services Unit Review

On 26 to 27 March 2014 the review of the EMBL Core Facilities and IT Services took place. Fifteen international experts, including three members of EMBL's Scientific Advisory Committee, formed the Review Panel. The panel was chaired by Michael Snyder from Stanford University (USA).

Regrettably, Christian Boulin, the Director of Core Facilities and Scientific Services, was unable to participate in the review due to illness and he sadly passed away on 27 April 2014. Christian joined EMBL in 1976 and worked in a variety of positions until taking over the Core Facilities and Scientific Services leadership role under Fotis Kafatos. As will be evident in my following response Christian will be remembered for his considerable effort in developing the Laboratory's Core Facilities over many years into their current excellent state. Christian was an ideal colleague, constructive, unselfish and committed to the success of everyone at EMBL. He incorporated the collaborative, good-humoured spirit that distinguishes the laboratory and will be sorely missed by all of us.

Evaluation Summary

The EMBL Core Facilities and IT Services were created as a way to provide support to EMBL staff members. In the case of the Core Facilities, state of the art technologies and equipment are provided to support EMBL researchers and Core Facility staff with expertise in the use of the equipment and technologies are chosen with the role of supporting EMBL research and training staff members in the use of the Core Facilities. Where capacity permits, the Core Facilities also serve and advise external users from the member states. This function is much appreciated. IT Services in EMBL-Heidelberg have an even broader internal remit in that they provide access to all forms of IT service and support in their use to all members of staff in Heidelberg and Monterotondo. They also liaise with IT staff at the other three EMBL locations.

The panel rates the overall performance of the EMBL Core Facilities and IT Services as outstanding and congratulated Christian Boulin for moulding the EMBL Core Facilities over many years into their current excellent state. The panel praised the core facilities for clearly being one of the highlights of EMBL, supporting users, especially new researchers who use the facilities to get their research programmes up and running quickly. They considered the facilities a major attraction in recruiting outstanding faculty to EMBL.

All the core facilities offer advanced technologies to EMBL researchers and external users and all have kept pace with new developments. The quality

of service was rated as outstanding in terms of number of users served and the quality of the service. The panel highlighted that the technologies and services offered by the Advanced Light Microscopy Facility (ALMF) and Electron Microscopy Core Facility (EMCF) are rarely offered by other core facilities. The panel underlined the excellent interactions of the facilities with industry for obtaining and co-developing equipment and other support. The panel evaluation was supported by a user satisfaction survey carried out in late 2013, which showed that user satisfaction has generally grown since the last review, and stands at a very high level.

In addition to providing services, the facilities have an outstanding record of training, with most facilities offering numerous workshops, facility staff being involved in EMBL courses and facilities reaching out broadly to institutions in EMBL member countries. The facilities have increased the impact they have outside EMBL even more by being involved in networks such as the P4EU network initiative established by the Protein Expression and Purification Core Facility; the European Cytometry Network started by the Flow Cytometry Core Facility; and the support given to Euro-BioImaging.

The panel concluded that the core facilities function exceptionally well and all existing core facilities serve a useful purpose and should be maintained. They encourage EMBL and the core facilities to consider user fees for all users. The panel also recommended that all core facilities meet at least once a year with their user committee and that they should consider adopting a more formal process for horizon scanning of new technologies that might be worth adopting.

It was the second time that the IT Services in Heidelberg were included in the review and the first time that there was a dedicated sub-panel focused solely on IT services. The adjusted review format worked well. The IT infrastructure required to support data-driven research at EMBL is seriously challenged by high-throughput technologies in large-scale and interdisciplinary information biology projects. The IT Services perform extremely well, due in large part to the skills and commitment of the staff and efficient management. To maintain high quality service, the panel recommended EMBL to look into staffing, redundancy in skills, mechanisms for massive HPC, storage and an upgrade of the EMBL data link to EBI and the rest of the network.

Finally, the panel made some recommendations concerning plans that need to be made to replace Christian Boulin as he was approaching retirement age.

Response to the Panel's Recommendations

I wish to thank the panel for their extensive and detailed analysis of the Core Facilities and IT Services (CFITS). I am very pleased with the strongly positive opinion of the performance of these critical support functions and with the thoughtful recommendations on ways to further improve the performance and function of CFITS.

I agree with the panel's opinion that Christian Boulin performed outstanding work in organising and leading these (and other) scientific support services for EMBL. The work of Christian and all his staff was evaluated very positively by a large cross-section of users who participated in a web-based survey of the quality of service provided that was conducted in preparation for the review.

I note, and discussed with the panel, Christian's retirement towards the end of the next review period and the need for succession planning. Some preliminary discussion of this has already taken place and I value the panel's advice that it will likely be necessary to divide the future leadership into at least two sections, with the Core Facilities plus workshops forming one area and IT Services forming another.

Like many review panels before them, the panel is of the opinion that EMBL's staff turnover system may not be the best way to organise aspects of our activity, including CFITS. I however disagree strongly with their recommendation that fixed term staff contracts should not be applied in CFITS. The success and performance of CFITS (and other EMBL Service Units) is ample evidence that the EMBL fixed term contract model does not inhibit us from setting up excellent support services and we will continue with its use to the benefit of the member states.

Recommendations are made by the panel to increase staffing levels in two areas; to make processes of user feedback and horizon scanning of new technologies more formal; and to introduce a transparent user fee system for all core facilities. I will discuss these issues with the Unit leadership and where appropriate with Council in preparing the next Indicative Scheme.

The panel, while acknowledging the very high level of performance of the individual ITS staff, recommends that change is required in the overall organisation of the ITS to increase its robustness to staff illness and turnover. They recommend following more closely some 'industry standard' organisational protocols to achieve this, as well as increasing the cross-training of staff members in each others' tasks. I believe this is a wise recommendation and will follow this up with the leadership of the Unit.

The panel recognises that EMBL Heidelberg and Hamburg do not have high capacity links to the German data network. They point out that this is already essential and will only become more of a problem for the function of these parts of EMBL as time goes on. We are already in discussion on this topic with the German Ministry for Education and Science, who are sympathetic to our needs, and will continue to work with them until a suitable solution is achieved.

Professor Iain W. Mattaj, FRS

Director General

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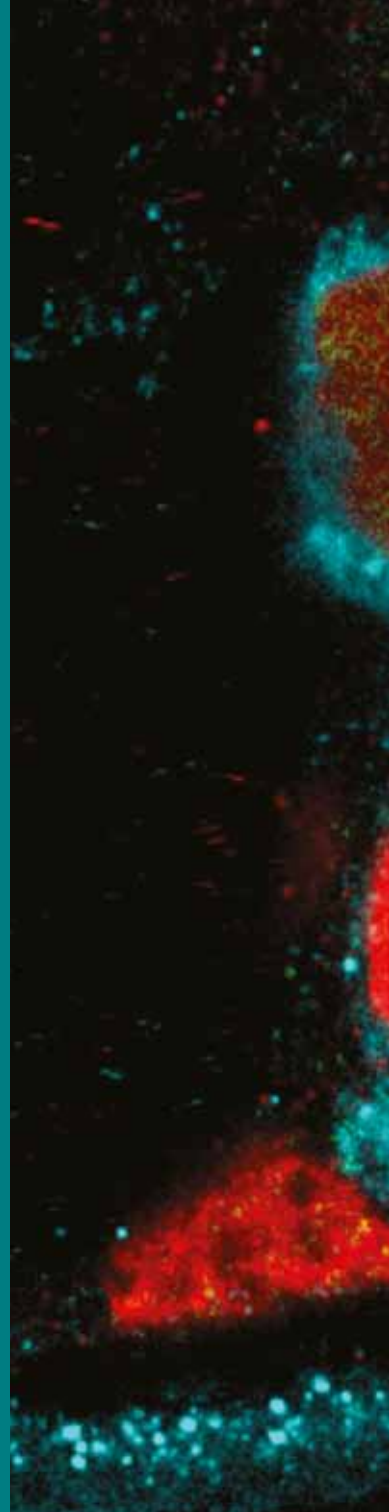
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