



The European Bioinformatics Institute - Cambridge

Overview

EMBL-EBI



EMBL-European Bioinformatics Institute

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Table of contents

About us	2
Welcome	3
Part of the European Molecular Biology Laboratory	4
Our mission	5
Services	6
Research	10
European coordination	12
Collaboration	13
Training	14
Supporting industry	16
Opportunities	18
How to find us	20

About us

EMBL-EBI is a global leader in the storage, analysis and dissemination of large biological datasets.

By sharing our expertise and through collaboration, we help researchers realise the potential of 'big data', enhancing their ability to exploit complex information to make discoveries that benefit mankind.

We are a non-profit, intergovernmental organisation funded by EMBL member states. Our 500+ staff represent 43 nationalities and we welcome a regular stream of visiting scientists throughout the year.

We are located on the Wellcome Trust Genome Campus in Hinxton, Cambridge in the United Kingdom.



Welcome

Welcome to the European Bioinformatics Institute, the hub of bioinformatics in Europe. We are part of the European Molecular Biology Laboratory (EMBL), and provide freely available data from life science experiments.

While we are perhaps best known for our provision of bioinformatics services, about 20% of our institute is devoted to basic, curiosity-driven research. We also offer an extensive training programme to help scientists make the most of the incredible amount of data being produced every day in the life sciences.

EMBL-EBI is a highly collaborative organisation, and we serve as the European node for globally coordinated data collection and dissemination projects. Our core databases are produced in collaboration with other world leaders, including the NCBI (US), the National Institute of Genetics (Japan), the SIB Swiss Institute of Bioinformatics (Switzerland) and the Wellcome Trust Sanger Institute (UK).

This brochure gives an overview of our activities, which centre on service provision, basic research, training, industry support and the coordination of biological data provision in Europe. We hope you enjoy reading about us, and encourage you to get in touch if you have any questions.

Sincerely,



Professor Dame Janet Thornton, Director



Dr Rolf Apweiler, Joint Associate Director



Dr Ewan Birney, Joint Associate Director

Part of the European Molecular Biology Laboratory

EMBL is one of the world's leading research institutions, and is Europe's flagship laboratory for the life sciences. Research at EMBL is conducted by approximately 85 independent groups covering the full spectrum of molecular biology.

EMBL is an intergovernmental organisation funded by public research monies from 20 member states: Austria, Belgium, Croatia, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Israel, Italy, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom, as well as associate member state Australia.

The main laboratory is located in Heidelberg, Germany. In addition to EMBL-EBI in Hinxton, EMBL has outstations in Monterotondo, Italy, Grenoble, France and Hamburg, Germany.

How we are funded

The largest part of EMBL-EBI funding comes from the governments of EMBL's member states. The global importance of our work is reflected in the fact that we also attract significant funds from external sources, including the European Commission, the US National Institutes of Health, the Wellcome Trust, the UK Research Councils and our industry partners. The UK's Research Councils, led by BBSRC, has provided substantial funding to further develop our robust compute infrastructure and to expand our activities in the new South Building.



Leadership

The Director of EMBL-EBI is Professor Dame Janet Thornton, who is also a Senior Research Group Leader and heads the EMBL-EBI Research Programme. As Joint Associate Directors, Dr Rolf Apweiler and Dr Ewan Birney are responsible for the smooth running of EMBL-EBI services, which serve millions of researchers worldwide.

EMBL's Director General is Professor Iain Mattaj, and its governing body, EMBL Council, is composed of representatives of all member and associate member states. The EMBL Council appoints a Scientific Advisory Committee (SAC), which plays an important role in guiding the programme of the Laboratory. In addition, EMBL-EBI has an established guidance structure in the form of a Bioinformatics Advisory Committee (BAC).



Our mission

To provide **freely available data** and bioinformatics services to all facets of the scientific community in ways that promote scientific progress;

To contribute to the advancement of biology through basic **investigator-driven research** in bioinformatics;

To provide advanced bioinformatics **training to scientists at all levels**, from PhD students to independent investigators;

To help **disseminate cutting-edge technologies** to industry;

To **coordinate** biological data provision throughout Europe.

Services

At EMBL-EBI, we see data as a critical tool that can accelerate research and development.

We maintain the world's most comprehensive range of biological databases, and are constantly working to provide opportunities for scientists to make the best possible use of public and proprietary data.

We help public- and private-sector researchers focus on innovative work by providing access to our sophisticated and large-scale data infrastructure. For example, anyone can perform large-scale analysis using our servers. In addition, many of our resources can be downloaded in their entirety for local use.

Principles of service provision

Accessibility

Our data and tools are freely available, without restriction. The only exception is potentially identifiable human genetic information, for which access depends on research consent agreements.

Compatibility

We are a world leader in promoting the adoption of standards in bioinformatics.

Quality

Our databases are enhanced through annotation: information is added to the original data to provide context and help with interpretation. Much of our annotation is performed by highly qualified biologists, and the automated annotation that we undertake is subjected to rigorous quality control.

Portability

Many of our datasets are made available for download from the EMBL-EBI website. In a number of cases the entire software system can be downloaded and installed for local use.

Comprehensive data sets

We share data to ensure that our resources are comprehensive and up to date. We also work with publishers to ensure that biological data are placed in a public repository as part of the publication process and cross-referenced in the relevant publication.



Programmatic access

EMBL-EBI web services allow you to query our large biological databases programmatically, so that you can develop data analysis pipelines or integrate public data with your own applications.

www.ebi.ac.uk/tools/webservices

Bioinformatics services

Literature

Europe PubMed Central - Europe's life sciences literature database: abstracts, full text, patents, clinical guidelines and more.

Genes & genomes

European Nucleotide Archive - A comprehensive archive of submitted nucleotide sequence read, assembly and functional annotation data.

1000 Genomes - A deep catalogue of shared human genetic variation in population groups worldwide.

Ensembl - High-quality, integrated annotation on vertebrate genomes within a consistent and accessible infrastructure.

Ensembl Genomes - An integrating portal for genome-scale data from non-vetebrate species.

The European Genome-phenome Archive - A service for permanent archiving and sharing of all types of personally identifiable genetic and phenotypic data resulting from biomedical research projects.

Database of Genomic Variants archive - A repository that provides archiving, accessioning and distribution of publicly available genomic structural variants, in all species.

EBI Metagenomics - A resource for the analysis and archiving of metagenomic data.

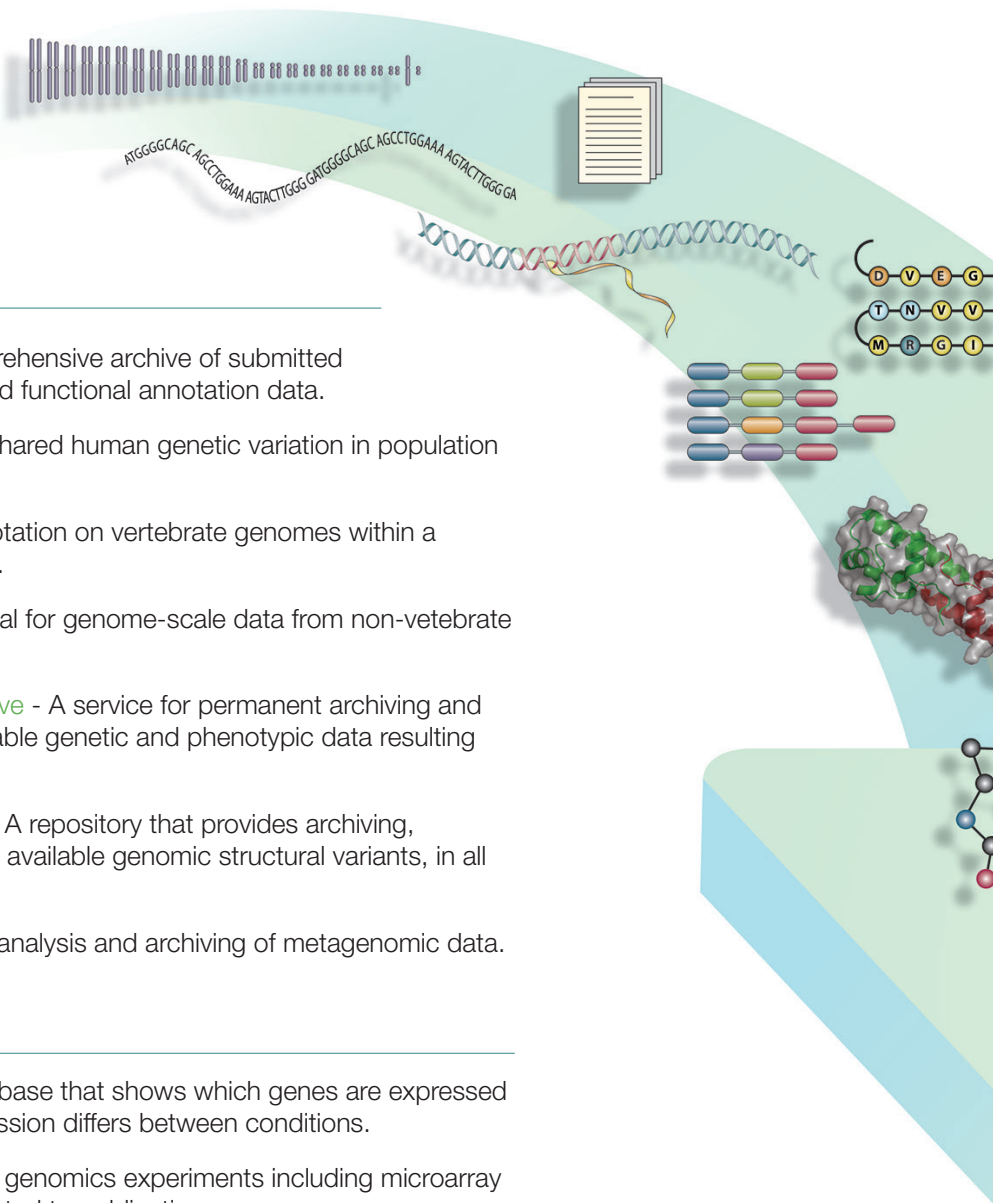
Expression

Expression Atlas - An added-value database that shows which genes are expressed under which conditions, and how expression differs between conditions.

ArrayExpress - A database of functional genomics experiments including microarray or RNAseq expression data typically related to publications.

PRIDE - An archive of protein expression data determined by mass spectrometry.

MetaboLights - A cross-species, cross-application, open-access, open-submission archive and reference database for metabolomics.



Proteins: sequences, families, domains and motifs

InterPro - A database for the classification of proteins into families, domains and conserved sites.

Pfam - A database of hidden Markov models and alignments to describe conserved protein families and domains.

UniProt - The Universal Protein Resource: The comprehensive resource for protein sequence and functional annotation data.

Molecular & cellular structures

Protein Data Bank in Europe - The European resource for the collection, organisation and dissemination of 3D structural data (from PDB and EMDB) on biological macromolecules and their complexes.

Chemical biology

ChEMBL - An open data resource of binding, functional and ADMET bioactivity data.

ChEBI - Chemical Entities of Biological Interest - Reference chemical structures, nomenclature and ontological classification.

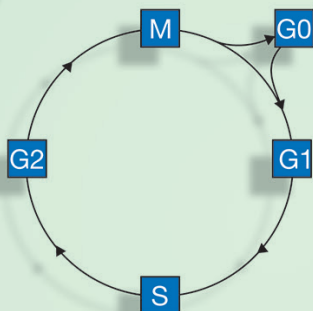
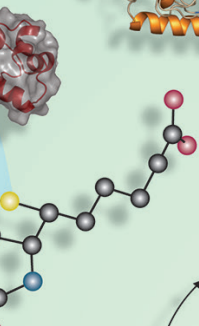
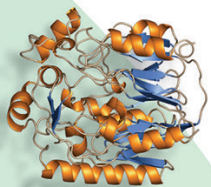
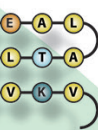
Enzyme Portal - Integrated enzyme data from EMBL-EBI resources - Integrated functional, sequence, nomenclature, substrate, product and cofactor data for enzymes.

Pathways & systems

Reactome - Navigate a map of human biological pathways, ranging from metabolic processes to hormonal signalling.

BioModels - Search and retrieve published mathematical models of biological interest. Models are annotated and linked to relevant data resources.

IntAct - An open-source database system and analysis tools for molecular interaction data. All interactions are derived from literature curation or direct user submissions and are freely available.



Research

EMBL-EBI's collaborative, investigator-led research uses computational approaches to unravel the secrets of life.

Our research is carried out both in groups devoted solely to research and in some of the larger service teams that have associated research activities. Most of our researchers collaborate closely with experimentalists and even generate experimental data themselves.

Increasingly, much of our work is related to problems of direct medical significance. With the emergence of personal genomes, we are very conscious of the need to contribute to the translation of the new knowledge into medicine and the environment.

Genes & gene expression



Bertone group:
Pluripotency, reprogramming and differentiation
www.ebi.ac.uk/research/bertone



Birney group:
Sequence algorithms and intra-species variation
www.ebi.ac.uk/research/birney



Brazma group:
Functional genomics research
www.ebi.ac.uk/research/brazma



Enright group:
Functional genomics and analysis of small RNA function
www.ebi.ac.uk/research/enright



Flicek group:
Evolution of transcriptional regulation
www.ebi.ac.uk/research/flicek



Goldman group:
Evolutionary tools for genomic analysis
www.ebi.ac.uk/research/goldman



Marioni group:
Computational and evolutionary genomics
www.ebi.ac.uk/research/marioni



Stegle group:
Statistical genomics and systems genetics
www.ebi.ac.uk/research/stegle

Proteins, structures & chemical biology



Bateman group:
Analysis of protein and RNA sequence
www.ebi.ac.uk/research/bateman



Overington group:
Drug discovery informatics
www.ebi.ac.uk/research/overington



Steinbeck group:
Small molecule metabolism in biological systems
www.ebi.ac.uk/research/steinbeck



Thornton group:
Proteins: structure, function and evolution
www.ebi.ac.uk/research/thornton

Systems biology



Beltrao group:
Evolution of cellular networks
www.ebi.ac.uk/research/beltrao



Saez-Rodriguez group:
Systems biomedicine
www.ebi.ac.uk/research/saez-rodriquez



Teichmann group:
Gene expression regulation and protein complex assembly
www.ebi.ac.uk/research/teichmann

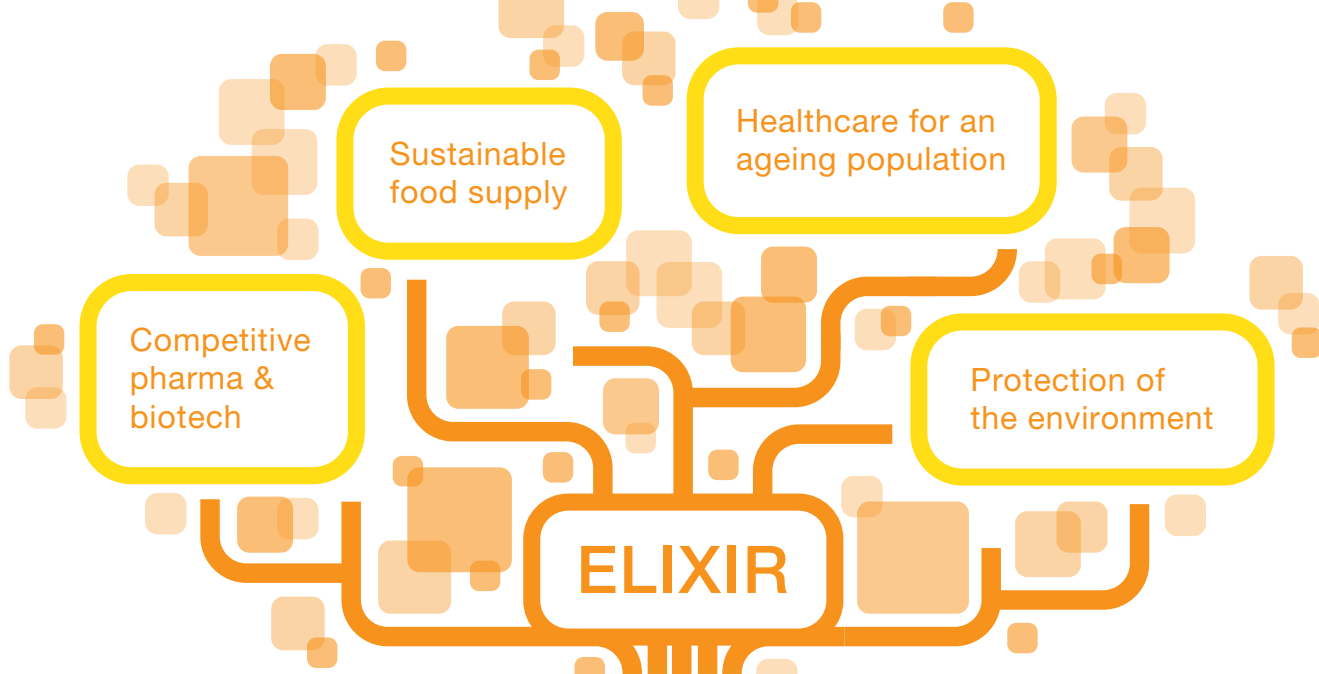
European coordination

Europe has always been at the forefront of bioinformatics research, but as we move towards a single European Research Area there is a greater need than ever to consolidate our efforts.

EMBL-EBI is a central partner in ELIXIR, Europe's emerging superhighway for biological information. The purpose of ELIXIR is to support life science research and its translation to medicine and the environment, the bio-industries and society.

BioMedBridges, an ELIXIR project, is building technical bridges between Europe's biomedical sciences research infrastructures. ELIXIR and BioMedBridges are collaborative projects undertaken with our partners in the European Member States.





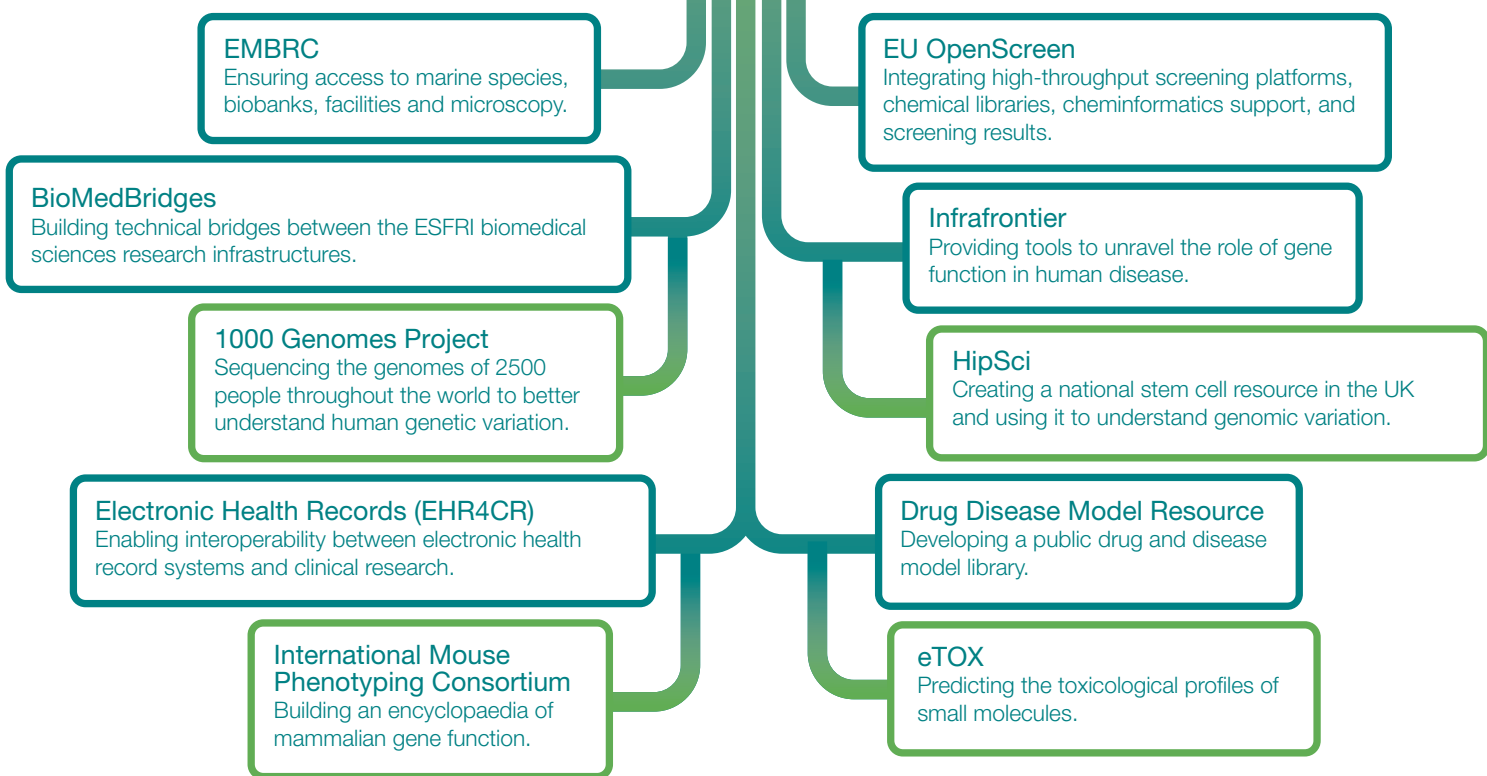
Collaboration

At EMBL-EBI we place a high value on our work with other leading research institutes and industry partners. Our data services are run jointly with partners throughout the world, and our research groups play a key role in many projects of global significance.

We are a pivotal partner in several of Europe's emerging research infrastructures, and play a key role in ELIXIR, the emerging infrastructure for biological information in Europe.
www.ebi.ac.uk/about/collaboration



- Research Infrastructures
- International projects



Training

The background of the page features a network of stylized human figures and laptops. The figures are rendered in light blue and white, with some appearing as solid blue shapes and others as white outlines. They are interconnected by a series of dashed lines, suggesting a global or collaborative network. Several laptops are also depicted, some as solid objects and others as faint outlines, further emphasizing the theme of technology and research.

With the falling costs and rapid growth of DNA sequencing, data analysis has become a major bottleneck in research. The estimated 3 million researchers in Europe's life science community represent a growing and diversifying bioinformatics community with an evolving set of training needs.

EMBL-EBI helps researchers get the most out of publicly available data in an extensive user-training programme. Our goal is to familiarise scientists with bioinformatics services that are relevant to their work. This way, they can develop the confidence they need to make use of the vast amounts of data in the public domain.

Our programme

The EMBL-EBI Training Programme helps users get to grips with their data and make the most of our bioinformatics services. We emphasise demonstration, discussion and practical exercises in our hands-on courses, which are conducted on site in state-of-the-art facilities and at host institutes throughout the world. Our

courses are led by experts from EMBL-EBI as well as by guest speakers from other institutes. We draw on the materials from these courses to create modules in our online learning programme, **Train online**.

The EMBL-EBI Training Programme is part of the EMBL International Centre for Advanced Training.



The EMBL-EBI Training Programme offers hands-on training in custom-built facilities. Topics range from courses for experimental biologists to more specialised workshops for computational biologists, working in both the public and private sectors.
www.ebi.ac.uk/training

Our web-based resource, **Train online**, offers free, interactive courses and is ideally suited for on-the-job training. The modules are created by experts at EMBL-EBI and collaborating institutes, and do not require any previous training in bioinformatics.
www.ebi.ac.uk/training/online

Our off-site workshop programme, established in 2006, sends experts from EMBL-EBI to host institutes throughout the world to run courses tailored to their specific R&D needs.
www.ebi.ac.uk/training/roadshow



What is bioinformatics?

We define 'bioinformatics' as the application of computer technology to the storage, management and analysis of biological data. This is essential for research in all areas of life science, including health, agriculture, biodiversity, energy and biotechnology.

Technologies such as DNA sequencing produce incredible amounts of new information every day. The ultimate goal of bioinformatics is to identify biologically meaningful information in large experimental data sets so that we can understand organisms on many different levels – from chemical reactions to entire systems.

Supporting industry

As biology becomes increasingly data-driven, pre-competitive collaboration has become crucial for improving efficiency and reducing costs. Precompetitive collaboration is the cornerstone of our Industry Programme, a forum for interaction and knowledge exchange for companies at the forefront of life science R&D.

Since 1996 our Industry Programme has been helping industry make the most of advances in bioinformatics and cheminformatics. The strategic focus is the development of resources and services that will benefit both our members and our wider stakeholder communities.

Industry Programme members lend their insights and expertise to help define and shape the services we provide. Our members meet regularly to discuss shared challenges and identify topics for training workshops, which serve to facilitate the discovery of new therapeutics, vaccines, consumer goods and a growing range of agricultural products.

Members

Our Industry Programme members represent many of the world's leading healthcare, agri-food and diagnostics companies. The programme is funded by annual member subscriptions.

Quarterly meetings

Our Industry Programme facilitates inter-company interactions in a neutral environment that is exceptionally well suited to the collective discussion of bioinformatics challenges faced by our members. Events can be closed or open to members of the appropriate community, and may address general areas or have a technical focus on a particular topic.

Pharmaceutical and diagnostic



Agri-food and personal care



Access to experts

EMBL-EBI's service teams work closely with research groups in areas of direct relevance to industry, and discuss emerging research areas and opportunities during quarterly meetings and workshops. Through our wide network of collaborators, we facilitate access to the world's pre-eminent researchers in computational biology and related fields:

Member-selected workshops

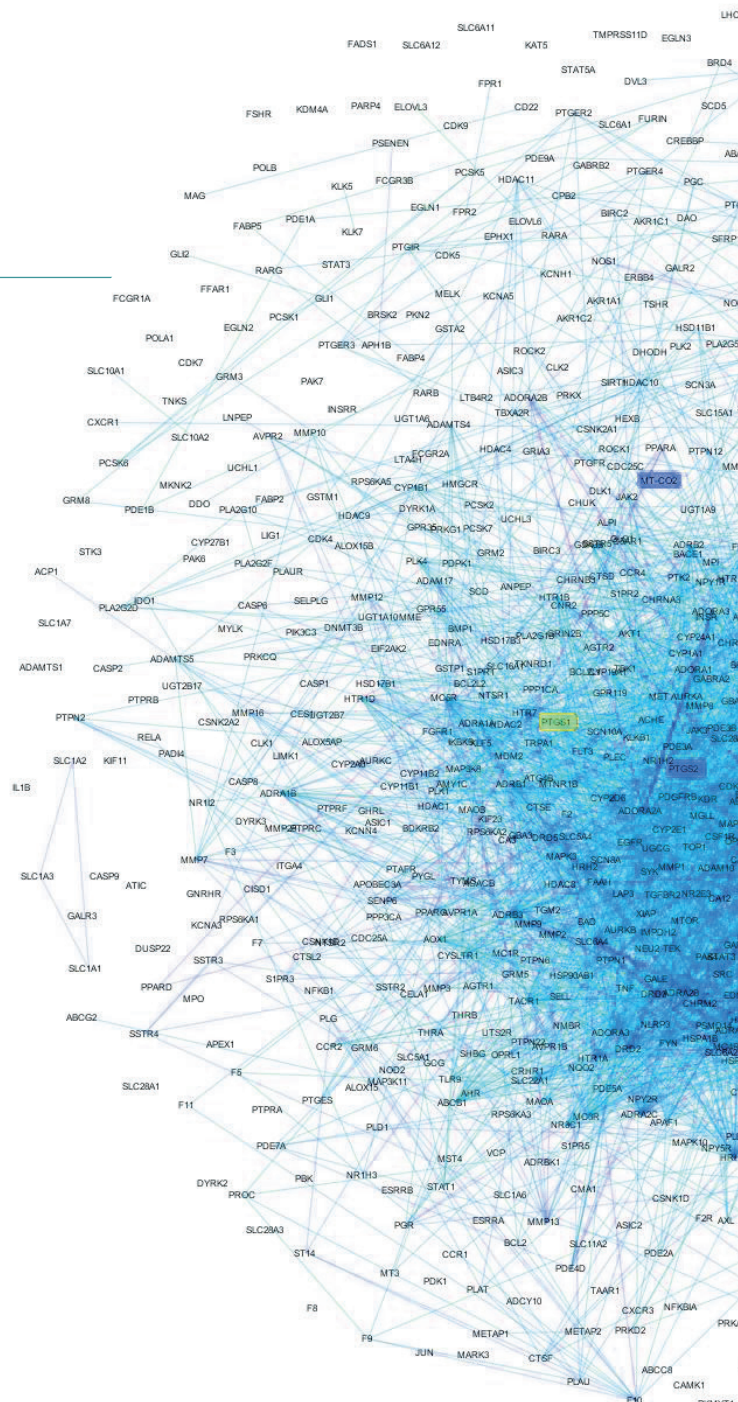
- Chemogenomics and drug discovery
- Cheminformatics and metabolism
- Genome-scale analysis of regulatory systems
- Vertebrate genomics and human variation
- Differentiation and development
- Evolutionary analysis of sequence data
- Functional genomics using advanced statistics
- RNA-seq, ChIP-seq and microarray informatics
- Protein structure, function and evolution
- Computational systems biology

Industry-focused training

EMBL-EBI is known for its delivery of high-quality services, its strong customer focus and its flexibility in working with academic and industry partners. We are in a unique position to provide bioinformatics training on services of relevance to all major areas of molecular biology, and are responsive to the training and project needs of our industry partners. We run a special series of hands-on training courses, led by experts in the development of our resources, with topics chosen by our Industry Programme members.

Open standards

The EMBL-EBI Industry Programme leads on the development of open data standards that protect our partners from becoming locked into proprietary solutions. For example, we brought together pharmaceutical companies, public and commercial data providers and academic groups to agree on a standard called MIABE that greatly enhances the interchange of public data on drug discovery.



Opportunities

EMBL-EBI is situated on the beautifully landscaped, 55-acre Wellcome Trust Genome Campus in Hinxton, UK, conveniently located for Cambridge (16 km) and Stansted airport (30 km) and with excellent communication links to London and other cities. Campus employees benefit from a large number of services and activities, including an on-site nursery and commuter bus to Cambridge and nearby Saffron Walden.

Our 500+ staff comprise talented scientists, web developers, programmers, project managers and administrators who enjoy a dynamic, creative and supportive international working environment. Our campus offers countless opportunities for scientific and personal development, including seminars delivered by world-leading scientists and a wide range of training courses.



Working at EMBL-EBI

EMBL benefits include help for those moving to a new country and a family-friendly policy: our employees benefit from an on-site children's nursery, a gym and two restaurants on site. The campus also enjoys a highly active social life, with events held on campus throughout the year and many different sports teams.

You can find out more about opportunities throughout EMBL on our jobs page: www.embl.de/jobs.

Open Days

We hold open days twice a year, and welcome anyone who is interested in what we do, or who would like to pursue a career in bioinformatics.

www.ebi.ac.uk/training/penday

We also offer a number of events for secondary-school teachers and students at all levels, and welcome a steady stream of visitors throughout the year.

www.ebi.ac.uk/training/public-events

Web developers

Our web developers create interfaces and implement web designs tailored to the needs of different scientific communities, and build and deploy bioinformatics services.

<http://www.ebi.ac.uk/about/jobs/career-profiles>

Bioinformaticians

EMBL-EBI employs software developers and engineers with a deep understanding of biology to integrate data in collaboration with external partners, enhance scientific datasets and develop analysis tools to support scientists using the molecular data we host.

<http://www.ebi.ac.uk/about/jobs/career-profiles>

PhD students

Our lively graduate community is part of EMBL's International PhD Programme. Many EMBL-EBI PhD students join the University of Cambridge; they participate fully in Cambridge graduate life and leave EMBL-EBI with a PhD from the University of Cambridge.

www.ebi.ac.uk/research/eipp/

Postdocs

Most EMBL-EBI postdocs have external funding. We also offer fellowships such as the EMBL Interdisciplinary Postdoctoral Programme (EIPOD), for candidates whose research crosses scientific boundaries, and the EBI-Sanger Postdoctoral Programme (ESPOD), for those who take both an experimental and computational approach to their work.

<http://www.ebi.ac.uk/research/postdocs>



Visiting scholars

Scientists at all career stages are welcome to conduct collaborative projects with EMBL-EBI staff or carry out their own research in Hinxton. Many of our teams work with Masters students or offer short-term placements such as internships.

<http://www.ebi.ac.uk/about/jobs/visitors-and-scholars>

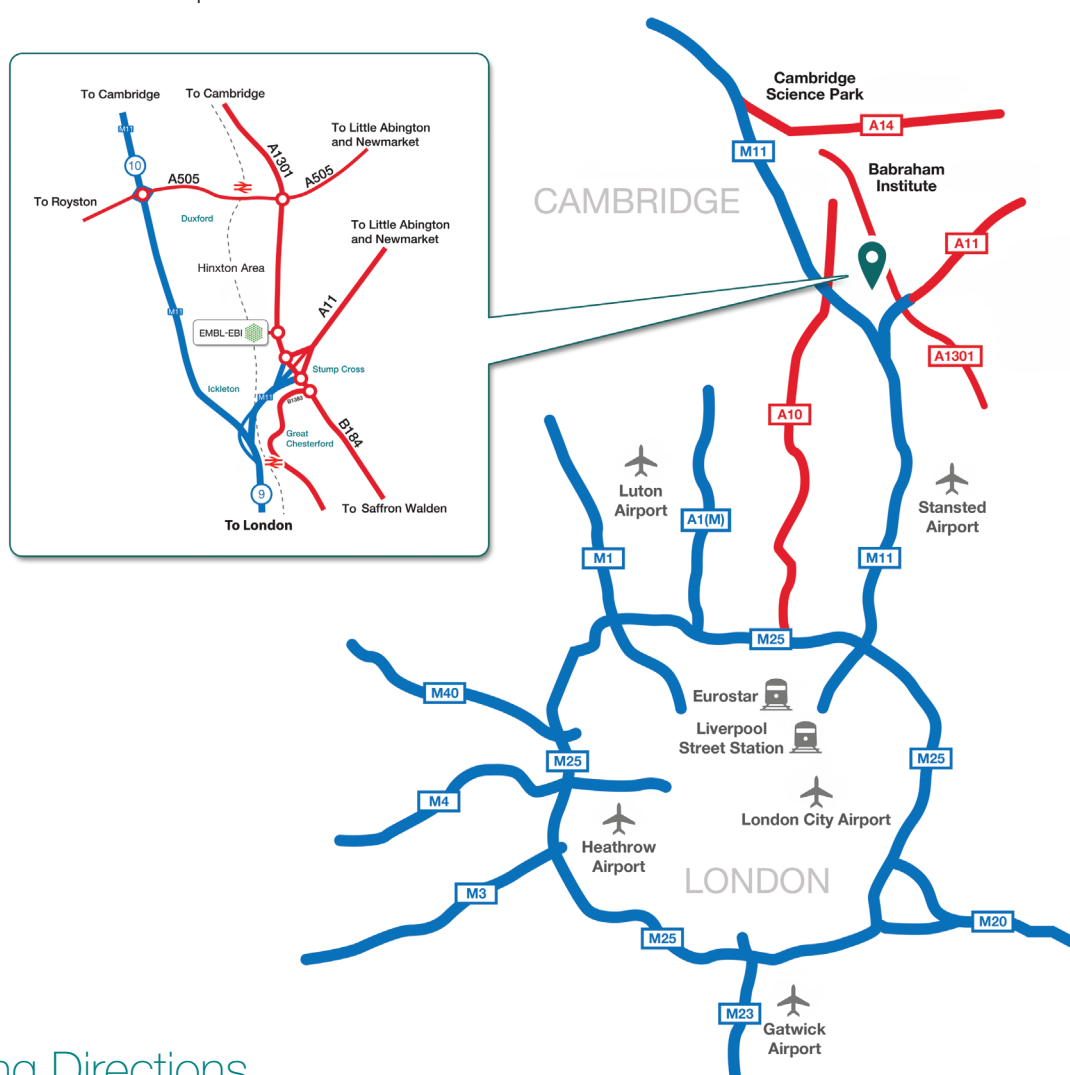
How to find us

EMBL-EBI is situated on the Wellcome Trust Genome Campus 10 miles (16 km) south of Cambridge, alongside the village of Hinxton.

The Genome Campus sits between two local railway stations (Whittlesford and Great Chesterford) and close to Junction 10 of the M11 motorway. We are 30km from London Stansted airport.

Our address: EMBL-European Bioinformatics Institute, Wellcome Trust Genome Campus, Hinxton, Cambridgeshire CB10 1SD, United Kingdom

Detailed travel and accommodation information can be found on our website: www.ebi.ac.uk/about/travel



Driving Directions

From the North:

Leave the M11 at junction 10, marked 'Saffron Walden'. Travel a mile or so in the direction of Saffron Walden to a roundabout and take the third exit (A1301 towards Saffron Walden). Pass two turnings to Hinxton, and take the next right, a small roundabout, with a sign post for Genome Campus.

From the South:

Leave the M11 at junction 9 and take the A1301 towards Cambridge. From the Stump Cross roundabout system take the first left (about 800m). At the next small roundabout follow the signpost for the Genome Campus.



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EMBL member states:

Austria, Belgium, Croatia, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Israel, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom, Associate member state: Australia

EMBL-EBI is a part of the European Molecular Biology Laboratory

www.ebi.ac.uk/about/brochures