

# European Molecular Biology Laboratory

## Case Example

Dr. Silke Schumacher  
Director International Relations



# EMBL Member States

Austria 1974  
Denmark 1974  
France 1974  
Germany 1974  
Israel 1974  
Italy 1974  
Netherlands 1974  
Sweden 1974  
Switzerland 1974  
United Kingdom 1974  
Finland 1984  
Greece 1984  
Norway 1985  
Spain 1986  
Belgium 1990  
Portugal 1998  
Ireland 2003  
Iceland 2005  
Croatia 2006  
Luxembourg 2007

Australia 2008 (1<sup>st</sup> Associate Member)

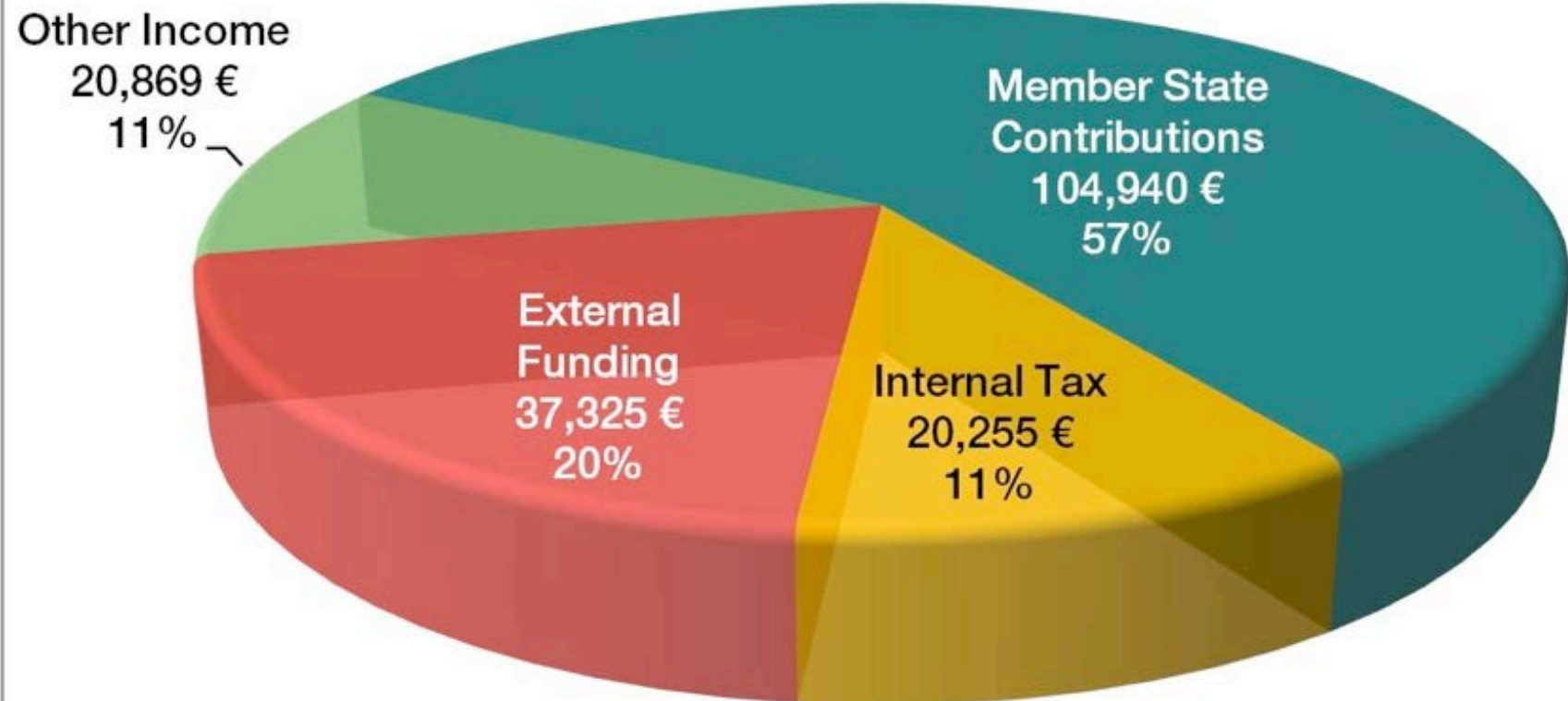


# EIROforum - EMBL is one of eight inter-governmental research organisations



**Income 2010 in k Euro  
(excluding pension contributions)**

**Total: € 183,389**



# EMBL Member State Contributions

The established method of calculating the contributions of EMBL Member States is according to a scale that is readjusted every three years, on the basis of net national income at factor cost, in US dollars, over the last three years for which official statistics are available from the OECD in Paris.

**No “juste retour”!**

# The Five Branches of EMBL

## Heidelberg



Basic Molecular Biology  
Research Laboratory  
Central Administration  
**EMBO**

1600 staff  
>70 nationalities

## Hamburg



Structural Biology  
**DESY, CSSB, XFEL**

## Grenoble



Structural Biology  
**ILL, ESRF, IBS, UVHCI**

## Hinxton



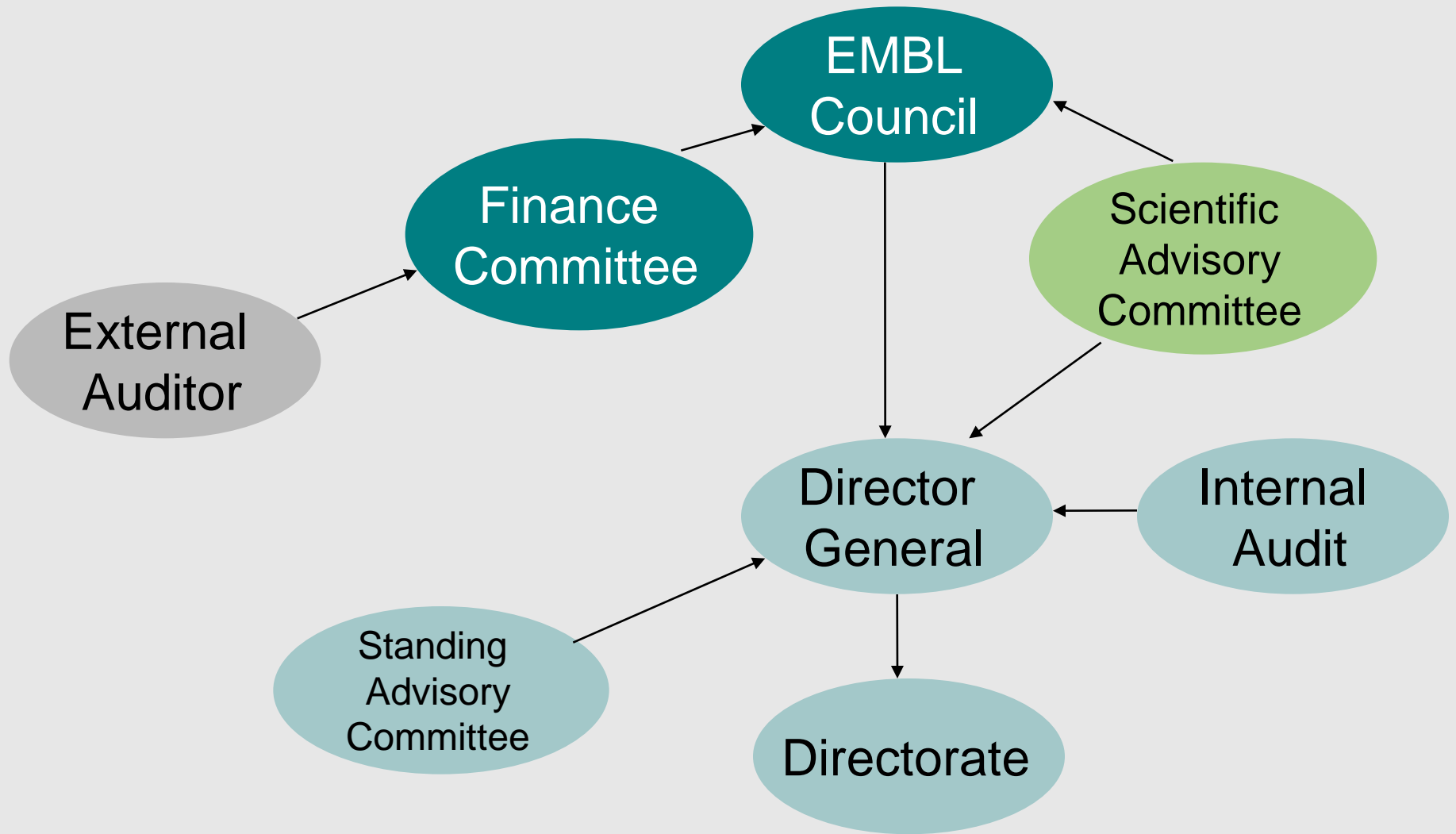
European Bioinformatics  
Institute (EBI)  
**Sanger Centre**

## Monterotondo



Mousebiology  
**EMMA, CNR**

# EMBL Governance





# Goals for the EMBL Programme 2012-2016



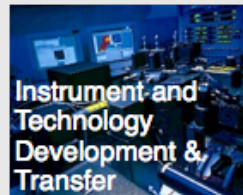
1) Forefront life science research: setting trends and pushing the limits of technology



2) Providing world-class research infrastructure and services to the member states



3) Training and inspiring the next generation of scientific stars



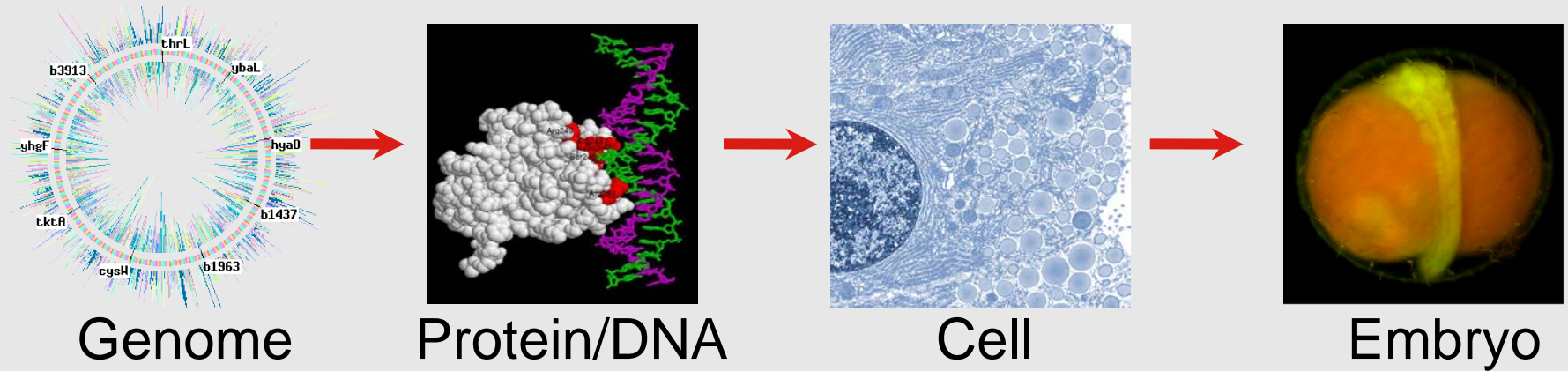
4) Driving research, innovation and progress through technology development, interactions with industry and technology transfer



5) Taking a leading role in the integration of life science research in Europe



# Biology: From Molecules to Organisms



Fruitfly



Mouse



Organism

# EMBL's citation ranking

- EMBL ranks as top European institute and fourth worldwide 1999-2009 in molecular biology and genetics (Thomson Essential Science Indicators)

	Institution	Papers	Citations	Citations per paper
1	Cold Spring Harbor Lab	669	63,570	95.02
2	MIT	1,995	163,596	82.00
3	Salk Institute for Biological Studies	707	49,996	70.72
4	European Molecular Biology Lab	1,435	94,736	66.02
5	Memorial Sloan-Kettering Cancer Centre	1,099	71,250	64.83
6	Wellcome Trust Sanger Institute	790	50,997	64.55
7	Rockefeller University	1,332	83,307	62.54
8	Dana Farber Cancer Institute	673	41,627	61.85
9	Massachusetts General Hospital	1,447	86,773	59.97
10	Cancer Research UK	752	44,343	58.97

# What makes EMBL so special?

## Outstanding science



- 'Hire the best'
- A combination of synergistic missions
- Continuous turnover
- International (>70 nations)
- Stringent quality control (Scientific Advisory Committee)
- Financial, intellectual and technical support



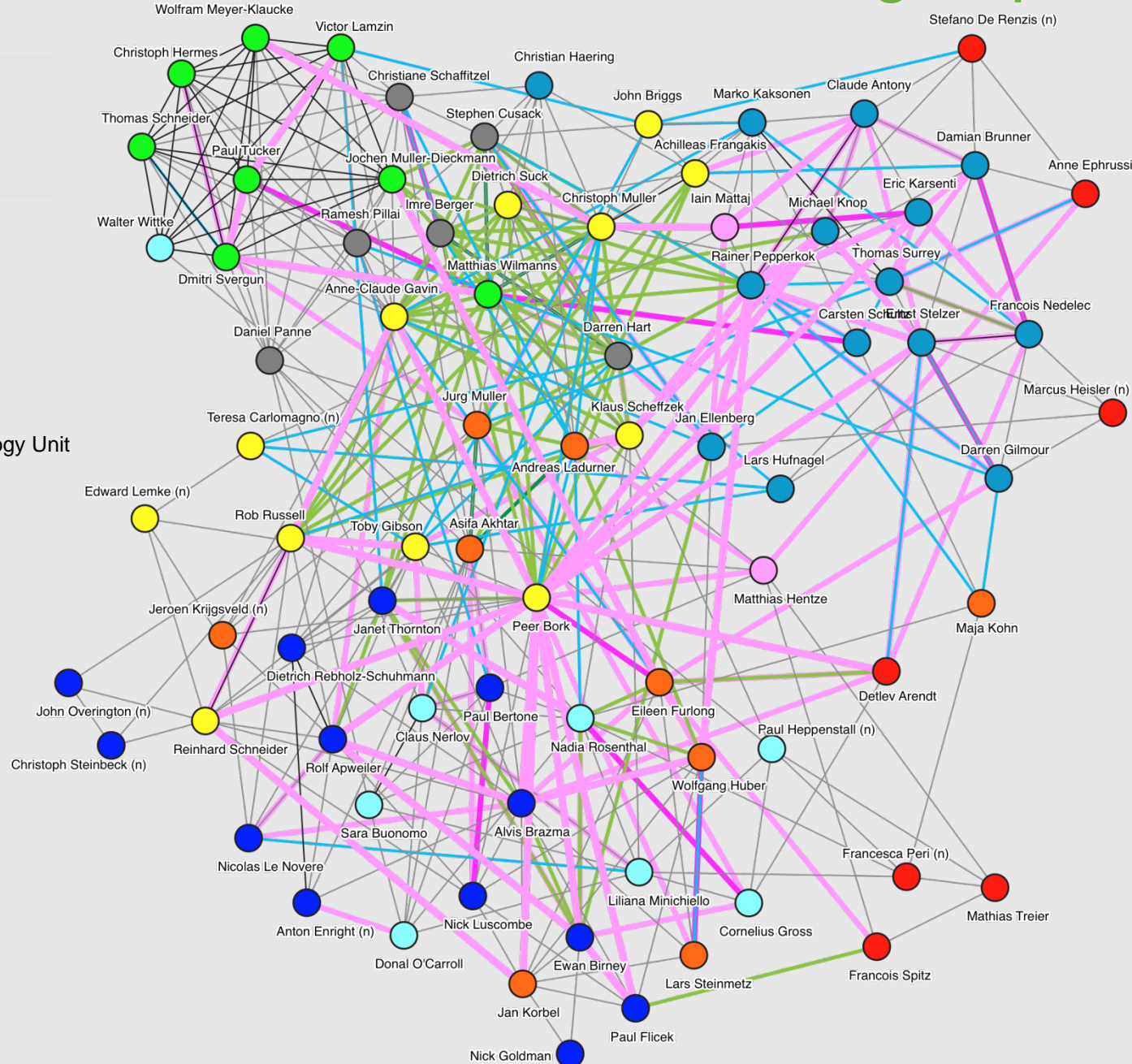
# Collaborations between EMBL research groups

## EMBL Research Units

- Director's Research
- Developmental Biology Unit
- Cell Biology and Biophysics Unit
- Structural and Computational Biology Unit
- Grenoble
- EMBL-EBI
- Hamburg
- Monterotondo
- Genome Biology Unit

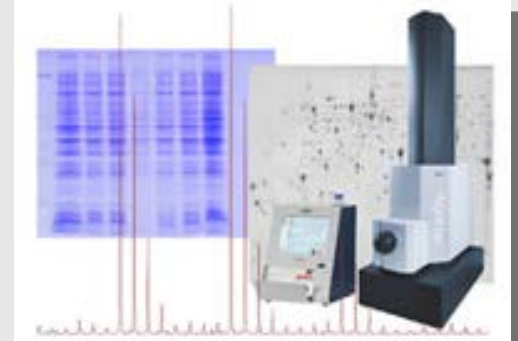
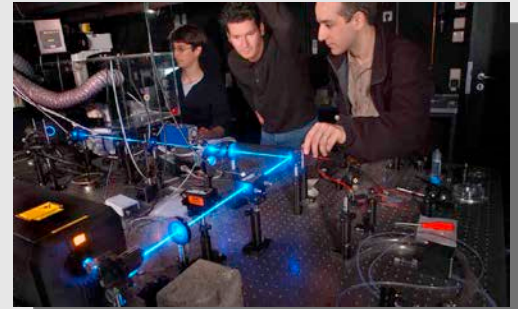
- Joint papers (2006-2009) — >1
- Joint papers (2006-2009) — 1
- Shared grants (2006-2009) — >1
- Shared grants (2006-2009) — 1
- EIPOD —
- Keyword similarity (correlation coefficient) — >0.8
- Keyword similarity (correlation coefficient) — >0.5

\* (n) means new group leaders

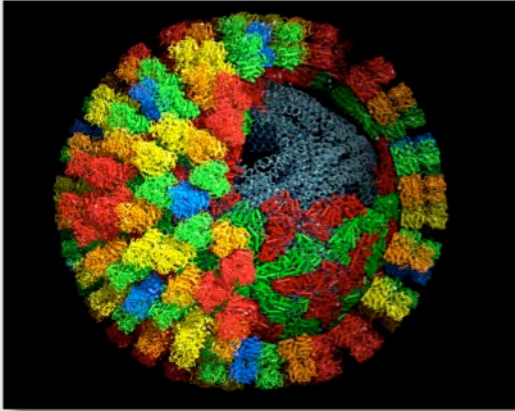


# EMBL Scientific Core Facilities

- Advanced Light Microscopy
- Chemical Biology
- Electron Microscopy
- Flow Cytometry
- Protein Expression & Purification
- Genomics
- Proteomics
- Monoclonal Antibodies
- Transgenics

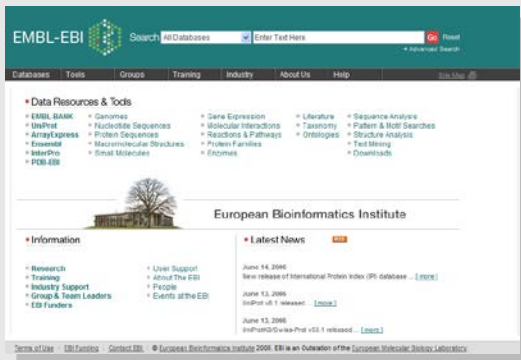


# EMBL Services



## Structural Biology

More than 3,000 users per year



## Bioinformatics

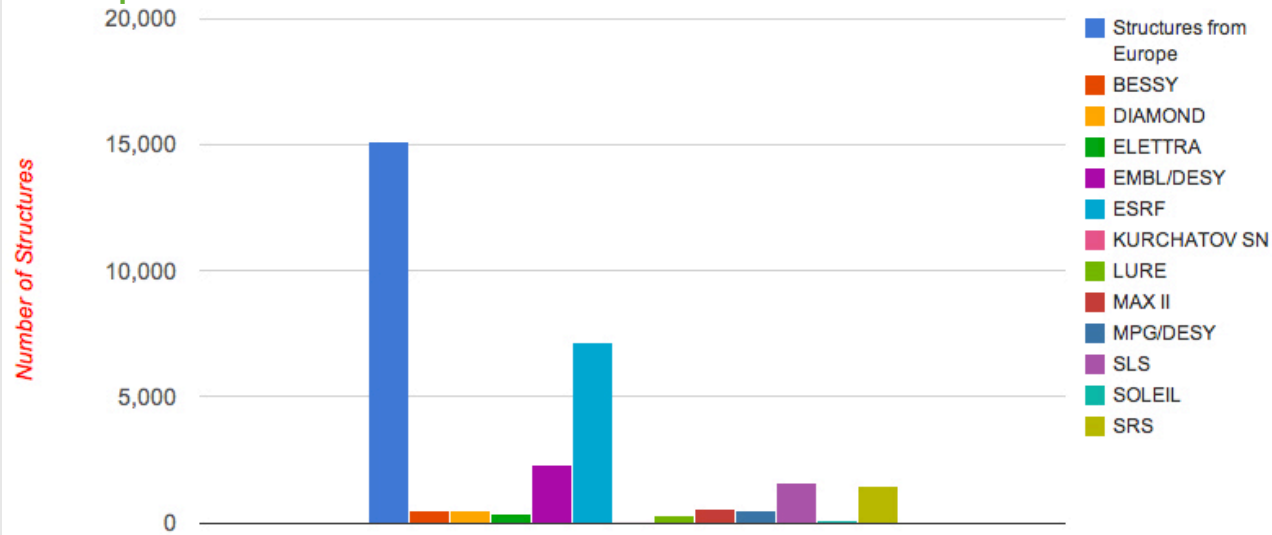
>6,500,000 web hits per day

Around 6000 meeting/training course participants and 450 visiting scientists per year at all EMBL sites

# EMBL Services in Structural Biology

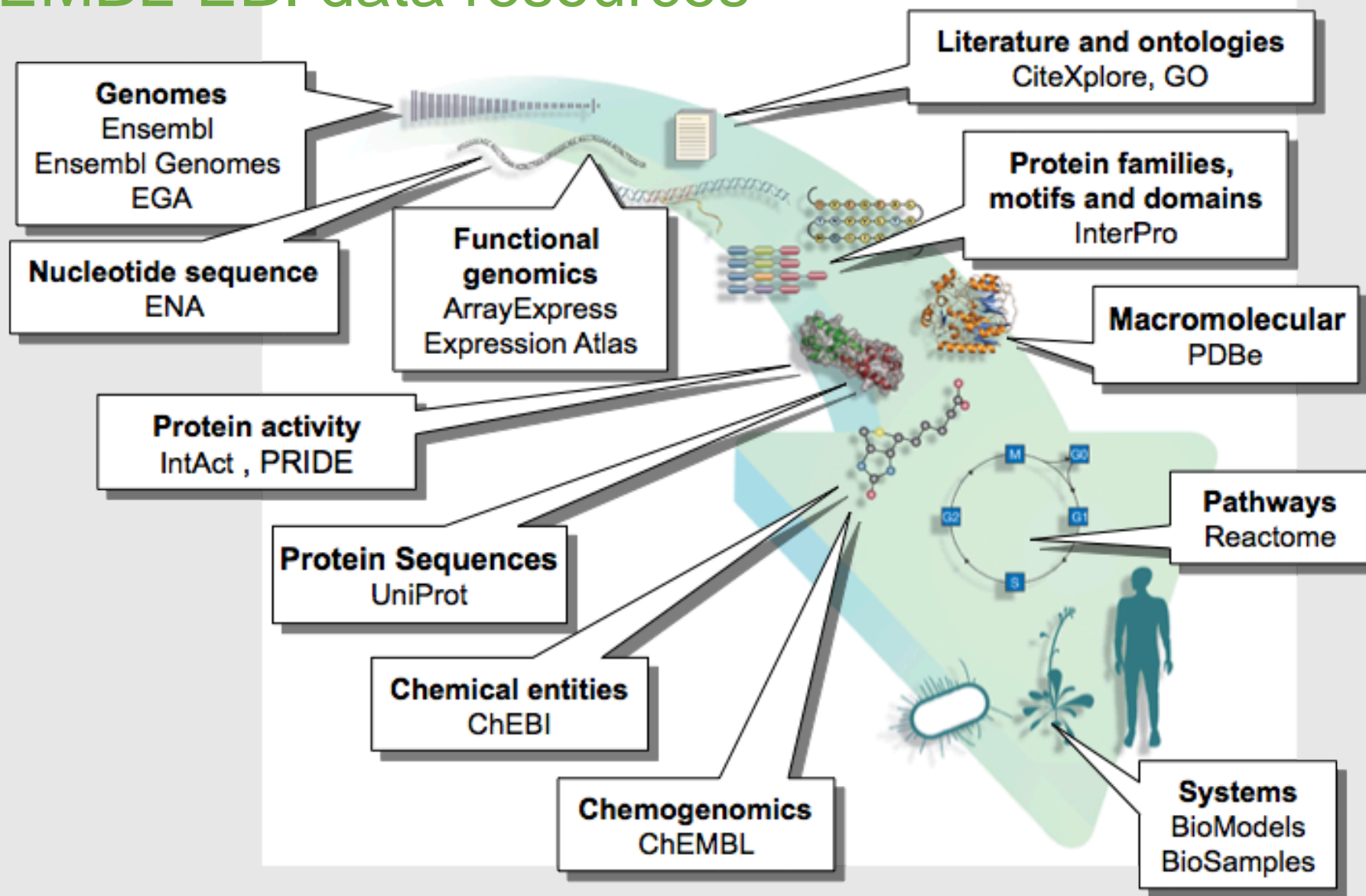
- In Hamburg and Grenoble EMBL provides access to synchrotron radiation for biological applications at DESY and ESRF
- In Hamburg EMBL explores biological applications of the new European-XFEL

Deposited PDB structures by synchrotron facilities in Europe since 1995



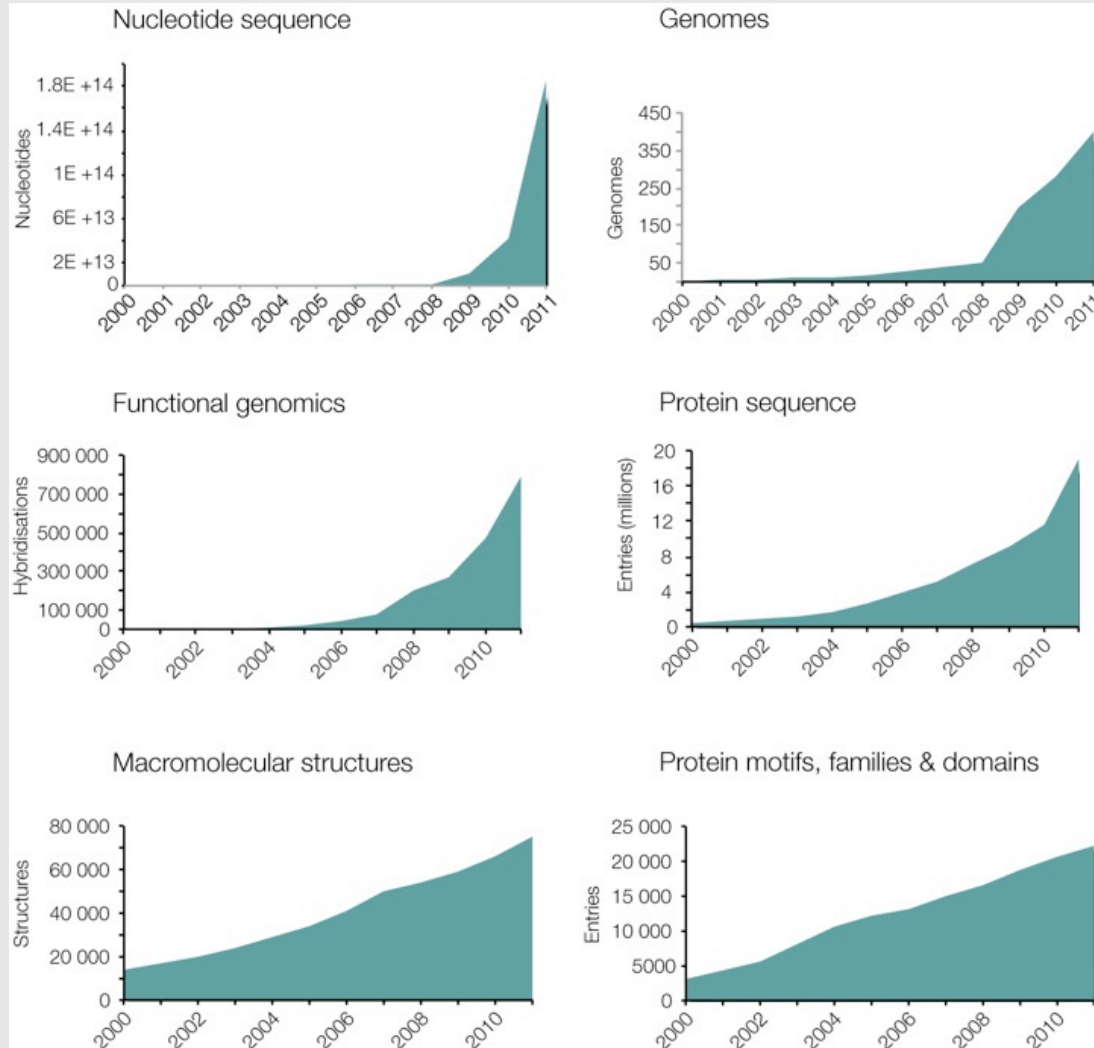


# EMBL-EBI data resources



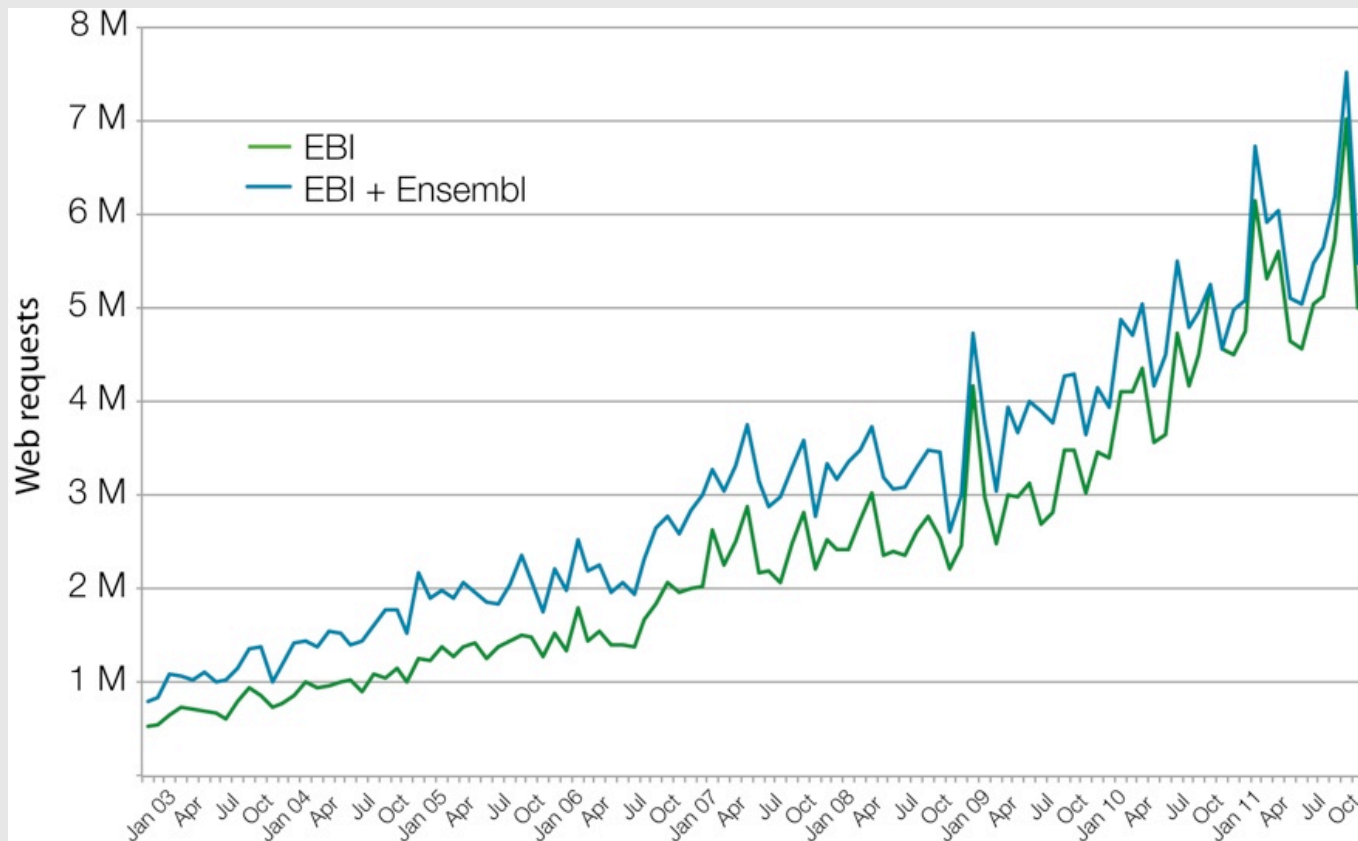
# EMBL-EBI Bioinformatics Services

- Provide Europe with the biological data that serves basic research and innovation in biology, health and agriculture.
- Keeping up with growing data volumes
- Data integration



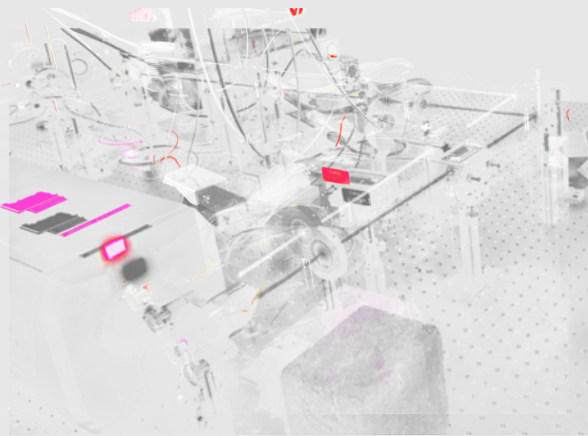
# Usage of EMBL-EBI services

- EMBL-EBI offers Europe's most extensive and most widely used biomolecular databases
- 6.5 million webhits per day from academia and industry
- Usage from >3 million unique IP addresses per year



# Technology Development

- EMBL develops a broad spectrum of technology and instrumentation for life science research
- Cross-fertilisation between research activities and technology development



Imaging  
technology

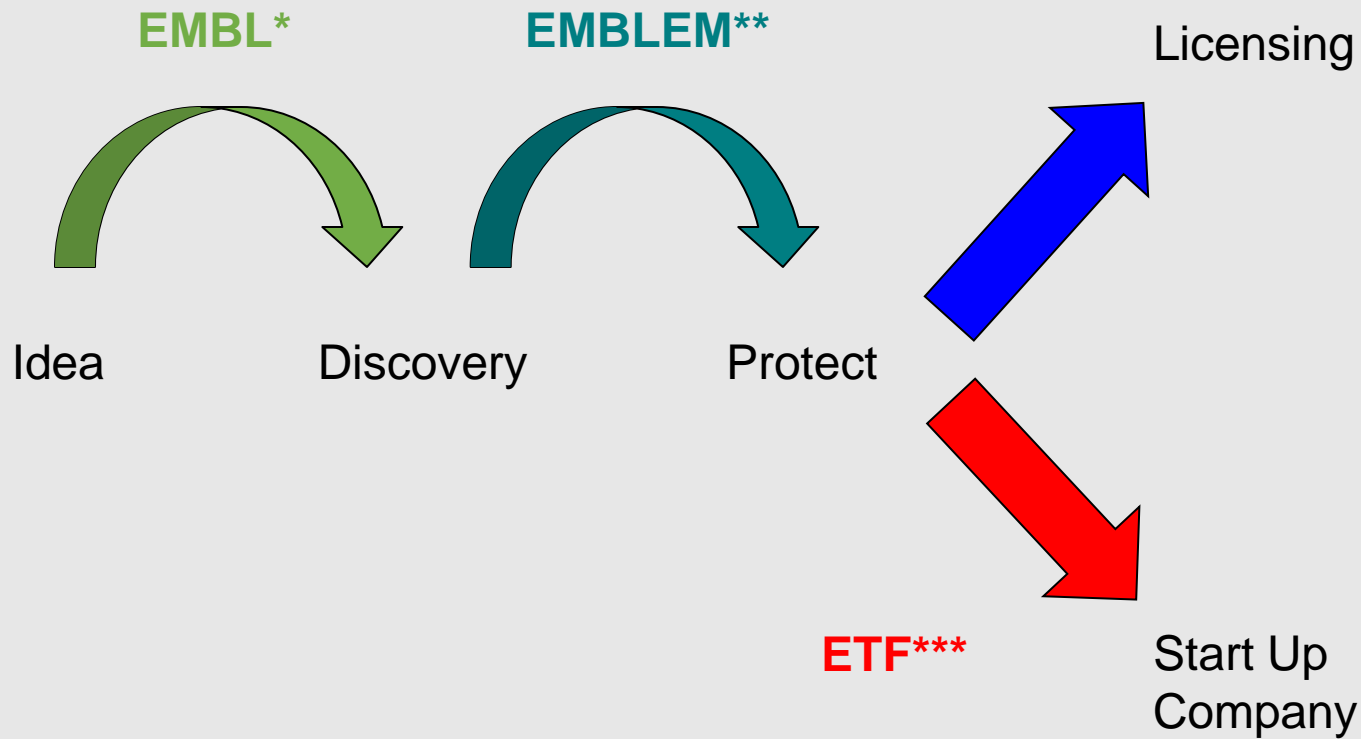


Software  
development



Synchrotron instrumentation

# EMBL Technology Transfer









\* European Molecular Biology Laboratory (<http://www.embl.org>)

\*\* EMBLEM Technology Transfer GmbH (<http://www.embl-em.de>)

\*\*\* EMBL Technology Fund (<http://www.embl-ventures.com>)

# EMBL Spin out companies

Name	Field	Founding Year	VC Fin. Phase
Lion Bioscience AG	Bioinformatics	1997	Post IPO
Cenix Bioscience GmbH	RNAi	1999	2nd round
Cellzome AG	Chem. Proteomics	2000	4th round
Anadys Inc.	Anti Viral	2000	Post IPO
Gene Bridges GmbH	Genetic Eng.	2000	-
EVP Inc.	Neuronal Disorders	2001	3rd round
SLS GmbH	Software	2002	-
HybriCore GmbH	HT mAb Prod	2002	seed
Triskel Ltd.	Oncology	2006	seed
Elara Pharma GmbH	Oncology	2006	1st round
BioBytes	Bioinformatics	2008	seed
Savira Pharmaceuticals GmbH	Anti Viral	2009	seed

# EMBL's Interaction with Bio-Industries

- Operation of key research infrastructures
- Diverse range of training activities
- EMBL-EBI Industry Programme
- EMBL ATC Corporate Partnership Programme
- Innovative Medicine Initiative (EU-funded programmes)
- Pistoia Alliance
- Interaction between beamline engineers and Core Facility staff and bio-industries





# EMBL Training

## Intramural training

### EMBL International PhD Programme



### EMBL Postdoctoral Programme



### General Training & Development Programme



## Extramural training

### EMBL Courses & Conferences



### European Learning Lab for the Life Sciences



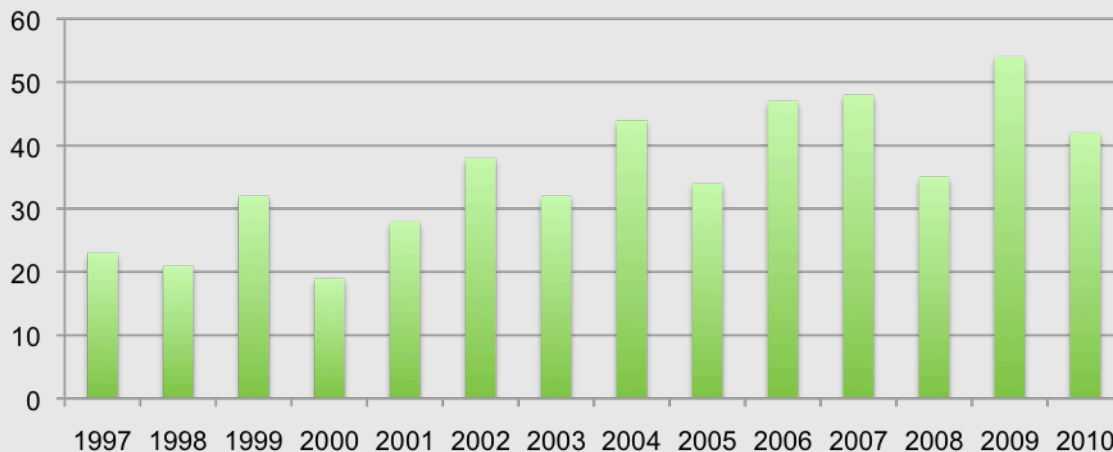
### EMBL Visitors' & Scholars' Programme



# EMBL International PhD Programme (EIPP)

- Created in 1983, can award its own PhD degree (since 1997)
- Joint PhD degree with 29 universities in 19 countries, including Iceland University
- EMBL fellowships only for students from member states
- 40% EMBL internal fellowships / 60% external fellowships
- Average: ca 170-200 students from more than 40 countries

**PhD defences since 1997**



Currently two  
PhD students  
from Iceland!

# EMBL Postdoctoral Programme

- EMBL Postdoctoral Association
- Second Mentor Programme
- Special Career Development Opportunities
- Competitive salary and social benefits



## **EIPOD – EMBL Interdisciplinary Postdocs**

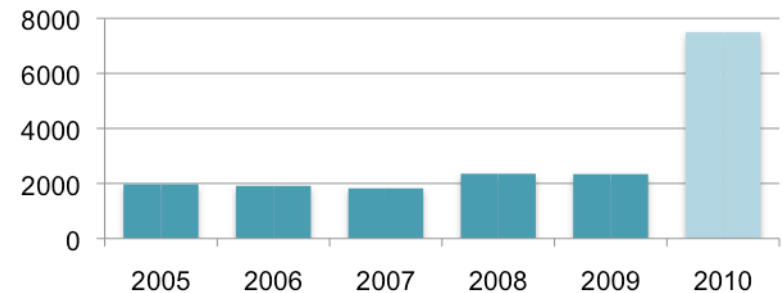
- Interdisciplinary research project, hosted in two different labs at the five EMBL sites
- EU Sponsored (Marie Curie Co-Fund)
- Full three years of EMBL funding
- Priority to member state applicants
- Average intake 10-15 EIPODs per year

# EMBL Courses and Conferences

- **EMBL ATC**: hub for advanced life science training and exchange in Europe
- Opening on 9 March 2010
- In 2010 & 2011:  
47 conferences & meetings  
46 courses
- **~10,000 participants**
- **New training formats:**  
EMBO | EMBL Symposia  
Tailored practical courses  
Vision 2020 lecture series



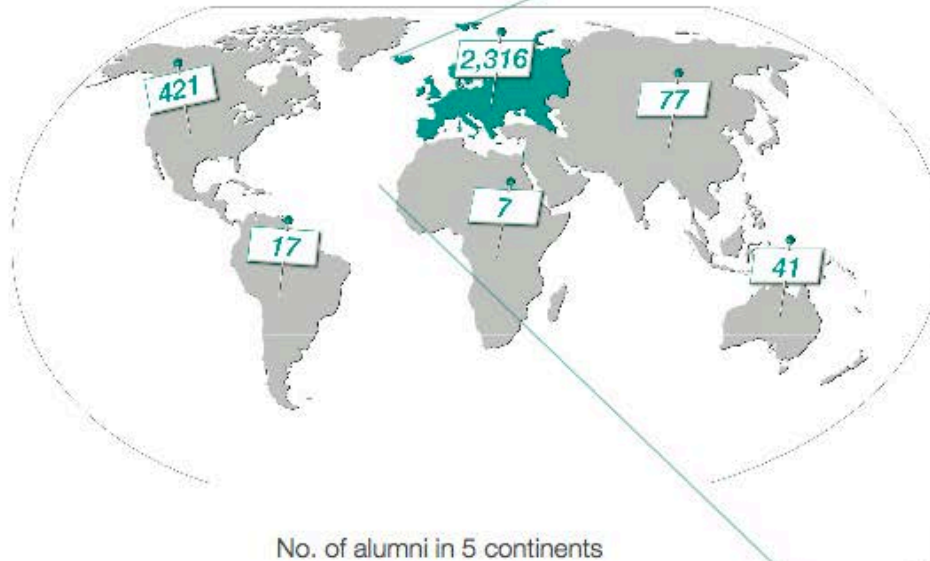
**Total Course & Conference  
Participants EMBL Heidelberg  
(2007-2010)**



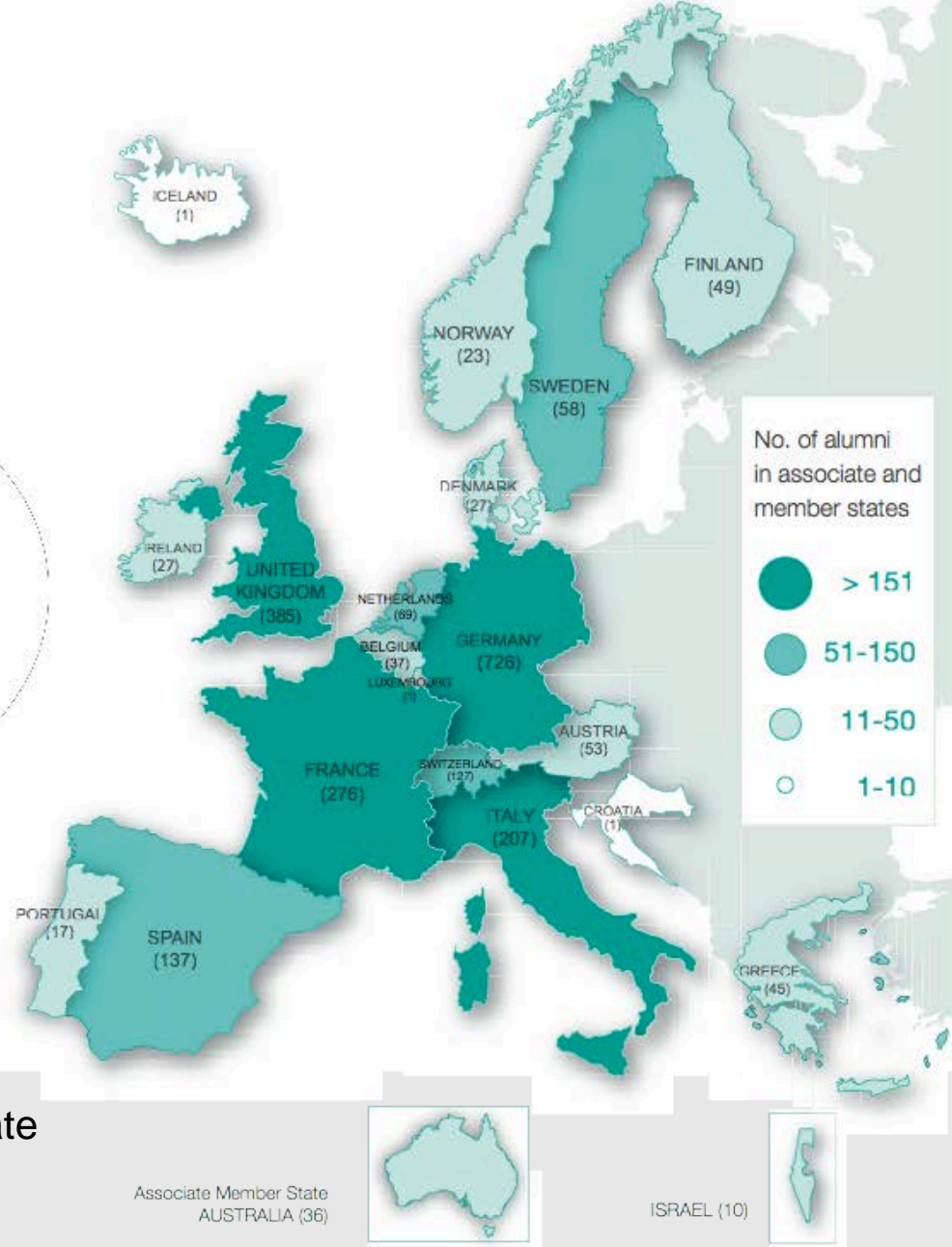


# EMBL ALUMNI

- > 5000 alumni are EMBL's strongest asset



- ~3000 alumni with known country of residence
- 81% live in EMBL member and associate member states



# Integration of life science research in Europe

## **Encourage all European countries to join EMBL.**

- New EU member states

## **Serve an integrating role in life science research.**

- Collaborations (2008-2010 ~2700 external collaborations, 247 publications)
- EMBL researchers coordinated 29 and participated in >130 FP6 + 7 projects



Develop EMBL partnerships for scientific collaborations & exchange.

Play an active role in European science policy (Research Infrastructure focus).

Close interactions with the European Commission.

# EMBL Partnerships



- Special cooperations with national institutions in EMBL member states
- Establish network of international centres of scientific excellence and advanced training modelled on EMBL
- Exploit complementarity or synergy
- Transfer know how
- Implementation varies with local circumstances and national funding
- No net transfer of EMBL resources possible



# EMBL Partnerships

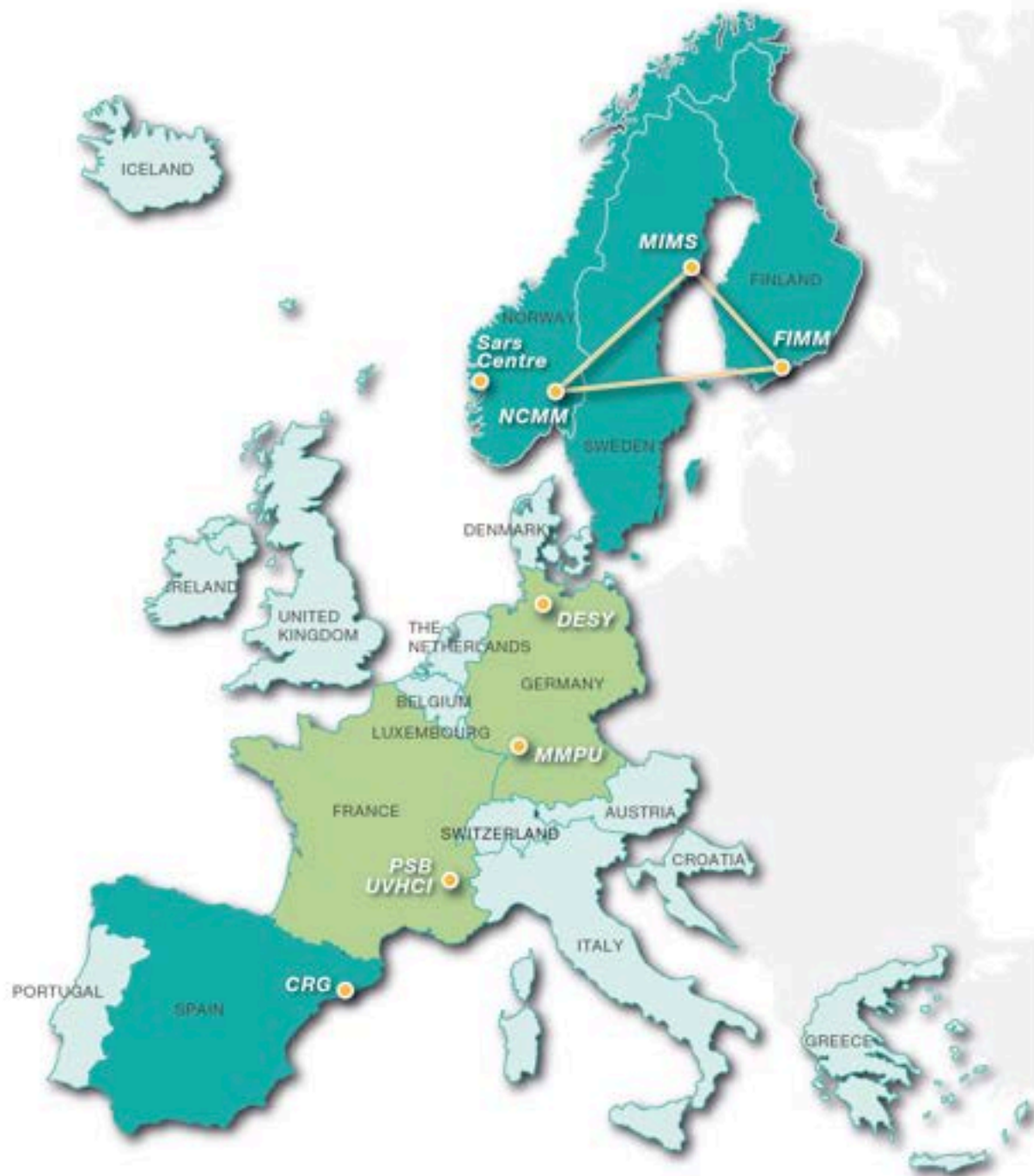
## EMBL Partnerships



ASSOCIATE MEMBER STATE  
AUSTRALIA



ISRAEL



# ESFRI Biomedical research infrastructures



# EMBL's role in the BMS projects

- Coordinates ELIXIR and Euro-Bioimaging
- Gives scientific and strategic input into 5 additional projects
- 35 years of experience in running international research facilities that provide services and training
- Profits from experience of other successful RIs unified in EIROforum
- EMBL's responsibility to the member states and the European life science community



# ELIXIR

Safeguarding the results of life science  
research in Europe

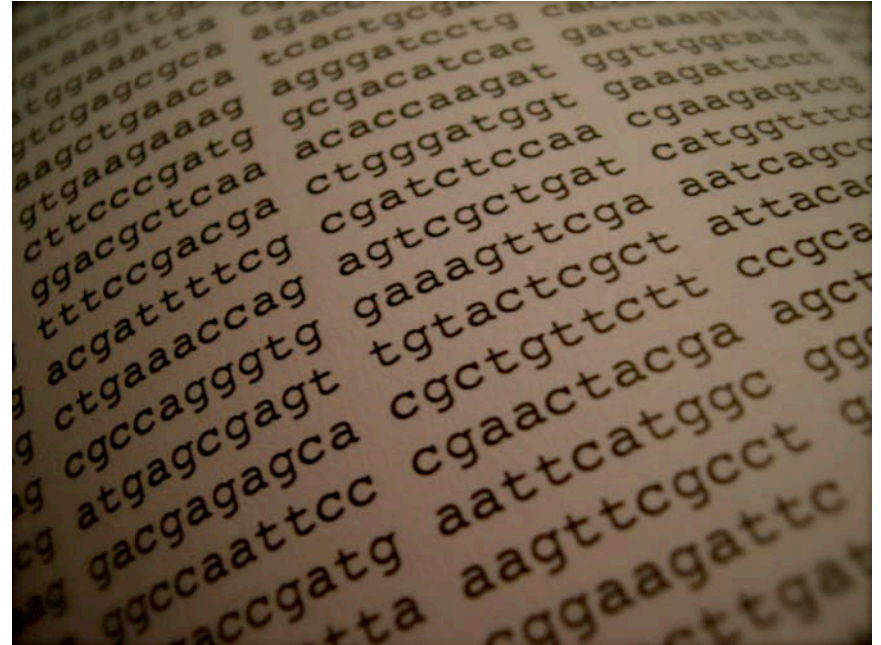
*European Life Sciences Infrastructure for Biological Information*

[www.elixir-europe.org](http://www.elixir-europe.org)



# What is bioinformatics?

- The science of storing, retrieving and analysing large amounts of biological information
- An interdisciplinary science involving biologists, biochemists, computer scientists and mathematicians
- **At the heart of modern biology**



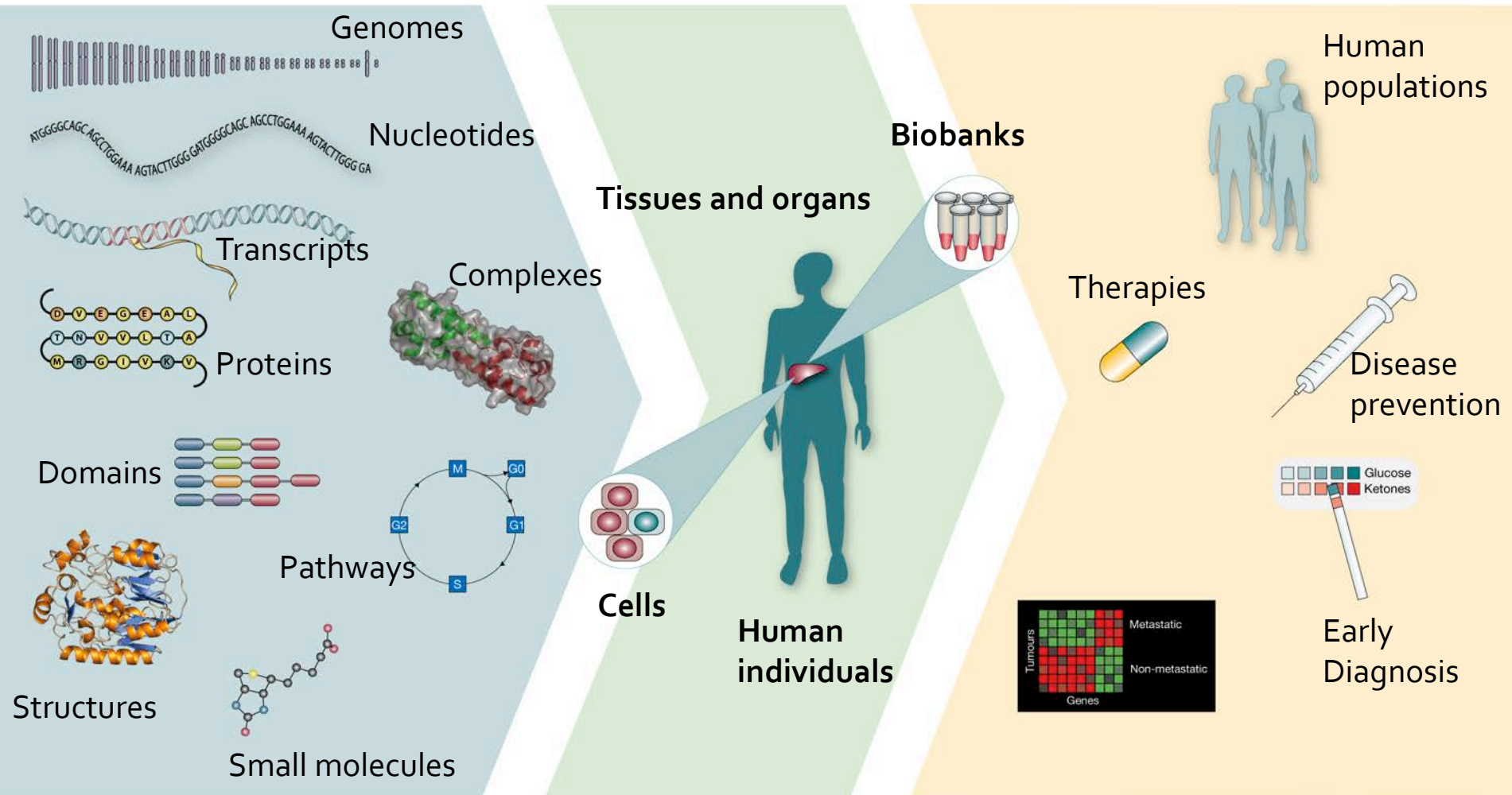


# From molecules to medicine

## Molecular components

## Integration

## Translation



# What is ELIXIR?

- *An ESFRI research infrastructure of global significance*
- Unites Europe's leading life science organisations in managing and **safeguarding** the vast amounts of data being generated every day by **publicly funded research**.
- A large-scale initiative that will provide the facilities necessary for Europe's life-science researchers to make the most of our rapidly growing store of information about living systems, which is the foundation on which our understanding of life is built.

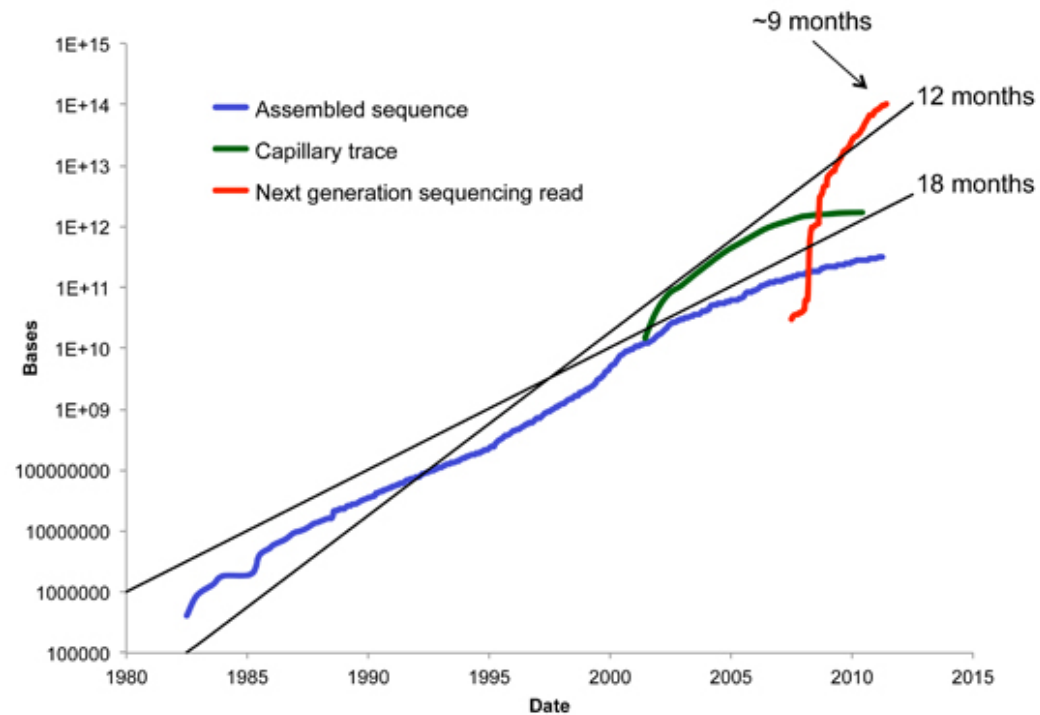


# Why ELIXIR?

- Creating a robust infrastructure for biological information is a bigger task than EMBL-EBI – or any individual organisation or nation – can take on alone.
- Biology has by far the largest research community:
  - ~3 million life science researchers in Europe
  - >6 million web hits a day at EMBL-EBI alone
- **We need to involve other European partners**

# The challenge

- Computer speed and storage capacity is **doubling every 18 months** and this rate is steady
- DNA sequence data is **doubling every 6-8 months** over the last 3 years and looks to continue for this decade



Guy Cochrane, ENA, EMBL-EBI

# ELIXIR's mission

To build a sustainable European infrastructure for biological information, supporting life science research and its translation to:



society

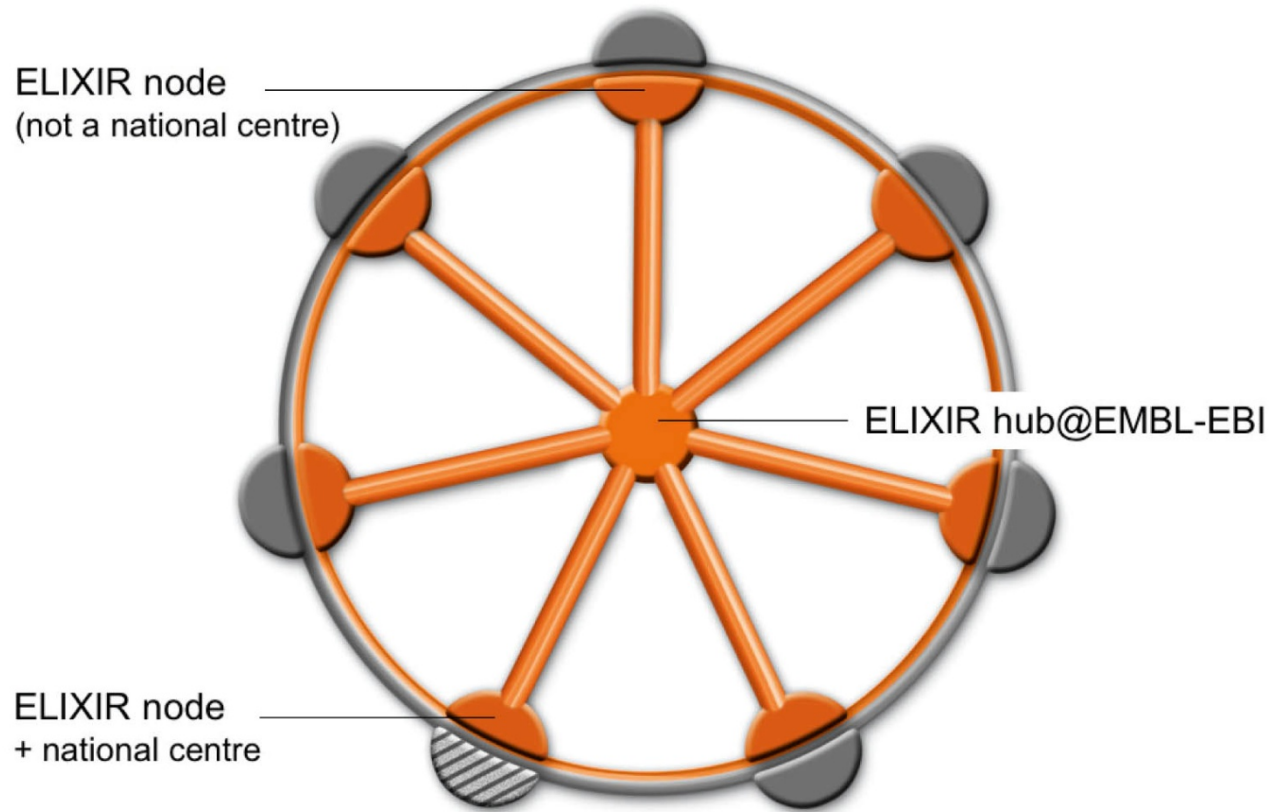
bioindustries

environment

medicine



# A distributed pan-European infrastructure



# Benefits

**ELIXIR** will contribute to European innovation by:

- Optimising **access** and exploitation of life-science data
- Ensuring **longevity** of the data, thereby protecting investments already made in research
- Enhancing the **quality** of European research by supporting national efforts to increase the competence and number of bioinformatics users through **training**
- Strengthening the global position and **influence** of Europe in life-science research in both in academia and industry



# The scientific reason for ELIXIR

- Data is an essential commodity for life-science research.
- Ten years ago, finding the connection between a gene and a characteristic (e.g. drought tolerance, risk of heart disease) could take years; now it takes minutes.
- Data analysis is now the **bottleneck** in life-science research
- **ELIXIR** is our only realistic hope of easing that bottleneck

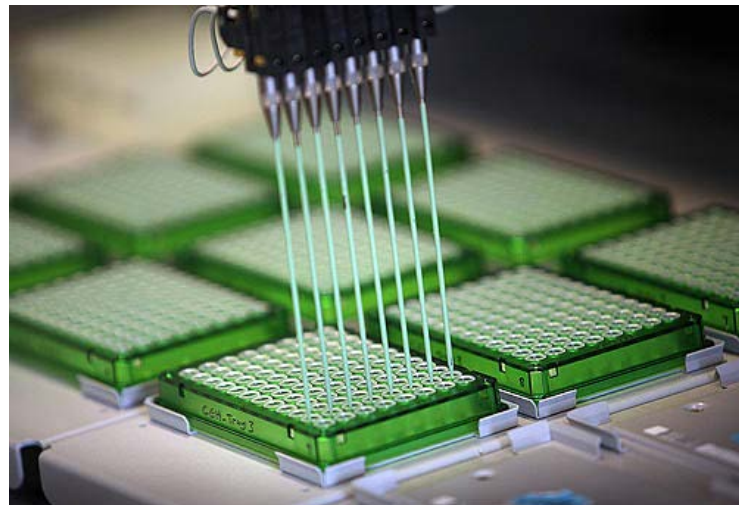


Image courtesy of Genome Research Ltd.

# One societal reason for ELIXIR

- The era of personal genome sequencing is upon us.
- Sequence data will not cross national boundaries.
- Every national health system will need **expertise to interpret it** and treat patients accordingly.
- Individuals need to be sure that their personal biological data are in safe hands.

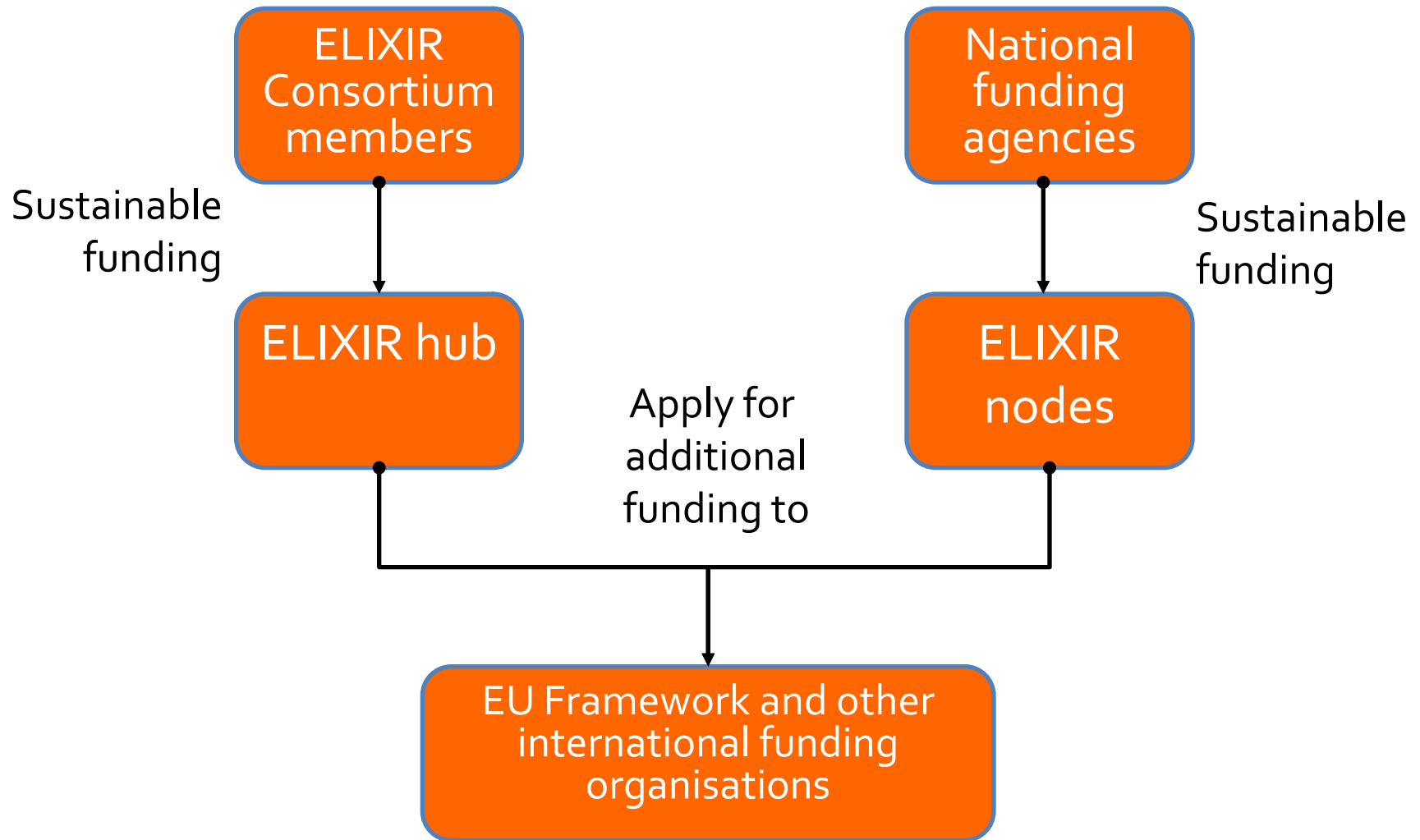


# The financial reason for ELIXIR

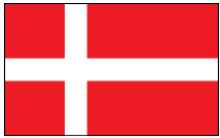
- Europe has already spent the money to generate the data.
- It will waste all this investment in research if the future of the data is not secured.
- Industry, from SMEs to big multinationals, needs access to public data to analyse its proprietary data.



# How will ELIXIR be funded?



# Eleven countries have signed up



- 11 countries plus EMBL have now signed the Memorandum of Understanding (MoU) to participate
- More are expected to follow...
- Countries will now work towards signing an International Consortium Agreement (ICA)

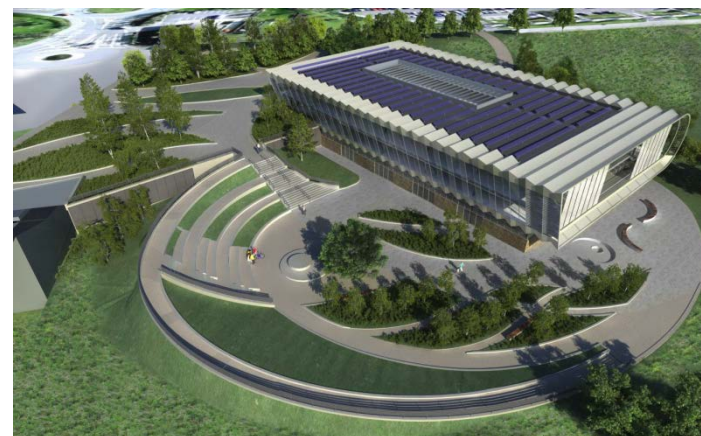


# ELIXIR Current Status

- ELIXIR Members are currently drafting an International Consortium Agreement (ICA), working towards signing a final version in 2013
- ELIXIR Scientific Advisory Board (SAB) has just been appointed
- Process for reviewing and selecting ELIXIR Nodes will begin in coming months
- ELIXIR Founding Director currently being sought

# ELIXIR Current Status (cont.)

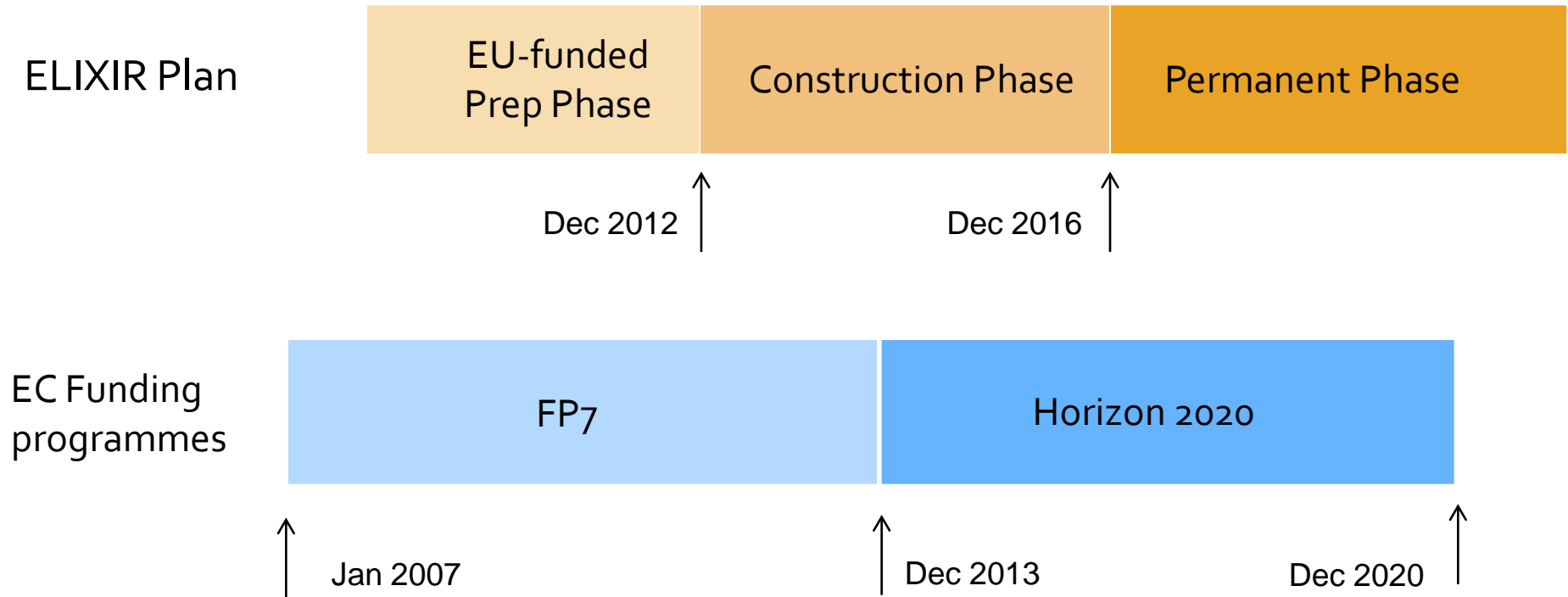
- Over €20 million has so far been committed for the construction and operation of national ELIXIR Nodes
- Commitment of €100 million has been made by UK government
- This will go towards a new building on EBI campus, currently being constructed, which will house the ELIXIR Hub, in addition to space in the London Data Centre
- ELIXIR Interim Board has approved an operating budget for ELIXIR Hub for 2012



# BioMedBridges EU grant funded

- Building data bridges and services between biological and medical infrastructures in Europe
- Collaboration between all BMS Infrastructure projects
- 21 partners
- Coordinated by EMBL-EBI
- 10.5 m euros
- Start Jan 2012

# ELIXIR Timeline



# Thank you!