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Ewan Birney
EMBL Deputy Director General

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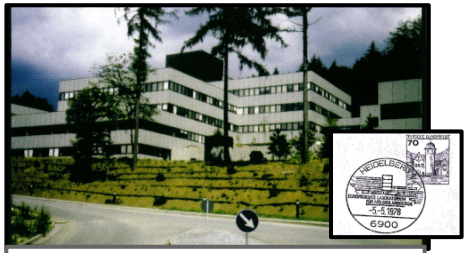
The European Molecular Biology Laboratory (EMBL) History



EMBL Heidelberg

1974

EMBL Grenoble

1976

EMBL Rome

1999

1973

EMBL signing ceremony, Geneva

1975

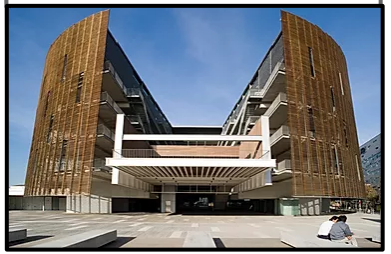
EMBL Hamburg

1994

EMBL-EBI

2017

EMBL Barcelona



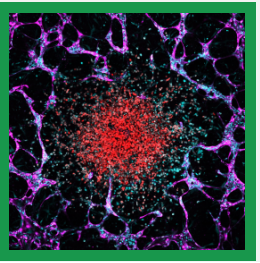
EMBL's Sites

EMBL-EBI

Bioinformatics

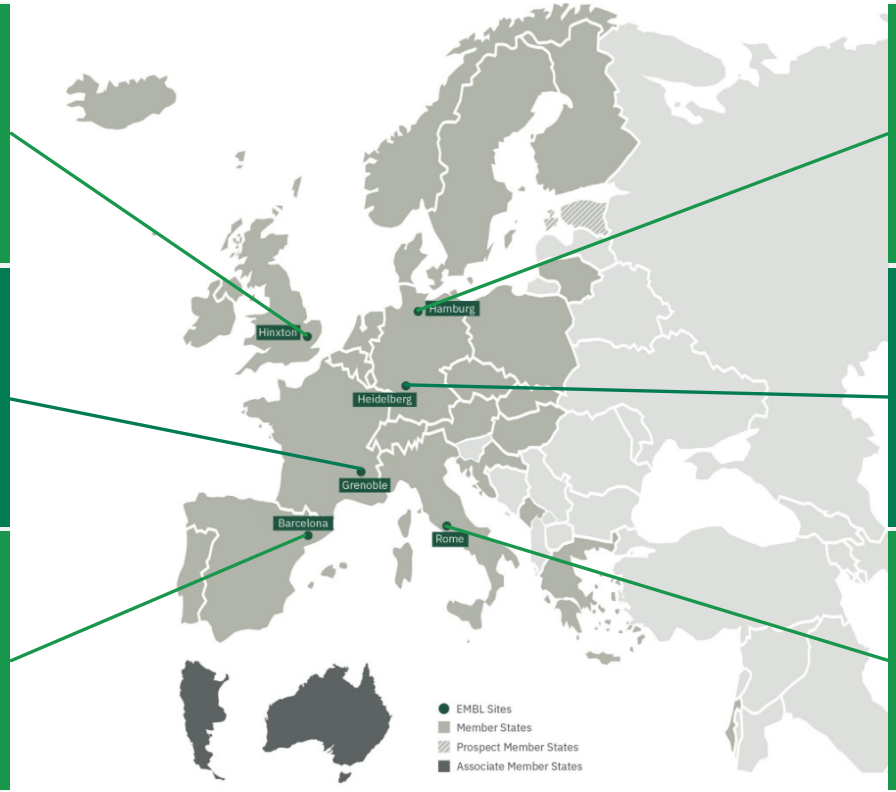
Grenoble

Structural Biology



Barcelona

Multicellular Engineering



Hamburg

Structural Biology

Heidelberg

Life Sciences

Rome

Epigenetics Neurobiology

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EMBL's Member States

Member states (27)

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
Czech Republic 2014
Malta 2016
Hungary 2017
Slovakia 2018
Montenegro 2018
Poland 2019
Lithuania 2019

Associate member states

Australia 2008
Argentina 2014

Prospect member states

Estonia 2019

EMBL is Europe's sole life sciences intergovernmental organisation

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EMBL's Legally required turnover model

44% turnover among EMBL Group Team Leaders over 5-year period

46 new hires and **35** departures **2015–2019**

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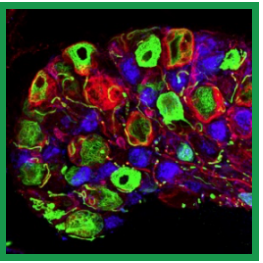
EMBL's Missions

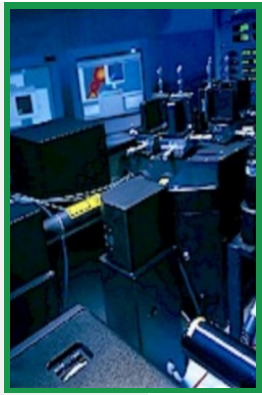


Excellent fundamental research

Infrastructure and services

Advanced training

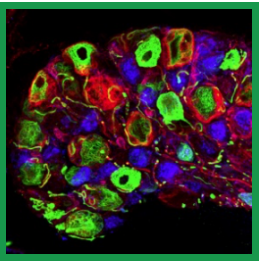
Technology development, transfer and industry



Integration of European life science research

EMBL

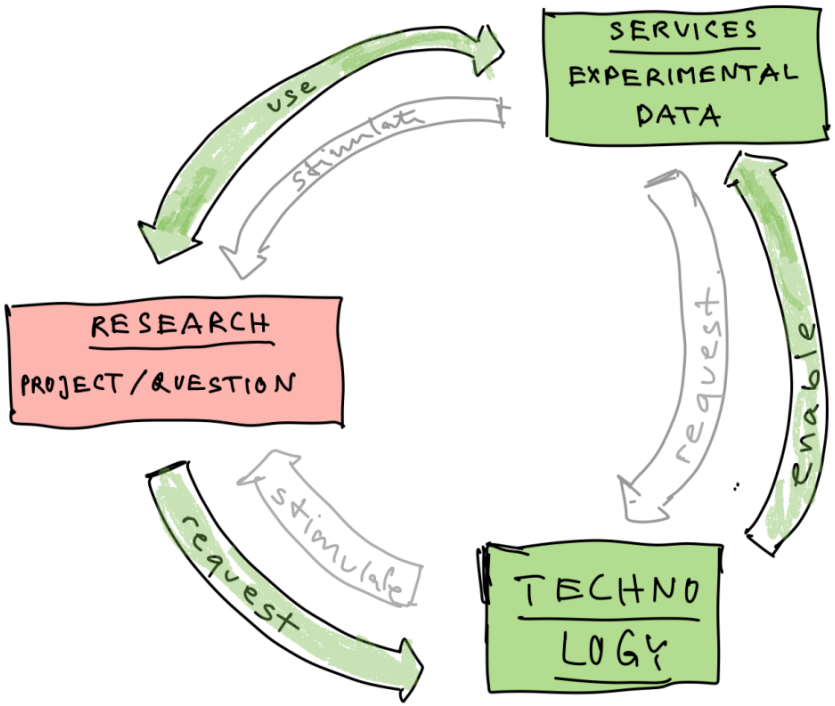
EMBL's Missions



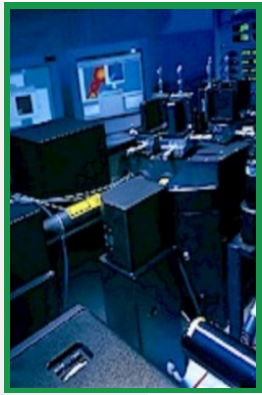
Excellent fundamental research

Infrastructure and services

Advanced training



Technology development, transfer and industry



Integration of European life science research

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Scientific Services: EMBL-EBI Data Resources

Access to EMBL-EBI data resources in 2019

63m	~3m	50m	300+
daily requests to EMBL-EBI	unique IP addresses every month	Jobs every month	petabytes of raw data storage

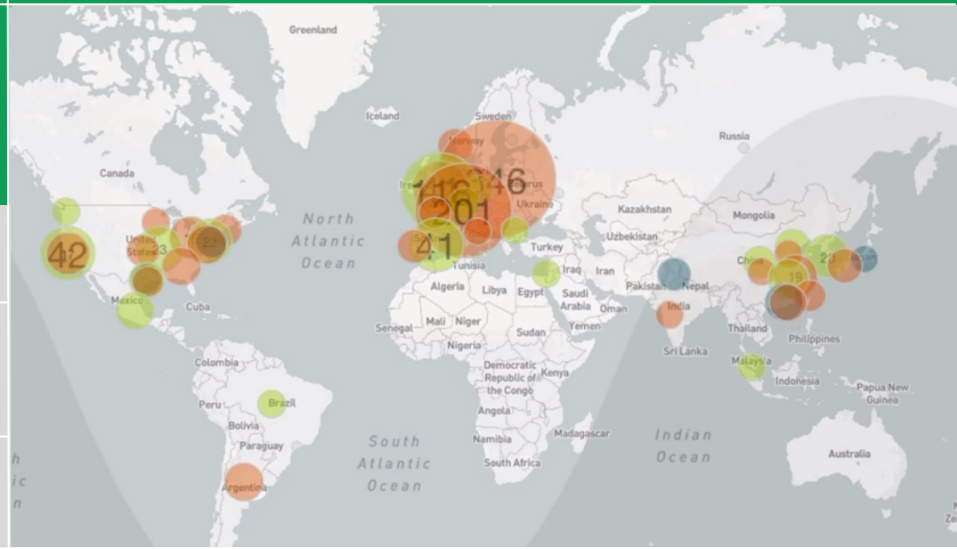
Global leader in biological data management

Hosting archival data resources, knowledge-bases and driving data standards

Coordinating large-scale international research consortia

Enabling data access to researchers and clinicians around the world

Enabling technologies and integrating data



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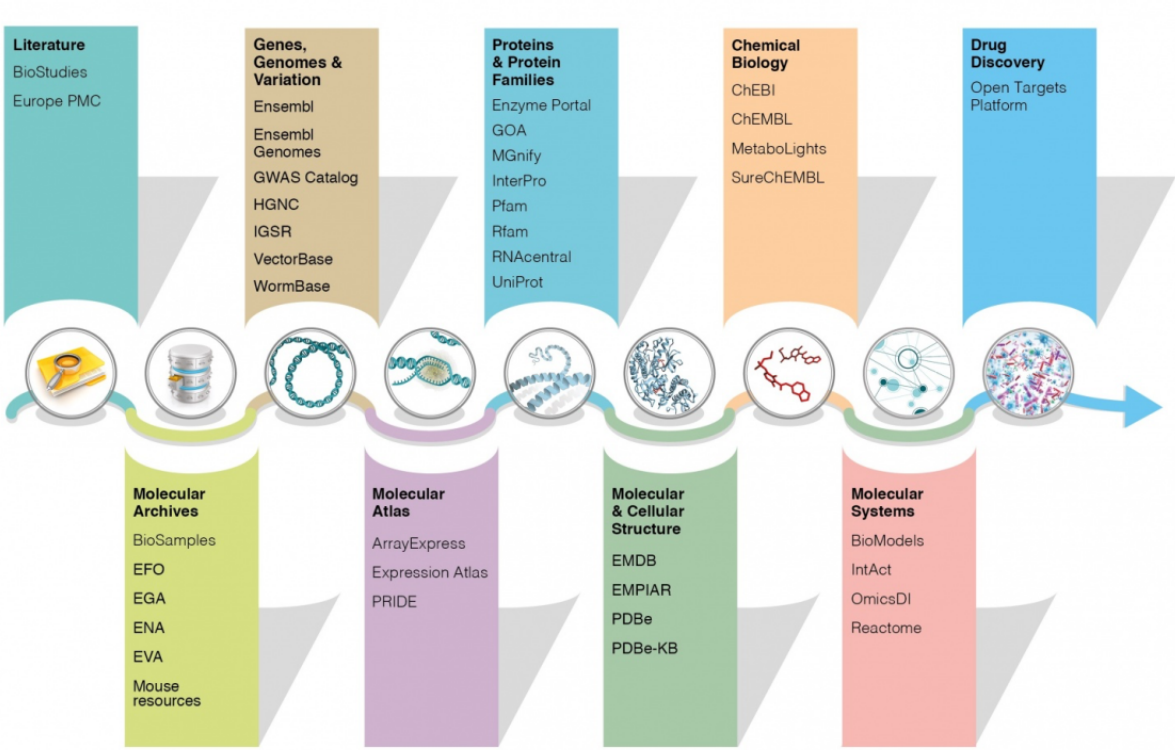
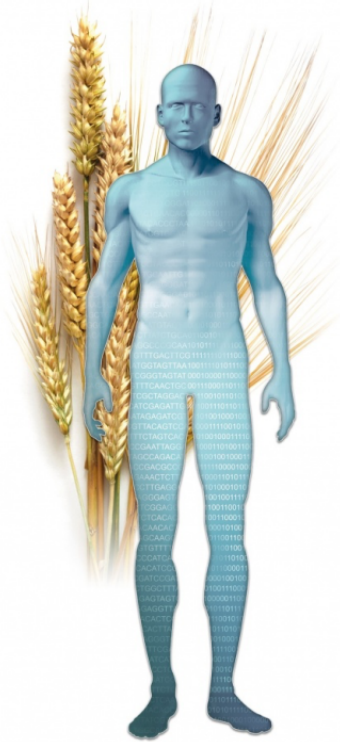
EMBL-EBI Data Resources





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BioImage Archive

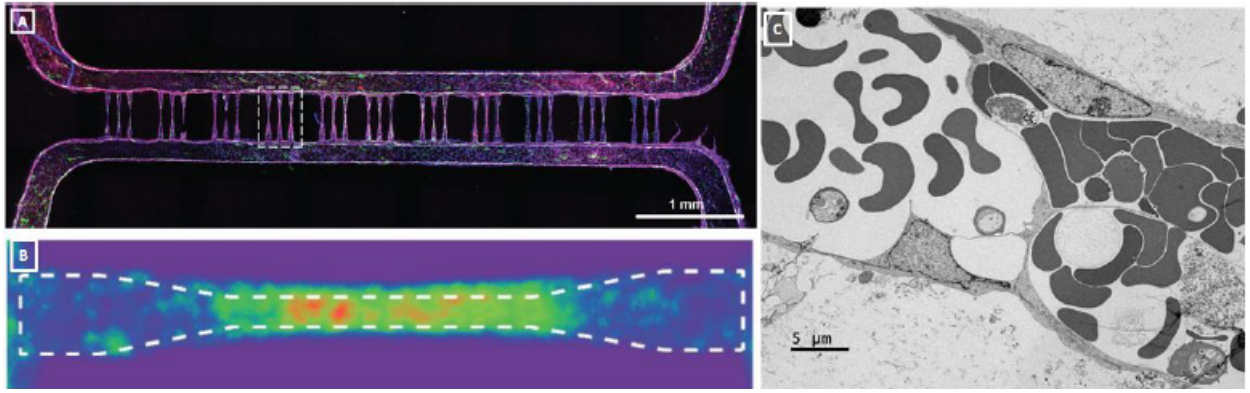

Image datasets linked to articles

Working with communities

Integration with omics data

Foundation for AI and analysis methods development

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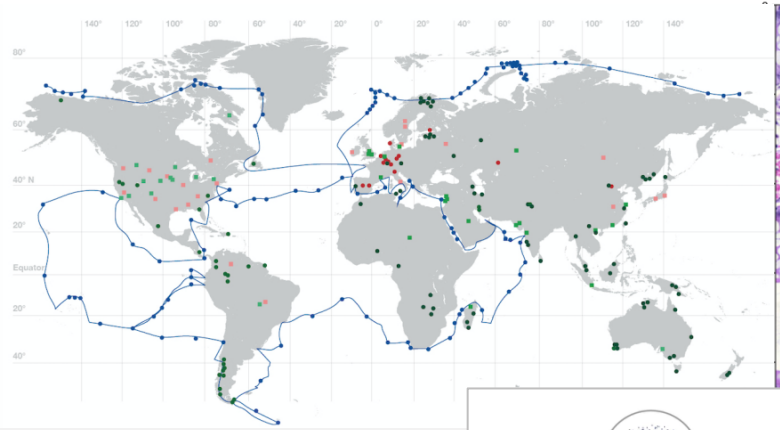
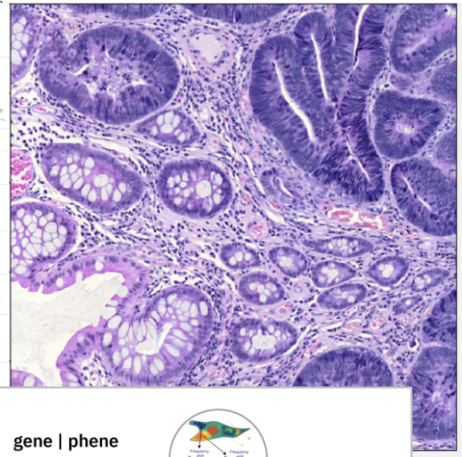
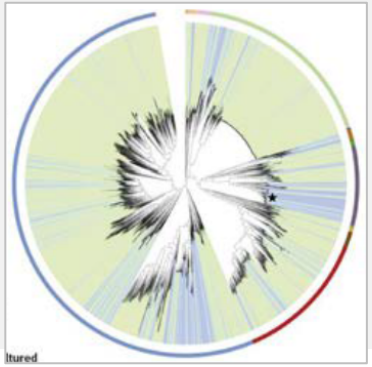
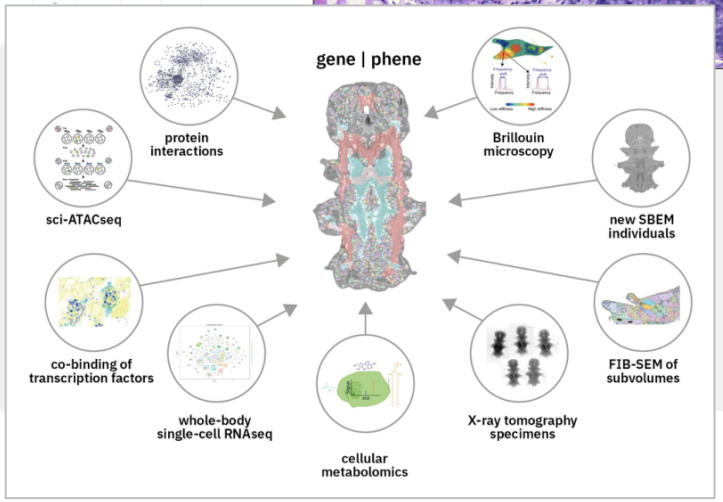
Many data types









Multiple data ingest streams at scale

Community-driven metadata

Integration and curation

Links with literature, unstructured data,

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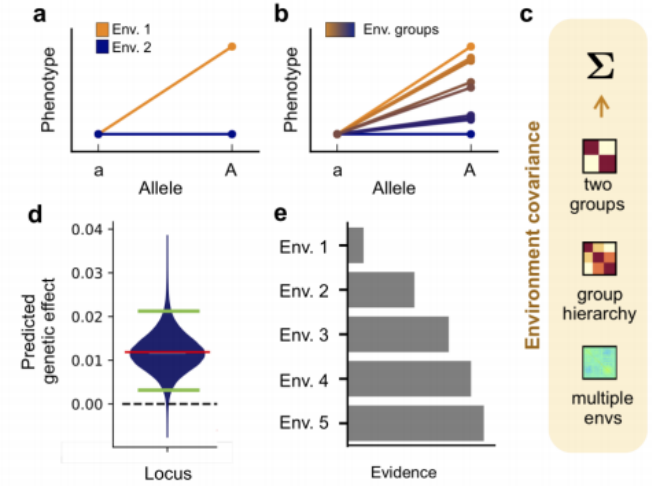
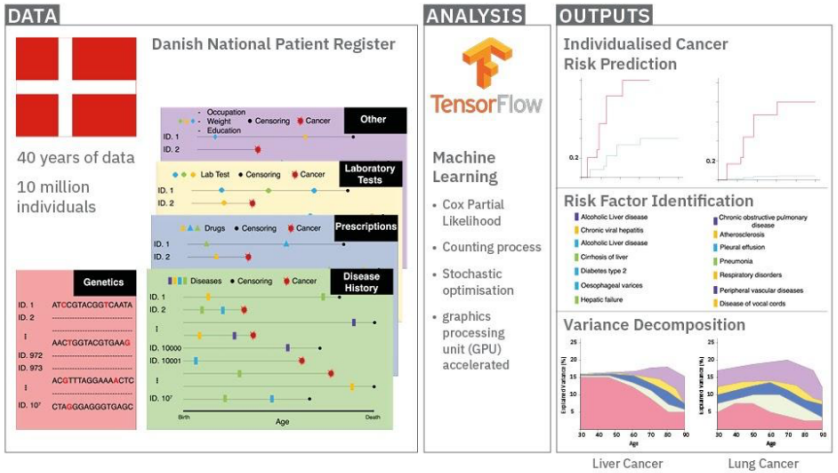
Innovative Data Science

Gene x Environment technique without precise definition of environment of interest.



Innovation in statistical methods

“BigData” Epidemiology – able to process >100 million person with >1 billion data items



Innovation in data science engineering

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Current human datasets

EU Child Cohort Network	Danish EHR	UK BioBank	Estonian Biobank	Lifework	Constances	Iceland/ DeCode	German National Cohort
200K parents + children	5000K	500K	50K	88K	200K	~350K	200K
available	available	available	available	available	available		

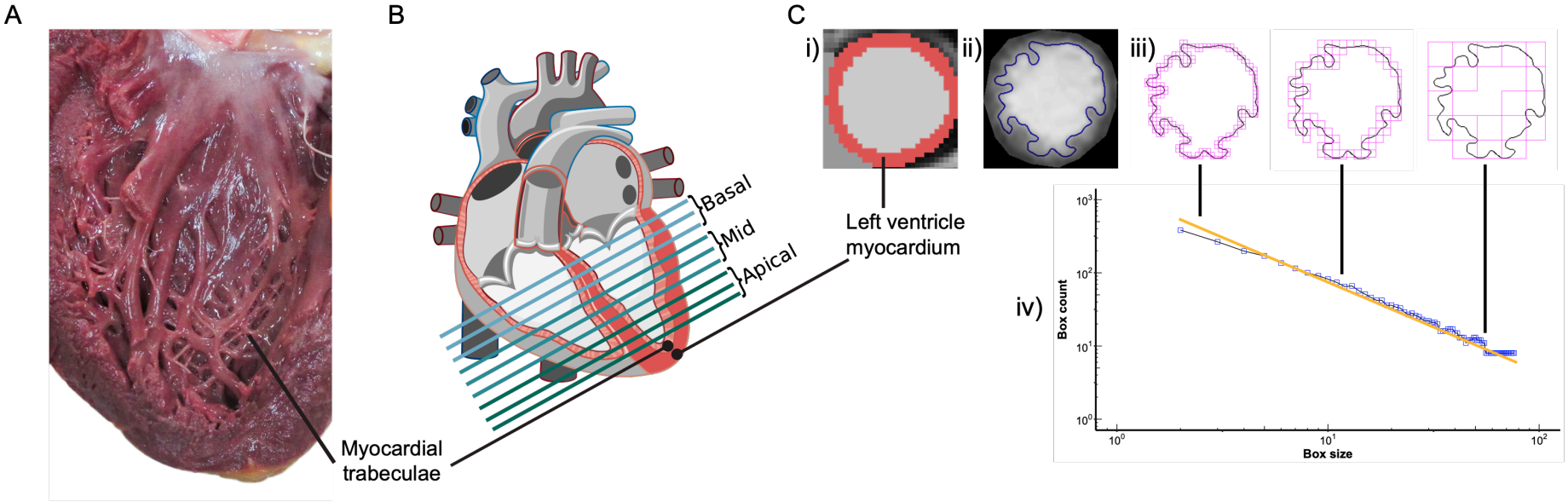
- Environmental measures (e.g. place of residence/work, smoking)
- Social measures (e.g. mobile phone use, location)
- Linked to medical records
- Biopsies (e.g. blood)

>6 millions subjects

Example research

EMBL

UK BioBank Cardiac MRI scans



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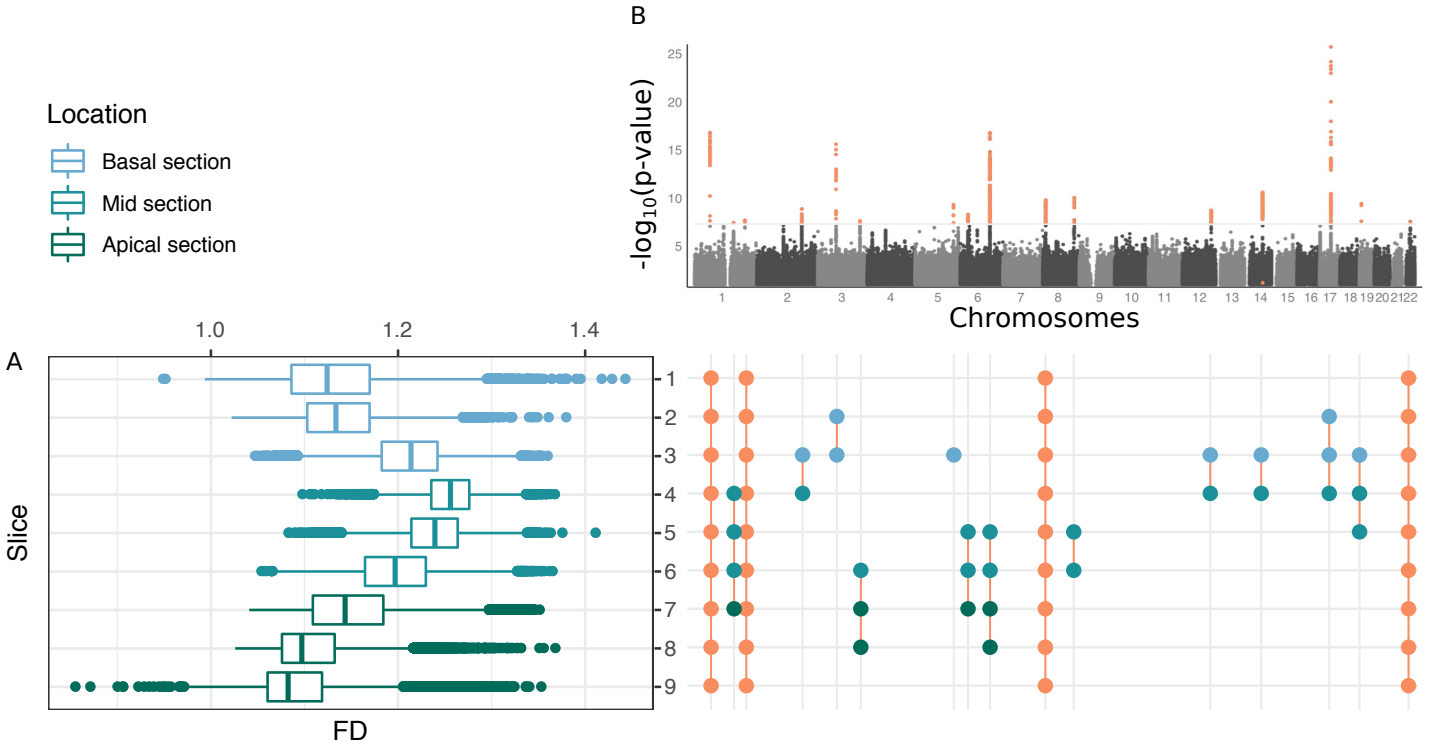
“Standard” GWAS



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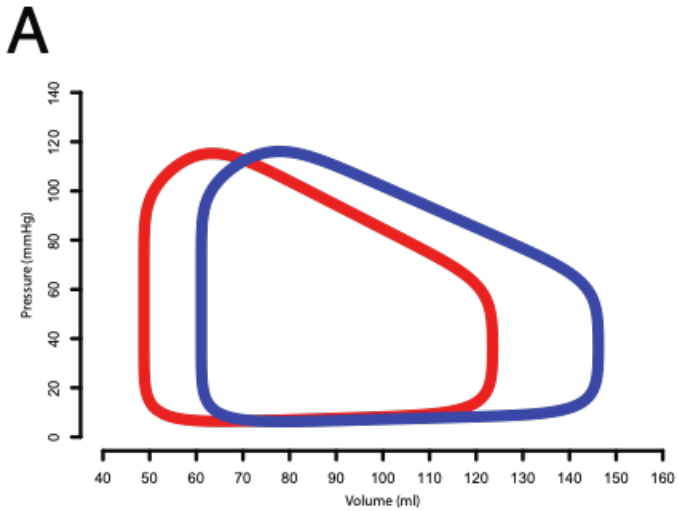
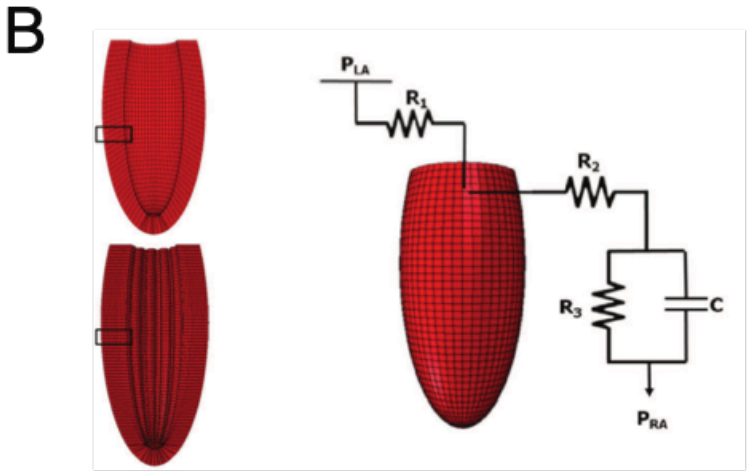
Haemodynamic model





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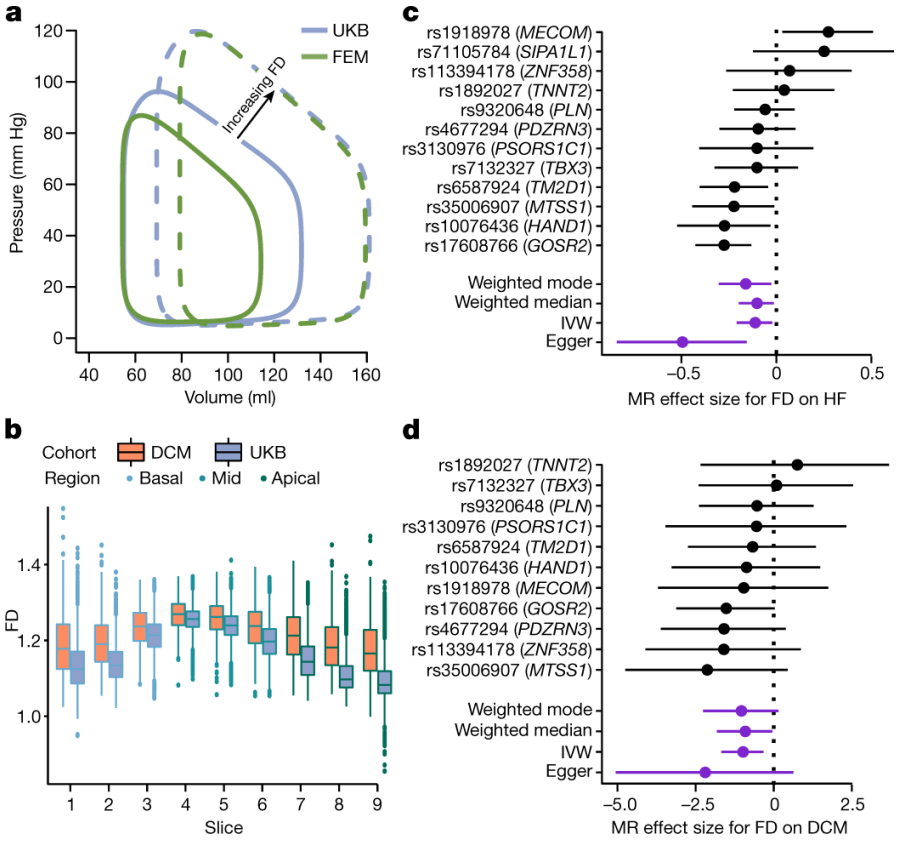
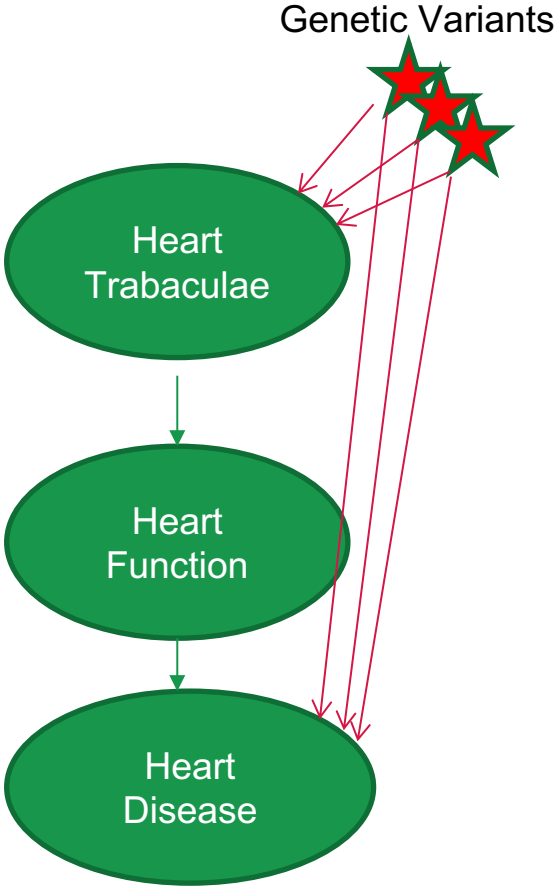
Using genetics to understand causality





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Genomic Medicine

Strategic advice

Reference data

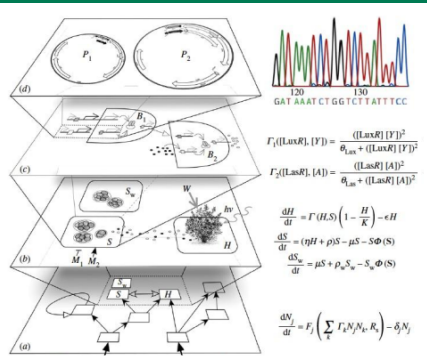
Federation

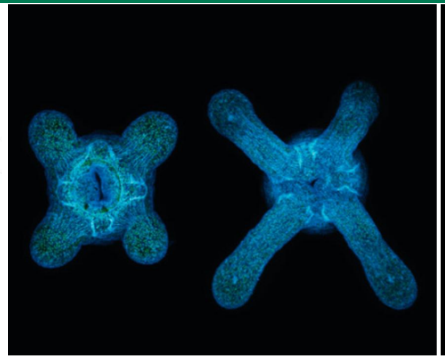
Training

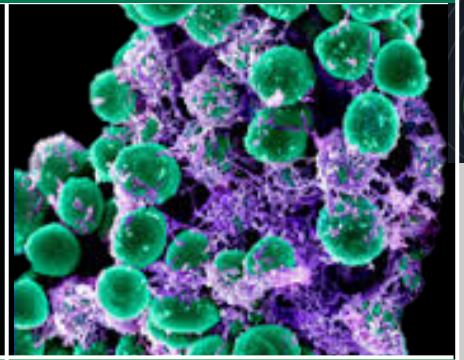
EMBL

Theory@EMBL

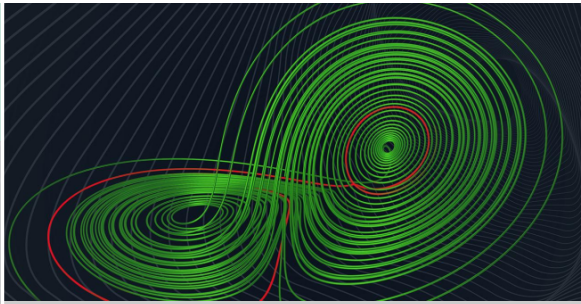
Theoretical approaches to reveal the principles in complex living (eco)systems







Planetary Biology: modelling ecosystems	Organisms in their dynamic environment	Microbial ecosystems
Multi-scale modeling (e.g. SYNTERRA)	Dynamical Systems Synchronization Theory	Modeling emergent properties (collective metabolism)



Theory Sabbatical Programme

Researchers working on theoretical and mathematical modelling aspects of biology can apply for financial and organisational support for visits to any of EMBL's sites

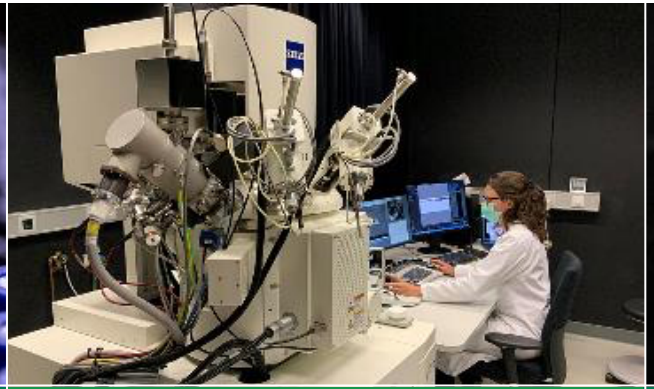
EMBL

SARS-CoV-2 Scientific actions: Research and Service

For information only

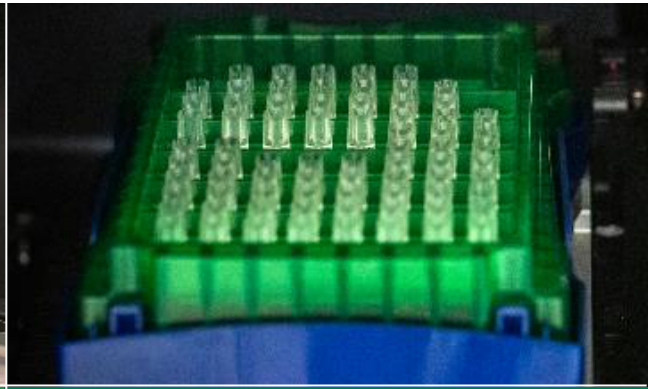
Identifying how potential COVID-19 drugs work

Following computational analysis of potentially beneficial existing drugs, EMBL seeks to understand how the drug works in living cells and its efficacy against COVID-19



Taking a closer look at infected cells

Electron microscopy specialists collaborate with hospital researchers to understand the changes occurring in cell structures upon SARS-CoV-2 infection



Exploring synthetic antibodies to stop coronavirus

Identifying nanobodies that could bind to SARS-CoV-2 and prevent it from entering human cells

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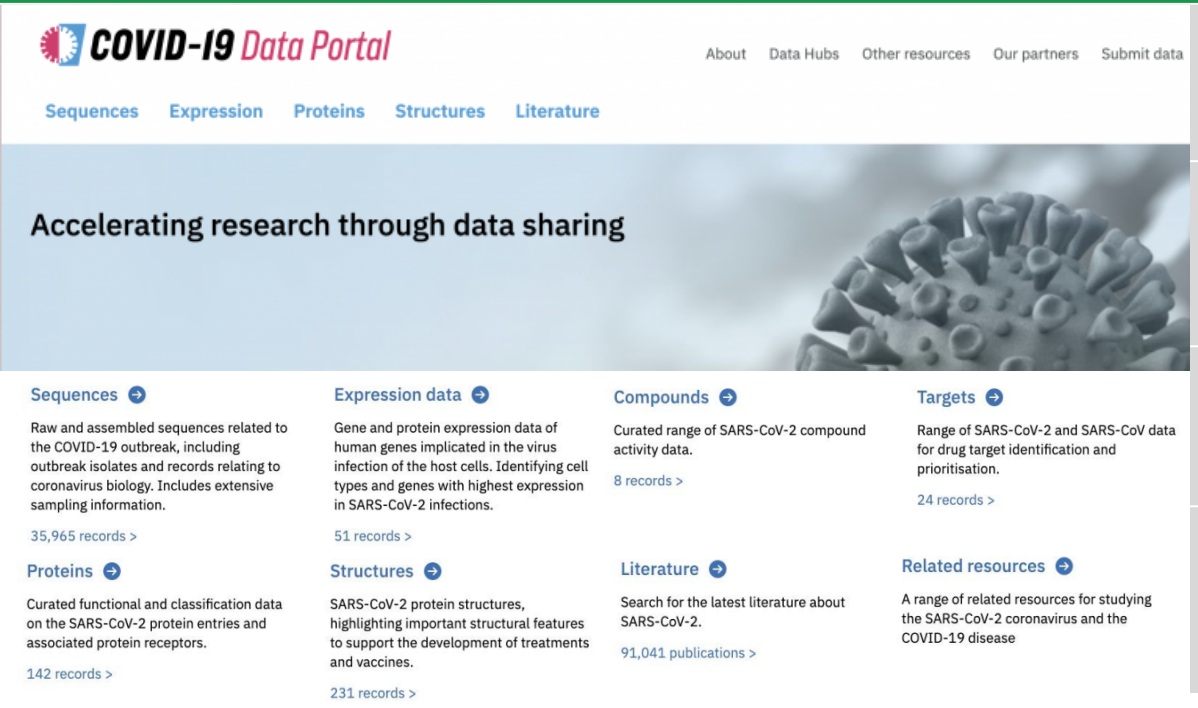
SARS-CoV-2 Scientific actions: COVID-19 Data Portals

European expertise bringing global data together



One easily accessible site, where researchers can upload, share, and access data related to the new SARS-CoV-2

Data includes sequences, expression data, protein function and structures, compound activity, drug targets, literature, and others

EMBL-EBI is facilitating the set-up of national SARS-CoV-2 Data Hubs across Europe

Hubs will be used by public health agencies and research centres doing genome sequencing of the new virus at national or regional levels

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EMBL Training the Next Generation

Internal training

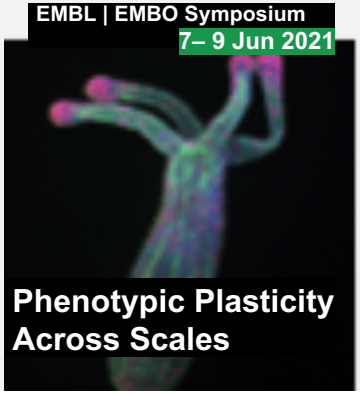
200 PhD students **250** postdocs

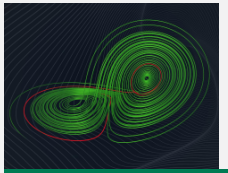
EMBL PhD and Postdoctoral programmes
EMBL Fellows' Career Service
General training and development

External training

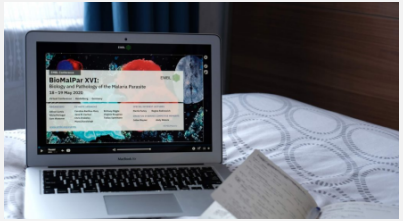
~7,000 guests per year

EMBL Courses and Conferences
Virtual training and e-learning programmes
Scientific Visitor Programme





Theory sabbatical programme



EMBL

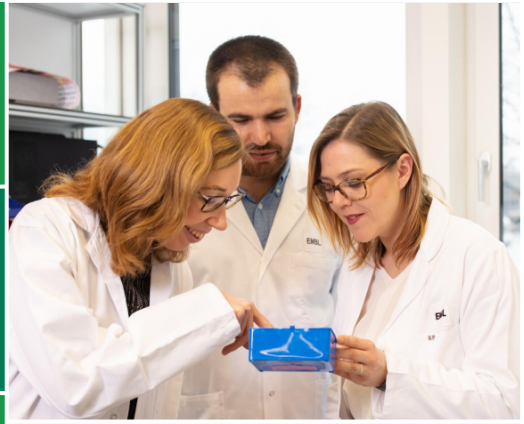
Training: Future – Engineers as well as Scientists

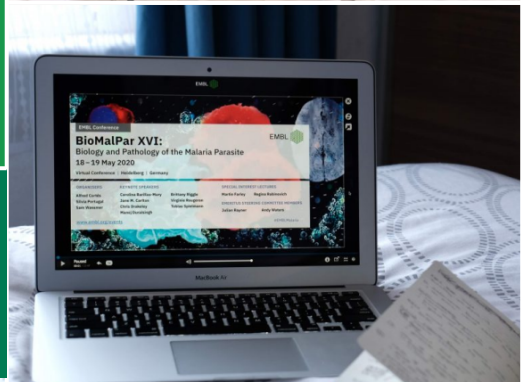
Pre-doc course: Scientific modules with focus on new research themes

Post-docs: new EIPOD-like fellowships dedicated to new research themes **with our member states**

Courses and Conferences: Focus on new research themes and enhancing **e-Learning Programme**

Sabbaticals: Developing expertise through collaborations with member state experts and institutions





ARISE

Career Accelerator for Research Infrastructure Scientists

New programme for **technology developers and engineers** to train the future leaders of European infrastructures and platforms

EMBL

Thank you all

And questions

EMBL