



ELIXIR

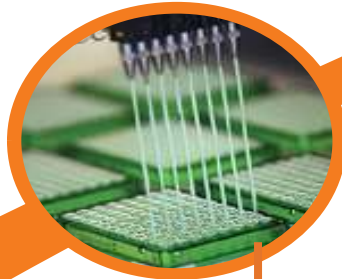
*Safeguarding the results of life science
research in Europe*

www.elixir-europe.org

*ELIXIR connects national
bioinformatics centres and
EMBL-EBI into a sustainable
European infrastructure for
biological research data*



environment



bioindustries



agriculture



medicine

*ELIXIR underpins
life science research
– across academia
and industry*



The data challenges

- Data production sites increasing across Europe
- Data growth in life sciences
- Secure access and governance of human data
- Open data mandates of National and European funders



ELIXIR: European infrastructure for biological information

Data infrastructure for Europe's life-science research:



Data



Interoperability



Tools



Compute



Training



Marine metagenomics



Crop and forest plants



Human data



Rare diseases



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ELIXIR Members



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Denmark



EMBL



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Ireland



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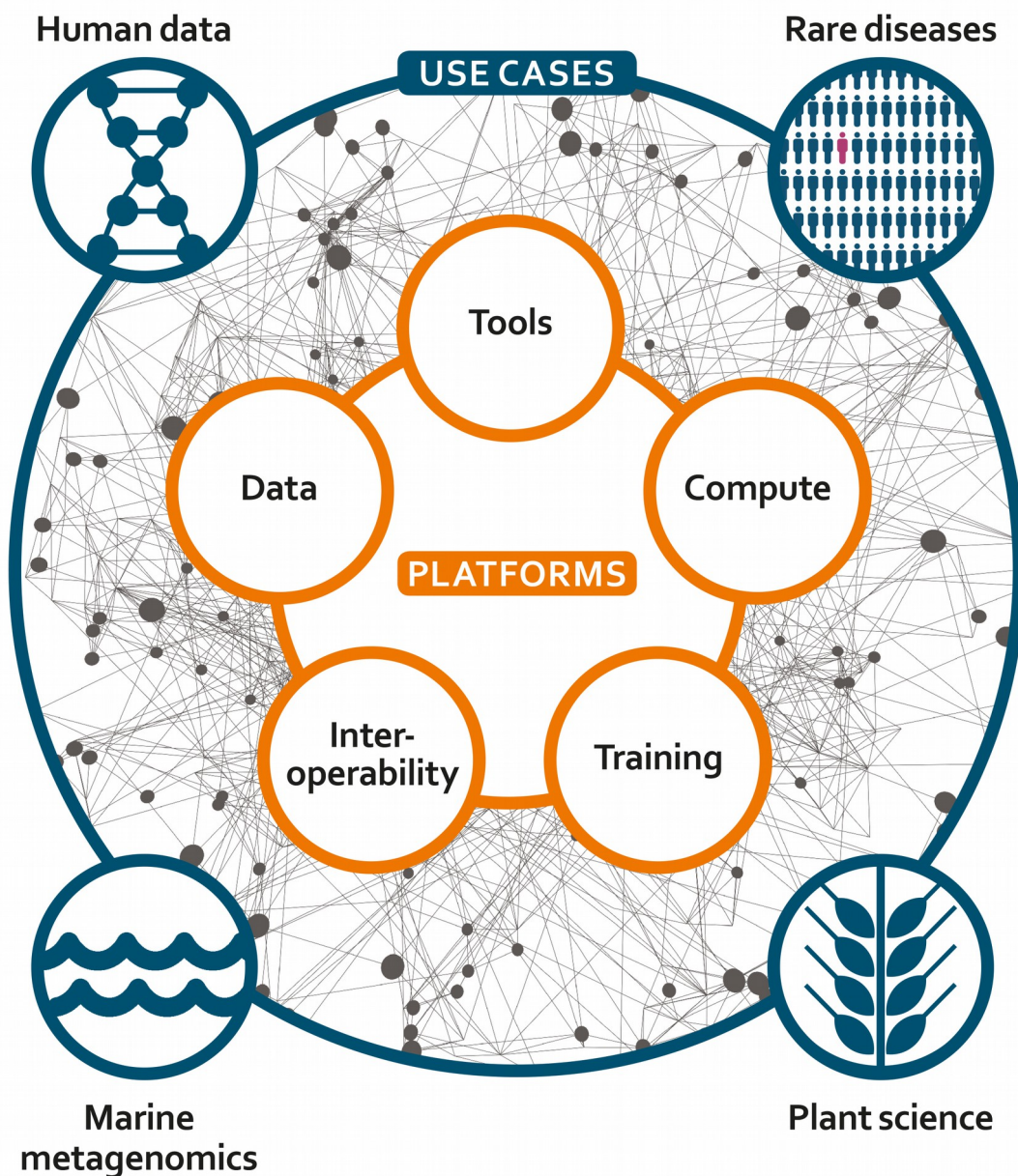
United Kingdom

ELIXIR Observers



Greece





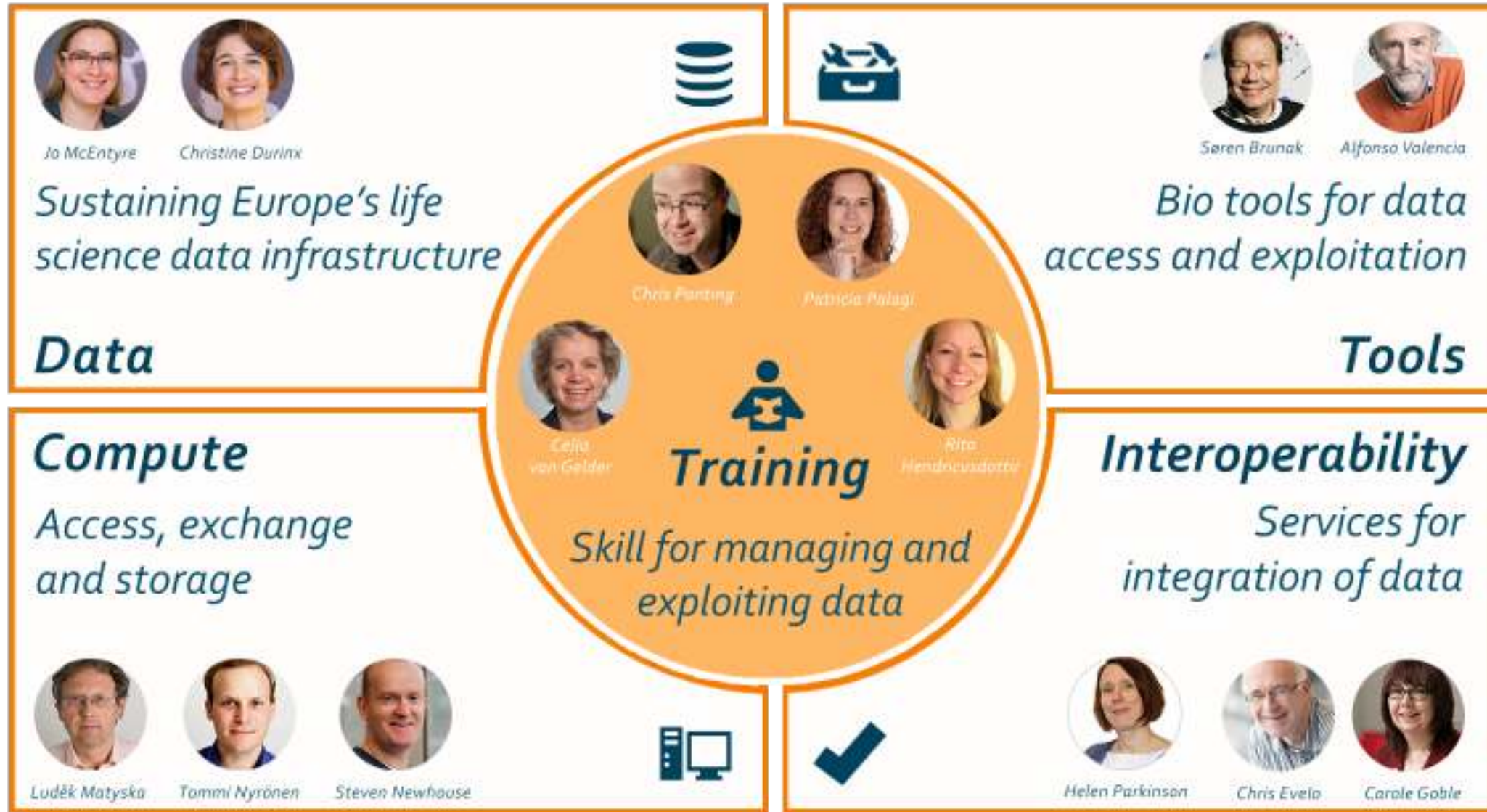
ELIXIR Structure

Five technical platforms for **Data, Tools, Interoperability, Compute and Training**

Complemented by four Use Cases for **marine meta-genomics, rare diseases, human data and plants sciences**



ELIXIR : 5 platforms of shared services led by leading European scientists



ELIXIR Services



Data deposition:

ENA, EGA, PDBe, EuropePMC, ...



Data management:

Genome annotation

Data management plans



Added value data:

UniProt, Ensembl, OrphaNet, ...



Data Interoperability:

Standards, Identifiers, Ontologies



Compute:

Secure data transfer, cloud computing, AAI



Bioinformatics tools:

Bio.tools



Industry:

Innovation and SME programme

Bespoke collaborations



Training:

TeSS, Data Carpentry, eLearning



Tools: Services and connectors to drive access and exploitation

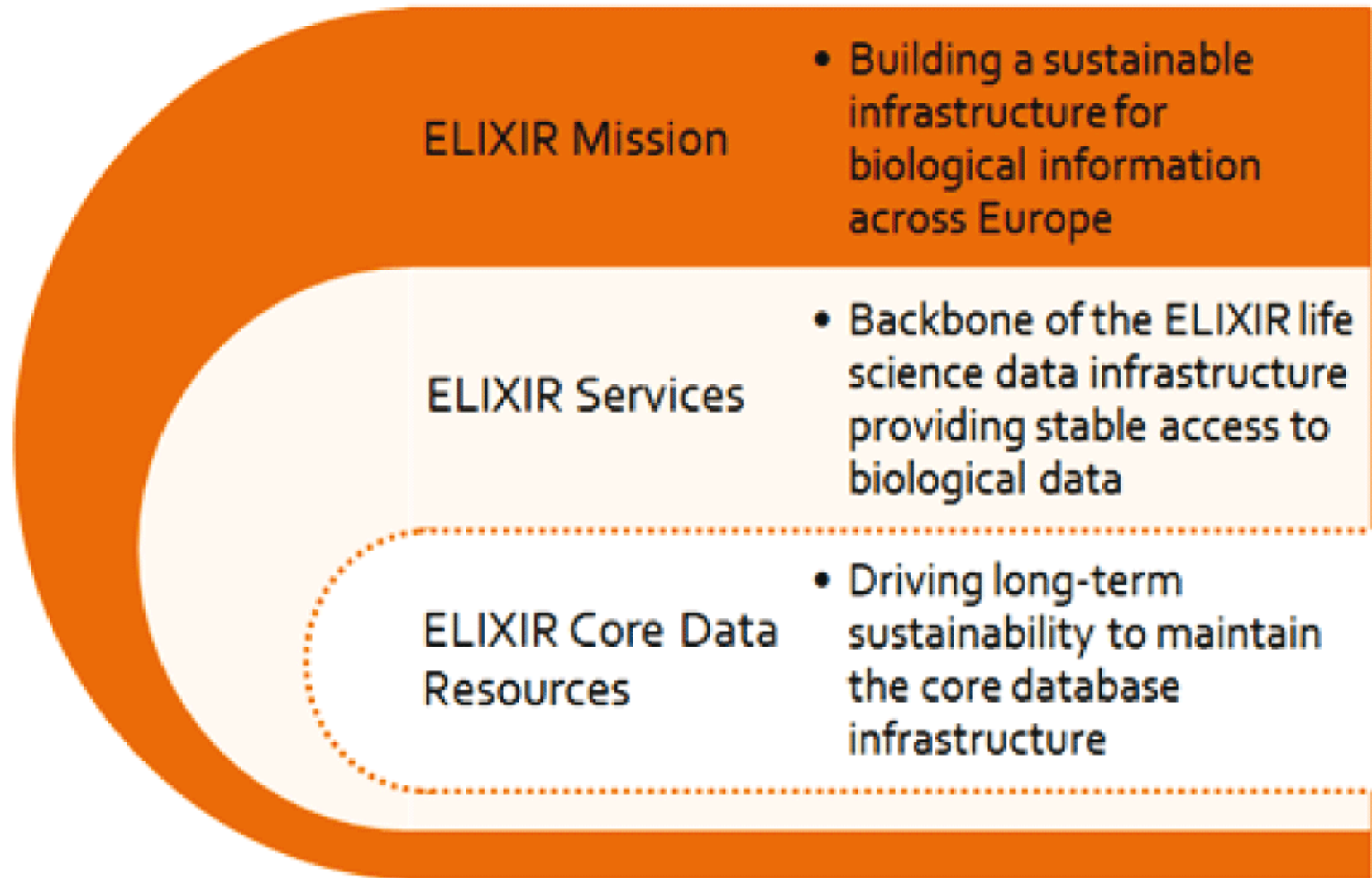
- Tools and Data Service Registry: <http://bio.tools> Discovery portal of key bioinformatics resources world-wide
- Main goals:
 - Provide tools to help users find, understand and compare resources for their research
 - Support resource providers and developers to contribute to emerging biocurator network
 - Develop procedures to create standards for benchmarking
- Federated and community driven curation through series of hackatons and technical workshops



Data: Sustaining Europe's life science data infrastructure

- Mission: **drive long-term sustainability** of life science data resources
- **ELIXIR Core Data Resources** - Resources of fundamental importance for the research community and the long-term preservation of life-science data.
 - Basis for policy actions
 - Basis for technical actions
 - Capacity building
 - Life cycle management
- Actions:
 - Identify set of ELIXIR Core Data Resources
 - Develop quality indicators for data resources
 - Design review process to identify and evaluate ELIXIR Core resources





Compute: Access, exchange and storage

- Mission: Develop **distributed solutions** for **cloud, compute, storage services** including **user authentication and access control**
- Coordination of dependencies with e-infrastructures (esp. GÉANT, EGI, EUDAT) in collaboration with biological and medical research infrastructures (CORBEL)
- **ELIXIR AAI** (Authentication and Authorisation Infrastructure):
 - Single-Sign on user mgmt solution for bioinformatics service providers with Federated Identity Management
 - Multiple authorisation layers to access all ELIXIR services



Interoperability: Integration of data and services

- Mission: Implement principles for **Findable**, **Accessible**, **Interoperable** and **Reusable** Data
- Goals:
 - Deliver interoperability services for ELIXIR Use cases
 - Promote interoperability best practices
- Activities:
 - **Bring Your Own Data** (BYOD) Workshops
 - **Technical services** to ensure that data is interoperable, can be accessed programmatically, and contain persistent identifiers.
 - Ontologies, minimum information standards, vocabularies
 - ELIXIR **Standards Registry**
- Collaboration with CORBEL, RDA, Google, BD2K, FORCE



Training: Professional skills for managing and exploiting data

- Mission: provide developers, researchers and trainers with skills to use and exploit ELIXIR services
- Builds on and complements trainings in ELIXIR nodes
- ELIXIR Training infrastructure:
 - TeSS portal to **share and exchange training content and events**: <http://tess.elixir-uk.org>
 - **E-learning** platform and solutions
 - Large pool of ELIXIR trainers (**Train the Trainer**)
 - **Good training practices and guidelines**, including metrics and evaluation
 - **Training events** for researchers, developers, trainers and infrastructure operators



Use Case: Marine metagenomics

- Mission: develop sustainable **metagenomics infrastructure** to enhance research and innovation
- Actions:
 - Develop **standards** for the marine domain
 - Develop **databases** specific to marine metagenomics
 - Implement **tools and pipelines** for metagenomics analysis
 - Develop **search engine for interrogation** of marine metagenomics datasets
 - Develop and deliver **training for end users**



Use Case: Plant sciences

- Mission: facilitate genotype-phenotype analyses for crop and tree species
- Actions:
 - Develop **standards** for representation of genotypic and phenotypic data
 - Make data discoverable and interoperable through **common APIs**
 - Annotate and submit **key exemplar datasets** to relevant public archives
 - Develop reusable **modules for visualisations**
 - **Disseminate best practices** and tools to national projects



Use Case: Human data

Mission: develop a **long-term management policy for controlled access human data** and provide tools for data discovery and access

EGA as the central service for secure sharing of -omics data

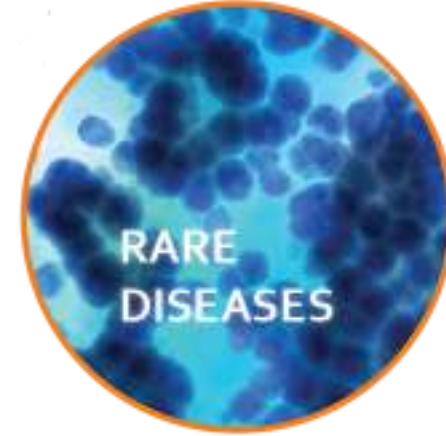
Projects:

- Connect TRaIT platform (NL) with EGA
- IMI OncoTrack – explore long-term storage and data-discovery for OncoTrack's data
- Beacons –discovery service for genomics data
- Local EGA - Stores sensitive data locally Integrates metadata globally in EGA



Use Case: Rare Diseases research

- Mission: support the development of new therapies for rare diseases
- Collaboration with RD-CONNECT, BBMRI-ERIC, BBMRI-NL
- Actions:
 - Build ELIXIR portfolio of **data resources and analysis tools** rare disease research
 - Implement **technical framework for comparison and standardization** of services for rare-disease communities
 - Develop and deliver **training courses** and workshops for rare disease researchers



ELIXIR Innovation and SME programme: 2017/2018

Previous Events



Upcoming Events

- **Belgium - Brussels 9-10 October:** Microbiome and smart food (in collaboration with Flanders government)
- **France - Paris 14-15 November:** Rare diseases and personalized medicine
- **Cambridge - UK 25 January 2018:** Discovery of data, tools and training (in collaboration with OneNucleus)

Impact – Paper on Open Innovation

Public Resources as a business model for SMEs

Types of Interactions with Public Resources

Customisation

Aggregation

Broker





ELIXIR Bridging Force IG

- Life science research projects increasingly depend on more than one type of measurement
 - need for integrating data of different types
 - also from e.g. environmental science, social science etc.
- IG to align efforts:
 - Strive to make sure that ELIXIR initiatives are compatible with RDA outputs
 - Provide feedback and suggestions from a life science perspective
- **Learn** about RDA activities

Acknowledgements



Over 180 institutes involved in ELIXIR

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