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Human Brain Project

# Realising Ethics and Responsible Innovation in a Large Neuroinformatics Project

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INRIA

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# Beyond Research Ethics: Dialogues in Neuro-ICT Research

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The increasing use of information and communication technologies (ICTs) to help facilitate neuroscience adds a new level of complexity to the question of how ethical issues of such research can be identified and addressed. Current research ethics

# Rome Declaration

Responsible Research and Innovation (RRI) is the ongoing process of aligning research and innovation to the values, needs and expectations of society.



21.11.2014



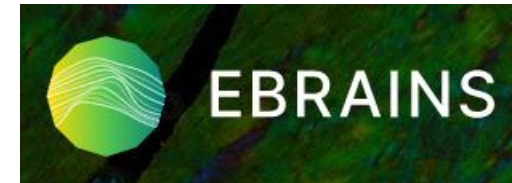
## RESEARCH COMMUNITY

RRI is a way to do research that takes a long-term perspective on the type of world in which we want to live

# Human Brain Project

- 2013-2023
- EC funding of €~450m
- 100+ partner organisations
- 500+ scientists / researchers

To tame brain complexity, the project is building a research infrastructure to help advance neuroscience, medicine, computing and brain-inspired technologies - EBRAINS. The HBP is developing EBRAINS to create lasting research platforms that benefit the wider community.

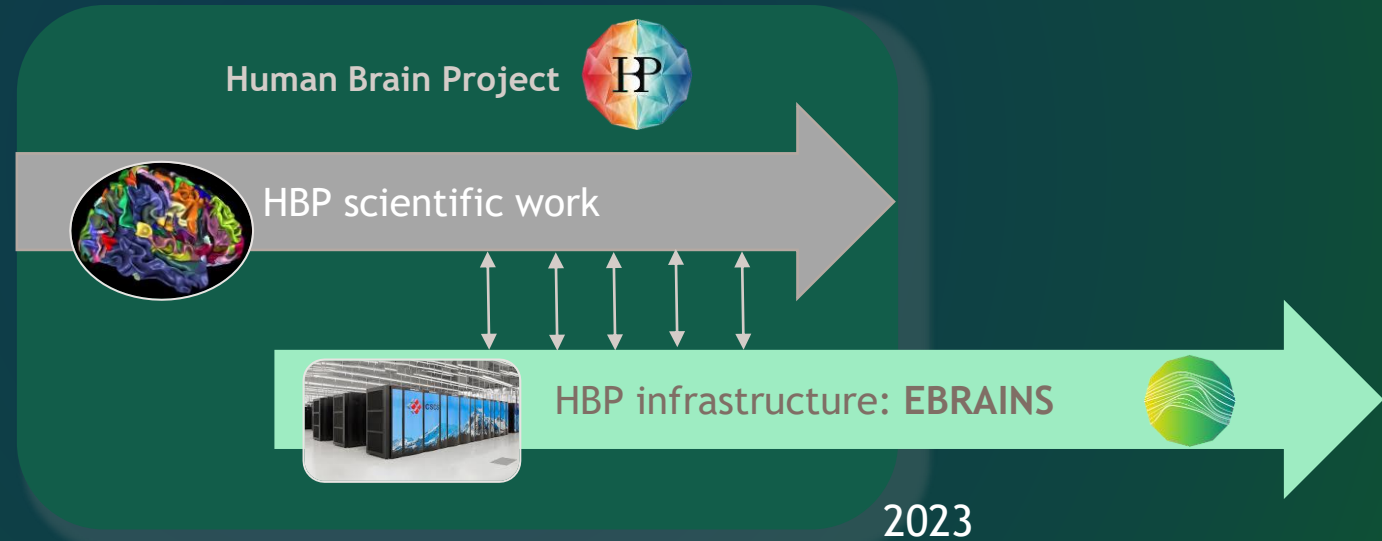


# EBRAINS' mission: Enabling brain research advances and innovation

It builds on the work of the Human Brain Project and takes it to the next level

EBRAINS offers the science community **state-of-the art**

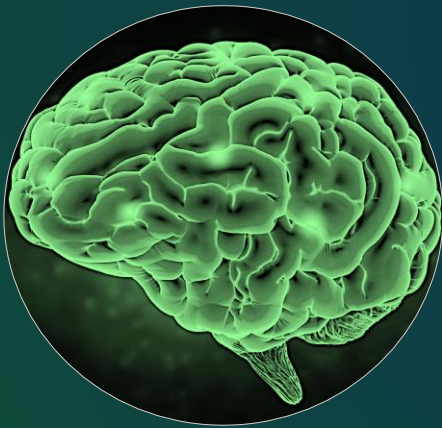
- Brain data
- Simulation and modelling tools
- Access to (super) computing resources



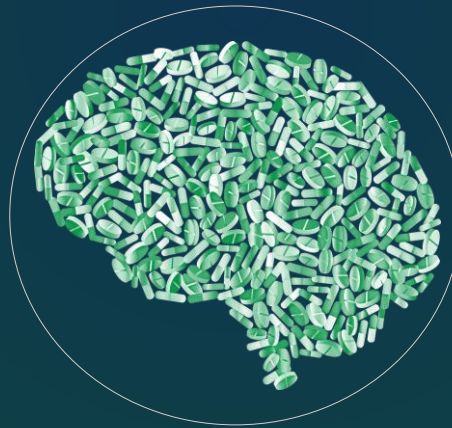
# EBRAINS Focus areas

Covering and ensuring equilibrium between three areas:

Neuroscience



Brain Medicine



Brain-inspired technologies



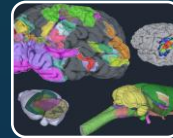
# What EBRAINS brings to the scientific community

EBRAINS aims at accelerating collaborative brain research with a comprehensive package of data, tools and facilities.



## Data and Knowledge

- Online solutions to facilitate sharing of and access to research data, computational models and software



## Atlases

- Navigate, characterise and analyse information on the basis of anatomical location



## Simulation

- Solutions for brain researchers to conduct sustainable simulation studies and share their results



## Brain-Inspired Technologies

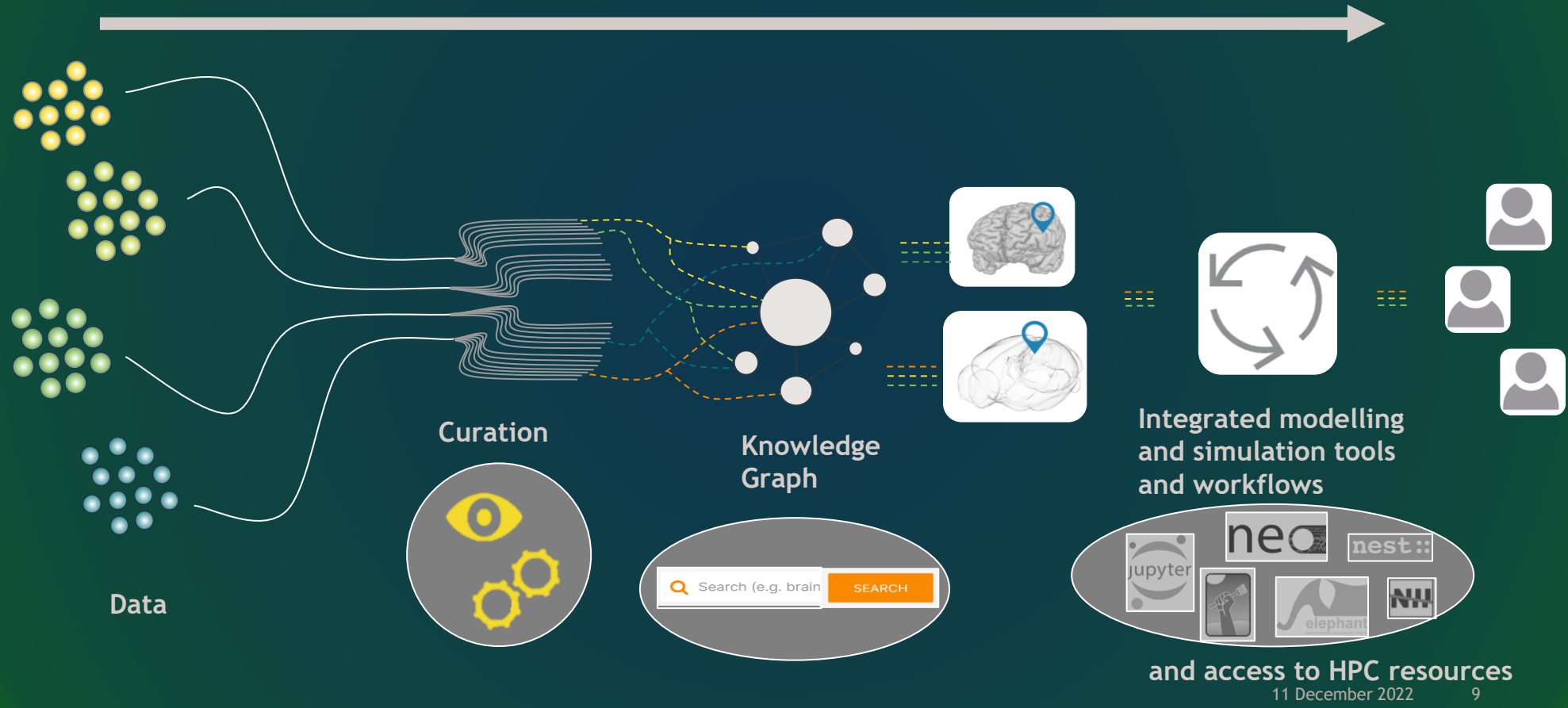
- Understand and leverage the computational capabilities of spiking neural networks



## Medical Data Analytics

- The Medical Data Analytics service provides two unique EBRAINS platforms, covering key areas in clinical neuroscience research

# An integrated platform with cutting-edge workflows



and access to HPC resources

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# Involving a broad network of stakeholders

## NEUROSCIENCE

HBP and non-HBP academic centers  
Strong links with Neuroscience associations in Europe

## INDUSTRY

Players in the digital, tech, medical spaces, Innovators,  
Pharma companies, Health care providers,

## OTHER BRAIN INITIATIVES

- EBC, EBRA, EAN
- International Brain Initiative
- Global Brain Consortium
- IBRO

## GOVERNMENT AND POLICY MAKERS

European, national, regional and local

## NEUROLOGY

Pan-European and national neurology and neuro-degenerative disease associations; Brain centers and hospitals; Patient associations

## BRAIN-INSPIRED TECHNOLOGIES

Academic, industry and start-up network

## OTHER EU INITIATIVES

Horizon EU, EU Health Data Space, IMI, FLAG-ERA, AI4EU and other RIs: Elixir, PRACE, BioExcel, Biomedicine, EOSC, ...

## CIVIL SOCIETY

NGOs, press & media, general public.

# EBRAINS: a distributed Research Infrastructure spread throughout Europe

Bringing the best of the national expertise and creating synergies

## Central Hub

Brussels



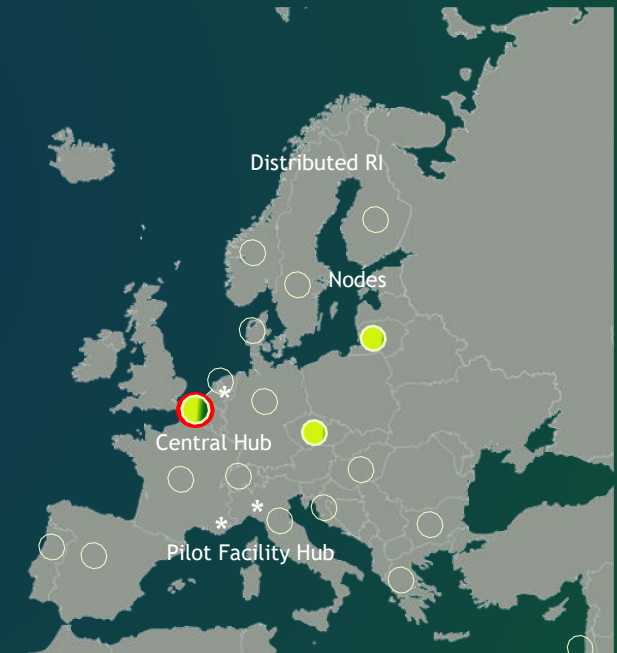
## National Nodes

Group of local institutions providing key EBRAINS services



Local institutions

## Facility Hubs



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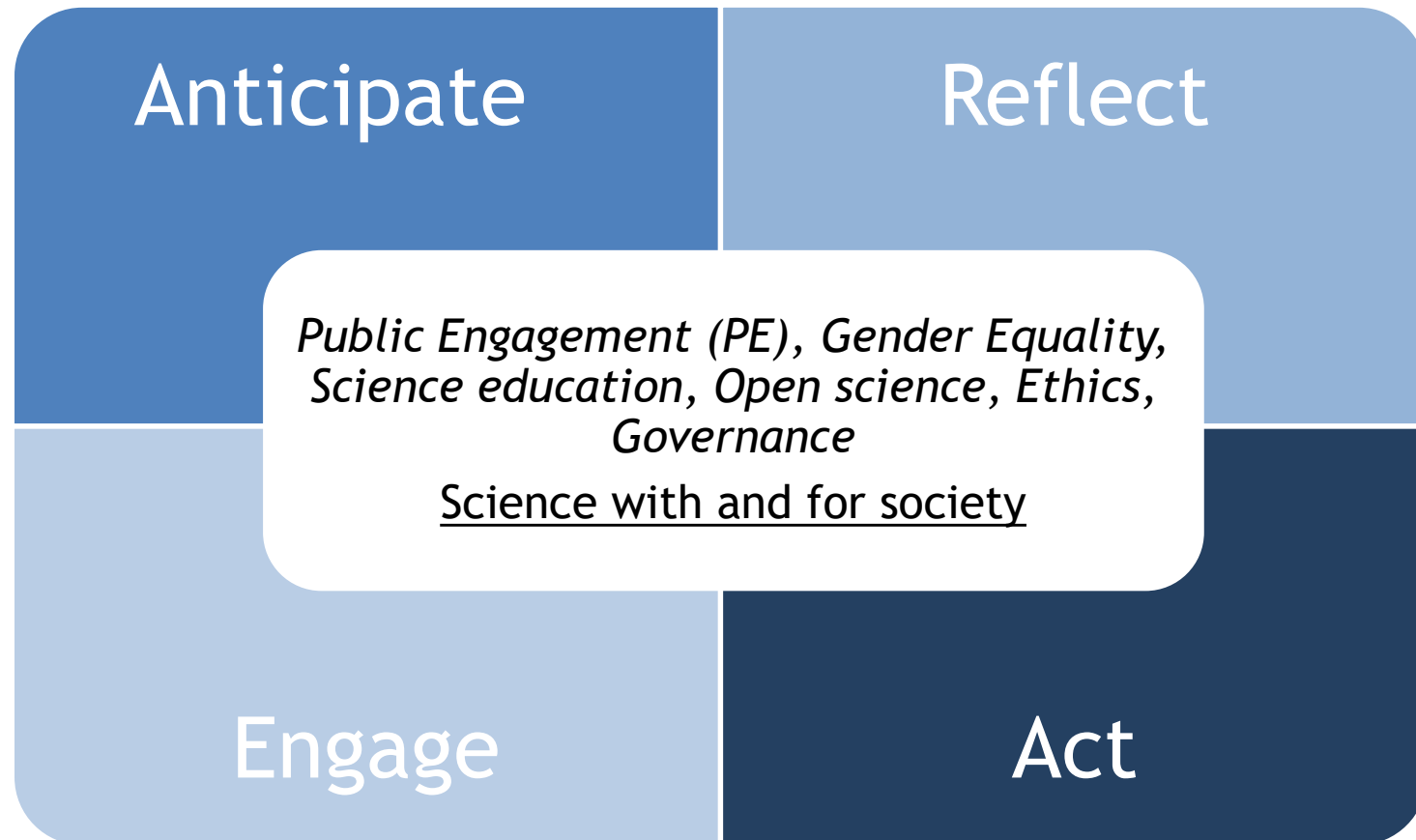
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# Ethical and Social Questions in the HBP

- Research ethics and compliance
  - Animal research
  - Human research
- Data-related
  - Data protection
  - Responsible data governance
- Neuroethics
  - Consciousness
- Dual use, misuse
- Diversity and inclusion
- Commercial exploitation
- Societal consequences
- Licence to operate
- New (since 2021): AI as an ethical issue

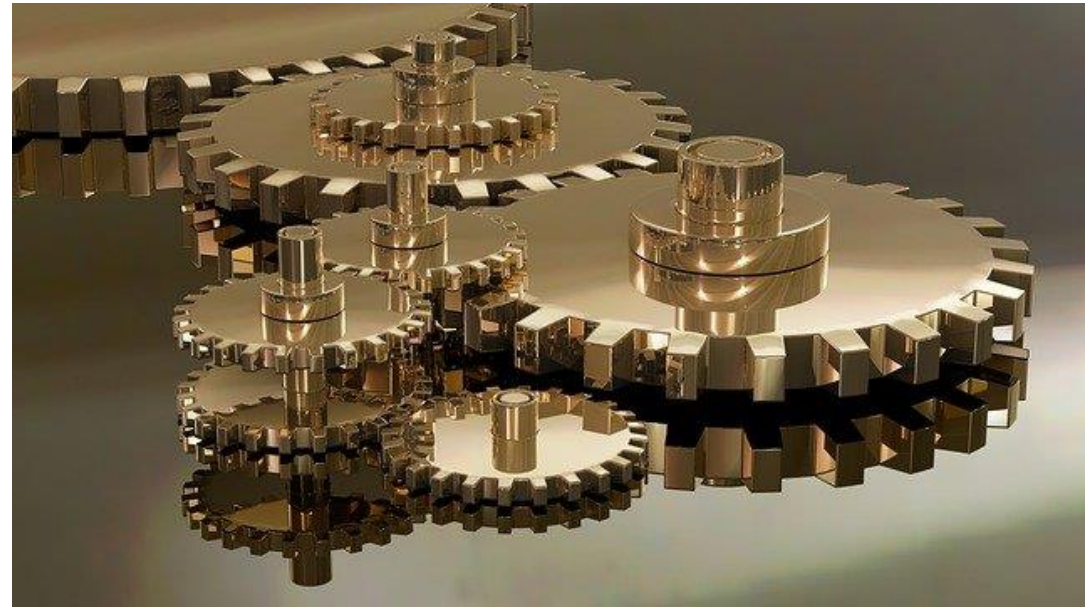


# Responsible Research and Innovation in the HBP



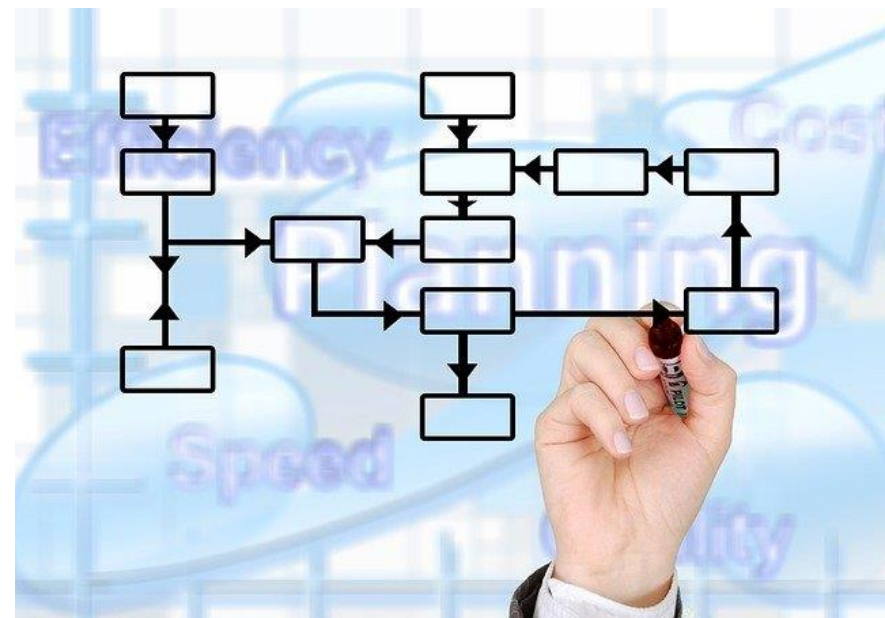
# RRI Activities

- Research on various RRI topics
- Neuroethics and philosophical reflection
- Foresight
- Public engagement
- Researcher awareness
- Ethics support
- Capacity development

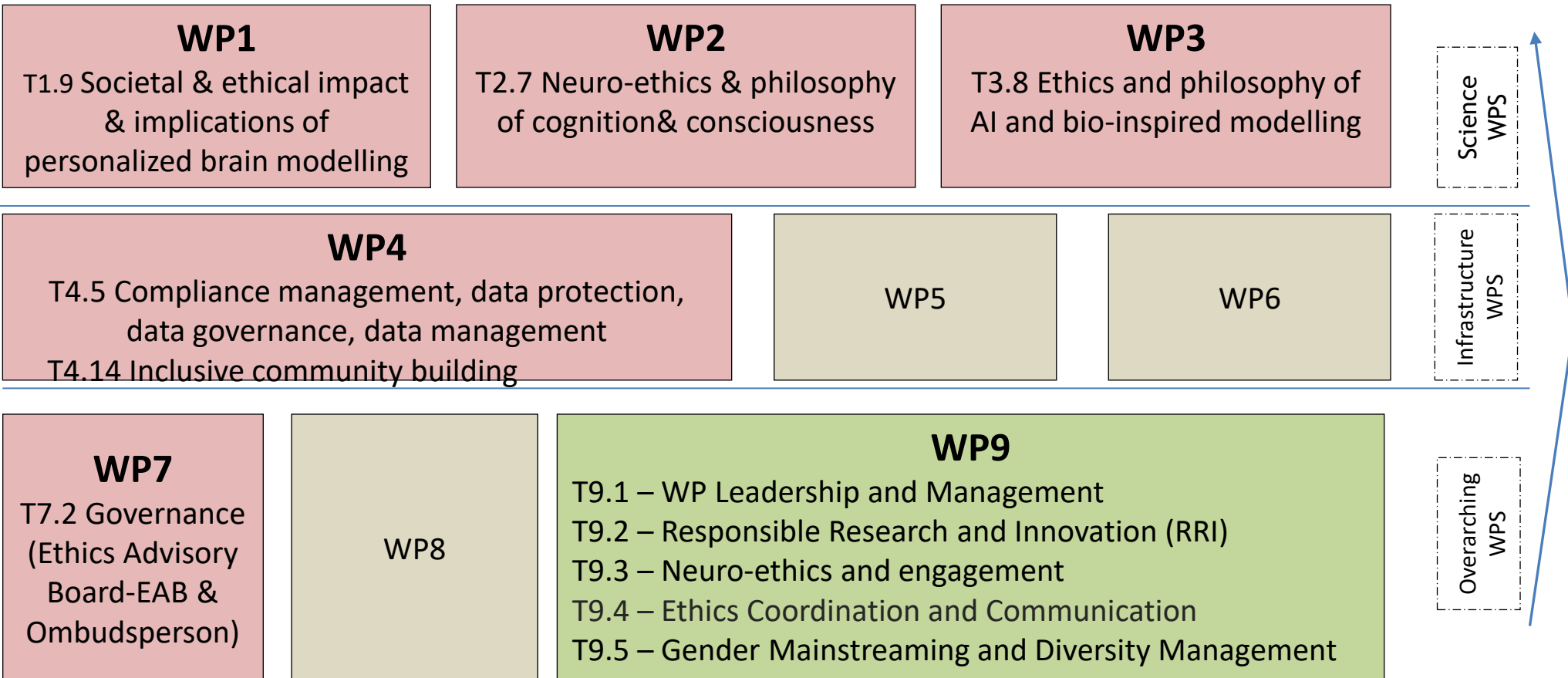


# RRI Structures

- Ethics Advisory Board (external experts)
- Ombudsperson
- Ethics Rapporteur Programme
  - Annual update (1-pager)
- Compliance management workflow
- Data Governance Working Group
- Dual Use Working Group
- Diversity and Equal Opportunities Committee
- Representation in project governance
  - Ethics Director
  - RRI WP lead in Science and Infrastructure Board

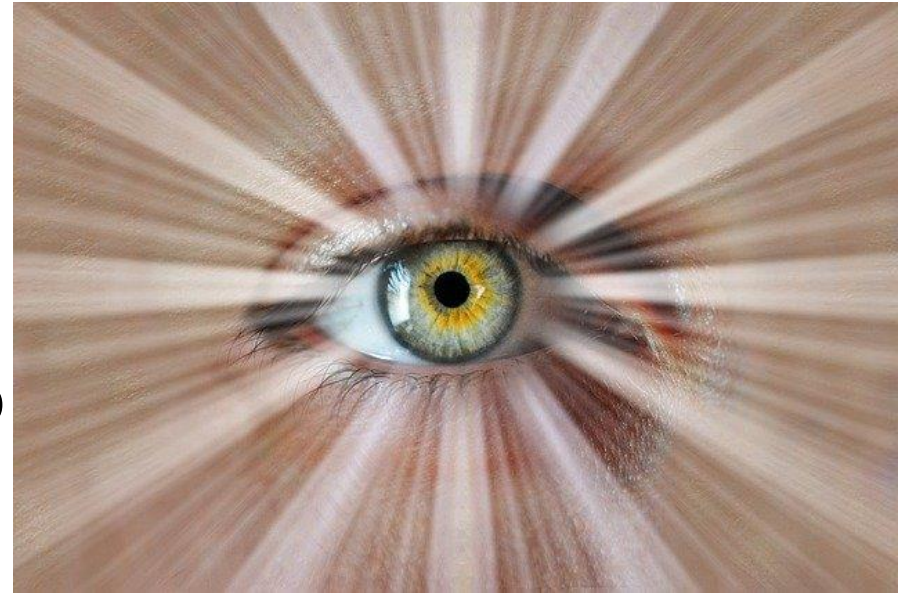


# Structure of Ethics-related Tasks in SGA3



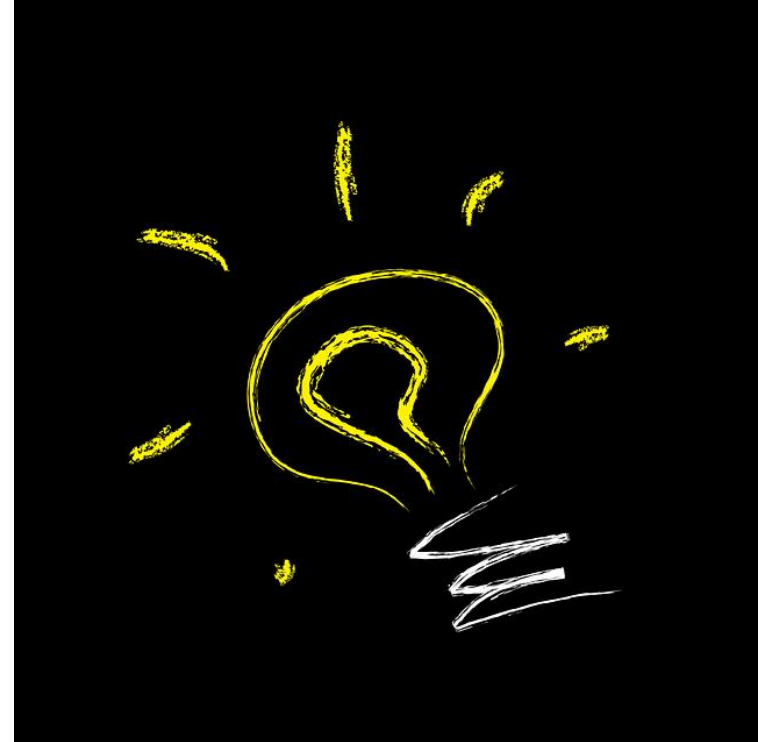
# Lessons Learned (2013-2020)

- Extensive Public Engagement Can Inform Project Decisions
- In Practice Compliance Issues Tend to Dominate the RRI Agenda
- Interdisciplinary Collaboration is Challenging when Implementing RRI
- Interpretations of RRI Continue to be Subject of Debate
- Implementing RRI Reveals Gaps in Knowledge of Substantive Issues
- Success of RRI Implementation is Difficult to Prove



# Some further insights

- RRI remains a contested concept
- Expectation management is important
- Uncertainty and conflict remain
- RRI is not a solution, but a process
- RRI needs to co-evolve with the science



# Future Plans (2022-2023): Responsibility by Design

Preparation for the transition from research project to distributed research infrastructure

- Organisational Integration of RRI
- Ethics and Society Vision
- EBRAINS Ethics and Society Committee
- Community and Capacity Building
- From Research to Innovation and Commercial Exploitation
- Global RRI Engagement and ensuring societal benefit





# Assessing the ethical and social concerns of artificial intelligence in neuroinformatics research: an empirical test of the European Union Assessment List for Trustworthy AI (ALTAI)

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## Abstract

Ethical and social concerns are a key obstacle to the adoption of artificial intelligence (AI) in the life sciences and beyond. The discussion of these issues has intensified in recent years and led to a number of approaches, tools and initiatives. Key amongst them is the idea of ex-ante impact assessments that aim to identify issues at the early stages of development. One

# Resources

- Responsibility by Design paper in JRI  
<https://doi.org/10.1080/23299460.2021.1955613>
- HBP website  
<https://www.humanbrainproject.eu/en/social-ethical-reflective/>
- HBP education  
<https://www.humanbrainproject.eu/en/education/participatecollaborate/curriculum/online-course/research-ethics-societal-impact/>
- EBRAINS data governance  
<https://ebrains.eu/terms>
- Ethics Dialogues  
<http://www.ethicsdialogues.eu/>
- EBRAINS Ethics and Society Vision  
<https://ebrains.eu/ethics-and-society-vision/>