

## **HBP SGA2: Human Brain Project Specific Grant Agreement 2**

### **Description**

The biggest challenge in understanding the brain is being able to understand how its different levels of organisation relate to each other, hierarchically, spatially and temporally. This means identifying how genetic, molecular and cellular principles of organisation are translated into brain activity, cognition and behaviour. It also involves deciphering how behaviour, disease and environment influence and constrain what happens at the molecular, genetic or cellular levels.

However, decoding the human brain comprehensively at multiple levels is so complex that even the sum of all the resources mobilised to date by all brain research initiatives pales in comparison. Even the best-funded single research initiative will not scale to the necessary level, nor be able to undertake all the excellent scientific research needed. The HBP includes many research paths which could help unleash the potential of a biologically grounded approach to Artificial Intelligence (AI), including: brain-inspired computer architectures, cellular mechanisms, cognition, data analytics, embodied AI, network structure and dynamics, robotics and theoretical principles.

The HBP is therefore building an information and communications technology (ICT)-based European infrastructure to enable and accelerate neuroscientific, technological and medical research, by integrating European and national resources through strategic alliances. In this way, the HBP can leverage and align the best such research in Europe and, through partnerships, around the globe. To inform the infrastructure development, the HBP conducts its own specific neuroscientific and interdisciplinary research, including mathematics, physics, computer science, and information theory, as well as neuroinformatics and other disciplines. The Project promotes a Use Case-driven co-design approach to build a user-centric infrastructure, designed ab initio with prospective users.

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