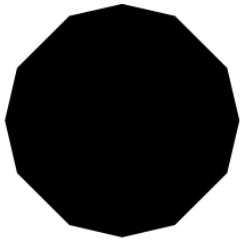
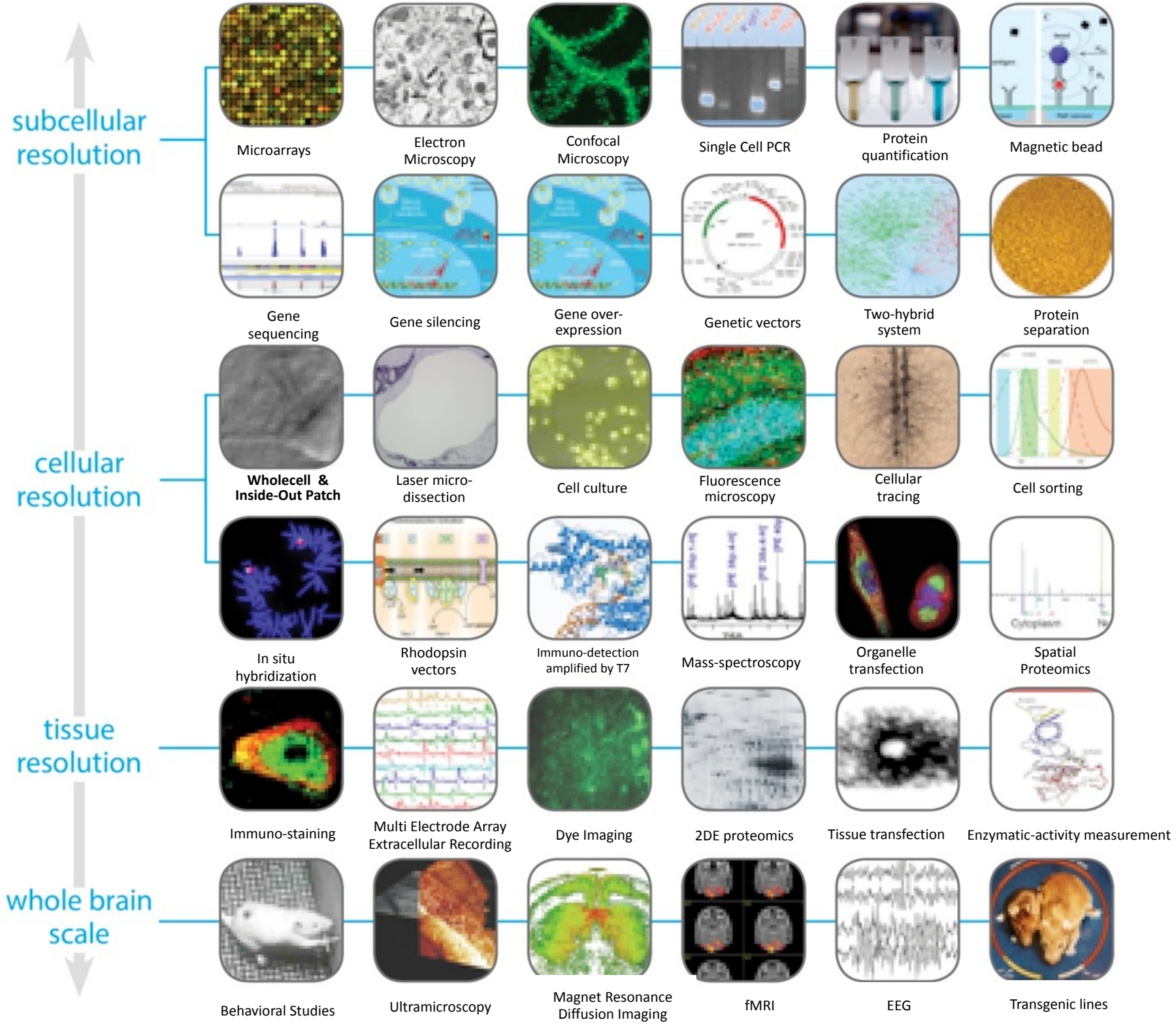


Publicize, discover, access distributed heterogeneous neuroscience data

The Human Brain Project – Neuroinformatics Platform

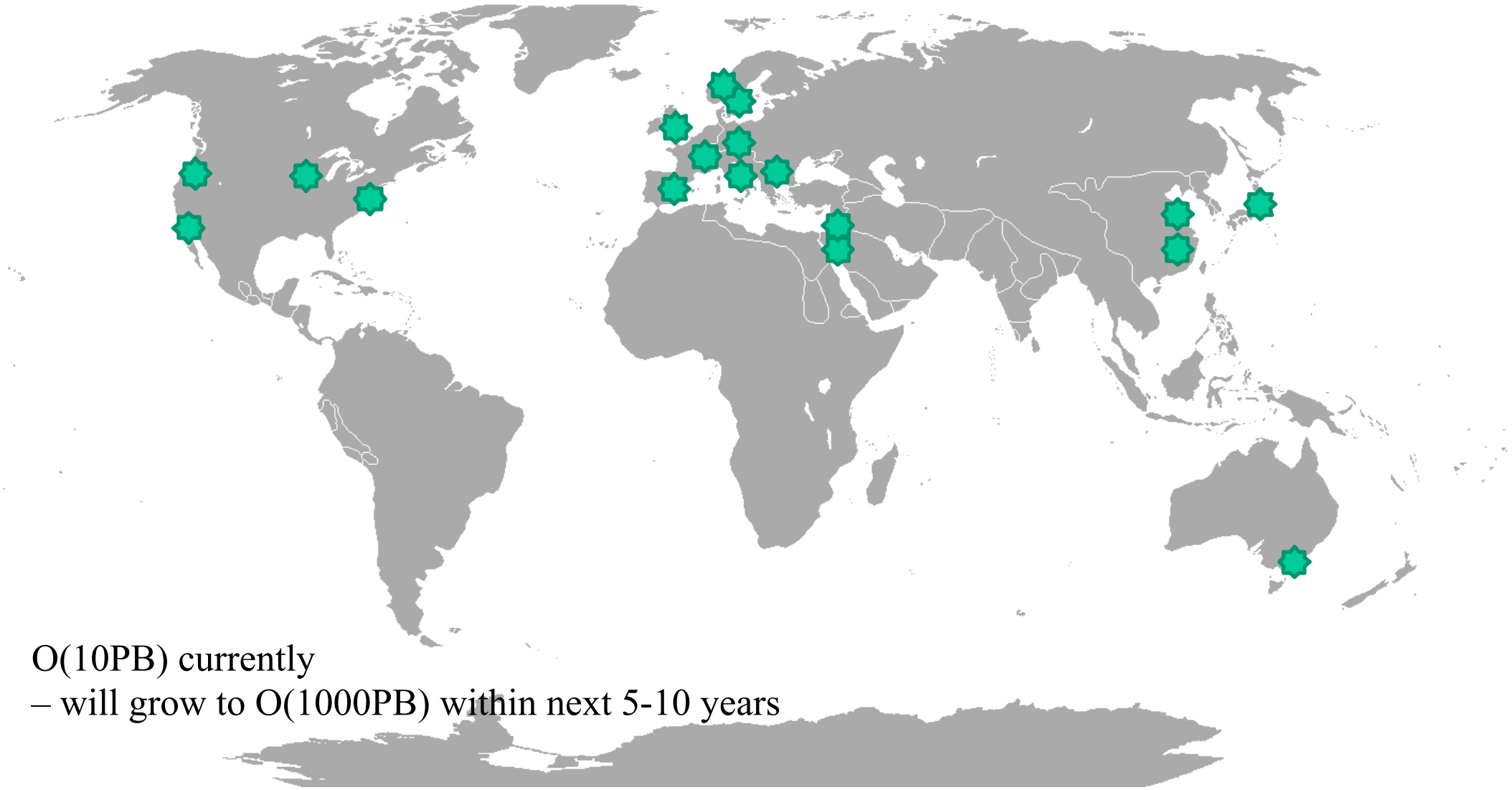
Sean Hill
EPFL, Switzerland


subcellular resolution
cellular resolution
tissue resolution
whole brain scale
Microarrays
Electron Microscopy
Confocal Microscopy
Single Cell PCR
Protein quantification
Magnetic bead
Gene sequencing
Gene silencing
Gene over-expression
Genetic vectors
Two-hybrid system
Protein separation
Wholecell & Inside-Out Patch
Laser micro-dissection
Cell culture
Fluorescence microscopy
Cellular tracing
Cell sorting
In situ hybridization
Rhodopsin vectors
Immuno-detection amplified by T7
Mass-spectroscopy
Organelle transfection
Spatial Proteomics
Immuno-staining
Multi Electrode Array Extracellular Recording
Dye Imaging
2DE proteomics
Tissue transfection
Enzymatic-activity measurement
Behavioral Studies
Ultramicroscopy
Magnet Resonance Diffusion Imaging
fMRI
EEG
Transgenic lines

Human Brain Project

Unifying our understanding of the human brain.

Publicize, discover and access globally distributed heterogeneous neuroscience data

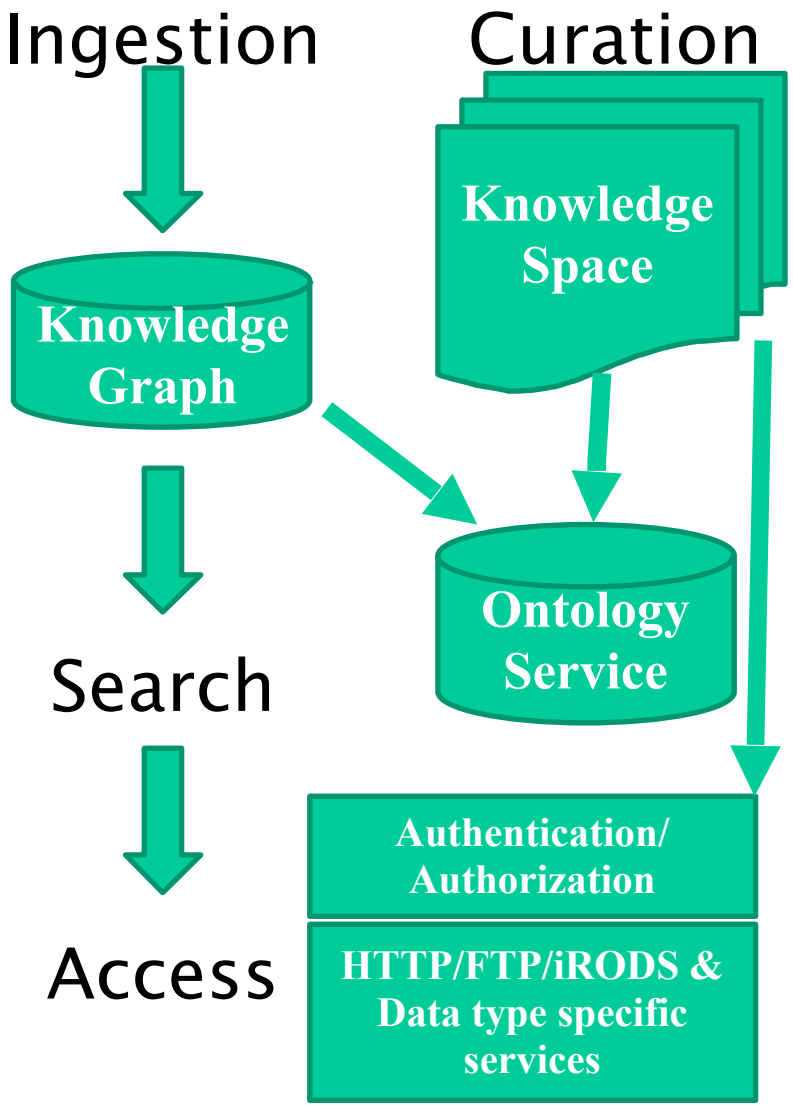


O(10PB) currently

– will grow to O(1000PB) within next 5-10 years

Human Brain Project
Unifying our understanding of the human brain.

Metadata ingestion, curation, search and data access



Ingestion:

- Register unique identifiers for each contributor, specimen type, methods/protocols, data types, location, etc
- Mapping metadata for data objects to common HBP data model with provenance info
- Issuing persistent identifiers for data objects in each repository
- Data registration REST-API
- Metadata harvesting
  - Defining OAI-PMH with common HBP Core data model
- Add entry to KnowledgeGraph – semantic provenance graph

- Curation
  - Registering spatial data to common spatial coordinates
  - Data feature extraction/quality checks
  - Update KnowledgeSpace Ontologies
    - Augmenting ontologies for metadata (methods/protocols/specimens, etc)
    - Review article defining concepts w/data links

- Search
  - Indexing to enable discovery of related (integrable) data

Human Brain Project

Unifying our understanding of the human brain.

Challenges

- Willingness to share data, need to provide incentives for contributions
- Establish common data use agreements
- Adopt common metadata, vocabularies, data formats/services
- Streamlining deployment of infrastructure to data sources (heterogeneous data access methods/authentication/authorization)
- Deploying data-type specific services attached to repositories (for feature