



CENTRE FOR
NEURO
INFORMATICS



ICM Centre for Neuroinformatics

Challenges and opportunities in the era of open science

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Molecular & cellular biology

12 research teams

Multiple Sclerosis,
brain tumors,
Neurodegenerative
diseases

...

Sequencing and
genotyping,
cellular imaging,
histology

...

Neurophysiology

6 research teams

Epilepsy, neuronal and
muscular excitability

...

Electrical recordings in
humans, animal
models, cellular
culture

...

Cognitive neurosciences

5 research teams

Motivation disorders,
psychiatry

...

Behavioural and
cognitive
assessments, virtual
reality platform, living
lab

...

Clinical and translational research

14 research teams

Alzheimer's disease,
Parkinson's disease,
prion disease, brain
tumors

...

Clinical investigation
center, functional
exploration platform,
therapeutics trials

...

Enable a digital transformation of neuroscience research

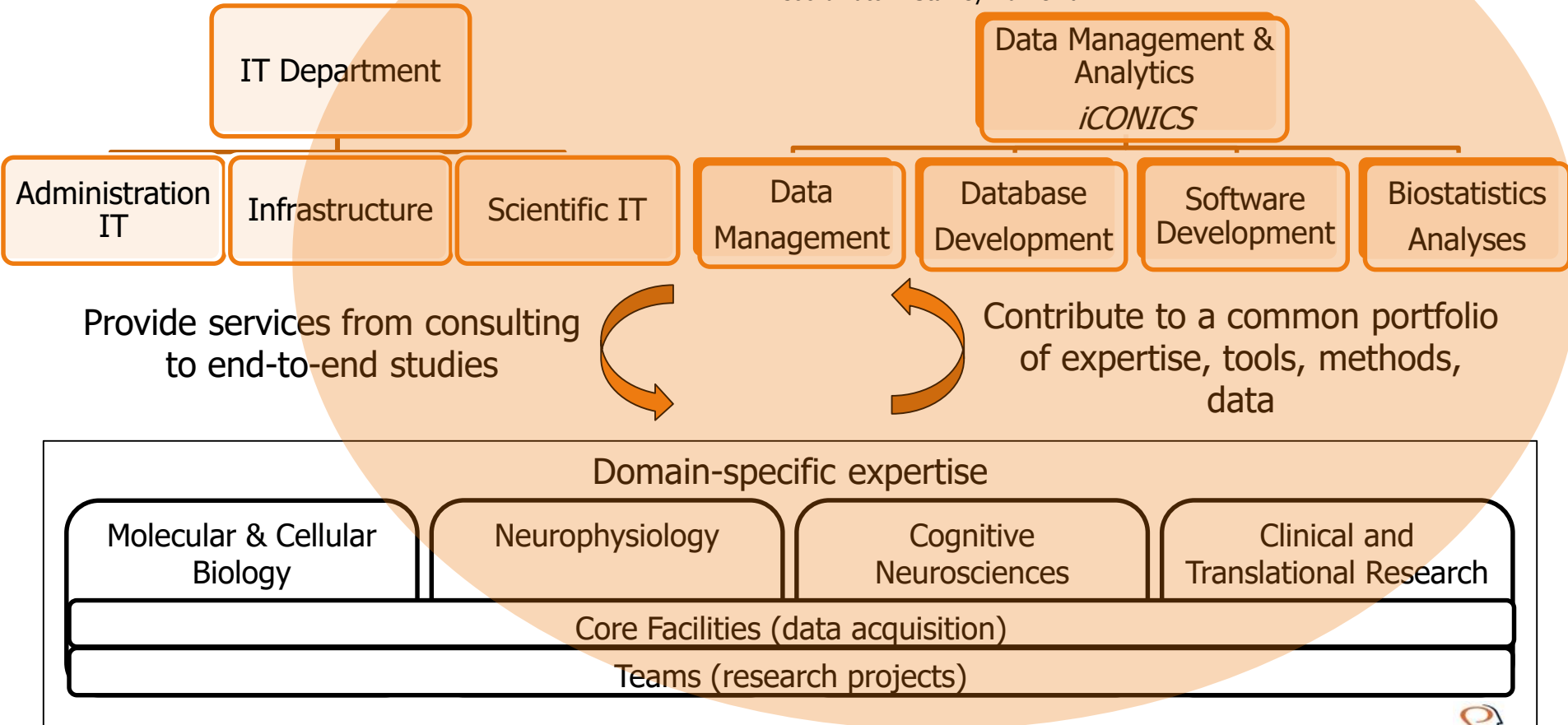
- **Break down barriers between domains**
 - Share expertise, tools and data
 - Enable transversal multidisciplinary research programs
- **Increase reproducibility of our findings**
- **Value research on retrospective data**
 - Enable easy test of new ideas and hypotheses
 - Enable data-driven research
 - data mining, statistical learning, computational modeling
 - Technological development (decision support systems, IoT, etc..)
- **Make neuroinformatics a distinctive aspect in the international scene & ease collaboration**

- **Creation of a *Centre for Neuroinformatics***
- **Provide hardware and software infrastructure for scientific computing and data science**
- **Create a common data lake and data catalog**
- **Create a common portfolio of software tools**
- **Promote a culture of share (community tools, open data, etc..)**

- **A virtual centre: a distributed model**
 - **Coordinate research & development** effort in data management and analytics
 - **Federate an open community** of developers, engineers, data scientists
- **A dedicated team and budget**
- **Event, training and communication:**
 - Internal training sessions (10+ sessions/year: software engineering, High Performance Computing, statistics, etc.)
 - Monthly meet-ups
 - Scientific conferences (e.g. NOW)
 - Hackathons (e.g. Brain Hack Network)

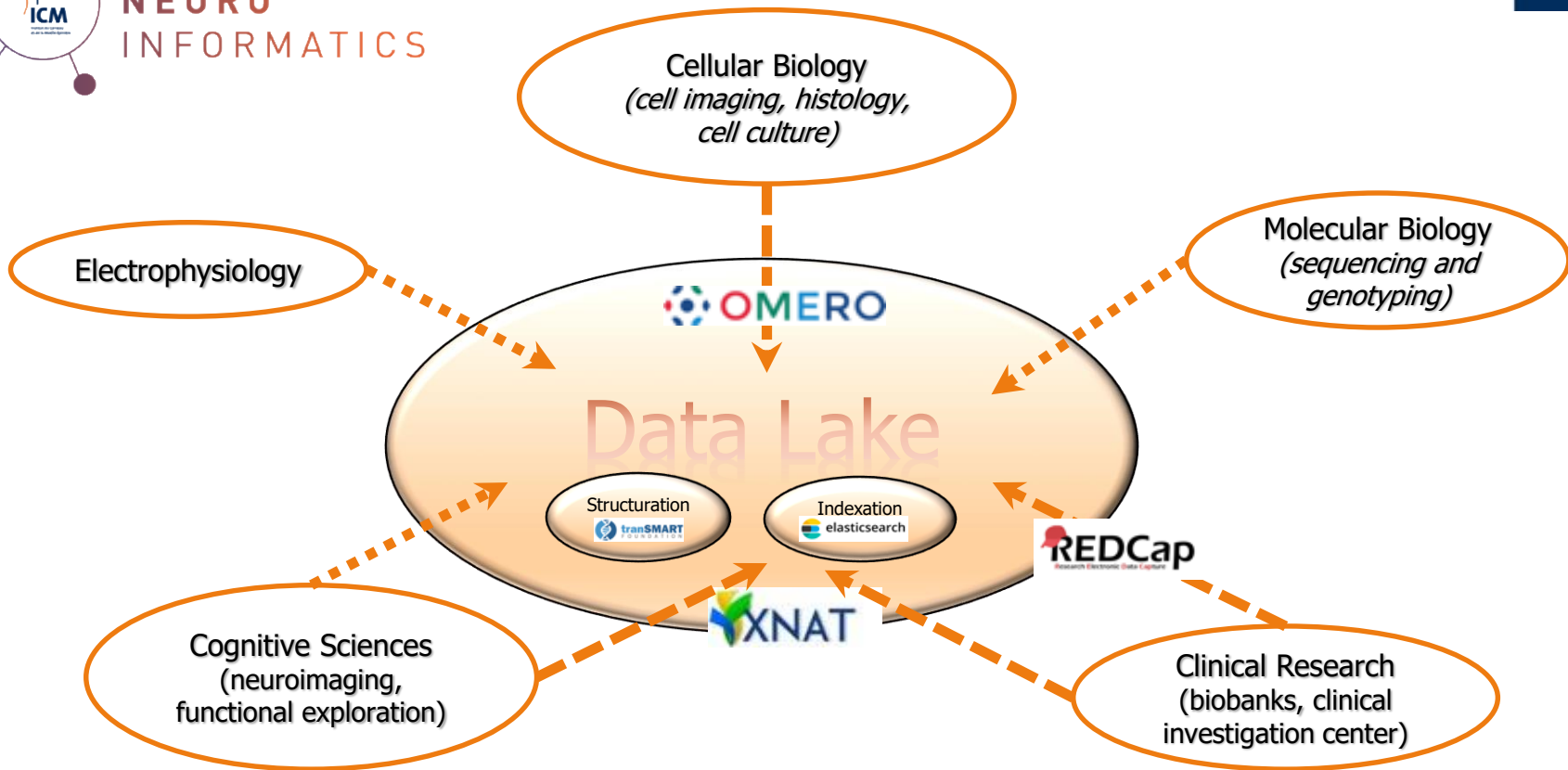
Centre for Neuroinformatics

Coordinator - Stanley Durrleman



A common **data lake** and **data catalog**

- **Built-on community tools in each scientific domain**
- **Multi-modal integration:**
 - Indexation (meta-data) for querying the data lake
 - Data warehouse
 - Use of common terminologies, ontologies
 - Common procedure for data de-identification



Unique de-identification procedure for ICM: technical and regulatory studies in progress

A common portfolio of software tools

- **An institutional gitlab repo**
- **Support in software engineering**
 - Optimization, parallelisation
 - GUI Development
- **Automation of data processing**
 - Built on community tools in each domain (e.g. Nypipe, DAX, Clinica in neuroimaging → tomorrow hands-on session)

- **Change management**
 - Work hands-in-hands with teams and core facilities
 - Invest lot of efforts in internal communication
 - Focus on projects with high value for the teams
- **Governance of the data lake**
 - Promote a culture of sharing with adherence of most ICM scientists
 - Motivation and rewards in the era of open science
 - Positive regulatory incentives (GDPR, FAIR, etc..)

- **Link with partners (AP-HP, networks, etc..)**
 - Heterogeneous level of maturity
 - Need a share strategy and technological choices
- **Ressources**
 - Core funding with institutional money: how to measure RoI?
 - Convince PIs to secure resources for neuroinformatics in grant applications

- **Development of Open Science is still often done by individual researchers or teams, in fewer occasions by organisations**
- **Open Science is a powerful tool to transform research organization**
- **It needs a careful implementation to ensure the commitment of the teams and the executives**