INS - Institut de neurosciences des systèmes

Rapport Hcéres

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HCERES

High Council for the Evaluation of Research
and Higher Education

report on research unit:

Institute of System Neuroscience

INS

under the supervision of the following institutions and research bodies:

Aix-Marseille Université

Institut National de la Santé Et de la Recherche Médicale – INSERM

Evaluation Campaign 2016-2017 (Group C)

HCERES

High Council for the Evaluation of Research
and Higher Education

In the name of HCERES,[1]

Michel Cosnard, president

In the name of the experts committee,[2]

Richard Frackowiak, chairman of the committee

Evaluation report

This report is the sole result of evaluation by the expert committee, the composition of which is specified below.

The assessments contained herein are the expression of an independent and collegial reviewing by the committee.

Unit name:	Institute of System Neuroscience
Unit acronym:	INS
Label requested:	UMR
Current number:	1106
Name of Director (2016-2017):	Mr Viktor Jirsa
Name of Project Leader (2018-2022):	Mr Viktor Jirsa

Expert committee members

Chair:	Mr Richard Frackowiak, EPFL, Switzerland
Experts:	Ms Carine Ali, GIP Cyceron, Caen (representative of the CNU)
	Mr Christian Büchel, University Medical Center Hamburg-Eppendorf, Germany
	Mr Stéphane Charpier, Institut du Cerveau et de la Moelle épinière, Paris
	Mr Jean-Marc Édeline, Institut des Neurosciences Paris-Saclay
	Mr Nasser Haddjeri, Université Claude Bernard Lyon 1 (representative of the INSERM)
	Ms Nathalie Lelong, INSERM / Maternité Port Royal, Paris (representative of the supporting personnel)

Scientific delegate representing the HCERES:

Mr Christian Giaume

Representatives of supervising institutions and bodies:

Ms Aurélie Philippe, INSERM

Mr Marc Sentis, Aix-Marseille Université

Heads of Doctoral Schools:

Mr Reinoud Bootsma, ED n° 463, Doctoral School "Sciences du mouvement humain"

Mr Alain Enjalberg, ED n° 62, Doctoral School "Science de la vie"

1 ● Introduction

History and geographical location of the unit

The Institut de Neuroscience des Systèmes (INS) was created in January 2012 under the direction of Mr Patrick Cʜᴀᴜᴠᴇʟ (director) and Mr Viktor Jɪʀsᴀ (co-director following an evaluation by the National Scientific Evaluation Agency (AERES)) in 2011. It is a mixed INSERM-university research unit located on the medical campus La Timone of Aix-Marseille Université (AMU).

Management team

In September 2014, as planned Mr Viktor Jɪʀsᴀ became director and Mr Patrick Cʜᴀᴜᴠᴇʟ deputy-director.

HCERES nomenclature

Domaine principal: SVE4 Neurologie.

Domaine secondaire: SVE5 Physiologie, Physiopathologie, Cardiologie, Pharmacologie, Endocrinologie, Cancer, Technologies Médicales.

Scientific domains

The Institute is set up as a multimodal and multidisciplinary collaborative venture focused on examining the human brain as a dynamic interactive system. The focus of interest is on characterising normal cognitive processes in terms of dynamic spatio-temporal pattern-formation. A parallel focus is on diseases that lead to dysfunction in dynamic systems, of which the paradigmatic example is epilepsy. The aim is to discover principles underlying such mechanisms and to exploit them for the discovery of new treatments. The structure of the INS is designed to facilitate inter-disciplinary interaction and multimodal data collection across temporal and spatial brain scales. Data collection and clinical observation are confronted in the context of neural theory and novel data analytic techniques. The methods used include computational neural modelling, electrophysiological studies in animals and man (with stereo-EEG, classical EEG, human brain imaging, mainly with MRI, transcranial magnetic stimulation, and magnetoencephalography), psychophysics, cognitive and behavioural assessment, clinical evaluation of patients with epilepsy and experimental neurobiology in rodent models of the disease. Added to these is a High Performance Computing (HPC) cluster that permits data handling and calculations at the speed needed for modern theoretical neurobiology. To quote the application, the ultimate "scientific objective at INS is to uncover the principles underlying the dynamic behaviour of brain networks and understand its links to cognitive function and dysfunction, as well as its organization across various scales".

Unit workforce

Unit workforce	Number on 30/06/2016	Number on 01/01/2018
N1: Permanent professors and similar positions	12	15
N2: Permanent researchers from Institutions and similar positions	12	12
N3: Other permanent staff (technicians and administrative personnel)	12	16
N4: Other researchers (Postdoctoral students, visitors, etc.)	13	
N5: Emeritus	0	
N6: Other contractual staff (technicians and administrative personnel)	2	
N7: PhD students	21	
TOTAL N1 to N7	**72**	
Qualified research supervisors (HDR) or similar positions	20	

Unit record	From 01/01/2011 to 30/06/2016
PhD theses defended	17
Postdoctoral scientists having spent at least 12 months in the unit	20
Number of Research Supervisor Qualifications (HDR) obtained during the period	4

2 • Assessment of the unit

Global assessment of the unit

The main scientific interests of the INS remain as initially expressed on foundation. There has been an expansion of the range of methods used, many through collaboration. For example, the imaging facilities are currently provided by the hospital's Center for Magnetic Resonance in Biology and Medicine (CRMBM-CEMEREM) in the context of a strong and long-lasting collaboration with Mr Maxime Guye. The accumulation of technological facilities for data collection has provoked new interest in other diseases and conditions than epilepsy.

The INS has strengths in modelling, theory and data collection. It has resources in patients and clinical expertise. There are clear potentials for translational science and some of the industrial and technological partners that will be needed for such an effort already seem in place. The cognitive expertise is thin, given the range of new neurodegenerative issues to be tackled. The basic neurobiology, whilst justified with focused cognition in terms of a specific attempt to cross the spatial and temporal scales of dynamic network characterisation, is potentially insufficient (given the coming retirement of a very experienced (s-EEG) and critical member of the engineering staff) if the ambition is to go beyond epilepsy. These issues have also been raised by the SAB in June 2016.

The INS has a terrific set of resources and expertise with some achievements to its credit. This is all the more remarkable because the administrative resources accorded are woeful and require strengthening, at least with an experienced project manager). There is little evidence of translation and change in medical practice (perhaps rhythmicity in language rehabilitation), but there is a sense that there is a much greater potential, especially in epilepsy. The uptake of some of the modelling software is very impressive (the Virtual Brain community includes over three thousand members) and such uptake of a common methodology can pre-date major scientific advances. The directorate needs to keep an eye on clinical and technological impact as well as publication rates in the next period. It also needs to establish a suite of written policies for hiring, firing, personal appraisal and career management, publication and valorisation. This has been impossible with current administrative resources.