#	Principal Investigator	Lab / Team name	Institute	Websites	Themes and methodologies
1	**Jean-Christophe Poncer**	Plasticity in Cortical Networks & Epilepsy	Institut du Fer a Moulin (IFM), INSERM U1270, 17 rue du Fer à Moulin, 75005 Paris	https://ifm-institute.fr http://poncerlab.fr	Themes : cellular and synaptic determinants of epileptic networks, Methods: -Multielectrode array recordings from human brain resective tissue in vitro -Telemetric chronic video-ECoG recordings in mouse models of temporal lobe epilepsy -In vitro cellular electrophysiology -Superresolution imaging techniques (PALM/STORM, single particle tracking...)
2	**Alexandre Charlet**	Peptidergic control of Emotions	Institut des Neurosciences Cellulaires et Intégratives (INCI, CNRS UPR3212) 8 allée du Général Rouvillois 67000 Strasbourg	https://inci.u-strasbg.fr/?page_id=5135	Our work focuses on understanding the cellular mechanisms that underlie the regulation of our emotions, from social interaction to pain to anxiety. We strive to explore how neuropeptides modulate the activity of neuroglial networks in key structures of emotional integration, such as the amygdala. To do this, we combine ex vivo and in vivo electrophysiology and imaging approaches around genetic tools.
3	**Marco Canepari**	Voltage & ion concentration imaging	Laboratoire Interdisciplinaire de Physique (LIPhy), Bat. E45, 140 avenue de la physique, Domaine univ., Université Grenoble Alpes et CNRS UMR 5588, 38402 St Martin d'Hères cedex, France	https://www-liphy.univ-grenoble-alpes.fr/OPTique-et-IMAgeries-en?lang=en http://marco-canepari.wix.com/neuron-imaging-team	We are in a physics lab and our specialty is very high speed ion / voltage imaging to reconstruct ion channel activity in neuronal excitability.
4	**Suliann Ben Hamed**	Neural bases of spatial cognition and action	Institut des Sciences Cognitives Marc Jeannerod	http://www.isc.cnrs.fr/	Theme: spatial attention / multisensory integration / representation of space Methodologies: electrophysiological and fMRI recordings in non-human primates in behavior / fMRI, EEG and psychophysics in humans
5	**Gabrielle Girardeau**	Sleep and emotional memory	Institut du Fer à Moulin, Inserm U1270, 17 rue du Fer à Moulin, 75005 Paris	girardeaulab.org https://ifm-institute.org/en/home/	sleep and memory, in vivo large-scale electrophysiology, optogenetics, closed-loop systems, rat behavior.
6	**Frédéric Lanore / Yann Humeau**	Synapse in Cognition	Interdisciplinary Institute for Neuroscience (IINS) UMR5297 CNRS, Université de Bordeaux, Centre Broca Nouvelle Aquitaine, 146 rue Léo Saignat 33077 Bordeaux	https://www.iins.u-bordeaux.fr/HUMEAU	Synapses are plastic. They change their efficacy depending on various parameters, including the respective activities of pre- and post-synaptic neurons. Numerous in vitro studies explored the plasticity repertoire of numerous synaptic populations in the mouse brain, but rarely according to endogenous inducers. It is no doubt that synaptic plasticity is associated and mediates learning and memory, thus our goal is to identify the neuronal activities that are associated with the learning and execution of cognitive abilities, and to understand how, when and where synaptic plasticity is generated. We are developing cooperative in vivo and in vitro strategies to study the link between synapse and cognition. These include behavioral tests, in vivo pharmacology and optogenetic, and in vitro electrophysiological recording in various brain regions of identified synaptic populations. Future main projects will focus on various phases of learning, and will progressively include in vivo electrophysiological recordings in behaving mice.
7	**Daniel Enersto Shulz**	Sensori-motor Integration & Plasticity	Paris Saclay Neuroscience Institute (NeuroPSI), 91190 Gif sur Yvette,	https://neuropsi.cnrs.fr/en/departments/icn/group-leader-daniel-e-shulz/	Our laboratory is the only one in the world to have developed a 24 whisker stimulator (the Matrix) which allows multidirectional whisker deflections at behaviorally relevant speed and acceleration. The Matrix allowed us to explore new paradigms that are changing the way we consider the functional organization of the somatosensory system, from a labeled line to a more distributed and flexible cortical coding. Within the framework of closed-loop neuroscience, we explore general rules of sensorimotor adaptation by developing brain-machine interfaces used as a probe for studying the neuronal code and its adaptation by reinforced learning. Our approach is original and out of the main stream since instead of applying adaptive decoding algorithms, we fix the algorithms and require the brain to adapt to them allowing the study of the plasticity capacities of the brain and the embodiment of external devices.
8	**German Sumbre**	Neural Circuit dynamics & Behaviour	Institut de Biologie de l'École Normale Supérieure, 46 rue d'Ulm, Paris	https://www.zebrain.biologie.ens.fr/	Neuroethology refers to the study of animal behaviour and its underlying neuronal mechanisms. Aiming to unravel how the nervous system processes cognitive functions and controls animal behaviour, the laboratory uses the zebrafish larva as the experimental model and a multidisciplinary approach, including two-photon calcium imaging and light-sheet microscopy (SPIM) to monitor the dynamics of large neuronal networks and even the whole brain, behavioural essays, optogenetics to monitor and manipulate the activity of specific neurons or entire circuits, and mathematical methods for the analysis of high-dimensional large datasets. It is the combination of disciplines, and the use of an intact behaving animal model that enables deciphering complex neuroethological questions such as perception of time, decision making, sensory perception, and the functional role of the brain's intrinsic dynamics.

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9	**Peter Vanhoutte & Jocelyne Caboche**	Neuronal Signaling & Gene Regulation	Neuroscience Paris-Seine INSERM-UMRS1130; CNRS-UMR8246, Sorbonne University, F-75005 Paris - France	https://www.ibps.sorbonne-universite.fr/fr/Recherche/umr-8246/signalisation-neuronale-et-regulations-geniques https://www.ibps.sorbonne-universite.fr/fr/Recherche/umr-8246	Research focus: -We study cellular and molecular mechanisms shaping long-term neuronal adaptations induced by drugs of abuse or striatal dysfunctions resulting from the genetic mutation encountered in Huntington's disease (HD). -Our overall goal is to design tools and strategies to overcome dysfunctions encountered in preclinical models of HD and addiction. Main methodologies: - Cell culture, including primary cultures of striatal neurons - Molecular biology; biochemistry; histology. - FISH; RNAscope - In situ detection of protein-protein interactions (Proximity Ligation Assay & Co-IP) and microRNA. - Live-calcium imaging (confocal, two-photon & fiber photometry) - 3D-analysis of neuronal morphology and dendritic spine dynamics. - Stereotaxic injections of custom-made viruses. - Behavioral studies (locomotion; locomotor coordination; conditioned place preference/aversion/ anxiety/depression…) Research focus: -We study cellular and molecular mechanisms shaping long-term neuronal adaptations induced by drugs of abuse or striatal dysfunctions resulting from the genetic mutation encountered in Huntington's disease (HD). -Our overall goal is to design tools and strategies to overcome dysfunctions encountered in preclinical models of HD and addiction. Main methodologies: - Cell culture, including primary cultures of striatal neurons - Molecular biology; biochemistry; histology. - FISH; RNAscope - In situ detection of protein-protein interactions (Proximity Ligation Assay & Co-IP) and microRNA. - Live-calcium imaging (confocal, two-photon & fiber photometry) - 3D-analysis of neuronal morphology and dendritic spine dynamics. - Stereotaxic injections of custom-made viruses. - Behavioral studies (locomotion; locomotor coordination; conditioned place preference/aversion/ anxiety/depression…)
10	**Jérémie Barral**	Neural coding in the auditory system	Institut de l'Audition, 63 rue de Charenton, 75012 Paris	https://www.institut-audition.fr/en/neural-coding-auditory-system https://www.barral-lab.org/	The goal of our team is to understand how the brain can understand complex sounds. Sound processing starts in the ear where the cochlea decomposes complex acoustic stimuli into elementary frequencies. How these frequencies are represented in the brain is a central question in the hearing field and in neuroscience in general. To control what signals the cochlea is sending to the brain, we stimulate the sensory hair cells with light instead of sounds or electrical pulses in the case of cochlear implants. This very precise control of the cochlear signal allows us to study systematically what information is necessary and sufficient to identify a sound. Methods: optogenetics, 2 photon imaging and stimulation, electrophysiological recordings
11	**Alain Chedotal**	Development, evolution and function on commissural systems	Institut de la Vision, 17 Rue Moreau, 75012 Paris	https://www.institut-vision.org/ https://www.institut-vision.org/fr/developpement-evolution-et-fonction-des-systemes-commissuraux.html	Development of retinal connectivity and optic nerve regeneration. Development, function and evolution of brain commissures. Molecular control of granule cell migration by semaphorins and plexins. Mechanisms controlling the differentiation and specification of neural crest cells. Role of axon guidance molecules in angiogenesis and ocular vasoproliferative diseases. Innervation of the cornea and cornea transplantation. Regulation of cell-cell interactions during myelination and remyelination by novel genetic methods.

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12	**Thierry Galli**	Membrane Traffic in Health And Brain Disease	Insitut de Psychiatrie et Neurosciences de Paris (IPNP), INSERM U1266, Univ. Paris Descartes, Paris, France	https://ipnp.paris5.inserm.fr/recherche/equipes-et-projets/15-equipe-galli	role of SNARE proteins in neuronal cell differentiation, with particular emphasis on the tetanus neurotoxin-sensitive routes, mediated by cellubrevin/VAMP3 and synaptobrevin/VAMP1,2, the tetanus neurotoxin-insensitive routes mediated by Tl-VAMP/VAMP7 and ER-plasma membrane contact sites regulated by Sec22b.
13	**Maria Cécilia Angulo**	Interactions between neurons and oligodendroglia in myelination and myelin repair	Insitut de Psychiatrie et Neurosciences de Paris (IPNP), INSERM U1266, Univ. Paris Descartes, Paris, France	https://ipnp.paris5.inserm.fr/recherche/equipes-et-projets/19-equipe-angulo	interactions between GABAergic interneurons and oligodendrocyte progenitors Molecular pathways Neurophysiology Optogenetics
14	**Julien Bouvier**	Neuronal Circuits & Motor Control	Paris Saclay Neuroscience Institute (NeuroPSI), 91190 Gif sur Yvette,	https://neuropsi.cnrs.fr/en/departments/icn/group-leader-julien-bouvier/	Our research aims at identifying the neuronal circuits that execute movements and support their adaptive nature. We principally study breathing and locomotion, two vital behaviors that are largely conserved across species. Our current research projects aim at unveiling how breathing and locomotion are dynamically modulated according to internal or external needs, such as transition from rest to exercise, changes in posture or locomotor direction. These questions are addressed by a multidisciplinary strategy combining state-of-the-art viral-based anatomical tracings on dedicated transgenic mouse lines, neuro-anatomy, and functional investigations using electrophysiology, optogenetic and behavioral analysis.
15	**Fiona Francis**	Cortical Development and Pathology	Institut du Fer à Moulin, Inserm UMR-S 1270, 17 rue du Fer à Moulin, 75005 Paris	https://ifm-institute.org/en/home/	Neurodevelopment. Molecular and cellular mechanisms, Genes and environment. Mouse and human in vitro models.
16	**Martin Giurfa**	Experience-dependent plasticity in insects	Center for integrabive Biology (CBI), Paul Sabatier University, Toulouse	https://cbi-toulouse.fr/eng/equipe-giurfa-devaud	The objective of our team is the integrative study of experience-dependent plasticity in insects, with a particular focus on cognitive functions, such as visual and olfactory learning and memory. Three model species (honeybee, bumblebee, Drosophila), for which detailed descriptions of brain anatomy and genome are now available, are used to explore behavioral plasticity in ecologically relevant tasks and to track down their genetic, molecular and neural mechanisms bases. The comparative analysis between species exhibiting various levels of social complexities provides a unique opportunity to consider experience-dependent plasticity in a social context. Our multidisciplinary approach is poised at the interface between experimental psychology, neurobiology, molecular biology, behavioral genetics and cognitive ecology. We use state-of the-art techniques spanning from behavioral observations of free-flying bees foraging on computer-controlled flowers, to the conditioning of harnessed individuals presented with tightly controlled stimuli, the identification of neural circuits involved in memory formation using transgenes, and the detailed tracking of neurotransmission processes in targeted brain structures.

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17	**Laure Bally-Cuif,**	Zebrafish neurogenetics (ZEN)	Institut Pasteur & CNRS UMR3738 25 rue du Dr Roux 75015 Paris France	https://research.pasteur.fr/en/team/zebrafish-neurogenetics/	Topic: Adult neural stem cell biology, with specific focus on the control of basis stem cell properties such as quiescence and cell fate choices. Model system: the zebrafish adult brain (telencephalon in particular) Methods: genetic and non-genetic manipulation of adult NSCs in vivo (intra-ceberal injections, electroporation, chemical interference…), molecular biology and single-cell -omics, cell fate tracing, intra-vital imaging (although this is still done at Polytechnique so cannot be seen), transgenesis/genome modifications, in vitro culture (NSc spheroids)
18	**Isabelle Audo et Christina Zeitz**		Institut de la Vision, 17 Rue Moreau, 75012 Paris	https://www.institut-vision.org/en/identification-of-gene-defects-leading-to-non-progressive-and-progressive-ocular-diseases.html	Identification of gene defects leading to progressive or non-progressive eye diseases Sequencing and genotyping study, immunostaining of candidate proteins in retinal sections, functional analyzes on cellular models of overexpression of candidate protein or iPS cells
19	**Christelle Peyron**	SLEEP Lab	Centre de recherche en neurosciences de Lyon, situé au: CH-le vinatier, Neurocampus Michel Jouvet, 95 BD Pinel, 69375 BRON cedex	https://lyonsleeplab.cnrs.fr/ https://www.crnl.fr	Our research strategy carried out in various species (rat, mice, lizards, birds, chameleons, humans etc) is to disentangle brain networks and biological mechanisms generating sleep and its natural alternation with wakefulness, to unravel either physiological, functional and cognitive functions of sleep and to understand the dysfunctional mechanisms underlying different pathologies affecting sleep (ie. RBD, narcolepsy) with well-documented negative impacts on both health and quality of life of human beings. Our projects and experimental approaches are multidisciplinary, translational and by definition integrative
20	**Wanaverbecq Nicolas**	Spinal Cord and CSF Interface (SpiCCCI)	Institut de Neurosciences de la Timone ('INT) Campus de la Timone 27, Boulevard Jean Moulin 13005 Marseille	http://www.int.univ-amu.fr/Research-teams/SpiCCI http://www.int.univ-amu.fr/?lang=en	Properties and function of CSF contacting neurons in the Spinal Cord Interaction with the motor spinal circuit at the lumbar level and the autonomous system at the thoracic level; Slice patch-clamp and extracellular electrophysiological recordings Epifluorescence and Biphoton Calcium imaging Mouse transgenic models, neuronal tracing combined to tissue clarification and light sheet microscopy Opto- and ChemoOptogenetic
21	**Thierry Leveillard**	Redox and Metabolic Signaling of Cone Survival Factors for the Treatment of Hereditary Retinal Degeneration	Département de génétique, Institut de la Vision (UMR-S 968), 17, rue Moreau 75012 Paris, France	http://kbass.institut-vision.org/KBaSS/ https://www.institut-vision.org/	Retinal degenerations: Mechanisms and therapeutic approaches Functional genomics
22	**Romain Goutagny / Demian Battaglia**	FunSy team (Functional System Dynamics)	Laboratoire de Neurosciences Cognitives et Adaptatives, CNRS UMR 7364, 12 Rue Goethe, 67000 Strasbourg	https://www.lnca.cnrs.fr/activite-oscillatoire-et-transfert-dinformation-au-sein-des-reseaux-neuronaux/	We combine electrophsyiological, behavioral and computational approaches to understand how the complexity of cerebral oscillations could underlie the processes of learning and memory.
23	**Xavier Nicol**	Mechanisms of sensory map development	Institut de la Vision, 17 rue Moreau 75012 Paris	http://xaviernicol.toile-libre.org/	themes: developmental mechanisms regulating the establishment of neuronal connectivity, axonal guidance, neuron cell biology, subcellular compartmentalization of signaling pathways methodologies: cell imaging of living axons, FRET imaging, TIRF imaging
24	**Sonia Garel**	Brain Development and Plasticity	IBENS- Ecole Normale Superieure- 46, rue d'Ulm, 75005 Paris	https://www.ibens.ens.fr/spip.php?rubrique14	Research themes: development and plasticity of the neocortex with a strong interest in neuroimmune interactions Methodologies: Mouse genetics, In utero manipulations, tracing in embryos pups, timelapse imaging, transcriptomics.

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25	**Julia Fuchs**	Pathophysiology of transposable elements in the brain	Collège de France, Center for Interdisciplinary Research in Biology, 11 place Marcelin Berthelot, 75005 Paris	https://www.college-de-france.fr/site/en-cirb/fuchs.htm	Our lab is interested in elucidating the role of transposable elements (TEs) in the physiology and pathophysiology of the brain. Transposable elements comprise the “dark side” of the genome of many organisms including humans and have gained recently growing interest as drivers of evolution but also as genomic elements associated with cancer, auto-immune and neurological diseases. We are particularly interested in the interconnection between aging of the brain, neurodegenerative diseases like Parkinson’s and Alzheimer’s disease and TEs and investigate the hypothesis that brain aging de-represses TEs which cause neurodegeneration through the activation of several downstream pathways including genomic damage, neuroinflammation and gene expression dysregulation. We study TEs in human and primate neuronal cells and brain tissues as well as in mice and use, besides a wide-range of standard biochemical, cellular and molecular biological techniques, also next-generation sequencing and bioinformatics, proteomics and state-of-the-art imaging.
26	**Laure Rondi-Reig**	Cerebellum, Memory and Navigation	Neuroscience Paris-Seine INSERM-UMRS1130; CNRS-UMR8246, Sorbonne University, F-75005 Paris - France	https://www.ibps.sorbonne-universite.fr/fr/Recherche/umr-8246/cervelet-navigation-et-memoire	Study of learning and memory with behavioral science approaches: mice and humans, behavioral electrophysiology, virtual reality
27	**Yves Boubenec**	Neuro platform - Audition team	Laboratory of Perceptual Systems, Department of Cognitive studies École Normale Supérieure, 29 rue d'Ulm 75005 Paris	https://lsp.dec.ens.fr/en	Topic : Context-dependent encoding of sounds Methodology: functional UltraSound neuroimaging and ephys in the behaving ferret
28	**Cécile Charrier**	Development and plasticity of synapses.	IBENS- Ecole Normale Superieure- 46, rue d'Ulm, 75005 Paris	https://www.ibens.ens.fr/?rubrique93&lang=en	Synapse development, synaptic plasticity, human brain evolution, human-specific genes, high-resolution imaging of synapses in brain slices, in utero electroporation, live cell imaging, slice electrophysiology, omics approaches.
29	**Ariel Di Nardo**	Development and Neuropharmacology	Centre Interdisciplinaire de Recherche en Biologie, CNRS UMR7241, Inserm U1050, Collège de France	https://www.college-de-france.fr/site/en-cirb/prochiantz.htm	Postnatal brain development and diseases: Amyotrophic lateral sclerosis, Parkinson Disease, and Psychiatric Diseases Méthodologies: Mouse CNS surgery, mouse behavior (muscle strength, socialisation, stereotypy, anxiety, memory), Neural stem cell culture, Histology, Molecular and cell biology (proteomics, epigenomics, transcriptomics, etc)
30	**Brice Bathellier**	Auditory system dynamics and multisensory processing	Hearing Institute - Pasteur Institute - 63 rue de Charenton 75012 Paris	https://www.bathellier-lab.org/ https://www.institut-audition.fr/en	Principles of auditory and multisensory processeing. Two-photon imaging and neuropixel recordings in awake behaving mice, optogenetics with light patterns.
31	**Fekrije Selimi**	Mice, Molecules and Synapse Formation	CIRB, Collège de France, Paris	https://www.fekrijeselimilab.com/	Molecular basis of synapse formation using the olivocerebellar network of the mouse as a model system. In vivo neuron specific genetic engineering, synapse morphology and quantification using high resolution microsocopy and function using patch-lamp and MEA.
32	**David Stroebel**	Paoletti lab, Glutamate Receptor and Excitatory synapses.	IBENS (Biology Institute of École Normale Superieure), 46, rue d'Ulm, Paris	: https://www.ibens.ens.fr/spip.php?rubrique24&lang=en	We are investigating the structural mechanism, pharmacology and physiological function of Ionotropic Glutamate Receptor using a multi-level approach. Methodologies: Cellular electrophysiology, receptor engineering, molecular modeling, neuropharmacology, optogenetic tools...

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33	**Olivier Thoumine**	Cell Adhesion Molecules in Synapse Assembly	Interdisciplinary Institute for Neuroscience UMR CNRS 5297- University of Bordeaux Centre Broca Nouvelle-Aquitaine 146 rue Léo Saignat CS 61292 Case 130 33076 Bordeaux (FRANCE)	https://www.iins.u-bordeaux.fr/THOUMINE	Our team aims at better understanding the role of adhesion molecules in synapse assembly and differentiation, with a focus on specific proteins including N-cadherin, neurexins, neuroligins, LRRTMs, and their associated partners (MDGAs, actin cytoskeleton, scaffolding proteins, glutamate receptors). We are particularly interested in characterizing the membrane dynamics, binding kinetics, nanoscale organization, and signaling mechanisms associated with these molecular complexes. To decipher these mechanisms, we use a combination of technical approaches including live-cell fluorescence imaging, single molecule tracking, optogenetics, electrophysiology, and single cell transcriptomics. Our working models, both isolated from rodent brains, are dissociated hippocampal neurons which bear good optical properties for super-resolution imaging, and organotypic hippocampal slices that have well-preserved dendritic architecture and synaptic connectivity.
34	**Arthur Leblois and Nicolas Mallet**	Network dynamics underlying function and dysfunction of procedural learning	l'Institut des maladies neurodéégénératives (IMN), UMR CNRS 5293, à l'Université de Bordeaux (146 rue Léo Saignat, 33000 Bordeaux)	https://www.imn-bordeaux.org/en/	The scientific questions behind the studies conducted in our team relate on the emergent properties of large neural networks involved in motor control and procedural learning. We aim at understanding the basic computational principles underlying movement (nature of the motor code, respective contribution of various brain areas such as the cortex, basal ganglia and cerebellum during motor learning, role of oscillatory activity in driving action and learning new skills) and which perturbations in these computational principles are responsible for the motor and cognitive symptoms observed in brain pathologies such as Parkinson's disease, dystonia, or epilepsy. The ambitious nature of our project requires the constant development of innovative methods, both experimental – revealing the cellular basis of movement and learning - and theoretical – building biologically realistic predictive models to understand the complex dynamics of the studied networks. The techniques routinely used in our team involve: in vivo electrophysiology (both acute and chronic, in particular in behaving birds, rodents and primates), optogenetics (in rodents) and chemogenetics (in primates), pharmacology, behavioral analysis (including a lot of custom-made programming in Python and Matlab), anatomy, and computational modelling
35	**Etienne Herzog and David Perrais**	Membrane traffic at synapses	Interdisciplinary Institute for NeuroScience - UMR 5297 Centre Broca Nouvelle-Aquitaine 146 rue Léo Saignat CS 61292 Case 130 33076 Bordeaux Cedex (FRANCE)	https://www.iins.u-bordeaux.fr/PERRAIS	Theme 1 : Explore membrane trafficking in cells using pulse pH imaging. Theme 2 : Explore synaptic composition and diversity using Fluorsencence activated synaptosome sorting.
36	**Christian Neri**	Brain-C Lab	Institut de Biologie Paris Seine (IBPS) Brain-C Lab CNRS UMR 8256 and ERL Inserm U1164 9 Quai Saint Bernard 75005 Paris France	https://www.ibps.sorbonne-universite.fr/fr/Recherche/umr-8256/brainc	Resarch interest: Role of compensatory homeostatic mechanisms in neurodegenerative diseases (Huntington's disease, Alzheimer's disease) Methods: Big data (omics)/machine learning/systems modeling Human stem cell biology (iPSCs, differentiation) Analysis of extracellular vesicles/exosomes C. elegans genetics Microfluidics (in collaboration) Mouse testing ((in collaboration) Clinical research

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37	**Julien Courchet**	Energy Metabolism and Neuronal Development	Institut NeuroMyoGène CNRS UMR5310 – Inserm U1217 Université Claude Bernard Lyon 1 Faculté de Médecine 8 avenue Rockefeller 69008 Lyon - France	https://www.inmg.fr/courchet/ http://courchetlab.eu/	Our group focus on some of the fundamental mechanisms underlying the development of neuronal circuits in the cerebral cortex. Neurons are among the most polarized cells in the organism. The axon typically exceeds the length of the cell body by several orders of magnitude. This extreme morphology raises many cellular challenges: in particular, the delay required to transport organelles and cargo from the soma to distant parts of the axon can reach several hours and is incompatible with the rapid adaptation of subcellular homeostasis. Thus, size constraints suggest that distinct regions of the axon behave as de facto isolated subcellular compartments, and that neurons have evolved strategies to ensure tight spatial and temporal control of critical cellular functions. Understanding the molecular connections between the local regulation of subcellular homeostasis and axon morphogenesis is therefore a critical challenge in cellular neurobiology. To address this question, our research concentrates on the local regulation of the energy metabolism in the developing axon. Indeed, the rapid remodeling of the axon during local morphogenetic events such as axon elongation, branch formation and elimination and synapse consolidation has an important energetic toll. Our goal is to characterize some of the molecular and cellular mechanisms involved in the local regulation of the energy metabolism in the axon during the embryonic and postnatal development, and to understand the consequences of disrupting the energy metabolism of developing neurons on axon development and circuit formation in the mouse. Our research combines real-time measurement of metabolic activity in developing neurons and in vivo manipulation of gene expression to determine the role of signaling pathways on mitochondria function, cortical axon development and mouse behavior.
38	**Rebecca Piskorowski**	Synaptic Plasticity and Neural Network	Institute of Psychiatry and Neuroscience of Paris INSERM UMRS1266 102-108 rue de la santé 75014 Paris, France	https://ipnp.paris5.inserm.fr/recherche/equipes-et-projets/16-equipe-chevaleyre-piskorowski	We study synaptic transmission, plasticity and network activity in the hippocampus with a focus on area CA2. We use acute brain slices and electrophysiology as well as behaviour and immunohistology.
39	**Asfaneh Gaillard**	Cellular therapies in brain disease	Laboratoire de Neurosciences expérimentales et clinique INSERM 1084	https://lnec.labo.univ-poitiers.fr/en/team-1-cellular-therapies-in-brain-disease-2/	Neural stem cells, iPS cells, cellular therapies , Parkinson, traumatic cortical lesions
40	**Laurent Groc**	Developmental Brain Physiology and Pathology	Institut Interdisciplinaire Neuroscience (IINS) CNRS - Université de Bordeaux - UMR 5297 Centre Broca Nouvelle-Aquitaine 146 rue Léo Saignat, CS 61292 Case 130 33076 Bordeaux Cedex, France	https://www.iins.u-bordeaux.fr/GROC	Synaptic physiology, neurodevelopment, neuropsychiatric disease techniques: high resolution imaging, dynamic imaging, electrophysiology
41	**Daniela Cota**	Energy balance and obesity	Neurocentre Magendie, INSERM U1215 146, Rue leo Saignat, 33077, Bordeaux	http://www.neurocentre-magendie.fr/cota https://neurocentre-magendie.fr/	Our team studies the role of the brain and particularly of the hypothalamus in the physiopathology of obesity and diabetes. To reach our research goals, we use cutting-edge neuroscience, genetic and pharmacology tools combined with integrated approaches for the study of feeding behavior and whole-body metabolism. Our research is at the crossroads of neuroscience, nutrition, neuroendocrinology and metabolism. Main methodological approaches in mice: stereotaxic surgery, chemogenetics, in vivo calcium imaging, AAV-mediated gene expression manipulation, study of feeding behavior and metabolic outputs in vivo (indirect calorimetry, locomotor activity....), neuroanatomy (IF, FISH), glucose and lipid metabolism (in vivo and ex vivo analyses), qPCR, western blots, ELISAs, in vitro microglia cultures.
42	**Nicolas Renier**	Laboratory of Structural Plasticity	Brain and Spine Institute Paris	https://www.renier-lab.com/	Brain development, brain plasticity, behavior, anatomy Tissues clearing and light sheet imaging, brain mapping, optogenetics, fiber photometry

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43	**Heike Rebholz**	Rebholz team	Institut de Psychiatrie et Neuroscience de Paris (Inserm 1266).	https://ipnp.paris5.inserm.fr/research/teams-and-projects/23-team-rebh	Signaling mechanisms in neurological disorders Les axes de recherche son la MP et l' ASD. behaviour and immunohistochemical analysis, tissue culture, primary tissue culture, biochemistry.
44	**Filippo Del Bene**	Development and function of the vertebrate visual system	Institut de la Vision, 17 rue Moreau 75012 Paris	https://www.institut-vision.org/en/development-and-function-of-the-vertebrate-visual-system.html	Vertebrate visual system development and function, main model system: zebrafish Molecular genetics, functional imaging, optogenetics, behavioural analysis.
45	**Bertrand Lambolez / Bruno Cauli**	Synaptic and Neuroenergetic Networks	Neuroscience CNRS UMR8246, INSERM U1130 / Institut de Biologie Paris Seine, 9 quai St Bernard, 75005 Paris	https://www.ibps.sorbonne-universite.fr/en/research/neuroscience/cortical-network-and-neurovascular-coupling	neurovascular/neuroenergetic coupling in the cortical network and larger scale brain circuits and their dysfunctions in Alzheimer's disease and epilepsy , as well as the role of delta1 glutamate receptor in synaptic transmission and its dysfunctions in intellectual disability. Techniques: slice electrophysiology combined with single cell RT-PCR, optogenetic or chemogenetic actuators, and imaging of fluorescent or bioluminescent sensors of diverse signaling or metabolic pathways, as well as in vivo functional ultrasound imaging combined with EEG in mobile animals.
46	**Thomas Freret**		Laboratoire COMETE UMR-S 1075, Pôle des Formations et de Recherche en Santé, 2, rue des Rochambelles, CS 14032, 14032 CAEN Cedex	http://comete.unicaen.fr/	The objective of the COMETE Unit is the development of methodologies and technologies for health through the study of the fundamental neurophysiological processes involved in mobility and cognition. The laboratory has and masters a large number of methodologies, ranging from preclinical (cellular and molecular biology, electrophysiology, behavior) to clinical (gait analysis, polysomnography, NIRS etc.).
47	**Olivier Marre**	Retinal information processing	Institut de la Vision, 17 rue Moreau 75012 Paris	https://www.institut-vision.org/en/	Topics: Neural coding and circuits in the retina, vision restoration. Methods: Optogenetics, 2 photon, large-scale electrophysiology.
48	**Béatrice Marquèze-Pouey**	Dynamics of intrinsic excitability & epilepsy	"Ion Channel and Synaptic Neurobiology" unit - UMR 1072 INSERM-Aix-Marseille University, Faculté de Médecine-Nord, Boulevard Pierre Dramard, 13015 Marseille	https://www.unis-neuro.com/	• Our team has a solid expertise in synaptic and intrinsic plasticity. It gathers electrophysiologists, cell and molecular biologists, biochemists and is composed of 8 permanent employees, 2 post-docs, 4 PhD students and 1 master student. A wide range of tools is available on cultured and acute slices of brain tissue as patch-clamp recording, confocal imaging, dynamic-clamp, CRISPR/Cas9, immunohistochemistry, mass spectrometry, Patch-seq RNA sequencing, Proximity Ligation Assay.
49	**Karine Loulier**	Corticogenesis	Institut des Neurosciences de Montpellier (INM) - INSERM U1298, Hôpital Saint Eloi, 80 avenue Augustin Fliche, 34091 Montpellier Cedex 5 - France	http://www.corticogenesislab.toile-libre.org/EN_main_page.htmlhttp://w	Themes: Diversity and plasticity of neural stem cells during brain development, in healthy and pathological contexts Methodologies: manipulations and surgery of small animals during development (in particular in utero electroporation), cell lineage monitoring methods, MAGIC Markers, transgenic mice, genetic models of neurodevelopmental pathologies, transparency, confocal and two-photon imaging, image analysis.
50	**Tihana Jovanic**	Neural Circuits and Behavior	Institut des Neurosciences Paris-Saclay (NeuroPSI) Campus CEA Saclay 151 route de la Rotonde Bâtiment 151 91400 Saclay	https://neuropsi.cnrs.fr/en/departments/cnn/group-leader-tihana-jovanic/	In our research, we exploit the advantages of the exquisite genetic tools available in Drosophila for manipulation and monitoring of neuronal activity at single neuron level and the numerical simplicity of the larval nervous system that allows the reconstruction of synaptic connectivity across the nervous system using large-scale electron microscopy to study the structure and function of the neural circuits for sensorimotor decisions and action sequences and investigate the mechanisms of their modulation by the internal state and external context.

#	Principal Investigator	Lab / Team name	Institute	Websites	Themes and methodologies
51	**Karine Merienne**	Laboratory of Cognitive and Adaptive Neurosciences	University of Strasbourg / CNRS 12 rue Goethe 67000 Strasbourg	https://www.lnca.cnrs.fr/equipe-1/	1) Our team is interested in the functional dynamics of the consolidation of a memory trace. We study the fundamental mechanisms that govern memory processes, with a particular interest in the hippocampo-cortical axis and the role of the reunion / romboid nuclei in the systemic consolidation of spatial memory, or the hippocampo-striato-cortical axis in systemic consolidation of procedural memory, using dedicated behavioral tests coupled with lesional approaches. 2) We explore the epigenetic and transcriptional mechanisms underlying memory processes, in a physiological or pathological context. In particular, using murine models of neurodegenerative pathologies (Alzheimer's disease and apparent diseases, dementias with Lewy and frontotemporal bodies, Huntington's disease), we seek to identify epigenetic / transcriptomic signatures specific to each pathology. and specific to the different charged cell types (ie neurons, glial cells), by an integrated omics approach. The neurodegenerative diseases that we are studying remain incurable at the present time, despite numerous clinical and preclinical tests. Our research in neuroepigenetics aims to identify new therapeutic targets to improve the memory capacities and cerebral plasticity of patients, relieve their symptoms, slow the progression of the disease, but also discover new biomarkers. Mastered methodologies: Stereotaxic brain surgery Various lesion approaches (excitotoxic lesions, selective lesions by injections of AAVs, etc.) Tracing techniques Immunohistochemistry / fluorescence, stereology Classical techniques of molecular biology Omics (RNAseq, ATACseq, ChIPseq, 4Cseq) and bioinformatic analyzes
52	**Sylvia Soares**	Axonal Degeneration and Regeneration	Neuroscience Paris Seine / IBPS 7 quai St Bernard Paris Bat A – 3e Paris 5e	https://www.ibps.sorbonne-universite.fr/fr/Recherche/umr-8246/regener	Thematic : Axon degeneration is the pivotal pathological event of acute traumatic neural injury as well as many chronic neurodegenerative diseases. It is an active cellular program, and yet molecularly distinct from cell death. Much effort is devoted towards understanding the nature of axon degeneration, and promoting axon regeneration. Accordingly, the work of the team is focused on 3 main aims : Aim-1 : Axon fate: Molecular mechanisms involved in axon regeneration and degeneration Aim-2 : CNS-on-Chip: Technological approaches for axonal degeneration and neuronal reconnections modeling Aim-3 : Regenerative strategies for spinal cord after traumatic injury Methods /Technologies : primary cell culture (embryonic neurons, astrocytes, monocytes/macrophages,astrocytes, adult DRG neurons), organoids, microfluidic chips, central (spinal cord) and peripheral traumatic injuries in rat
53	**Devrim Kilinc**	Molecular determinants of Alzheimer's disease and related disorders	Inserm U1167 - Risk factors and molecular determinants of aging-related diseases; Institut Pasteur de Lille, 1 rue du Prof Calmette BP245 Lille 59019 France	https://pasteur-lille.fr/en/home/center-of-research/research-units/risk-fac	Our team aims to characterize the genetic determinants of neurodegenerative diseases, Alzheimer's disease in particular, the leading cause of dementia worldwide, and to understand their implications in pathophysiological processes. To this end, we are developing high-throughput genomics approaches (genome-wide association studies and/or sequencing) on very large sample sets through establishing and coordinating European and global consortia. Once identified, we develop strategies to assess the physiological and pathological roles of these genetic factors using biochemistry, cell and molecular biology approaches based on cell (primary cultures / induced pluripotent stem cells) and animal models (Drosophila / transgenic mice), as well as high-content screening. Combining multidisciplinary data allows us to either support the pathophysiological processes already known in Alzheimer's disease, or generate new hypotheses allowing a better understanding of the pathology. For this particular short training program, we can expose the student to one or several thematics/techniques currently pursued/used in the laboratory.

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54	**Marie Paule Felder-Schmittbuhl**	Light, Vision and the Brain	Institut des Neurosciences Cellulaires et Intégratives, UPR3212 CNRS, 8 Allée du Général Rouvillois, 67084 Strasbourg	https://inci-en.u-strasbg.fr/?page_id=435	Study of retinal physiology, its pathologies, its role in the synchronization of circadian rhythms by light, and the effects of light on a certain number of behaviors linked to addiction, aggression. Methodologies: -Use of bioluminescence, associated or not with imaging, for the study of circadian rhythms -Electroretinography
55	**Nicolas Ramoz**	Genetics and clinics of addictive and psychatric behaviors	INSERM UMR1266 Institut de Psychiatrie et Neurosciences de Paris, 102-108 Rue de la Santé, 75014 Paris	https://ipnp.paris5.inserm.fr/research/teams-and-projects/11-team-gorwood#tab_detailed-information	I work on finding predictive factors, including biomarkers, and / or vulnerability to addictive behaviors, especially in anorexia nervosa, and substance misuse like alcohol dependence. The experiments used in our team are molecular genetic/epigenetic and cellular analyses, peptides and protein dosages. We corroborate clinical investigations to functional analyses of molecular, genomic biology and environment modifications and behavioral tests on in vitro cell cultures and in vivo animal models.
56	**Jessica Dubois / Lucie Hertz-Pannier**	InDev	- Unité NeuroDiderot U1141 Hôpital Robert-Debré 48 boulevard Serrurier 75019 Paris - CEA/ SAC/NeuroSpin/UNIACT Bat 145, PC 156 91191 Gif-sur-Yvette	https://neurodiderot.org/index.php/aehome/ https://neurodiderot.org/index.php/indev-en/ https://joliot.cea.fr/drf/joliot/en/Pages/research_entities/NeuroSpin/uniact/neuropediatrics.aspx	inDev team: Anatomo-functional variability, vulnerability and plasticity during neurodevelopment: clinics, behavior and imaging The inDev team of the NeuroDiderot unit (U1141) focuses on the characterization of the anatomical and functional variability of brain development, in close relationship to neurological and cognitive functions, in selected pathological conditions and in close link with the typical development dynamics from birth to adolescence. Neurodevelopmental disorders, characterized by an early focal or diffuse brain malfunction, manifest as perturbations of multiple acquisitions and learning processes, more or less associated with sensorimotor symptoms. Appropriate management and/or treatment of these common (up to 10% of an age range) and pleomorphic pathologies and their co-morbidities suppose a better characterization of their underlying neurobiological substrates, their commonalities and their interactions. The dynamics of individual phenotypes during childhood relies on critical mechanisms of brain plasticity that are specific to the immature brain and depend on both physiological variability and environmental influences. In the inDev team, we use a multimodal approach combining various biomarkers, both behavioral (neuropsychology, experimental psychology, oculometry) and imaging (advanced magnetic resonance imaging MRI, high-density electroencephalography EEG, etc.). The pathological models studied do share an early determinism, either pre- or perinatal : embryo-fœtopathy caused by prenatal alcohol exposure, early malformations of cortical development (especially with temporal lobe epilepsy, in relation with early memory development), various conditions of the third trimester of pregnancy (premature birth, intra-uterine growth restriction…), perinatal brain injuries (with/without cerebral palsy) and early language disorders (oral and written language) with their family predisposition. The inDev team is localized on two sites: Robert Debré University Hospital (APHP, Paris) and NeuroSpin neuroimaging research center (CEA-Saclay), to optimize interactions between clinical and basic research. Interactions are facilitated by the use of similar imaging equipment on both sites (3T MRI and high-density EEG), while benefitting from advanced data acquisition/analysis methodologies at NeuroSpin (7T MRI, MEG, neurocomputational approaches).
57	**FASANO Laurent**	Transcriptional regulatory networks in development and diseases	Developmental Biology Institute of Marseille (IBDM), Parc Scientifique de Luminy, Case 907 13288 Marseille Cedex 09 France .	http://www.ibdm.univ-mrs.fr	Our team has linked an autism spectrum disorder (ASD) syndrome to the heterozygous deletions of the TSHZ3 gene1. This gene codes for the TSHZ3 transcription factor, which is highly expressed in cortical projection neurons (CPNs) and in striatal cholinergic interneurons (SCINs)2. Heterozygous deletion of Tshz3 in mouse (Tshz3+/-)1, as well as postnatal conditional deletion using Camk2a-Cre (Camk2a-cKO)3, lead to functional defects at the level of corticostriatal circuitry, changes in gene expression pattern and behavioral deficits mimicking ASD (reduced social interactions and fields of interest, stereotypies)4. To address the specific role of CPNs and SCINs in TSHZ3-linked ASD, we are now studying new conditional KO mouse models, as well as a conditional rescue model to determine whether the timely-controlled restoration of Tshz3 expression in CPNs and/or SCINs can improve ASD symptoms. Our methods include molecular biology, immunohistochemistry and ex vivo electrophysiology.

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58	**GUBELLINI Paolo**	Cellular interactions, neurodegeneration and neuroplasticity	Developmental Biology Institute of Marseille (IBDM), Parc Scientifique de Luminy, Case 907 13288 Marseille Cedex 09 France .	http://www.ibdm.univ-mrs.fr	Our team has linked an autism spectrum disorder (ASD) syndrome to the heterozygous deletions of the TSHZ3 gene1. This gene codes for the TSHZ3 transcription factor, which is highly expressed in cortical projection neurons (CPNs) and in striatal cholinergic interneurons (SCINs)2. Heterozygous deletion of Tshz3 in mouse (Tshz3+/-)1, as well as postnatal conditional deletion using Camk2a-Cre (Camk2a-cKO)3, lead to functional defects at the level of corticostriatal circuitry, changes in gene expression pattern and behavioral deficits mimicking ASD (reduced social interactions and fields of interest, stereotypies)4. To address the specific role of CPNs and SCINs in TSHZ3-linked ASD, we are now studying new conditional KO mouse models, as well as a conditional rescue model to determine whether the timely-controlled restoration of Tshz3 expression in CPNs and/or SCINs can improve ASD symptoms. Our methods include molecular biology, immunohistochemistry and ex vivo electrophysiology.
59	**Jérémie Mattout / Mathilde Bonnefond**	COPHY - Computation, Cognition and Neurophysiology	The Lyon Neuroscience Research Center (CRNL) https://www.crnl.fr/en	https://www.crnl.fr/en/equipe/cophy	We study neuronal communication and encoding (e.g. the functional role of oscillations) in relation to brain disorders and to guide the design of neurotechnologies (brain-computer interfaces) for research and clinical applications (Autism, ADHD, Disorders of consciousness). Beside behavioural and classical neuroimaging approaches (electrophysiology, fMRI), we use multimodal high resolution neuroimaging (e.g. laminar MEG and fMRI) and advanced computational modelling (e.g. dynamic causal models of neuronal and cognitive processes; spiking/deep neural networks).
60	**Jean-François Ghersi-Egea**	FLUID - Fluids and Barriers of the Central Nervous System	The Lyon Neuroscience Research Center (CRNL) https://www.crnl.fr/en	https://www.crnl.fr/en/equipe/cophy	Using in vivo and ex vivo approaches, and cellular models of the blood-brain and blood-CSF barriers, the team investigates the mechanisms involved in transport processes and neuro-immune interactions at blood-brain interfaces in physiological and pathological condition, with a special focus on the perinatal and postnatal periods of brain development.
61	**Sylvie Mazoyer / Patrick Edery**	GENDEV - Genetics of Neurodevelopment	The Lyon Neuroscience Research Center (CRNL) https://www.crnl.fr/en	https://www.crnl.fr/en/equipe/fluid	The team, which comprises clinicians, molecular geneticists/biologists and bioinformaticians, deciphers the genetic causes of neurodevelopmental disorders through the studies of cohorts of families, patients' cells, animal (zebrafish) and cellular (IPSC, brain organoids) models.
62	**Alessandro Farnè / Denis Pélisson**	IMPACT - Integrative Multisensory Perception, Action and Cognition	The Lyon Neuroscience Research Center (CRNL) https://www.crnl.fr/en	https://www.crnl.fr/en/equipe/impact https://www.youtube.com/watch?v=dtlVOFARE3g	We study the behavioral processes and neural mechanisms of auditory, visual and tactile perception, motor planning and execution, cognitive representations and executive control, all critical components of human behavior. In collaboration with the CRNL Neuro-immersion facility, we develop and use cutting-edge technology for Virtual Reality and 3-D kinematics in healthy subjects and patients, complemented by neuroimaging and electrophysiology in human and non-human primates.
63	**Christelle Peyron / Pierre-Hervé Luppi**	SLEEP - Pathophysiology of the Vigilance States	The Lyon Neuroscience Research Center (CRNL) https://www.crnl.fr/en	https://www.crnl.fr/en/equipe/sleep, https://lyonsleeplab.cnrs.fr/	Our research strategy carried out in various species (rat, mice, lizards, birds, chameleons, humans etc) is to disentangle brain networks and biological mechanisms generating sleep and its natural alternation with wakefulness, to unravel either physiological, functional and cognitive functions of sleep and to understand the dysfunctional mechanisms underlying different pathologies affecting sleep (ie. RBD, narcolepsy) with well-documented negative impacts on both health and quality of life of human beings. Our projects and experimental approaches are multidisciplinary, translational and by definition integrative. Techniques: Full EEG/LFP analysis, in vivo electrophysiology (head restrained or freely moving mice) functional neuroanatomy, sleep recordings

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64	**Stephane Marinesco / Baptiste Balança**	BELIV - Bio-electrochemistry platform, TIGER - Translational and Integrative Group in Epilepsy Research	The Lyon Neuroscience Research Center (CRNL) https://www.crnl.fr/en		We develop innovative brain monitoring methods relying on implantable chemical sensors and microelectrode biosensors for glucose, oxygen, lactate, glutamate and nitric oxide monitoring. These methods are implemented in our research team to study experimental models of traumatic brain injury and stroke in rats, and understand the mechanisms of epileptogenesis and lesion progression.
65	**Laurent Seugnet / Jian-Sheng Lin**	WAKING - Integrated Physiology of the Brain Arousal Systems	The Lyon Neuroscience Research Center (CRNL) https://www.crnl.fr/en	https://www.crnl.fr/en/equipe/waking	Our goal is to unravel the mechanisms of wakefulness and associated sleep/wake pathologies, combining both basic and translational research. Wakefulness - as well as sleep - is a highly integrative function that relies on dedicated neuronal networks and is modulated by ongoing behavioral, neurodevelopmental, environmental, as well as cellular, molecular and metabolic signals. We thus investigate the brain arousal systems and regulatory networks in various behavioral contexts during waking, its impact on the local regulation of cortical activity and on molecular/genetic signaling in mouse and drosophila models. Our human and clinical research investigates how sleep, wakefulness and non-visual functions are regulated by light and the circadian clock. It also addresses the impact of sleep and sleep disorders on human health and neurodevelopment. We also investigate physiopathology and therapy of sleep/wake disorders, notably narcolepsy and excessive daytime sleepiness.