



600 M€
budget (2019)



6300 collaborators (2019)
including University, CNRS,
INSERM -> 32 joint labs

- 950 PhD (50% foreign)
- 900 post-docs and non permanents



3759 publications
p.a (2019)



203 industrial
research contracts



566 active
patents (2018)



33 startups
since 2000



250 H2020 European
Projects



89 ERC grants since
2007

Research in physics and related instrumentation

- ❖ Climate and environmental sciences
- ❖ Condensed matter physics, physics of complex systems, laser-matter interactions
- ❖ Nuclear and high-energy physics
- ❖ Astrophysics
- ❖ Cryotechnologies
- ❖ Theoretical physics
- ❖ Modelling and associated tools

Microelectronics

- ❖ Nanosciences including quantronics, photonics, spintronics

Basic research in life sciences

- ❖ Fundamental biology and health
- ❖ Radiobiology, toxicology
- ❖ Fundamental biology, sustainable development and the energy transition
- ❖ Methodological innovations for fundamental biology (structural biology, omics method, etc.)

Technologies for the medicine of the future

- ❖ Medical imaging and development of associated tools
- ❖ Technologies for prevention and diagnosis
- ❖ Therapeutic innovations
- ❖ Digital health methods (large scale analysis)

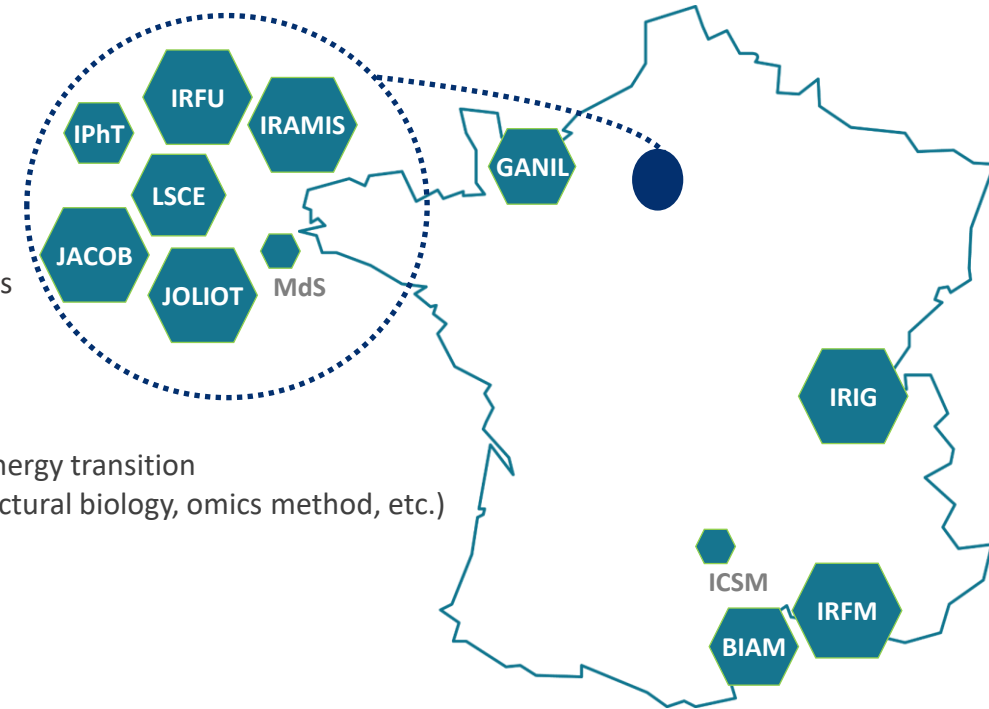
Renewable energy

- ❖ Materials science and chemistry

Nuclear fusion

- ❖ Tokamak plasma physics
- ❖ Fusion systems engineering

Development of very large research infrastructures, including high performance computing





DE LA RECHERCHE À L'INDUSTRIE

Life Sciences Frédéric-Joliot Institute

Contact for « MSCA Postdoctoral Fellowships » interests → Isabelle PHILIPPE isabelle.philippe@cea.fr

Christophe Junot

Medicines and Healthcare Technologies Department of the Frédéric Joliot Institute for Life Sciences carries out research in [Diagnostic and Therapeutic Innovation](#), in particular in the Molecular Innovation area, around 4 thematic axes :

- conception of bioactive molecules and nano-objects for diagnostic and therapeutic purposes,
- identification and validation of molecular biomarkers for early diagnosis, therapeutic decision support and follow-up of innovative therapies,
- development of technologies and methodologies for the detection and / or monitoring of the in vivo becoming of bioactive molecules,
- development of technologies and methodologies for the detection of molecular biomarkers.

Lab description and publications : [Frédéric Joliot Institute for Life Sciences - Medicines and Healthcare Technologies \(cea.fr\)](#)

Sophie Zinn :

Understanding cellular processes at the atomic level requires the determination of the three dimensional structure of protein complexes and the characterization of their assembly/disassembly mechanisms. The laboratory is particularly interested in the description of the protein-protein interaction networks controlling genome stability : DNA damage signaling and repair, telomere architecture, nuclear envelope assembly and structure.

Lab description and publications : [Frédéric Joliot Institute for Life Sciences - Nuclear envelope, telomeres and DNA repair \(cea.fr\)](#)

Xavier Maître :

BioMaps intends to address the requirement for new tools for exploring physiopathological processes, for diagnosis and therapeutic evaluation. Imaging biomarkers have a remarkable potential for meeting these challenges. The main scientific goal of BioMaps is to design biomedical imaging methods, instruments and agents and transfer them to clinical applications.

www.biomaps.universite-paris-saclay.fr

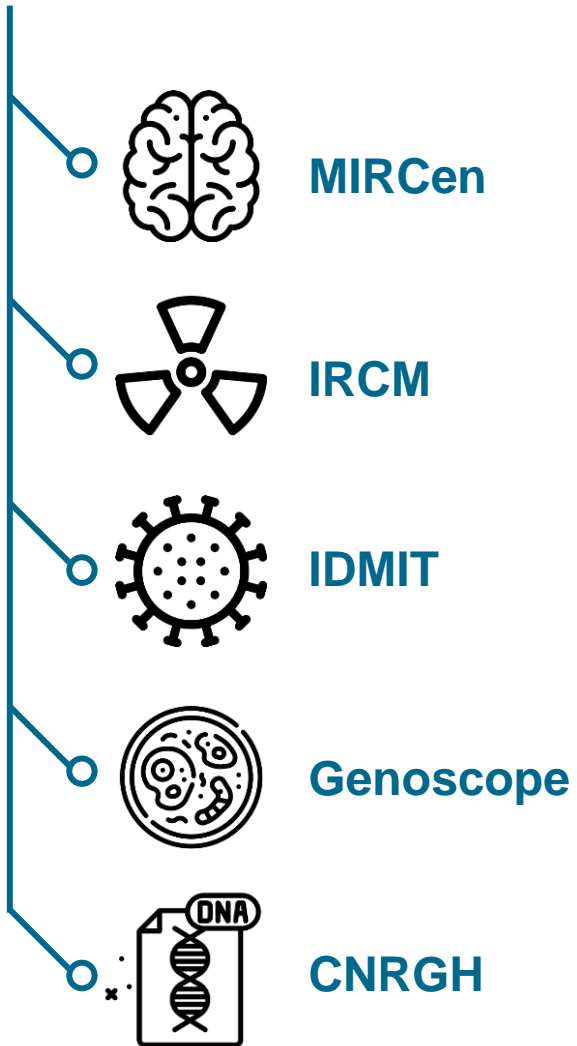


DE LA RECHERCHE À L'INDUSTRIE

François Jacob Institute of Biology

Contact for « MSCA Postdoctoral Fellowships » interests → Dr Yannick SAINTIGNY, PhD

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5 DEPARTMENTS**Neurodegenerative Diseases****Radiation Biology****Infectious Diseases****Human Genomic****Immuno-Hematology****Innovative Therapies****Synthetic Biology****Ocean Microbiome****3 SERVICES**



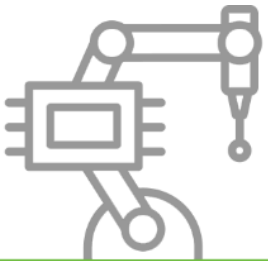
Employees

730



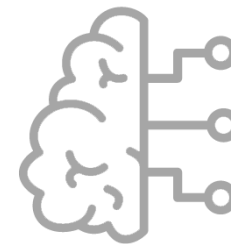
Teams

42



Core Facilities

12



Universities

5



**Permanent
Researchers**

320



Publications

300



**European
Grants**

25



**Early Stage
Researchers**

210



Patents

42



**International
Infrastructures**

4



**Operating
Budget**

80 M€



Start-up

2



**National
Grants**

100

- ▶ **Université Paris-Saclay focus on training, research and innovation**
- ▶ **Sciences, Medicine, Pharmacy, Law, Economics & Management, Sports Sciences, Technologies & Engineering, Foreign Literature and Civilizations, Arts, Logistics.**
- ▶ **65,000 students, 9,000 professors and lecturers, and 11,000 technical and administrative staff**
- ▶ **275 laboratories shared with the CEA, CNRS, IHES, INRAE, INRIA, INSERM, ONERA, Centrale-Supélec, AgroParisTech, ENS Paris-Saclay & Institut d'Optique graduate school**
- ▶ **Université Paris-Saclay represents 13% of the French research potential**
- ▶ **Université Paris-Saclay operates on a classified and protected natural site**

Research fields @ François Jacob Institute of Biology



- ▶ Overall study of **biodiversity** of consortia of organisms derived from **environmental samples** by analysis of their genomes: investigating the biodiversity of marine organisms (**Tara Oceans**).
- ▶ In-depth **elucidation** of the **metabolism** of prokaryotes by discovery of **new chemical reactions** catalyzed by the living world.
- ▶ Discovery of **new biocatalysts** with a view to their use as **alternatives** to synthetic chemistry.
- ▶ Development of bacterial strains **producing compounds** of interest for industrial **biotechnology** using the techniques of **metabolic engineering** and **synthetic biology**.
- ▶ Development of **bioremediation** processes.

- ▶ **Bio-bank** in compliance with ethical recommendations, statutory provisions and data confidentiality.
- ▶ SNP genotyping, whole **exome** and **genome** sequencing, **transcriptome** and **epigenome** sequencing
- ▶ Identification of **responsible genes** and biomarkers associated with **human diseases**.
- ▶ **Innovative technologies** for the analysis of DNA modifications and analysis of their **influences** on gene expression.
- ▶ Advanced technologies designed to **elucidate** the molecular and cellular **impacts** of **genomic variations** associated with diseases.
- ▶ **Bio-informatics** analysis of pipelines and conducts.
- ▶ **Bio-statistic** for validation of experimental designs and statistical analysis of data.

- ▶ **Somatic and Germinal Stem cells : their biology and their responses to stresses. Researches focused on skin, brain, hematopoiesis and germinal stem cells**
- ▶ **Molecular bases of DNA repair : in human and in animal models such as yeast**
- ▶ **Radiotherapy : to get a higher efficiency of radiotherapy and to develop cellular therapy against the deleterious effects of radiotherapy on normal tissues**
- ▶ **Radiotoxicology : researches focused on the effects of contaminations of animals with actinides and the development of decorporation**
- ▶ **Cancer : the role of nerves in cancer and the development of new treatments**

- ▶ **Progenitors from the central nervous system drive neurogenesis in cancer (Nature, 2019)**
- ▶ **Klf4 inhibition promotes the expansion of keratinocyte precursors from adult human skin and of embryonic-stem-cell-derived keratinocytes (Nature Biochemical Engineering, 2019)**
- ▶ **Condensin-mediated chromosome folding and internal telomeres drive dicentric severing by cytokinesis (Molecular Cell, 2019)**
- ▶ **Identification of the periplasmic DNA receptor for natural transformation of *Helicobacter pylori* (Nature Communications, 2019)**
- ▶ **Phagocytosis of Wnt inhibitor SFRP4 by late wound macrophages drives chronic Wnt activity for fibrotic skin healing (Science Advances, 2020)**

- ▶ Deciphering **interactions/relationships** between **host** and **infectious pathogens** (viruses, bacteria, parasites...).
- ▶ Understanding the mechanisms leading to the **persistence of infectious pathogens** in patients in the case of the **AIDS** virus (HIV) and its Simien equivalent (SIV) : persistence in **viral reservoirs**, role of the **immune system**.
- ▶ Pathophysiology, epidemiology and treatment of **Rheumatoid Arthritis**, the **Sjögren syndrome** and the **lymphomas** which occur in patients with **autoimmune diseases** and **neuro-inflammations** in children
- ▶ Analysis of the mechanisms by which **CD8 memory precursors** are generated and matured into subsets of very **functional memory T cells**.

- ▶ **Regional vulnerability** in neurodegenerative diseases (**Huntington's disease, Parkinson's disease**)
- ▶ Understanding and treating **brain aging** and **Alzheimer's disease** (modeling, imaging, biomarkers, treatment, evaluation)
- ▶ Evaluation of **innovative pre-clinical therapeutic strategies** (cellular & pharmacological approaches)
- ▶ **Biotherapies** and modeling of **neurodegenerative diseases** by gene transfer
- ▶ Metabolic interactions between **neurons and astrocytes**: role in neurodegenerative diseases
- ▶ **Reactive astrocytes** in neurodegenerative diseases
- ▶ Development of **aptamers** for research, imaging and therapy of neurodegenerative diseases
- ▶ Processing and analysis of **multimodal biomedical images** of normal brain and preclinical models of neurodegenerative diseases

- ▶ Development of **new molecular and cellular approaches** to the treatment of **innate or acquired genetic diseases**
- ▶ **Cell therapy** (expansion ex vivo of cell populations) and **gene therapy** (gene transfer and correction).
- ▶ Partner of the **first successful clinical trial** of gene therapy for **b-thalassemia** (beta-hemoglobinopathies).
- ▶ Characterization of **new connections** between transcription factors, cell signaling and knowledge of the control of the balance between proliferation and differentiation in normal and pathological (cancer) cells.
- ▶ Studies of the **molecular mechanisms** controlling the proliferation and differentiation of somatic cells, physiopathogenic processes targeted by many **cell therapy strategies**.

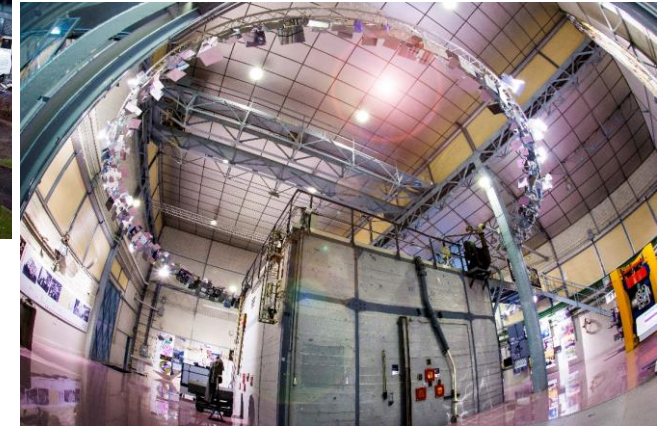
- ▶ **Position HLA-G as a new checkpoint therapeutic target in tumor immunotherapy**
 - Analysis of the impact of hypoxia, DNA methylation and miRNAs on HLA-G and PDL1 intratumor heterogeneity
 - Characterization of tumor-expressed HLA-G isoforms and receptors
 - Demonstration of anti-tumor function of ILT2+ tumor infiltrating T cells and their inhibition by HLA-G+ tumors
 - Demonstration that HLA-G/ILT2 is a relevant checkpoint in therapy-resistant tumor tissues after anti-PD1/PDL1
 - Generation of anti-HLA-G and anti-ILT2/ILT4 therapeutic antibodies

- ▶ **Position HLA-G as a graft stability diagnostic marker and anti-rejection therapeutic tool**
 - Expression and function of HLA-G/ILT2 and PD1/PDL1 in lung transplantation
 - Generation of tolerogenic HLA-G proteins for therapeutic use
 - Validate the use of Allogenic HLA-G⁺ MSC from perinatal tissues for cell therapy

- ▶ **SEPIA is associated with the French national reference center for prions and unconventional transmissible agents**
- ▶ **SEPIA develop and evaluate research strategies in response to public health issues raised by prions and prion-like or atypical pathogens.**
- ▶ **SEPIA research a potential link between protein-based infectious mechanisms and main neurodegenerative diseases (especially Alzheimer's disease).**
- ▶ **SEPIA develop new methods to reduce proteinaceous infectious threats, not only in medical and surgical fields, but also in food & agriculture.**
- ▶ **SEPIA evaluate decontamination methods for industrials.**

Get in touch **with** François Jacob Institute of Biology

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<http://jacob.cea.fr/drif/francoisjacob/english>