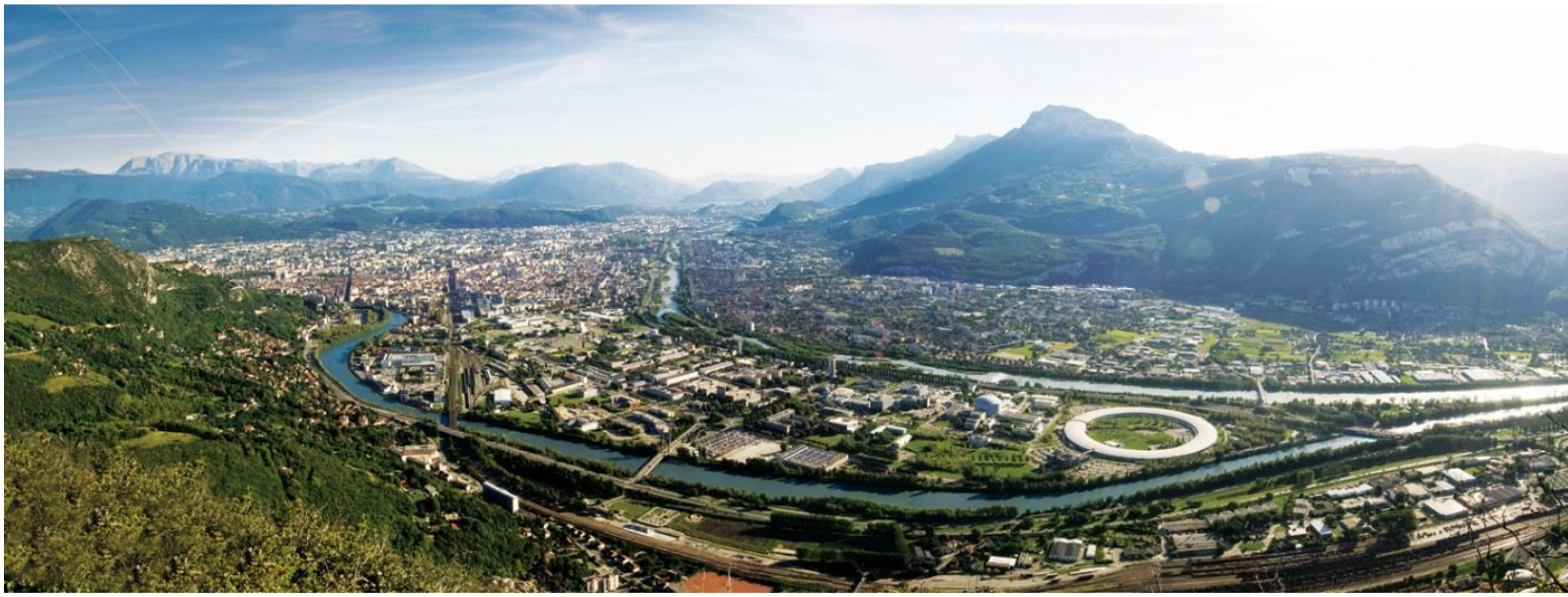
GIANT
INNOVATION
CAMPUS

La Région
Auvergne-Rhône-Alpes

Research projects proposed to students

GIANT
INTERNATIONAL
INTERNSHIP
PROGRAMME



MINATEC SUMMER PROGRAM 2012

Internship Topic	Host lab/institute
Protein adsorption and aggregation mechanisms on hydrophobic surfaces	INP LMGP
Engineering of polyelectrolyte assemblies with gradients of bioactive molecules	INP LMGP
Experimental study of monopole dynamics in dipolar spin ice	CNRS Néel

MSP@GIANT 2013

Internship Topic	Host lab/institute
Marketing and strategic studies on technologies developed in CEA labs	CEA – BEM
Theoretical prediction of stable B and N-doped C60 and their synthesis pathways	CEA – INAC
Analysis of complex mixtures using a novel electronic tongue	CEA – INAC
DNA-based Molecular Architectures for (Opto)Electronics	CEA – INAC
Ionic liquids for silicon based micro-supercapacitors	CEA – INAC
Interaction of proteins with material surfaces-molecular mechanism and tools	G-INP / LMGP
Muscle tissue engineering using biofunctional surfaces	G-INP / LMGP
Cell migration and differentiation onto surfaces exhibiting a gradient of matrix-bound growth factors	G-INP / LMGP
Imbibition in disordered *media*	CNRS – Institut Néel

GIANT INTERNATIONAL INTERNSHIP PROGRAMME 2014

Internship Topic	Host lab/institute
Molecular mechanisms of Streptococcus pneumoniae virulence	IBS

NMR studies of large biomolecular machines	IBS
Intrinsically disordered proteins: How do they work?	IBS
Nanostructured bioelectrodes for biosensors and biofuel cells	CNRS
Structural studies of CD4 and gp120 proteins relevant to HIV infection	ESRF
Theoretical prediction of stable boron based cage-like materials and their synthesis pathways – Prédiction théorique de la stabilité de cages à base de bore et voies de synthèse associées.	CEA – INAC
Plasmonic properties of metallic nanostructures	CEA – INAC
Functionalizing carbon nanotubes	CEA – INAC
Silicon nanowires and nanotrees based supercapacitors: effect of nanostructure morphology, architecture of the device and conducting polymer coating – Supercondensateurs à base de nanofils et nanoarbres de silicium : effets de la morphologie des nanostructures, de l'architecture du dispositif et greffage de polymères conducteurs	CEA – INAC
Caractérisation de transistors à effet tunnel (TFET) nanofils SiGe intégrés sur 300mm	CEA – LETI
Printing of BMP proteins onto biopolymeric films	G-INP/ LMGP
Adaptation of a model of DNA chain confined in LAMMPS for toroidal condensation	CNRS-LiPhy
Towards efficient energy & electronic transfers across multiple length scales	CEA – IRSTV
Host cell interactions using Peudomonas aeruginosa as a model	CEA – IRSTV
Development of qPCR analytical methods for residual DNA dosage	PX'Therapeutics

GIANT INTERNATIONAL INTERNSHIP PROGRAMME 2015

Internship topic	Host lab / institute
Probing the flexibility in a proenzyme of innate immunity by cryo-electron microscopy	CEA – IBS
Intrinsically disordered proteins: How do they work?	CEA – IBS
Understanding the role of SEPALLATA3 splice variants in flower development	CEA – LPCV

Internship topic	Host lab / institute
Characterization of the biochemical and biological functions of a chromatic factor	CEA – LPCV
Energy Efficient Integrated Circuits for Brain Computer Interface systems	CEA – LETI
Study of strain and electrical properties of Si-based nanowire transistors	CEA – LETI
Capillary microfluidics: achieving valving of spontaneous capillary flows by electro-capillary means.	CEA – LETI
Microfluidic system for continuous cell culture	CEA – LETI
Electronic transport in auto-assembled proteins	CEA – INAC/IRSTV
Detection of biomolecules (DNA) using surface plasmon resonance imaging-based biochips	CEA – INAC
Theoretical prediction of stable boron based cage-like materials and their synthesis pathways	CEA – INAC
Commissioning of, and first experiments on, the new instrument for in situ studies of nanoparticles and nanowires during their elaboration, using synchrotron X rays at the ESRF.	CEA – INAC
Electronic transport through topological Chern insulators	CEA – INAC
Fabrication of biocatalytic electrodes for bioenergy conversion using carbon nanostructures	UJF – DCM
Intercalation of Co atoms in between a graphene layer and its iridium substrate: a kinetic monte carlo approach based on DFT calculated parameters	CNRS – Institut Néel
Caractérisation de transistors à effet tunnel (TFET) nanofils SiGe intégrés sur 300mm	CEA – LETI
Study DNA hybridization detectionwith ZnO nanonets	G-INP – LMGP
Develop novel approaches for the identification of small molecule-protein interactions	EMBL
Genome defense by small RNAs in the mammalian germ line	EMBL
Designing novel anti-inflammatory drugs by targeting the CD domain of the MAP kinase p38α	EMBL/ESRF
Structural characterization of the unliganded and liganded 2dCD4S60C-gp140 GCN4 (+) trimers	ESRF/ILL
Iintegration de techniques AFM avec diffusion a petits angles pour l'analyse de nanostructures en solution.	ESRF
Influence of neighbouring dielectric on the performance of UHF RFID Tags – survey and enhancement"	Primo-1D
Validation of qPCR analytical methods for residual DNA dosage	PX'Therapeutics
Designing the new version of the serious game : » Tech It! »	GEM

GIANT INTERNATIONAL INTERNSHIP PROGRAMME 2016

Internship Topic	Host lab/institute
Electrical characterization of benthic microbial fuel cells for energy harvesting	CEA – LETI
Cracking in metallic thin film deposited on flexible substrate.	CEA – LETI
Electrical Characterization of TiOx-based Metal/Insulator/Semiconductor Contacts	CEA – LETI
Effect of geometrical design on electrical properties of lithium microbatteries	CEA – LETI
Acoustic manipulation of bacteria on agar nutrient media	CEA – LETI
Electroactive material on the flexible substrate for medical device: adhesion enhancement, characterization, reliability	CEA – LETI
Microfluidic system for continuous cell culture	CEA – LETI
The physics of capillary flow of whole blood and plasma separation	CEA – LETI
Investigation into the airway mucus penetrating abilities of PEGylated solid liponanopaticles	CEA – LETI
Auto-adaptive libraries for High Performance Atomistic simulations	CEA – LETI
Sample preparation and introduction for NEMS-based mass measurements of bio-nano-particles	CEA – IRTSV
Structural analysis of protein complexes by electron microscopy	IBS
Coupling a single quantum dot to a mechanical oscillator	CNRS – Institut Néel
Glass nanomechanical resonators in the quantum ground state	CNRS – Institut Néel
Characterization of physical interaction between antagonistic chromatin regulators	UGA / LPCV
Thermal Impedance of 3D module for power electronics	CEA – LETI
Water adsorption and wetting on nanostructured material surfaces	G-INP / LMGP
Interaction of proteins with polymer brushes	ILL
Growth and structure of Polyelectrolyte Multilayer Films based on chitosan	G-INP / LMGP
Multiscale structure/property correlations within precise single-ion polymers	CNRS – INAC
Macromolecular engineering, synthesis and characterizations of single-ion bottle-brush polymer electrolytes	CEA -LITEN
Self-assembled and hierarchically structured layers of functional nanocrystals: More than Moore approach towards next generation of inorganic PV solar cells	CEA – INAC
Structural studies of saposin B (sapB) binding of N-retinylidene-N-retinylethanolamine (A2E)	CNRS – IRTSV
Structural characterisation of novel HIV immunogen	ESRF
Structural characterisation of a Plasmodium falciparum kinase, PfPI4K, and its interaction with a clinical drug candidate, MMV390048	ESRF
Serious game « Smartifacts »	GEM

GIANT INTERNATIONAL INTERNSHIP PROGRAMME 2017

Internship Topic	Host lab/institute
Process development for sub-20nm pillars fabrication by DSA lithography	CEA LETI/DTSI
Offline and online experimentation set-up and data taking of neutron detection set-up with camera and scintillator	ILL
Lowtech Grid	CEA Ideas Lab
Nanomechanical mass spectrometry for biological applications	CEA BIG/BGE
Automatic Configuration of Location Privacy Protection Mechanisms	G-INP GIPSA
Direct bonding energy acquisition	CEA LETI/DTSI
Correlative surface microscopy for biotechnology applications	CEA Leti/DTSI/SCMC
Serious game design: superwisor	GEM Playground
Dynamic code generation	CEA LIST/LIALP
X-ray Scattering Experiments and Instrumentation on CRG-IF beamline at ESRF	CEA INAC @ ESRF
3D sequential integration of ICs	CEA LETI/DCOS
Structural basis for saposin B activity- ligand binding studies	CEA BIG/LPCV
Ingénierie macromoléculaire, synthèse et caractérisation de polymères en peigne à conduction monoionique	CEA LITEN/DEHT
Size evolution of spiral magnetic ordering in cobalt chromite nanoparticles	ILL
Manufacture of multilayer films based chitosan and the incorporation of antibiotics in these films	CNRS LMGP
Microsupercapacitors	CNRS INAC/SyMMES
Perovskites solar cells printing	G-INP/USMB LEPMI
Fast Quantitative X-Ray Fluorescence Analysis	ESRF
The strong Hanani-Tutte conjecture	UGA GIPSA
Simulation of X-ray beamlines by Phase Space Analysis	ESRF
Perception algorithms for autonomous vehicles	CEA Leti/DACLE
Physical interactions between epigenetic regulators involved in antagonistic histone modifications	CNRS BIG/LCPV
2D contacts	CEA Leti/DCOS
In-memory computing circuit design	CEA Leti/DACLE
Statistics and Actuarial science	GEM
Serious game design	Plush and Nuggets

+ 8 REACT projects in REACT partner labs

GIANT INTERNATIONAL INTERNSHIP PROGRAMME 2018

Internship Topic	Host lab/institute
Design and optimization of integrated power electronics current sensors	CNRS / G2ELab
Abnormal Activity Detection via Habit-Awareness	CEA-LETI
Screening of REACT coatings properties for innovative use in emergency situations – preparation of an innovation workshop	CEA-DOIC
Capillary-rise infiltration of polymers studied by neutron scattering	ILL
Nanoparticle diffusion through complex media	G-INP / LMGP
Channel Directed Phase Separation of Polymer Nanocomposites for Enhanced Ion Conductivity	CNRS / INAC
Synthesis, and morphology and ion transport analysis, of sulfophenylated ion-conducting polymers	CEA-LITEN
Spectroelectrochemical Characterization of Ferrocene-Functionalized CdSe/CdS Nanoheterostructures	CNRS / INAC
Nanoparticle diffusion through complex media	G-INP / LMGP
Synthesis and characterization of superparamagnetic iron oxide core – silk fibroin shell nanoparticles for drug delivery applications	ILL
Lotus leaf inspired superhydrophobic surfaces	CNRS / LMGP
Nanoparticule and probe diffusion inside layer by layer films	CNRS / LMGP
Superhydrophobic ZnO nanowires pattern	CNRS / LMGP
MEMS based on carbon nanomembranes for large band ultrasound device	CEA-LETI (DSYS)
Automatic Configuration of Location Privacy Protection Mechanisms	G-INP / GIPSA Lab
Control of Systems in the presence of Cloud Environment Constraints	G-INP / GIPSA Lab
Magnetic Control of attitude dynamics for CubeSat	G-INP / GIPSA Lab
Programming for In-Memory Computing	CEA-LETI (Dacle)
3D Package for GaN devices	G-INP / G2ELab
Nuclear control of chloroplast biogenesis by PAPs	CEA/BIG /LPCV
Implementation of the Phase Space Method to simulating synchrotron beamlines	ESRF
Machine Learning for building a Meta-Model of the Prospective Outlook for Long Term Energy System	CNRS / LPSC
Integrate Learning Analytics Approach and AI in immersive learning spaces "REAL WORLD LABS": exploring the utility for experiential learning approach and stakeholders (students, teacher, etc.)	GEM / dir inno

Cascade Catalytic Reactions for Amine Containing Pharmaceutical Active Compounds	CEA / BIG
Superfuidity of light in a 2D periodic potential	CNRS / Néel
Implementation of a non-linear equations solver with an application to « smart grids »	G-INP / G2ELab
Computational Caching Algorithms for Joint Proactive C3: Communication, Computing, Caching	CEA-LETI (DSYS)
Graph-based Learning Techniques for Tasks Popularity and Similarity in Proactive Computional Caching	CEA-LETI (DSYS)
Study of enzyme complexes involved in Heparan sulfate biosynthesis	CEA / IBS
Thermal runaway propagation study in Li-ion module	CEA-LITEN (DETH)

GIANT INTERNATIONAL INTERNSHIP PROGRAMME 2019

Internship Topic	Host lab/institute
Nanomanipulation of polymers	CEA – INAC
Dimensioning of extensible spin qubits for silicon-based Quantum Computing	CEA-LETI
Nano-mechanical mass spectrometry of self-assembled biological nanoparticles	CEA
Casimir effect on rheology of suspension	CEA
Break-up of protein aggregates in microfluidic flows	CEA
Synchrotron experiments and modelling of magnetic domain wall dynamics	CEA/CNRS
Localization of air pollution sources with a network of mobile gas sensors	CEA-LETI (DSYS)
Structural and biochemical studies of human Saposin B and mutants	CNRS / BIG
Advanced lithography by directed self-assembly (DSA) of block copolymers	CEA-LETI (DTSI)
Study of DNA origami-surface interactions for application in lithography	CEA-LETI (DTSI)
Acoustic quantum analogues for casimir forces	CNRS / Néel
Electronic properties of hexagonal boron nitride probed with cathodoluminescence	CEA / CNRS-Néel

+ 6 REACT projects in REACT partner labs

+ 3 HYBRID projects in HYBRID partner labs

GIANT INTERNATIONAL INTERNSHIP PROGRAMME 2020

Internship Topic	Host lab/institute
Structural biology of RNA modifications	EMBL
Magnetic skyrmions in ultrathin nanostructures	CEA / IRIG (SPINTEC)
RF Characterization of CMOS electronics down to cryogenic temperature	CEA-LETI (DCOS)
Improved wireless localization with smart reconfigurable surfaces	CEA-LETI (DSYS)
Nanomechanics at ultra-low temperatures	CNRS / Néel
Development of NIR OLED technology: device investigation and market opportunities	CEA-LETI (DOPT)
Quantum engineering with 2D monolayer materials	CNRS – Néel
Nano-imaging with deep neural networks	ESRF – ID01
Artificial Intelligence for Neutron Scattering Instruments (AINSI)	ILL – DS/SCG
Make a CTF on the vulnerabilities of the smart contracts	CEA-LETI (DSYS)
Development of Artificial Intelligence Assistants for Synchrotron Beamline Data Analysis	CEA-IRIG
Convolutional Neural Networks for Super-resolution Holotomography	ESRF – EXPD
Identification of the molecular bases of natural adhesive proteins	Grenoble-INP/ LMGP
Toxic effects of mixture of pollutants on cultures human cells	CEA /CNRS
Dynamic coverage of 5G Network using Mobile Access Points	CEA-LETI
Polymer synthesis for smart drug delivery	CEA-LETI
Spintronics on magnetic skyrmions	CEA – IRIG
Hybrid Semiconductor-Polymer Bonding	ESRF

+ 1 HYBRID project in HYBRID partner labs

The covid crisis obliged us to postpone some internships to 2021.

GIANT INTERNATIONAL INTERNSHIP PROGRAMME 2021

Internship Topic	Host lab/institute
Dynamic coverage of 5G Network using Mobile Access Points (San Sebastian)	CEA-LETI
Polymer synthesis for smart drug delivery	CEA-LETI
Spintronics on magnetic skyrmions (San Sebastian)	CEA-IRIG
Hybrid Semiconductor-Polymer Bonding	ESRF
Structural biology of RNA modifications	EMBL
Toxic effects of mixture of pollutants on cultures human cells	CEA-IRIG/CNRS
Convolutional Neural Networks for Super-resolution Holotomography	ESRF
Nano-imaging with deep neural networks	ESRF

GIANT INTERNATIONAL INTERNSHIP PROGRAMME 2022

Internship Topic	Host lab/institute
Mechanical systems at ultra-low temperatures	CNRS - Néel
Imagin of the structure of Nanoparticles during operation	ESRF
AI-BILITY : cultivating artificial intelligence awareness in schoolchildren	GEM
Ripnnovation : how tolerance for mistakes impacts creative output	GEM
Surface Nano engineering for studying protein adhesion	G-INP/LMGP
Raman characterization of Cu-based thin films	G-INP/ LMGP
Development of a spatial atomic layer deposition setup	G-INP/LMGP
Development of artificial intelligence assistants for synchrotron beamline data analysis	CEA IRIG
An atlas of transcription factors binding sites properties in Arabidopsis thaliana	CEA IRIG/ LPCV

GIANT INTERNATIONAL INTERNSHIP PROGRAMME 2023

Internship Topic	Host lab/institute
Catalytic hydrothermal gasification of sewage sludge under mild operating conditions	CEA LITEN

Neutron spectroscopy data analysis and rheology of proteins in crowded solutions	ILL
Networking assistant for the Fostering Science program	UGA
Communication assistant for the Fostering Science program	UGA
Manipulation of magnetic skyrmions for neuromorphic computing	CEA IRIG
Evaluating the impact of experimental conditions on signal drifts in nano-resonator mass spectrometry data	CEA IRIG
Magnetic moments and superconductivity in novel nickelate superconductors	CNRS/UGA
Structural biology of rna modifications	CEA IRIG/ LPCV
Multifocal approach for 3D diffraction imaging	DRBS/LSIV