

CNRS IN JAPAN

2021



FOREWORD

Japan has long been a strategic area for CNRS to develop its international collaboration.

There are a lot of obvious reasons for that. Japanese universities and research institutions have been developing for years a solid tradition for excellence. This is strongly supported by the public policies, as exemplified by Japan being for years **among the world top five countries** when you take the Gross Domestic Expenditure on Research and Development as a percentage of the Gross Domestic Product. Another example is that Japan has been, after the United States, the **country with the largest number of Nobel Prize Laureates** in the fields of natural and exact sciences since 2000.

CNRS and its partners have thus developed a large number of collaborative projects and initiatives with Japanese researchers, laboratories and institutions, in a quite wide spectrum of disciplines. Japan is **among the world top countries for the number of CNRS structured collaborations**, notably the IRL (International Research Laboratories), which are true full CNRS laboratories in Japan. This cooperation is producing excellent research, corresponding to the expertise of the various partners involved and also to the qualities of **confidence, trust, long-term vision** – and in most cases, personal friendship among the researchers – which mark these collaborative projects. It should also be noted that **this cooperation is dynamic** as shown every year by the number of new projects and the involvement of younger generations of researchers supporting the most experienced ones who have been players of this collaboration for several decades. It is remarkable that **the cooperation is keeping its momentum during the present covid-19 crisis** as 6 new structured projects have been initiated in 2021, including two new laboratories, and 2 others have been renewed.

This booklet presents a snapshot of this collaboration between CNRS and Japan as of early 2021. Should you need more information, do not hesitate to contact our CNRS Office in Tokyo or to visit it at the Embassy of France in Japan.

Patrick NEDELLEC, Director

CNRS European Research and International Cooperation Department



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WHAT IS CNRS?

The Centre National de la Recherche Scientifique (French National Center for Scientific Research) is a **research performing organization** founded in 1939 with a 33,000-strong workforce, including 11,000 permanent researchers.

It is the **largest fundamental research organization in Europe** and among the world's leading research institutions. It carries out research **in all fields of knowledge** through ten specialized Institutes (scientific departments) in order to **meet the major challenges of today and tomorrow**.

Internationally recognized for the **excellence** of its scientific research, CNRS is a **reference** in the world of research and development, as well as for the general public.

CNRS plays a key role in the French research landscape. More than 90% of its research is carried out in partnership with universities, research institutes and companies within **joint research units** (UMR).

CNRS is very open to international partners. More than **60% of its publications** are **co-signed with foreign laboratories**. CNRS also runs around **80 International Research Laboratories** (IRL) overseas with prestigious partners.



CNRS covers all fields of research through its 10 Institutes:

- Chemistry
- Ecology and the environment
- Physics
- Nuclear and particle physics
- Biological sciences
- Humanities and social sciences
- Mathematical sciences
- Engineering and systems sciences
- Computer sciences
- Earth sciences and astronomy

CNRS INTERNATIONAL COOPERATION TOOLS

CNRS is a key player in international science.

CNRS has set up structured cooperation mechanisms to strengthen its presence worldwide. These include in particular 80 international research laboratories that offer a long-term perspective to the organisation's activity. The reputation of its researchers has enabled the CNRS to step up exchanges with foreign partners in the form of publications in scientific journals, missions abroad, and international conferences.

IRL

International Research Laboratories are international establishments in which research work is jointly conducted around a shared scientific focus. They structure, within an identified location, the significant and lasting presence of scientists from a limited number of French and foreign research institutions from one foreign country. They have a duration of **5 years**.

IRP

International Research Projects are collaborative research schemes between one or more CNRS laboratories and laboratories from one or more foreign countries. They strengthen previously established collaboration through short- and medium-term scientific exchange. They have a duration of **5 years**.

IRN

International Research Networks are to structure an international scientific community around a common theme or research infrastructure. It promotes the organization of international workshops and seminars, as well as thematic schools organized by network partners in France and abroad. They have a duration of **5 years**.

IEA

International Emerging Actions are PI-to-PI projects whose purpose is to explore new fields of research and international partnerships through short-term assignments, the organization of working meetings, and the initiation of early joint research for shared scientific projects. They have a duration of **2 years**.

CNRS OFFICE FOR NORTH-EAST ASIA JAPAN - TAIWAN - SOUTH KOREA

The CNRS office for North-East Asia, based in Tokyo, is a **bridge** between CNRS and its French partners on one side, and Japanese, Taiwanese, and South Korean research institutions and other stakeholders on the other side.

It was created in 1991 and is currently located at the Embassy of France in Japan.

The main objectives of the CNRS Office in Tokyo are as follows:



Representing CNRS vis-à-vis the local science and technology players



Developing the best partnerships by supporting the creation of structuring collaborations



Organizing visits and meetings for high-level delegations from North-East Asia and CNRS



Monitoring the local S&T activity and **informing** the CNRS community (quarterly newsletter, Twitter account)



CNRS Office in Tokyo (hosted within the Embassy of France in Japan)

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CNRS INSTITUTIONAL PARTNERS IN JAPAN

CNRS has entered into an agreement with various research players in Japan: the two main research funding agencies, national research institutes, and prestigious universities. They allow researchers from both sides to tackle cooperative projects in a more **efficient** way.

Funding Agencies



JSPS - Japanese Society for the Promotion of Science (1975)



JST - Japan Science and Technology Agency (1999)

Research Institutes



AIST - National Institute of Advanced Industrial Science and Technology (1990)



KEK - High Energy Accelerator Research Organization (2004)



RIKEN (1994)



NIMS - National Institute for Materials Science (2004)

Universities



University of Tokyo - Institute for Industrial Sciences (1994)
General agreement (2012)



京都大学 Kyoto University (2013)



Osaka University (2005)



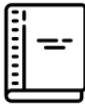
慶應義塾 Keio University (2013)

The year in brackets is the year when the agreement was first signed.

CNRS COOPERATION WITH JAPAN KEY FIGURES

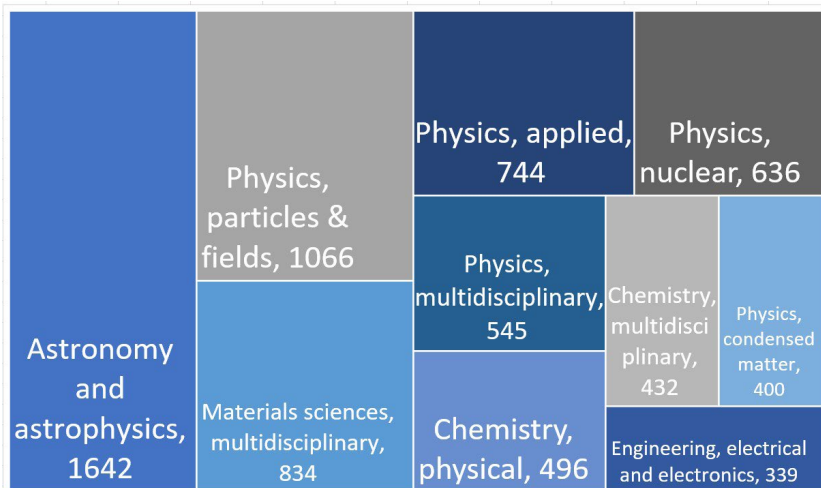


60+ STRUCTURED COOPERATIONS WITH JAPAN



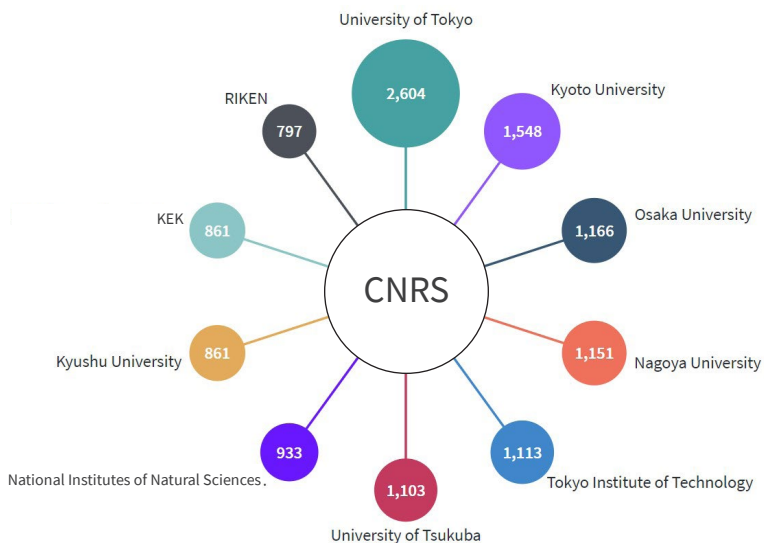
2,117 COPUBLICATIONS WITH JAPAN IN 2019

52% of Japan's publications with France



Top 10 areas of research for CNRS-Japan, by number of copublications in 2015-2019.

Source: InCites.



Top 10 CNRS partners for copublication in Japan in 2015-2019.

Source: InCites.



**33 JAPANESE PERMANENT STAFF,
INCLUDING 22 PERMANENT RESEARCHERS**

21 JAPANESE POSTDOCTORAL FELLOWS

in CNRS units in 2019



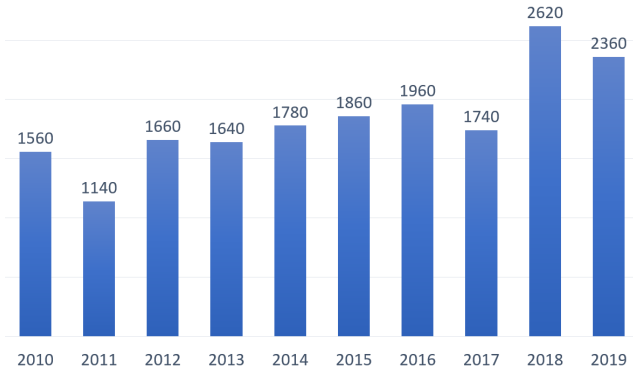
186 JAPANESE PHD STUDENTS

studying in France in 2018 (source: Campus France)

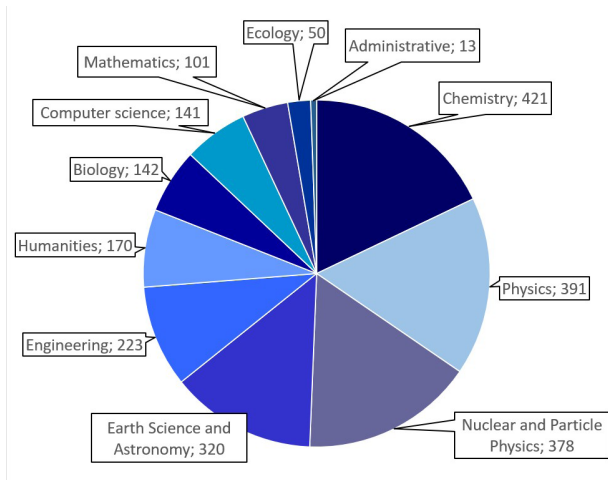


2,360 visits

of researchers organized by CNRS
in Japan in 2019



Number of visits organized by CNRS from 2010 to 2019
(rounded numbers)



Number of visits by field of research in 2019

10 INTERNATIONAL RESEARCH NETWORKS (IRN)

APERIODIC

Open space between aperiodic order and physico-chemistry properties of materials

Japanese leader: Atsushi MURAMATSU, Tohoku University

Other Japanese partners: Hokkaido University, Tokyo University of Science

French leader: Marc DE BOISSIEU, UMR5266 Sciences et Ingénierie, Matériaux, Procédés (SIMaP)

CNRS Institute: INC (Chemistry) and INP (Physics)

Other country involved: Germany

Topics: Aperiodic crystals; Strongly correlated electron systems (SCES); Intermetallic compounds.

ElyT Global
Engineering and Science
Lyon-Tohoku Laboratory

Japanese leader: Tetsuya UCHIMOTO, Tohoku University

French leader: Julien FONTAINE, UMR5513 Laboratoire de Tribologie et Dynamique des Systèmes (LTDS)

CNRS Institute: INSIS (Engineering and systems sciences)

Topics: Materials and structures architecture, surfaces and interfaces, digital simulation and modelling, transportation, energy, health.

NECo
France - Japan Network
for Extragalactic
astrophysics & Cosmology

Japanese leader: Toru YAMADA, JAXA

Other Japanese partners: Nagoya University, The University of Tokyo, RIKEN, Kyoto University, Waseda University

French leader: Denis BURGARELLA, UMR7326 Laboratoire d'Astrophysique de Marseille (LAM)

CNRS Institute: INSU (Earth sciences and astronomy)

Topics: Cosmology and extragalactic astrophysics, from local universe to first stars and galaxies.

WONDER

World Network for Design of processes and strains for Elaboration of Renewable energy and materials from microalgae

Japanese leader: Makoto WATANABE, Tsukuba University

French leader: Olivier GONÇALVES, UMR6144 Génie des Procédés - Environnement - Agro-Alimentaire (GEPEA)

CNRS Institute: INSIS (Engineering and systems sciences)

Other countries involved: United States, Australia

Topics: Developing techniques to produce microalgae-based biofuels on a large scale and in a sustainable way.

ReadiNet II
Reaction-Diffusion Network II

Japanese leader: Hiroshi MATANO, Meiji University

Other Japanese partners: Hokkaido University, Waseda University

French leader: Thomas GILETTI, UMR7502 Institut Elie Cartan de Lorraine (IECL)

CNRS Institute: INSMI (Mathematical sciences)

Other countries involved: South Korea, Taiwan

Topics: Mathematics applied to life sciences, in particular: Modelization of biological phenomena; Analyze of non-linear partial differential equations (PDE) and deterministic dynamical systems; Probability theory and stochastic processes.

Trajeco 2

Trading Networks and the Trajectory of Economic Institutions: Maritime Empires, Continental Empires, 1500-2000

Japanese leader: Mihoko OKA, The University of Tokyo

French leader: Frédéric OBRINGER, UMR8173 Chine, Corée, Japon (CCJ)

CNRS Institute: INSHS (Humanities and social sciences)

Other countries involved: China, United Kingdom, Italy, Israel, Greece

Topics: Analyzing how main institutions and practices in Asia broke with European models of economic institutions and commercial practices; Highlighting filiation and continuity in past and present Chinese and Japanese practices.

GHC

Global History Collaborative

Japanese leader: Masashi HANEDA, The University of Tokyo

Other Japanese partners: Hosei University, Nagasaki University, Kyoto University

French leader: Marc ELIE, UMR8083 Centre d'Etudes des Mondes Russe, Caucasien et Centre-Européen (CERCEC)

CNRS Institute: INSHS (Humanities and social sciences)

Other countries involved: Germany, United States

Topics: Understanding the flow of people, ideas, knowledge, institutions, and values; Analyzing their multiple trajectories beyond geographical and political borders; Highlighting the connections between global structures and specific regions.

GlobPhilBergson

A chapter in Philosophy's Global History: New Perspectives on Bergsonism

Japanese leader: Yasushi HIRAI, Fukuoka University

French leader: Caterina ZANFI, UMR8547 Pays Germaniques - Transferts Culturels

CNRS Institute: INSHS (Humanities and social sciences)

Other countries involved: United States, Cameroon, Brasil, Lithuania, Turkey

Topics: History of philosophy, Global History, Cultural transfers, Moral philosophy, Political philosophy, Henri Bergson.

FJFPB

France - Japan Frontiers in Plant Biology

Japanese leader: Takayuki KOCHI, Kyoto University

Other Japanese partners: RIKEN-CSRS, The University of Tokyo

French leader: Thierry GAUDE, UMR5667 Reproduction et développement des plantes (RDP)

CNRS Institute: INSB (Biology)

Topics: Cellular biology and signal transduction; Genome dynamics and epigenetics; Development and adaptation; Photosynthesis and metabolism. Traditional plants, usual crops, algae, moss, etc.

UGSF-iGCORE Glyco-Network

Japanese leader: Hiromune ANDO, Gifu University

French leader: Yann GUERARDEL, UMR8576 Unité de Glycobiologie Structurale et Fonctionnelle (UGSF)

CNRS Institute: INSB (Biology)

Other countries involved: Taiwan, Australia, Canada

Topics: Glycobiology, Biochemistry, Structural biology, Infectiology, Cellular biology.

18 INTERNATIONAL RESEARCH PROJECTS (IRP)

SYNERTE

Synergetic Study of the Regulation of Transposable Elements

Japanese leader: Tetsuji KAKUTANI, The University of Tokyo

Other Japanese partner: National Institute of Genetics

French leader: Leandro QUADRANA, UMR8197 Institut de Biologie de l'ENS (IBENS)

CNRS Institute: INSB (Biology)

Topics: Understanding how chromatin controls transposable elements (TE), DNA sequences found in most eukaryotes that can disseminate inside genomes.

MULTIDIM

Multifunctional Two-Dimensional Materials for Innovative Biomedicine

Japanese leader: Yuta NISHINA, Okayama University

French leader: Alberto BIANCO, UPR3572 Immunologie, immunopathologie et chimie thérapeutique (I2CT)

CNRS Institute: INSB (Biology)

Topics: Fundamental research using surface chemistry, nanotechnologies, and therapy on two-dimensional materials, to design new multifunctional conjugates for applications in medical imaging, diagnosis, and therapy.

DALoops

Changes in activity in dopaminergic nuclei during attentional set-shifting behavior in mice

Japanese leader: Jumpei MATSUMOTO, Toyama University

French leader: Sidney WIENER, UMR7241 Centre interdisciplinaire de recherche en biologie (CIRB)

CNRS Institute: INSB (Biology)

Topics: Recording experiments on mice's immunohistological behavior and marking to check the electrodes' placement. Creating electrode implants and optical probes, data analysis.

Ménage à trois

The molecular players governing the tripartite interaction of the soil bacterium *Burkholderia insecticola*, the bean bug *Riptortus pedestris* and soybean

Japanese leader: Yoshitomo KIKUCHI, National Institute of Advanced Industrial Science and Technology (AIST)

French leader: Peter MERGAERT, UMR9198 Institut de Biologie Intégrative de la Cellule (I2BC)

CNRS Institute: INSB (Biology)

Topics: Using functional genomics, reverse genetics and cellular biology to understand the molecular mechanisms governing the tripartite interaction between *Burkholderia insecticola*, the bean bug *Riptortus pedestris*, and soybean, toward applications in agriculture (elaboration of a new biological pest control strategy).

MITATE

Measurement Irradiation human Tolerance via Environmental Tolerance

Japanese leader: Koji ITONAGA, Nihon University

Other Japanese partners: Fukushima University, Kyoto Prefectural University, National Institute of Environmental Studies (Fukushima branch)

French leaders: Cécile ASANUMA-BRICE and Olivier EVRARD, UMR8212 Laboratoire des sciences du climat et de l'environnement (LSCE)

CNRS Institute: INSU (Earth sciences and astronomy)

Topics: Multidisciplinary project to analyze the consequences of the Fukushima Daiichi nuclear disaster, both on the environment (analyzing radionuclides' fallout redistribution, such as in soils and sediments), and on the local populations (sociology).

CNPA

Chiral Nanostructures for Photonic Applications

Japanese leader: Hirotaka IHARA, Kumamoto University

Other Japanese partner: Kyoto University

French leader: Reiko ODA, UMR5248 Chimie et Biologie des Membranes et des Nanoobjets (CBMN)

CNRS Institute: INC (Chemistry)

Topics: Design, synthesis and characterization of chiral hybrid nanostructures toward applications such as chiral light-managing materials, sensors, chiral separation and catalysis.

NanoSynergetics

Photo-active Nanomaterials with Cooperative and Synergetic Responses

Japanese leader: Hiroshi MIYASAKA, Osaka University

Other Japanese partners: Nara Institute of Science and Technology, Aoyama Gakuin University, Kyoto University

French leader: Keitaro NAKATANI, UMR8531 Photophysique et Photochimie Supramoléculaires et Macromoléculaires (PPSM)

CNRS Institute: INC (Chemistry)

Topics: Understanding phenomena linked to interactions between light and matter at the nanometric level. Creating new photofunctional molecules and nanomaterials toward applications in energy, information and communication technologies, biological and medical imaging.

SUPRHEME

SUPRAmolecular HEME protein models

Japanese leader: Takashi HAYASHI, Osaka University

Other Japanese partners: Hokkaido University, Doshisha University

French leader: Jean WEISS, UMR7177 Institut de Chimie de Strasbourg (ICS)

CNRS Institute: INC (Chemistry)

Topics: Bioinspired chemistry, heme proteins dealing with oxygen bonding, transport and activation.

NANOXCAT

Nano oxide-based catalysts for biomass valorisation

Japanese leader: Masahiro SADAKANE, Hiroshima University

Other Japanese partner: Kanagawa University

French leader: Sébastien PAUL, UMR8181 Unité de Catalyse et de Chimie du Solide (UCCS)

CNRS Institute: INC (Chemistry)

Topics: Innovative catalysts in new reactions to recover biomass-based renewable compounds, toward applications in industrial chemistry and bioraffinery.

CERMAC

Ceramics materials for societal challenges

Japanese leader: Koichiro FUKUDA, Nagoya Institute of Technology (NITech)

French leader: Philippe THOMAS, UMR7315 Institut de recherche sur les céramiques (IRCER)

CNRS Institute: INC (Chemistry)

Topics: Energy (ionic conductors, ionic/electronic mixes, preceramic polymer-derived ceramics); Information and Communication Technologies (materials for non-linear optics); Sustainable materials (geopolymers, porous materials, composites).

SMOLAB

Small Molecule Lab

Japanese leader: Susumu KITAGAWA, Kyoto University

Other Japanese partner: K.K. Air Liquide Laboratories

French leader: David FARRUSSENG, UMR5256 Institut de recherches sur la catalyse et l'environnement de Lyon (IRCELYON)

CNRS Institute: INC (Chemistry)

Topics: Development of new solids, especially Porous Coordination Polymers (PCPs) and Metal-Organic-Frameworks (MOFs), breaking with conventional adsorbents.

TYL-FJPL

Toshiko Yuasa Laboratory -
France-Japan Particle
Physics Laboratory

Japanese leader: Shoji HASHIMOTO, High Energy Accelerator Research Organization (KEK)

French leader: Isabelle RIPP-BAUDOT, UMR7178 Institut Pluridisciplinaire Hubert Curien (IPHC)

CNRS Institute: IN2P3 (Nuclear and Particle Physics)

Topics: Subatomic physics and related subjects.

EXCELSIOR

Exotic electronic states in
correlated and functional materials

Japanese leader: Hiroshi KUMIGASHIRA, Tohoku University

French leader: Andres SANTANDER SYRO, UMR8214 Institut des Sciences Moléculaires d'Orsay (ISMO)

CNRS Institute: INP (Physics)

Other country involved: Argentina

Topics: Transition metal oxides, Metal-insulator transition, Photoemission spectroscopy.

IM LED

France-Japan Impact Dynamics Lab

Japanese leader: Shin'ichi OHKOSHI, The University of Tokyo

French leader: Eric COLLET, UMR6251 Institut de Physique de Rennes (IPR)

CNRS Institute: INP (Physics)

Topics: Ultrafast light-induced phenomena, Commuting correlated materials, Commanding bistability in materials.

Next PV II

Next Generation
Photovoltaic Cells II

Japanese leader: Hiroshi SEGAWA, The University of Tokyo

French leader: Eric CLOUTET, UMR5629 Laboratoire de Chimie des Polymères Organiques (LCPO)

CNRS Institute: INC (Chemistry) and INSIS (Engineering and systems sciences)

Topics: High-efficiency III-V solar cells; Perovskite and hybrid solar cells; Integrated systems.

DERCI - Tokyo Office for North-East Asia

NuPIC FJ

Nuclear Physics International
Collaboration France-Japan

Japanese leader: Tomohiro UESAKA, RIKEN

Other Japanese partners: The University of Tokyo, Osaka University, KEK, Tsukuba University, Niigata University, Kyoto University

French leader: Julien GIBELIN, UMR6534 Laboratoire de Physique Corpusculaire (LPC)

CNRS Institute: IN2P3 (Nuclear and Particle Physics)

Topics: Experimental and theoretic nuclear structure and reactions.

ESEC

Excitations in correlated
electron systems in the
presence of gigahertz tensions

Japanese leader: Takeo TAKO, The University of Tokyo

French leader: Thibaut JONCKHEERE, UMR7332 Centre de Physique Théorique (CPT)

CNRS Institute: INP (Physics)

Topics: Mesoscopic physics, Quantum physics, Electronic transport, Electronic correlations, GigaHertz Excitations, Time-dependent transport.

FJ-IPL

France-Japan ITER Physics
Laboratory: Basic Plasma
Approach to ITER Physics

Japanese leader: Sanae ITO, Kyushu University

Other Japanese partners: National Institute for Fusion Science, Osaka University, QST Fusion Institute

French leader: Sadruddin BENKADDA, UMR7345 Physique des Interactions Ioniques et Moléculaires (PIIM)

CNRS Institute: INSIS (Engineering and systems sciences)

Topics: Characterization and control of turbulent transport in magnetic confinement fusion's plasma, toward applications for ITER reactor.

8 INTERNATIONAL RESEARCH LABORATORIES (IRL)



LIMMS Laboratory for Integrated Micro-Mechatronics Systems

LIMMS is an International Research Laboratory (IRL) on **MEMS** and **NEMS** (Micro- and Nano-Electro-Mechanical Systems) between the CNRS and the University of Tokyo's Institute of Industrial Science. It is located in Komaba Campus, Tokyo, Japan. It was created in **1995** and became a UMI (now IRL) in **2004**. Research activities are focused on four main fields: **Integrative Bioengineering; BioMEMS for Translational Research; Energy; Smart Sensors in Society**.

At LIMMS, 2019 and 2020 were particularly fruitful. We began a **JSPS Core-to-Core Program** and a project of the **JST CREST Program**. We also set up the **BioPharMems LabCom** (EU financing), based at SMMIL-E in Lille, France. Finally, we were able to start two projects with **ANR** (French National Research Agency) financing. We organized **7 workshops** during these two years.

As for **iLITE** (innovation in Liver Tissue Engineering), that we began as part of a Research Hospital University project in October 2016 with financing from the Investments for the Future Program, it is reaching its final phase.

CNRS and IIS anniversaries were celebrated on 11 October 2019. We were honored by the presence of CNRS CEO and chairman Antoine Petit.



Director
Sebastian VOLZ



Co-Director
Beomjoon KIM



Top: The University of Tokyo's Komaba Campus, where LIMMS's offices are located.
Bottom: LIMMS researchers.

Date of creation: 1995

CNRS Institute: INSIS (Engineering and Systems Sciences)

Staff: 16 permanent researchers (of which 13 CNRS); 17 Japanese host-professors; 15 postdoc fellows; 6 PhD students

Research topics:

- MicroFluidics
- DNA
- Bio Hybrid Systems
- iPS Cells
- Neural Networks
- Sensors
- Quantum Electrochemistry
- Energy Harvesting and Management
- Organ-on-Chip

Mirror site: SMMIL-E (Seeding Microsystems in Medicine in Lille – European Japanese technologies against Cancer)

Website: <https://limms-tokyo.org/>



FRIJ-MFJ
French Research Institute on
Japan in Maison Franco-Japonaise



Maison
franco-japonaise
Institut français
de recherche sur le Japon



Director
Bernard THOMANN

The IFRJ-MFJ conducts a research and a conference program with the ambition to **contribute to the understanding of the major issues concerning Japan at the beginning of the 21st century.**

Since the beginning of the **Covid-19 crisis in Japan**, IFRJ-MFJ researchers have been engaged in a significant work of **monitoring and analysis on cartography, statistical data, public policies and published research.** The UMIFRE is also a partner in an **ANR project** submitted in the framework of the

AAP call RA-COVID-19 EDITION 2020 under the title “SOUFFLE: Covidisation of respiratory health: Acting on the trajectory of respiratory diseases after the impact of COVID-19.”

A **common action between the UMIFRES of Asia** is being set up with a partnership with the **Pasteur Institute** which installed its representative office within the MFJ. Concretely, to get this partnership off the ground, the IFRJ-MFJ is organizing a webinar on 16 and 17 December 2020, which also involves the RIETI [Research Institute of Economy, Trade and Industry].

The **analysis of social mobilizations around environmental issues** is an important research axis of the IFRJ-MFJ. A partnership has been initiated **with LIMMS** on the project **UrbanMorphoJap - Bio-Inspired Multiscale modelling of the response of Japan to climate change**; this project, carried by LIMMS but designed in collaboration with IFRJ-MFJ, has been accepted within the framework of the AAP MITI Climate Change. The IFRJ-MFJ is also conducting the project “Judicialization of social and environmental issues in

Date of creation: 2007

CNRS Institute: INSHS (Humanities and Social Sciences)

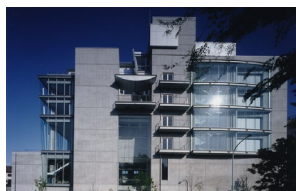
Staff: 1 director; 3 French Ministry of Foreign Affairs researchers; 1 CNRS researcher; 3 assistants; 1 librarian

Research topics:

- Japan
- Environment
- COVID-19 crisis
- Justice
- Labor

Website:

<https://www.mfj.gr.jp/index.php>



Maison Franco-Japonaise in Tokyo, where are located IFRJ-MFJ's offices



MINISTÈRE
DE L'EUROPE
ET DES AFFAIRES
ÉTRANGÈRES
*Liberty
Equality
Fraternity*



Japan and France” which is the subject of regular workshops. The environmental issue will be the subject of a major colloquium at the MFJ commemorating the **Fukushima triple disaster** (nuclear accident, earthquake and tsunami) on 9-10 April 2021.

Japanese and French societies are the scene of **profound transformations in forms of labor**, and the COVID-19 crisis seems to have further accelerated these changes. But these mutations also highlight **serious social fractures between men and women, between the most protected and the least protected layers of the workforce**. In order to discuss these fundamental questions for the future of our societies, a major conference entitled “Work in the 21st century in Japan and France” was organized on 27-28 November 2020. The IFRJ-MFJ is also a partner of the **ANR** project “Eurasemploi - Growth and Forms of Employment: A Eurasian Comparison of Employment Insecurity” and of the **ERC** [European Research Council] project “J-InnovaTech - Beyond Eureka: The Foundations of Japan’s Industrialization, 1800-1885.”



JRL
Joint Robotics Laboratory



Director
Eiichi YOSHIDA



Co-Director
Abderrahmane
KHEDDAR

JRL is a joint laboratory established between the CNRS and AIST. It is located at the AIST Intelligent Systems Research Institute in Tsukuba. It was created as an IRP in 2004 and became an IRL in **2008**.

An important topic at JRL since its beginning has been to develop the ability for **humanoid robots** to perform **locomotion** and tasks involving **multiple contacts**. This research consists of the planning level, thinking in advance about the sequence of contact, and the control level, deciding in real-time how to move while the robot execute a sequence of contact. We have also been working on applications of this technology to an industrial scenario, especially **large-scale manufacturing**. Among them, airplane assembly has been our central topic as it requires locomotion in non-flat surface and task execution in a constrained space. Using our humanoid platform **HRP-2Kai**, we have demonstrated multi-contact locomotion into a hole and execution of nut fastening by using tools with one hand and by supporting its body holding the environment with the other hand.

Dr. Ko AYUSAWA, Senior Research Scientist who belongs to JRL since 2014, received **The Young Scientists’ Award** of The Commendation for Science and Technology by the Minister of Education, Culture, Sports, Science and Technology (MEXT) in April 2020. This

is a prestigious prize that is awarded to only around 100 excellent young scientists in all science and technology area every year. Dr. AYUSAWA has been actively conducting original research on dynamics theory and optimization of anthropomorphic systems, which is highly recognized in international research community through publications in top-tier journals.

Dr. KHEDDAR is currently working on i.am. project, financed by the European program **H2020**. Furthermore, Dr. KAJITA, Dr. AYUSAWA, and Dr. YOSHIDA are working on JSPS Grant-in-Aid (**Kakenhi**) projects. Finally, JRL is tackling collaborative industrial projects with Japanese and foreign private companies.



Humanoid platform HRP-2Kai

Date of creation: 2009

CNRS Institute: INSIS (Engineering and Systems Sciences)

Staff: 17 permanent researchers (14 AIST, 3 CNRS) and 5 adjunct AIST members; 2 postdoc fellows; 10 PhD students; 6 Master students

Research topics:

- Humanoid robotics: multi-contact planning, control and model-based optimization, retargeting
- Cognitive robotics, applied neuroscience and intelligent interaction
- Human modeling for human-centered design and human monitoring

Website:

https://unit.aist.go.jp/jrl-2/index_en.html



JRL experiments on humanoid platforms





JFLI Japanese-French Laboratory for Informatics

The Japanese-French Laboratory for Informatics was **created on January 1st, 2009** as an International Research Project (IRP). It became an International Research Laboratory (IRL) on January 1st, 2012.

As science evolves and research domains become more mature and **impactful**, JFLI has defined a new scientific program from 2021 onwards that **evolves from the original five topics** which have formed the scientific program of JFLI since its creation. The current four topics developed at JFLI are :

- **Artificial Intelligence;**
- **Quantum Computing;**
- **Networks and Cybersecurity;**
- **Foundations of informatics.**



Damian MARKHAM presenting Quantum Networks at JFLI seminar.



Director
Philippe CODOGNET



Co-Director
Kae NEMOTO

Date of creation: 2012

CNRS Institute: INS2I (Information Sciences and Technologies)

Staff: 6 French researchers (3 senior researchers and 3 post-doc fellows); half a dozen Japanese researchers at each Japanese partner institution

Research topics:

- Quantum computing
- Quantum communication and networks
- Artificial intelligence
- Internet of Things
- Cybersecurity
- Validation and formal methods
- Knowledge representation and optimization methods
- New generation networks
- Foundations of informatics
- Theoretical computer science

Website: <https://jfli.cnrs.fr>



Gerard ASSAYAG presenting IRCAM research on AI & Music at JFLI seminar.



LINK
Laboratory for Innovative
Key Materials and Structures



Director
David BERTHEBAUD



Co-Director
Naoki OHASHI

LINK (Laboratory for Innovative Key Materials and Structures IRL 3629) is an IRL hosted at the NIMS CNRS Saint-Gobain International Collaboration Center at NIMS [National Institute for Materials Science], Tsukuba Japan. This international chemistry laboratory created in Japan represents an **innovative academic and industrial collaboration model between international researchers**.

Research activities at LINK include the **creation and synthesis of novel materials, innovative processes** and the **fine characterization of physical and chemical properties**. The two main topics are **nanocomposites** (optics, energy...) and **thermoelectric materials**. This IRL was run for five years by Fabien GRASSET, who moved back to Rennes at the beginning of 2020. The **new appointed director** is **David BERTHEBAUD** (CNRS) who joined LINK in 2018 from the CRISMAT laboratory (UMR 6508, Caen). Two **new deputy directors** were nominated in 2020 (David LECHEVALIER from Saint-Gobain, and OHASHI Naoki from NIMS). The group has welcomed this year a new member, Jean-Francois HALET (CNRS Research director) coming from ISCR Rennes (UMR 6226), who is an expert in theoretical chemistry (thermoelectric, molecular materials). The two UMR in Caen and Rennes have been designated by CNRS as mirror units to LINK. Through this **strong connection**, many visitors from both laboratories have been able to visit LINK since its creation facilitating fruitful collaborations with NIMS and Saint-Gobain.

Date of creation: 2014

NIMS CNRS Saint-Gobain International Collaboration Center director: Naoki OHASHI

CNRS Institute: INC (Chemistry)

Staff: 2 CNRS permanent researchers; 2 Saint-Gobain researchers; 2 Saint-Gobain admin/technical staffs; 3 NIMS group leaders; 1 JSPS-CNRS postdoc fellow; 1 CNRS postdoc fellow; 2 NIMS postdoc fellows; 2 PhD students; 1 Master student

Research topics:

- Thermoelectrics
- Nanocomposites
- Energy
- Optics

Mirror sites: CRISMAT (Caen, France) and ISCR (Rennes, France)

Website: <https://link.cnrs.fr/>



Cover-page article
in *J. Mater. Chem. A*, 2020



In addition to NIMS, CNRS and Saint-Gobain supports, LINK is currently supported by **3 ANR [French National Research Agency] projects**: HIGHTHERM “Thermoelectric antimonides for high temperature applications”; CLIMATE “CLuster-based Infrared selectivity MATerials for Energy saving applications”; and DUVNANO “Fabrication of functional thin films by combining deep UV nanolithography and solution colloidal nanocrystals processes”.



LINK researchers



ELyTMaX
 Engineering & Science, LYon Tohoku
 joint laboratory for MAterials and
 systems under eXtreme conditions

Researches performed at ELyTMaX are related to engineering science focusing on the **material’s behaviour and systems under extreme and complex conditions** (pressure, temperature, electromagnetic field, corrosive environment) with a major in mechanical engineering. It combines expertise from mechanical engineering, electrical engineering, material science and electrochemistry. As an international joint unit, joint expertise of Japanese and French researchers is gathered to investigate together material behaviour, and to propose innovative solutions to monitor their lifetime.

In the view of predicting and extending lifetime of materials and structures, three main strategies are developed: (i) **Fabrication / repair and optimization** of the materials and systems, (ii) **Investigation of the behaviour of materials**, when subjected to complex solicitations or environments and (iii) **Monitoring of the structural health of materials and systems**. Experimental approaches are supported by **multi-physics and multi-scale** modelling. Research activities are mostly driven by groups of French and Japanese professor co-supervising double degree Ph.D. and Master candidates.

ELyTMaX members publish around 20 journal articles per year in international journals and participated in 2 ANR French projects consortiums: (ANR ECPOR & ANR FIESTA), one ANR-MEXT project: PYRAMID involving CEA, CNRS and INSA Lyon from France, and Tohoku University, CRIEPI and Gunma University from Japan. JSPS also supported researches with one Kakenhi Kiban A, two Kakenhi Kiban B and two Kakenhi Kiban C grants. ELyTMaX has also collaborative industrial projects with French and Japanese companies.



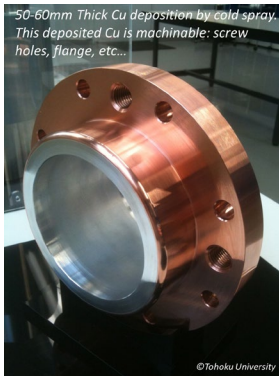
Director
 Gaël SEBALD



Co-Director
 Kazuhiro OGAWA

The activity of ELYTMaX contributes significantly to the International Research Network (IRN) ELYT Global, with 10 projects ongoing and involving ELYTMaX, over a total of around 30 research projects within the IRN activity, strengthening the links between researchers from mainly CNRS, INSA Lyon, Ecole Centrale de Lyon, Université Lyon Claude Bernard and Tohoku University.

To this extent, ELYTMaX is constituted of **two sites implementing a unified scientific strategy** presented above: ELYTMaX@TU in Tohoku University on the one hand, and ELYTMaX@Lyon at INSA Lyon and ECL on the other hand. The French site of ELYTMaX also host the IFS Lyon Center, a branch of the Institute of Fluid Science of Tohoku University. This allows researchers to spend significant time in the partner institution, in order to work on the scientific topics and objectives of the unit.



Date of creation: 2016

CNRS Institute: INSIS (Engineering and Systems Sciences)

Staff/year (average): 13 permanent researchers (3 from French institutions and 10 from Japanese institutions) representing a total of ~6 equivalent full-time researchers ; 2 postdoctoral fellows ; 4 PhD students (double degree PhD).

Research topics:

- Thermomechanical behaviour of polymers under high strains
- Particles – Particles – substrate adhesion mechanism in cold spray for protective coating
- Electrochemical responses combining stress, temperature, friction
- Development of new material and structures for medical application
- Complex heat and mass transport phenomena
- Electro-thermo-magneto-mechanical response and new types of smart materials and devices
- Innovative Non-Destructive Techniques for microstructure, damaged materials correlation
- Geometrical multi-objective optimization for durability objectives

French site: ELYTMaX@Lyon, located at INSA Lyon and Ecole Centrale de Lyon, headed by Pr Jean-Yves CAVAILLÉ and Dr Nicolas MARY

Website: <https://www.elyt-lab.com/en/content/elytmax-umi-3757>



Director
Michel GONIN



Co-Director
Takaaki KAJITA

Date of creation: 1 April 2021

CNRS Institute: IN2P3 (Nuclear Physics and Particle Physics)

Expected staff: 4 to 5 CNRS researchers and engineers; 10 PIs for 5 research topics; 30 Japanese professors and collaborators; postdoctoral fellows; PhD Students

Research topics:

- Neutrino, Particle and Cosmic Messenger
- The Primordial Universe
- The Dark Universe
- Gravitational Waves
- Particle Physics and Detectors

A new international research laboratory is created on 1 April 2021 between CNRS and the University of Tokyo. The laboratory called “International Laboratory for Astrophysics, Neutrino and Cosmology Experiments”, or simply “ILANCE”, is located at the University of Tokyo’s Kashiwa Campus.

The creation of ILANCE between the University of Tokyo and the National Institute of Nuclear physics and Particle physics (IN2P3), a division of CNRS, will perfectly coincide with the start of new research programs in Japan and around the world, with a very **great potential for first-class discoveries**. Over the past decades, the teams of this new laboratory have been actively involved in very successful international programs including France and Japan. Strengthening existing collaborations over a long period of time for **fundamental research in physics at the smallest and largest scales of our universe**, and developing new common research areas will be the objective of this program.

The scientific fields concerned by ILANCE are **elementary particle physics, cosmology, astro-particles and astrophysics**. This new laboratory will promote joint research projects between the Institute for Cosmic Ray Research (ICRR), the Kavli Institute for the Physics and Mathematics of the Universe (IPMU), the International Center for Elementary Particle Physics (ICEPP), and the School of Science on one side, and ten laboratories operated by IN2P3 on the other. More than fifty physicists from these different institutions or laboratories in France and Japan will participate in ILANCE’s activities.

In search of new discoveries, the field of elementary particles, cosmology and astrophysics explore what the universe is made of and what are its fundamental laws at the smallest and largest scales. The history of our universe has been **dominated by the intimate relationship between these areas since its beginnings just under 15 billion years ago**. Five primary fields concerned by ILANCE and associated leading projects of research have been identified: Neutrino physics, the Primordial Universe, the Dark Universe, Gravitational Waves and Particle Physics.



東京大学
THE UNIVERSITY OF TOKYO



The University of Tokyo’s Kashiwa Campus,
where ILANCE will be located

GALTAST
Grenoble Air Liquide Tsukuba
Alliance for Science and Technology

GALTAST was initiated in 2016 at the University of Tsukuba, as an **International Education and Research Laboratory Program**, in the framework of a Top Global University Project from the Japanese Ministry of Education. The earliest objective was to **promote international collaborative educational programs for student exchange and double degree diploma**, based on the development of advanced research activities in the field of atomic scale technologies dedicated to innovative semiconducting materials. Under the impulsion of researchers from CNRS, UGA and the University of Tsukuba, Air Liquide (Japan) was officially involved in 2017. From then on, collaborative research actions were fostered in a wide range of fields, in both pure and applied physics.



Director
Marceline BONVALOT

The core research program of this new IRL is dedicated to **advanced physics and technology of electronic and opto-electronic semiconductor devices**, with a particular focus on **atomic scale processing** and with a strong involvement from Air Liquide company. Technological processing challenges rely on **Atomic Layer Deposition and Etching** developments with unique precursor gases, based on fundamental investigation of plasma-surface interactions. Investigation on semiconducting materials are motivated by the complementary expertise of each partner. Materials include wide band-gap semiconductors (GaN, diamond, Ga₂O₃) and new medium band-gap (BaSi₂, kesterites) for energy applications, and narrow band-gap II-VI materials (CdTe/ZnTe) for quantum processes.

The long-term objective of this IRL is to establish a complete and unique **cross-disciplinary** international research laboratory involving physicists, chemists, theoretical scientists and technological experts dedicated to the fabrication of advanced microelectronic, optical and power devices, addressing current technological issues and **energetic, information and quantum technology challenges**.

Date of creation: 2021

Japanese co-director: TBD

CNRS Institute: INP (Physics)

Staff: 3 professors (University Grenoble Alpes), 3 researchers (CNRS), 1 research engineer (Air Liquide Japan), 7 professors (University of Tsukuba), 4 double degree PhD students, 2 double degree Master students

Research topics:

- Semiconducting nanostructures for quantum devices
- Wide band gap semiconductors devices (GaN, Ga₂O₃, diamond)
- Nanomaterials surface functionalization
- New semiconductors for photonics (BaSi₂, kesterites)
- Positron Annihilation Spectroscopy (PAS)
- Magnetic thin films for spintronics
- Atomic Layer Etching and Atomic Layer Deposition



GALTAST French researchers





EIG CONCERT JAPAN

Connecting and Coordinating
European Research and Technology Development with Japan

The European Interest Group (EIG) CONCERT-Japan is an **international joint initiative to support and enhance science, technology and innovation (STI) cooperation between European countries and Japan**. It is coordinated by the Japan Science and Technology Agency (JST) and **its Joint Call Secretariat is hosted by CNRS**.

Its primary function is to **collaboratively implement multilateral joint funding**. As far as it is relevant to that objective, the EIG CONCERT-Japan also aims to facilitate coordination between participating organizations in their activities relating to the programs of the European Union and those undertaken within other international collaborative frameworks through the identification of common preferences, priorities and areas of mutual interest.

CONCERT-Japan began as a European Research Area Network (ERA-NET) project from 2011 to 2014. Two successful joint calls have shown a high relevance of the schemes and the need for continuation. Therefore, the European Interest Group was founded as a **flexible platform for communication and coordination among STI institutions in Europe and Japan**. The collaboration is now continuing independently of EU support, as an activity from a broader European Interest Group for Japan. A total of **32 projects** have been financed by CONCERT-Japan **since its creation**.

The 8th joint call for proposals, on the theme “**Sustainable Hydrogen Technology as Affordable and Clean Energy**”, should be launched in May 2021.



€4.7 M OVERALL CALL BUDGET
JST €900,000 / CNRS €110,000



6 THREE-YEAR-LONG PROJECTS
funded every year on average



12 COUNTRIES

EIG CONCERT-Japan's past joint calls



2012 Resilience against disasters
Efficient Energy storage and distribution



2014 Photonic Manufacturing



2016 Food Crops and Biomass Production Technologies



2017 Efficient Energy Storage and Distribution



2018 Functional Porous Materials



2019 Smart Water Management for Sustainable Society



2020 ICT for Resilient, Safe and Secure Society

Check this QR Code
for the latest
updates!



Selected projects with CNRS participation

INNISOY "Innovation Network to Improve Soybean Production under the Global Change"

Japan, Germany,
France, Turkey
3rd call (2016)

CarFree "Novel carbon-free cathode materials for metal-air rechargeable batteries"

Japan, Spain, France, Turkey
4th call (2017)

RealMethod "Removal of Obstacles in Widespread Application of Membrane Technology: Toward Smart Water Management in Future Cities"

Japan, Germany, France, Turkey
6th call (2019)

IPSC "Improving Crop yield by enhanced Plant performance under Stress conditions"

Japan, Spain,
France, Germany
3rd call (2016)

MicroGreen "Scientific Upgrading of Novel Multi-dimensional Microporous Catalysts for Green Chemical Reactions"

Japan, France, Bulgaria
5th call (2018)

FAVPQC "Formal Analysis and Verification of Post-Quantum Cryptographic Protocols"

Japan, France, Turkey, Spain
7th call (2020)

IRUEC "Towards a multi-approach study focused on Improving Resource Use Efficiency in Cereals under Climate Change"

Japan, Spain, France, Germany
3rd call (2016)

PROPER "Printable fully inorganic porous metal Oxide based PERovskite Solar Cells: defining charge selective oxides for high-efficient and low-cost device structure"

Japan, Germany, France, Switzerland
5th call (2018)

Projects from the 3rd call were extended due to covid-19.



Japanese-French Frontiers of Science (JFFoS) symposiums are a part of larger programs carried out by the Japan Society for the Promotion of Science (JSPS) to promote young researchers.

The Japan Society for the Promotion of Science (JSPS) supports Frontiers of Science (FoS) symposiums that provide a **platform for talented young researchers** (up to 45 years of age) to engage in **cross-disciplinary** discussions on **leading edge scientific topics**. The symposiums aim to contribute to the **development of new academic disciplines** and the **fostering of future generations of leaders**. The participants lodge together over the 3-day period and attend all of the sessions.

Japanese-French Frontiers of Science (JFFoS) has its origins in a March 2005 discussion between the heads of JSPS, French Ministry of Foreign Affairs and International Development (MAEDI), French Ministry of Higher Education and Research (MENESR), and the CNRS on initiatives to promote exchange among young researchers, which was to become part of the framework of the Japan-France Summit Meeting between Japanese Prime Minister Junichiro Koizumi and French President Jacques Chirac.

Since its creation in 2006, a total of **9 symposiums** have been organized, alternately in France and in Japan. The participants have the opportunity to discuss about a variety of topics that change from year to year, ranging for example from biomimetic materials to atom manipulation.

The 10th edition of the Symposium, that was to take place in November 2020, was postponed to November 2021 due to the covid-19 pandemic.



Group photo at the 9th edition of JFFoS, held in Kyoto, Japan in January 2015.



CNRS SUPPORTS JSPS PROGRAMS

Among its various missions, the Japan Society for the Promotion of Science (JSPS) carries out programs aimed at young researchers from **all disciplines**.

JSPS **entrusted CNRS** with the **evaluation** and the **selection** of fellows coming from France for the 3 following programs.

Standard Fellowships



15 grants a year

Funding **12 to 24 months** long research internship in a Japanese laboratory

For **post-doctoral fellows** who have defended their thesis less than 6 years before

Short-term Fellowships



13 grants a year

Funding **1 to 12 months** long research internship in a Japanese laboratory

For **PhD** or **post-doctoral fellows** who have defended their thesis less than 6 years before

Summer Program



13 grants a year

Funding a **summer** research internship in a Japanese laboratory

For **M2 students**, **PhD** or **post-doctoral fellows** who have defended their thesis less than 6 years before



CNRS STRATEGIC PARTNERSHIP WITH THE UNIVERSITY OF TOKYO



CNRS and the University of Tokyo, being **leaders of excellence** in their respective countries, have developed numerous research collaboration and initiatives. Among them, there are an **exceptional number of structured collaborative schemes**, as indicated by the figures below, showing that this collaboration **combines the quality as well as the quantity**.

For long, the two institutions have wished to further deepen their partnership. For instance, they have launched in 2021 an **exclusive “Excellence Research” Joint Research Program** in order to develop new promising cooperation, allowing to fund research projects for 3 years to support one PhD student on each side.

The partnership also includes **joint activities on key issues**, such as **gender equality**. Thus, CNRS and the University of Tokyo organized a joint round table on “Women in Science: What Place for Women in Tomorrow’s Science” in Tokyo on 11 October 2019, with the participation of Antoine PETIT, CNRS CEO, who visited Japan for the CNRS 80th anniversary celebrations, and Teruo FUJII, the University of Tokyo then Executive Vice President and President from 1 April 2021.

CNRS partnership with the University of Tokyo features:



2,600 COPUBLICATIONS IN 2015-2019

28% of CNRS publications with Japan

Source: InCites

I L A N C E

International Laboratory for **A**strophysics,
Neutrino and **C**osmology Experiments

3 INTERNATIONAL RESEARCH LABS

LIMMS since 1995 (more on page 16)

JFLI since 2012 (more on page 20)

ILANCE since 2021 (more on page 24)



EXCELLENCE SCIENCE JOINT RESEARCH PROGRAM

Call from 22 February to 22 April 2021
Funding joint research projects for 3 years,
including one PhD student on each side

4 INTERNATIONAL RESEARCH PROJECTS

SYNERTE (more on page 13)

NuPIC FJ (more on page 15)

NEXT PV II (more on page 15)

ESEC (more on page 15)



REGULAR EXCHANGES AT PRESIDENT LEVEL

4 INTERNATIONAL RESEARCH NETWORKS

NECo (more on page 11)

FJFPB (more on page 12)

Trajeco 2 (more on page 12)

GHC (more on page 12)

On strategy and past & present cooperation

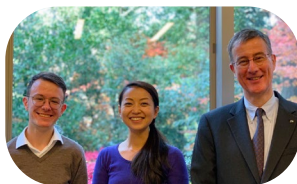
DERCI - Tokyo Office for North-East Asia



CNRS Europe of Research and International Cooperation Department in charge of North-East Asia



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Let's keep in touch!



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