

FRANCE - HKUST INNOVATION HUB

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AN INNOVATION HUB

WHAT FOR?

On 24 March 2017, Mr Eric BERTI, Consul General of France, and Prof Tony F CHAN, President of HKUST, inaugurated the France-HKUST Innovation Hub.

DEVOTION TO COLLABORATIVE INNOVATION

In partnership with the French foreign trade advisers and their initiatives to promote French technology in Hong Kong, we aim with this platform at fostering France-Hong Kong collaborations within the continuum of education, research and industry. We believe this will serve the purpose of French companies and scientists to gain a better understanding of local science and innovation as well as better knowledge of the incentives and opportunities offered by the Hong Kong government. This will also serve the purpose of HKUST scientists and professors for the development of R&D projects and agreements with French universities and engineering schools.

Technology-driven innovations are very much surveyed by investors, technology leaders, incubator and accelerator structures mostly in the IT, bioTech and environment domains, to identify any possible game-changing technology. The University Grant Council and the Hong Kong government have explicitly asked scholars to improve the societal impact of their projects, so to say, to develop technology transfer. This hub will with no doubt match the talent of HKUST students and the experience and business culture of French industry. The hub will serve as an incubator of ideas, opportunities and innovation, promoting aspiration for excellence in innovative projects.

ACTIVITIES

We will gather existing activities under the patronage of the Hub to give a clearer view of France-HKUST collaborations. We have already organized and will organize specific conferences and events with different departments of HKUST and French companies, always all motivated by strong links between education, training, research and industry.

In order to materialize the communication of the Hub, this publication will gather information related to the collaborative projects and events held between HKUST and French companies. It will highlight hot topics on science and innovation policies in France, in HKUST and in Hong Kong. It will report testimonies of stake holders and promote dual degrees as well as other agreements.



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RESEARCH & INNOVATION

KEY FIGURES IN FRANCE

The past ten years have seen tremendous evolution of higher education and research structures in France aimed at improving the international ranking of universities and to create integrated competitive clusters to foster **R&D and tech transfer** through dedicated structures (eg. Accelerator of Technology Transfer societies) and companies. Today, the ecosystem is still evolving, maintaining strong priorities on R&D and innovation.

The research effort has come largely from businesses, that carried out 65% of all R&D conducted in France in 2014, a total amount of **€31.6 billion**, and financed 62% of this work. Public sector GERD (gross domestic expenditure on R&D) **totaled €16.9 billion** in 2014, with much of the **R&D** conducted by dedicated research institutions (54%), as well as higher education institutions (46%). SMEs contributed 13% of GERD, more than half of which was invested in the service sector. **Large enterprises**, which accounted for **58% of GERD**, focused three quarters of their funding on high and medium-high technologies. More than 54% of all intramural BERD (Business Enterprise Research and Development) went towards six industry groups: 'Manufacture of motor vehicles', 'Manufacture of **air and spacecraft** and related machinery', 'Manufacture of basic pharmaceutical products and pharmaceutical preparations', 'Specialised scientific and technical activities', 'Computer-related and information service activities', '**Manufacture of chemicals** and chemical products'. Businesses also devoted a considerable proportion of their intramural BERD to multidisciplinary fields such as new materials, **nanotechnology**, digital, biotechnology and the **environment**.

A BALANCED PROFILE

In 2015, France showed a balanced profile in terms of fields of education qualified by major specialisation in **mathematics**. France stood out clearly from the United Kingdom and United States, which specialise more in Human and Social Sciences, and the more divergent Asian countries, that are highly specialised in some fields of education and very little in others. French biomedical research lay seventh globally, with nearly **20,000 publications** in 2015. The number of publications has increased in the last decade but, driven by the dynamic expansion of emerging countries, France's global share in **biomedical research** publications has been contracting, as has the impact index of its publications. More than one French publication in two is produced in conjunction with **foreign scientists**, which places the rate of French co-publications among the highest in the world (comparable with the United Kingdom and Germany). As an example, one quarter of French publications include American scientists.

MAJOR PLAYER IN PATENTS

France is also a major player in **patents**. In 2014, France was in **fourth place** globally in the European patent system (6.3% of applications lodged). Its specialist fields include '**transport**', 'nanotechnologies, microstructures', 'organic fine **chemistry**', 'materials, metallurgy' and 'ecotechnology'.

PHDS

PhDs are the most advanced qualification awarded by higher education institutions and **doctoral research** contracts provide many PhD students with their first professional experience. PhD graduates are a key driving force behind research in France. Training through research has been provided by graduate schools since 2000. 41% of these complete in less than 3 years. Nearly **14,500 PhDs** were awarded in 2015. The number of PhDs awarded increased by nearly 10% between 2009 and 2012. Most of the PhDs awarded (**more than 65%**) were in scientific subjects (including Biology and Healthcare). At the start of the 2015-16 academic year, there were nearly **75,600 PhD students**.

Ref: Emmanuel Weisenburger, Ministère de l'Enseignement Supérieur, de la Recherche et de l'Innovation, Higher Education and Research in France, Facts and Figures (2017)

https://publication.enseignementsup-recherche.gouv.fr/eesr/10EN/EESR10EN_RESUME-higher_education_and_research_in_france_facts_and_figures_summary.php

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A SHORT PRESENTATION OF THE CNRS

The French National Center for Scientific Research (CNRS) is actually **the largest public research organisation** covering all scientific disciplines, from the humanities and social sciences to biological sciences, nuclear and particle physics, information sciences, engineering and systems, physics, mathematical sciences, chemistry, Earth sciences and astronomy, and ecology and environment. With its 32,544 staff, CNRS operates **1,025 joint research units**, including **35 abroad**, one of which is in HK, the French Centre for Research on contemporary China (CEFC).

Of course, the CNRS metrics is unmistakably knowledge production. However, it would be an easy shortcut to reality as **CNRS plays a critical role** in other fields, including **higher education** (i.e. PhD training through research), France science capacity building and innovation among others. In CNRS, **"interdisciplinary" research activities** is usually preferred to "multidisciplinary" because CNRS scientists are encouraged to bridge with other disciplines than their own for which incentives are provided, especially through the CNRS "multidisciplinary task force".

FROM RESEARCH TO BUSINESS

Research commercialization has obviously been a challenge for CNRS over the years. But although CNRS is a basic science organisation, CNRS is striving to meet the needs of industry in terms of **Technology Transfer activity (TT)**, research commercialization, and startups. Thomson Reuters 2014 ranks CNRS among the top 100 global innovators and CNRS was the **7th largest patent filer** in France that same year. CNRS coordinates 300 TT officers, based at local level through 18 regional partnerships (and TT departments) and **14 TT companies (SATTs)** in which CNRS is a shareholder. CNRS research commercialisation activities also take advantage of **FIST SA, a subsidiary dedicated to industrial applications**, managing the CNRS patent portfolio and negotiating operating agreements.

CNRS innovation missions:

- **ENHANCING TT** - With **4,535 patents and 1,237 active licenses**, the CNRS guarantees the protection of its laboratories' results. CNRS registers patents, signs licensing agreements and supports the creation of innovation business with FIST SA and the SATTs.
- **BUILDING PARTNERSHIPS WITH INDUSTRY** - From startups to multinationals, the CNRS offers an array of solutions to help companies develop their R&D capacity. It works closely with industry through about a hundred public/private research units, **2,000 research contracts** each year and 26 framework agreements with large corporations (EDF, Essilor, Safran, Thales, etc.).
- **CREATING BUSINESS** - As a **driver of economic growth**, the CNRS takes pride in launching more than 1,000 innovative companies, generating 7,000 jobs (Innoveox, SuperSonic Imagine, WatchFrog, etc.) since 1999. **It provides support for entrepreneurs** at every stage of the startup process, through consulting and coaching, simplified administrative procedures, tailored financial conditions and equity investment **through FIST SA**. In addition, the CNRS participates in the development of a seed capital fund for the benefit of innovative startups.
- **SHARING KNOWLEDGE** - Each year, the CNRS gives access to its laboratories and technological platforms, offering 180 short training sessions in key areas. Its experts also **provide training at companies'** premises. <https://cnrsformation.cnrs.fr>
- **THE CNRS SERVICES** - **Consulting, expertise, assessments, publishing**, thesis supervision and laboratory experience promote interaction between researchers and industry on innovative projects. As the organizer of high-profile events on innovation-oriented themes ("Innovatives" forums www.innovatives.cnrs.fr, or "Start-up Connexion") and a participant in **business seminars and conferences**, the CNRS reaches out to the socio-economic world.

A RESEARCH CENTER FOCUSED ON INTERNATIONAL COOPERATION

Almost **60% of CNRS copublications are international**. It is the objective of CNRS to duplicate domestic activities at the international level. CNRS is, for instance, developing **36 joint research units in 17 countries**, where dedicated CNRS staff are seconded. Some of them are jointly managed with local partners and industry, such as Thales (Singapore, TICS), Solvay (Shanghai, green chemistry) and Saint Gobain (Tokyo, materials). The labs are the flagships of CNRS excellence in science and innovation abroad together with the other, more scientific oriented, CNRS **182 international associated labs in 43 countries** ("LIA"), 102 international research networks ("GDRI") and 439 other smaller scale joint projects in 59 countries.



PORTRAIT

XAVIER PLANTAZ

A FRENCH STUDENT IN HKUST



I am a **French student** born and raised in Chamonix Valley in the French Alps. I am currently involved in a **Double Degree program with HKUST and CentraleSupélec** where I study fundamental and applied sciences with a real **focus on innovation**, especially those which have some deep **social impacts**. I am currently involved in **HKUST Master of Philosophy in Technology Leadership and Entrepreneurship**, focusing on how **technology transfers** can push inventions to innovations able to **remodeling the way we live**.

THE CHOICE OF HONG KONG

Three years ago, I did an internship in **Tianjin** (China), it was one of my **first experiences abroad** and I visited my friends in Hong Kong for 3 days. I was amazed by the city, the culture and the people. In 2016, I was selected to join the CentraleSupélec **program called the Digital Tech Year**. One day, the director of the international office of my school informed me that CentraleSupélec had just signed a partnership with HKUST and offered to one of my colleagues, Ahmed, and me the opportunity to be the pioneers of this adventure, so here we are!

MY PROJECT IN HKUST

I **work on two projects** with HKUST. The first in a research lab with 20 other students. The team publishes around 20 papers a year on **visual analytics and data visualization**. We are exploring **new ways to represent extremely complex data**, you can think of hundreds of thousands of Excel sheets with hundreds of dimensions. We focus on the data processing part to create better ways to **extract meaningful information** and on the psychological part to enhance cognitive processes through data visualization.

My second project is an entrepreneurship project called **Retailr**. We aim to use our work on visual analytics and computer vision to provide tools to retailers to **enhance their customers' experiences and generate new revenue streams**. Based on camera, sensors, transaction data streams and powerful AI algorithms, we are building a system to help retailers get comprehensive analytics, giving them a detailed picture of who comes into their store, when and for how long. So far, we have great output. For example, **we were finalist of the "big data for business challenge"** last December that led us to go to Shanghai; we were also invited to an exhibition in **Wan Chai at HKTDC - ICT expo** where we have promoted our concept and found clients. **We won the Million Dollar Competition** focus award on AI and Robotics hosted by HKUST. We know there is a long way to go to understand everything about doing business in Hong Kong. But what matters here is the experience!

NEXT STEPS

We are currently developing in Hong Kong what we think will be the most advanced platform to **understand customers' journeys**, providing state-of-the-art computer vision and data science algorithms and visualizations. Using Artificial Intelligence to **understand and enhance in-store customers' experiences**, Retailr will help brands to take data-driven decisions to optimize their revenues. The project is still under development and at a very early stage. We are currently **registering a new company**, to have a proper business running that will gather all costs, from payroll to infrastructures, allowing us to scale up at some point. We are looking forward to the opportunity for cross exchanges under the France-HKUST Innovation Hub, as it can be very interesting to **push ideas and entrepreneurs** not only from France but also from Hong Kong.

FRANCE-HKUST INNOVATION HUB

BRIDGING RESEARCH, EDUCATION AND INDUSTRY

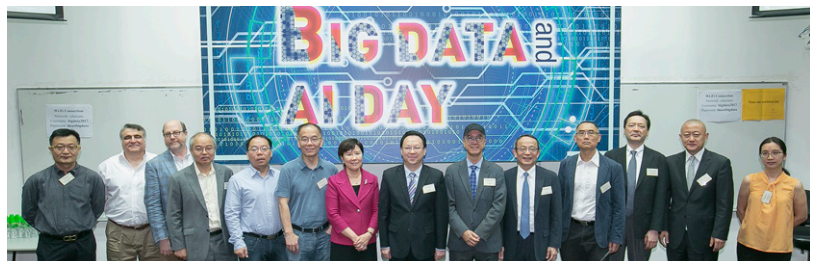
Excellence in research and education is core to the **HKUST identity**. In this spirit, one of HKUST's latest initiatives include the **Big Data Institute (BDI)**, which was established in 2016. BDI serves as a **bridge** between **academic** research, **education**, and **industry**. Recently, the Institute organised its **first Big Data day** on May 26th to promote progress in the fields of Big Data and **Artificial Intelligence** within the Hong Kong scientific community and beyond.

The event saw the coming together of over 500 guests, including leading **academics worldwide** and industry celebrities in these fields. It was a gathering of world experts and bright minds to share insight into the future and the impending big data revolution. This included talks on topics such as the **impact of social media** and artificial intelligence on financial markets, AI-powered information creation and distribution, and other relevant cutting-edge topics.

The Institute primarily develops cutting-edge AI and big data technologies in areas including **smart city**, business intelligence, health and well-being, **bioinformatics** and genetics, e-commerce, security and privacy, **policy and robotics**. The expertise of HKUST's faculty in these areas shone through clearly during the Big Data Day, with talks on human-powered machine learning and **language for AI** and data analytics. **HKUST's students**, too, presented their **research projects** related to big data and AI at the symposium, truly bridging the gap **between education and academic research** during the event.

BDI's research spans a number of multidisciplinary fields, and this research plays a key role in big data and AI, placing HKUST at the **forefront of innovation** in both fields. **The success of BDI** since its establishment is astounding, and **Dean Tim Cheng** lauded the Institute's role as 'a platform for cross-discipline and cross-organisation research collaboration, for cooperation with **industrial partners**, and for developing new education programs' during Big Data Day. HKUST's commitment to **interdisciplinary innovation** manifests in BDI's establishment, as well as initiatives such as the WeChat-HKUST **Joint Lab** on Artificial Intelligence Technology and two progressive academic programs in Big Data: a Master of Science, and an undergraduate minor.

The **importance** of big data and AI is **ever-growing**, and **Professor Qiang Yang**, the **director of BDI**, spoke of the power of data during Big Data Day, saying, 'The **world** is fast becoming a **digital society**, and in the process, a lot of data is accumulated. Whoever can **master the power** of these **data** will **move ahead**.' The success of Big Data Day shows the growing interest and expertise in both these fields and the immense potential they harbour. A common sentiment echoing throughout many keynote speakers' speeches was **the potential of Hong Kong's** research, education, and industry in developing big data and AI-related technology. As a frontrunner in the fields of Big Data and AI, both within Hong Kong and globally, **HKUST** is geared to **lead Hong Kong** in the **data revolution** that is sure to come.



Dr Tieniu Tan, Vice Minister of the Liaison Office of the Central People's Government in HKSAR (7th from right), HKUST President Prof Tony F Chan (6th from right), Vice-President for Research and Graduate Studies Prof Nancy Ip (7th from left), Dean of Engineering Prof Tim Cheng (5th from right), Prof Qiang Yang, Head of the Department of Computer Science & Engineering and Director of the Big Data Institute (4th from right), with world-class academic and industry leaders in Big Data and AI fields, and HKUST faculty

President Tony F Chan welcomed the guests and audience



Dr Tieniu Tan spoke on "big visual data analysis"



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SPOTLIGHTS ON



THE FIER-DOC PROGRAM SEEKS NEW APPLICANTS

«n+i» Engineering Institutes, that gather 50 French Engineering Schools, and over 150 research laboratories, offers a new program for the French Innovative Experience in Research.

Campus France has created a partnership with the network with the aim to promote this new and innovative scheme called French Innovative Experience in Research - FIER-DOC. This program was built to welcome students on arrival in France through cultural immersions, language and completion of all administrative formalities. Thereafter the PhD candidate works at least 3 months in his host laboratory and participates in conferences, tutorials and courses. At the end of this scheme, the participant writes an activity report and presents the research performed and then receives an international experience certification with 30 ECTS credits.

This program aims to provide skills in project management for research and development, applied in the fields of industry in a multicultural environment.

TWO SESSIONS PER YEAR SCHEDULED FOR THIS PROGRAM:

October 1st, 2017 & February 2nd, 2018

THE ÉCOLE POLYTECHNIQUE AUTUMN SESSION

The prestigious École Polytechnique has opened the Application Session up to September 1st, 2017. This application session is of interest to students who have already completed at least 2 semesters of B.Sc at their institution with excellent grades in mathematics, and who wish to strengthen their curriculum by a high-level curriculum in sciences and humanities leading to the Engineering Degree of École Polytechnique and the École Polytechnique Diploma. The results of admission will be published online by the end of November 2017.

CENTRALESUPÉLEC STARTS A NEW INTERNATIONAL CONTEST

CentraleSupélec launches the first edition of an international competition for students completing a Bachelor's degree in Science or Engineering outside of France. This competition opens the possibility to integrate the accelerated path in two years of the engineering cycle of CentraleSupélec from September 2018 by obtaining the diploma of engineer (Master level) in 2020. The languages of instruction for this course will be English and French.

FOR THIS EDITION, THE DEADLINE FOR SUBMISSION OF APPLICATIONS IS October 1st, 2017
APPLY ONLINE AT <http://centralesupelec-accelerated-progr.fr/>

EVENTS

PAST EVENTS

- FEBRUARY 20th** . Visit of Pr. C. Le Hénaff, Institut Polytechnique de Bordeaux
- MARCH 24th** . Inauguration French-HKUST Innovation Hub
- . Conference of J-P. Bourguignon, President of the European Research Council, at the Institute for Advanced Study
- APRIL 28th** . Conference of L. Boutillon, VINCI Construction
- . Visit of the *So French So Innovative* show, organized by the French foreign trade advisers
- SEPTEMBER 1st** . Visit of A. Mynard, French National Center for Scientific Research Director in China

NEXT EVENTS

- SEPTEMBER 6th** . Visit of a delegation of the École Spéciale des Travaux Publics (ESTP) with the French company Dragages
- OCTOBER** . Meeting Innovation and Technology Fund by Pr. K. Leung