

Institut Polytechnique de Paris

Educate, Research & Innovate for a Better Future



A world-class Institute





IP Paris : Identity & Objectives

5

INSTITUTIONS



3 MAIN OBJECTIVES

1

Providing top level education
in a wide range of fields

2

Leading cutting-edge research to
answer global challenges

3

Fostering innovation &
entrepreneurship

Top French Graduate Schools
of Engineering (« Grandes Écoles »)

IP PARIS: KEY FACTS & FIGURES

8 000 students (39% international)

1000 Faculty members

1000 PhD students

2500 publications per year

30 Laboratories

3 incubators

- **Centuries of experience in education and research**
- **An International Faculty**
close to 40%
- **High employability rate**
95% employability rate
- **World-Class Research Infrastructures**
30 Laboratories, 6 Equipex, 9 Labex et 1 Idex
- **Strategic education & Research partnerships**
>40 corporate partners // >30 academic partners
- **A campus in the 8th global innovation hub**
30 min away from Paris



IP Paris first rankings : 100 TOP World Universities



**QS WUR first entry:
49th World
2nd France**

**QS Graduate Employability
first entry:
12th World
1st France**



**THE WUR first entry:
91th World
3rd France**

**THE Young Universities
6th World
2nd France**



Governance



Administrative Board



ISAB – International Scientific Advisory Board



Executive Committee Board



Academic Council

Patrick Aebischer	EPFL
Hirochi Amano	Nagoya University
Corinne Aubert	Sorbonne université
David Cardwell	Cambridge University
Pierre André Chiappori	Columbia University
Nassif Ghoussoub	University of British Columbia
David Hibbit	Abaqus
Bruce Kogut	Columbia University
Anne L'Huillier	Lund University
Seeram Ramakrishna	NUS
Sonia I. Seneviratne	ETHZ
Carlo Sirtori	ENS
Gisou Van der Goot	EPFL
Andrew Chi-Chih Yao	Tsinghua University
Tamar Ziegler	Jerusalem University

International Scientific Advisory Board





Education at IP Paris



Educational program of IP Paris and its schools



Bachelor



Engineer Degree



Master / MSc&T



PhD / PhD Track



Executive Master

Advanced Master

Executive Education



3 year

3 year

2 year

2 year + 3 year

14 months



15 Master Programs

Taught by high level international faculty



Applied
Mathematics,
Statistics



Biology
& Health



Chemistry



Computer
Sciences



Design



Economics



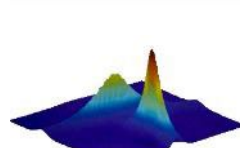
Energy



Information &
Communications
Engineering



Innovation
Industry
Society



Mathematics &
Applications



Mechanics



Nuclear Energy



Physics



Sociology



Transport,
Mobility,
Networks

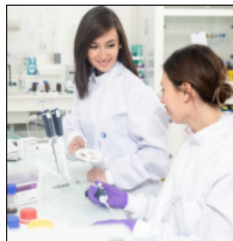


PhD tracks at IP Paris

Research at the heart of Education



Advanced Materials



Life Sciences



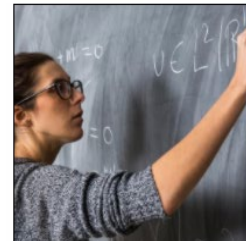
Chemistry and Interfaces



Electrical Engineering



Energy for Climate



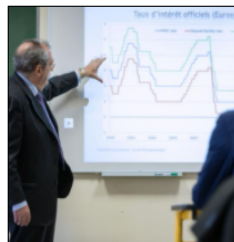
Mathematics



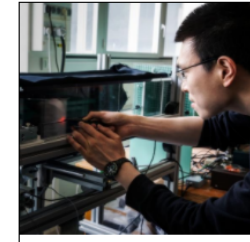
Computer Science



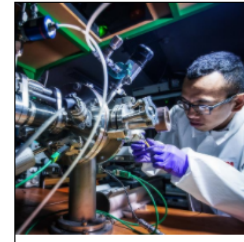
Data & Artificial Intelligence



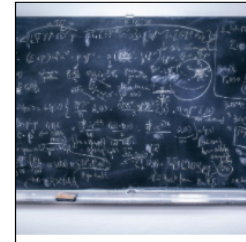
Economics



Mechanics



Physics



Quantum Science and Technologies (QUANTIX)



Research at IP Paris



IP Paris Research

IP Paris Research Center

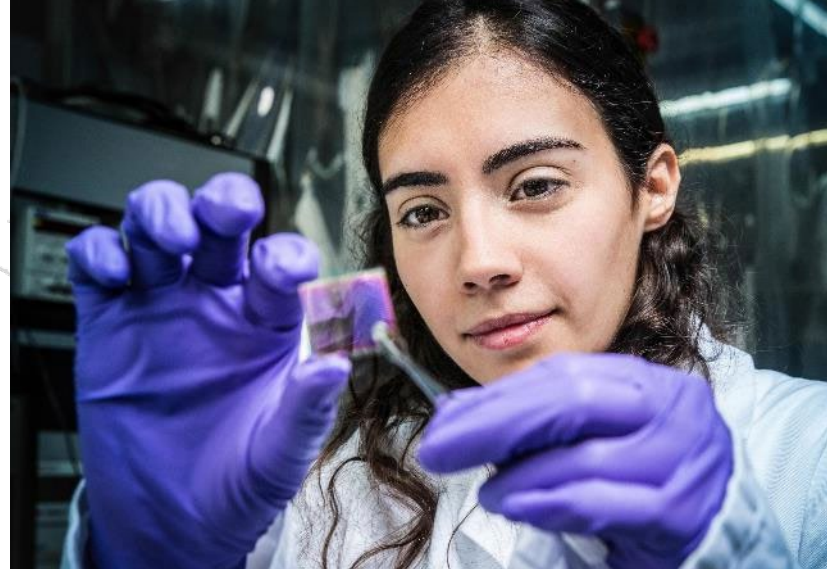
5 Schools
30 laboratories

A strategy elaborated at IP Paris Level

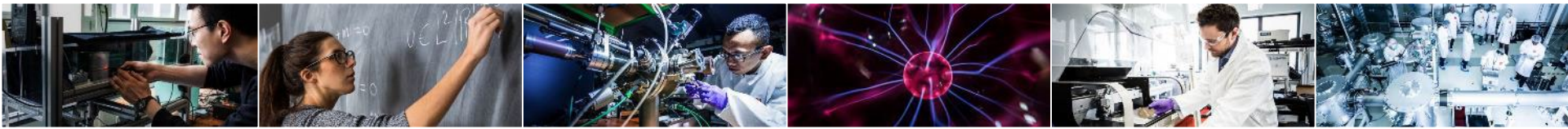
- Concertation between the 5 partners and the ONRs (CNRS, Inria,..)
- An IP Paris research advisory commission

Some shared facilities

Microscopy, NMR, Mass Spectrometry
Plasmas and Lasers
HPC and Data



A common vision



A research to answer economic & social challenges

- 30** Laboratories
- 40** Corporate partnerships
- 2 500** Publications per year
- 1000** Faculty members
- 1000** PhD students
- 230** Post-doctoral students
- 10** Research & education departments
- 1** Grants' Office

Research in close partnership with national research organizations

The CNRS is co-supervisor of 24 of our 30 laboratories
Privileged partners: Inria, CEA, Inserm and ONERA



Numerous collaborations with laboratories of the University of Paris Saclay

Interdisciplinary research to meet global challenges

Partnership research and corporate sponsorship programs

IP Paris conducts research partnerships with numerous companies in a variety of sectors

Research in an exceptional ecosystem

On a campus located in the heart of the Plateau de Saclay, 8th innovation hub in the world, with the presence of numerous institutional research and education actors as well as corporate research centers.



4 Interdisciplinary Centers

- E4C – Energy for Climate
- HI!Paris – AI for Business & Society
- CIEDS – Defense & Security
- Interdisciplinary Center for Life Sciences

Developing an integrated research

- Inria @ IP Paris
- Maths @IP Paris
- Physics @ IP Paris
- Mechanics @ IP Paris
- Life Sciences @ IP Paris
- Quantum technologies and materials science @ IP Paris
- Digital technologies @ IP Paris

Buildings and facilities

- Existing infrastructures
- Future New Lab buildings

IP Paris Research Center



E4C – Energy for Climate Center

*Addressing the systemic complexity of
energy transition*

*A challenge for research, education and
innovation.*

8 institutions
4 corporate partners
26 laboratories
240 staff

4 Research Pillars

- Greenhouse gas decrease
- Renewable energies deployment
- Energy consumption Decrease
- Feedback to energy policies



E4C
INTERDISCIPLINARY
CENTER



Scientific Director

Philippe Drobinski

Professor at Ecole
Polytechnique, Director of LMD,
expert MedECC

Recent research developments

- Platform for testing photovoltaic production in real conditions
- NRLAB smart nanogrid to model the operation of a complex system, such as a smart building
- Smart Buildings equipped with smart grids
- E4Cast forecasting model for energy production and consumption forecasting
- E4Clim modeling platform for renewable energy mixes impacted by climate variability
- E4C's 5-year research strategy : E4C White Book

Education

- **2 MScTs** : Environment and Energy Management (STEEM), Smart Cities and Urban Policies (SCUP)
- **2 Masters**: Energy and Energy Transition & Territories (ENPC)
- **1 PhD Track organized in 4 tracks** (one for each 4 E4C center research pillars)
- **1st E4C summer schools on smart buildings**



Putting Artificial Intelligence and Data Science at the service of business and society

*A center for research, education,
innovation and technology transfer
to businesses*

Scientific Leadership



Eric Moulines
Professor at Ecole
Polytechnique
Silver medal at CNRS
(2010)



Nicolas VIEILLE
Professor at HEC
Paris



Key Facts & Figures

2 institutions: HEC Paris and IP
Paris

5 major sponsors: L'Oréal,
Capgemini, Total, Kering and
Rexel

20 founding professors

1 million € per year for each
company

Research areas

- AI and Machine Learning Methods
- AI and Data Science for Business
- AI and Data Science for Society

Education

- Design and implement new
multidisciplinary programs in AI
- Triple the number of students in
joint master's programs by 2025

Center for Defense & security



Scientific Director

David Filliat

Professor at ENSTA Paris

Main research fields:

- Detection, protection and care
- Cybersecurity
- Energy optimization and propulsion
- Imaging and modeling for systems engineering
- Intense lasers and applications
- Innovative materials and functionalization
- Robotics and Artificial Intelligence
- Quantum Technologies
- Defense Innovation Management

Center to be launched end of September

- Research, education and innovation at IP Paris level in fields of major interest for European **defense industry and strategy**
- Launch of **10 projects for €10 million**

Challenges

- Conduct leading-edge research in areas of interest to defense,
- Implement or adapt our teachings at various levels to take defense into account
- Connect the communities of researchers and students of IP Paris and its partners (Ministry of the Armed Forces, agencies, ONR such as CNRS, Inria, CEA, ONERA, companies)
- Target high value-added scientific and technological devices for defense
- Identify these technological breakthroughs as early as possible and ensuring their scaling up to a pre-industrialization phase.



Future Interdisciplinary Engineering for Health

Mathematics & Computer Science for life sciences • Biomedical Engineering • Biologie et interfaces

Education

PhD track Life Sciences

- Biomedical engineering
- Mathematics of Living Systems
- Biology & Interfaces

Master 1

- Jacques Hadamard
- Mechanics tracks, Biomedical engineering (BME)
- Biology and Health

Master 2

- Mathematics for life sciences - MSV
- Biomedical engineering (BME)
- Biology and Health

Corporate partners



Scientific Priorities

- Biofabrication
- Connected and personalized medicine
- Conservation Biology
- Biomass modeling
- Human/machine interaction
- Biodiversity and ecology
- Digital medicine
- Seeing the invisible

New Platforms



Cellular imaging platform

Multi-view light sheet microscope
 NanoWizard4 Bioscience AFM
 Piuma Chiaro Nanoindenter
 Microfluidic fabrication space

Living lab @ Drahi-X
 bioengineering
 prototyping space

Main Partners



Inria

GRUPE
 HOSPITALIER
PARIS
 SAINT-JOSEPH

Some Research Facilities on campus



Plasmas and lasers

- Apollon and LULI 2000 at LULI, Laplace at LOA
- Sirius @ LSI

HPC, data and AI center facility:

- In relation with the existing facilities and with the new centers
- Mutualization of the existing facilities and optimization

CIMEX: the microscopy center@IP Paris:

- Existing high level equipment

RMN & Mass Spectro: analytic center@IP Paris:

- Submitted for regional fundings



INNOVATION AT IP PARIS





Thriving start-ups from our incubators

Exotrail
AGILE SPACE

 **della**

Cobbaï


FORSSEA
ROBOTICS

mila

Invenis

N
NEOLITHE

SENSOME

 **Alvie**

 **Outmind**

IP Paris boosting innovation & entrepreneurship

Innovation at IP Paris in figures

- 25 DeepTech start-ups from IP Paris labs in the last 10 years
- IP Paris supports 110 projects/start-ups per year in its 3 incubators
- 990 M€ raised by IP Paris start-ups in 2020
- 25% of the start-ups in the Next40 selection come from the alumni communities of IP Paris schools or its incubators
- IP Paris files an average of 33 patents per year
- IP Paris collects €450k per year from its intellectual property licenses and assignments



Entrepreneurship & Innovation at the heart of education & research

Entrepreneurship & Innovation

Incubateurs

Participation aux
événements Tech
le Drahi X Novation
Center
le Télécom Paris Novation
Center

Des Partenariats :



Research & Innovation

Soutien à l'émergence de Deeptech

**Deux appels à projets
prématuration lancés en 2020** pour
favoriser l'émergence de DeepTech au
sein des laboratoires d'IP Paris

20 projets lauréats

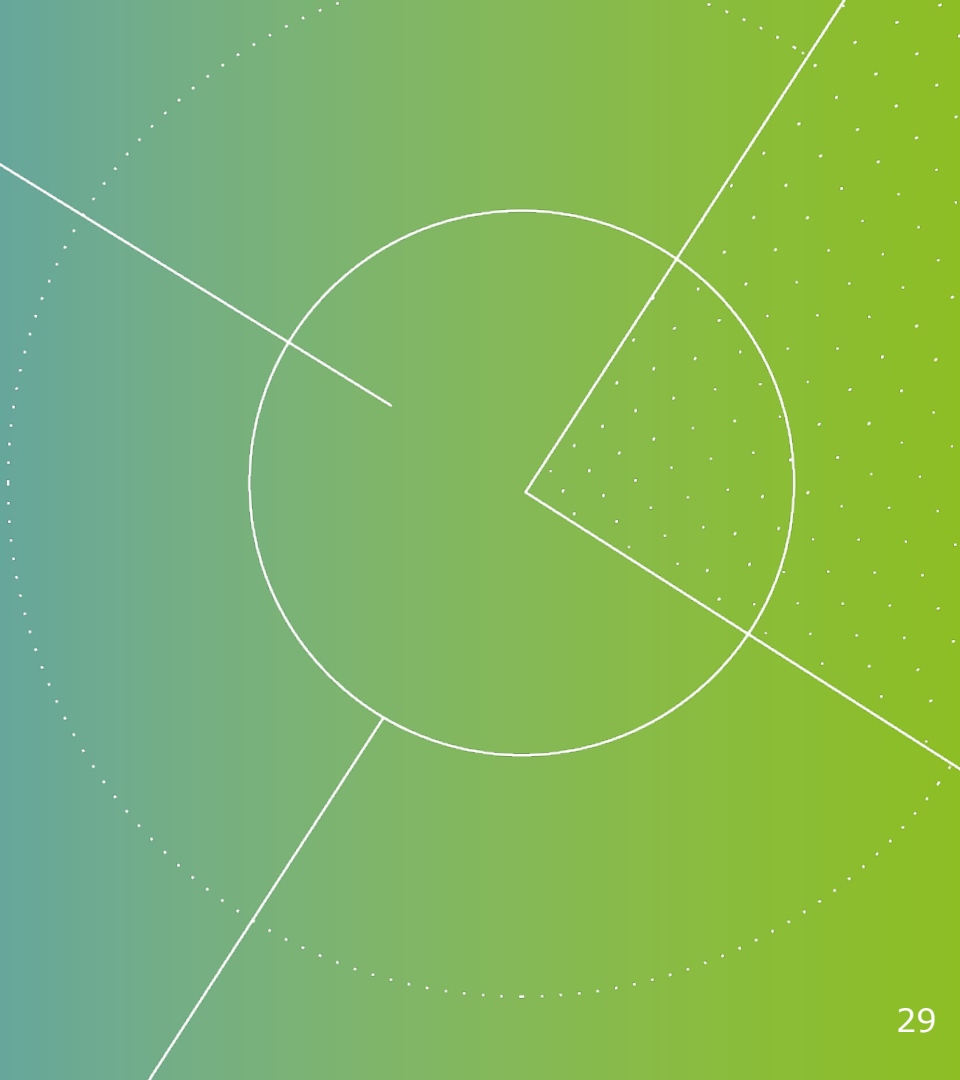
1 400 K€ attribués

Valorisation de la propriété intellectuelle

**Entrepreneurship
& Education**
Dedicated student training



CAMPUS AT IP PARIS





Un campus en développement

Elaboration du nouveau schéma directeur de développement pour un campus :

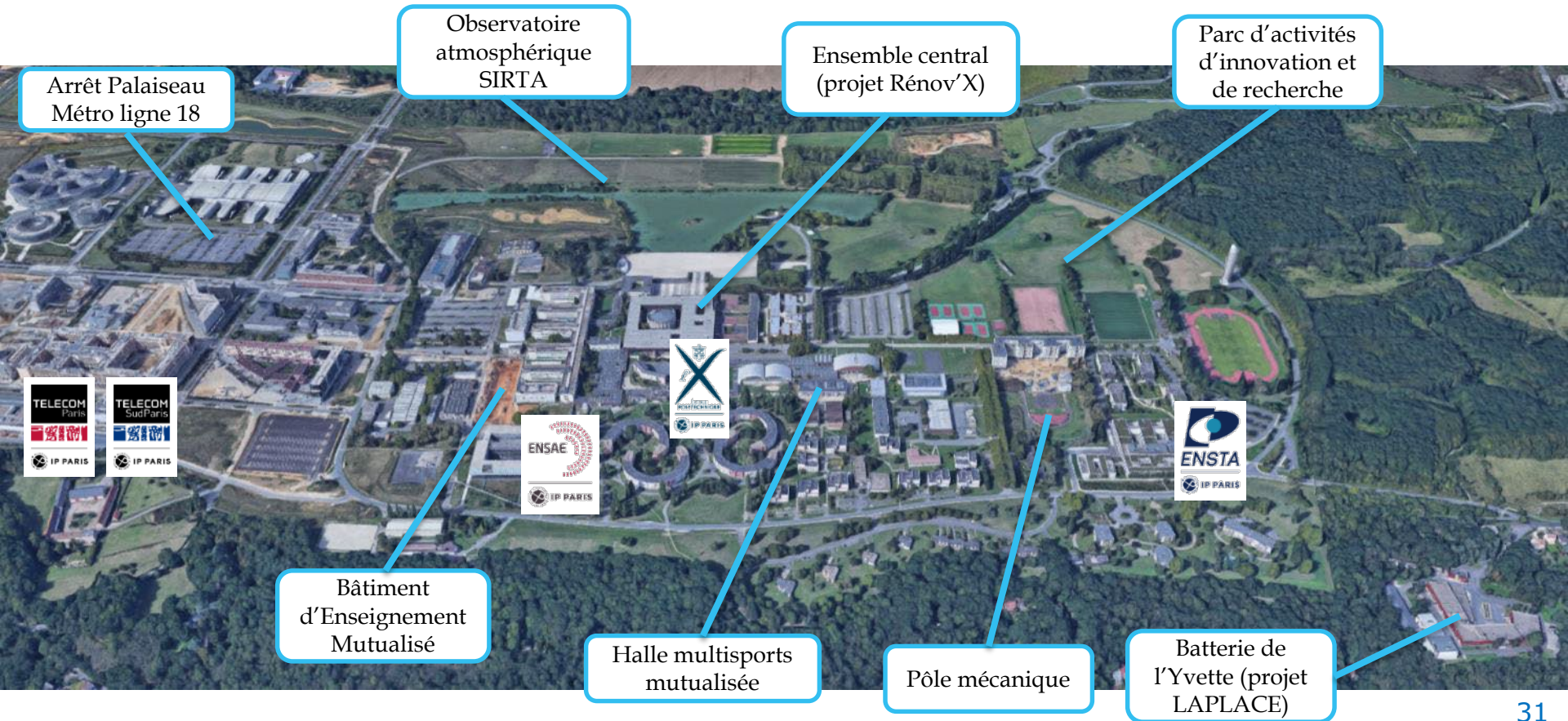
- **intégré** dans son environnement
- **lisible**, par la structuration des espaces
- **interactif**, grâce à des pôles de vie
- **vert**, exemplaire en matière de transition écologique et énergétique
- **attractif** pour tous, car innovant
- **doté d'équipements** de rang mondial

De **nombreux projets en cours** :

- Bâtiment d'Enseignement Mutualisé
- Pôle méca
- SIRTA
- Innovation park



De nombreux projets d'infrastructure en cours





PARTNERSHIPS AT IP PARIS





EDUCATION & RESEARCH ECOSYSTEM

A Strategic partnership with HEC

- Creation of a multidisciplinary academic alliance in the fields of technology and business innovation.



IP Paris benefits from the partnerships of its founding institutions

National research centers



Institut Pasteur



International institutional partners

- EuroTech Network
- Columbia (Alliance Program)
- Top-ranked universities worldwide
- International Research Centers

Other national institutional partners

- Université Paris-Saclay
- IMT
- GENES
- ParisTech

AND MANY MORE INSTITUTIONAL PARTNERS...



PARTNERSHIPS FOR EDUCATION & RESEARCH



AND MUCH MANY INDUSTRIAL PARTNERS...

Institut Polytechnique de Paris

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