INSTITUT POLYTECHNIQUE DE PARIS

Annual Report 2022

Sciences and Technologies for the common good
Contents

5     PRESIDENT’S INTRODUCTION
6     OVERVIEW AND KEY FIGURES
8     RANKINGS
10    2022 MAJOR ACHIEVEMENTS
13    EDUCATION
17    RESEARCH
29    INNOVATION
33    CORPORATE PARTNERSHIPS
37    INTERNATIONAL PARTNERSHIPS
43    CAMPUS
47    STUDENT LIFE
« IP Paris has set itself up as a world class multidisciplinary institution of science and technology »
At the Institut Polytechnique de Paris, we are now making great strides towards our ambition of building a pluridisciplinary institution of science and technology of global importance, the foremost of its kind in France and among the best in Europe.

Our Institute brings together five of France’s most prestigious engineering Schools - the École Polytechnique, ENSTA Paris, ENSAE Paris, Telecom Paris and Telecom SudParis - and has already become a fixture of the most widely-respected global rankings, recognized as one of the leading institutions of research and higher education in France, and indeed the world.

Since launching in 2019, IP Paris has developed at a remarkable pace. In 2022 we adopted a five-year development strategy in order to cement our position as a prominent player in the France 2030 Future Investment Plan, the government initiative to shape the France of tomorrow and plot a course to environmental, industrial, technological, health and cultural autonomy, forging ahead in these areas of strategic importance.

As we pursue these objectives, the number of students and alumni of IP Paris continues to grow, as does our range of courses. Our research capacities are also going from strength to strength, with the recent addition of a new interdisciplinary center devoted to healthcare engineering - Engineering 4 Health (E4H). The Institute is at the heart of a rich and rapidly-growing ecosystem of innovation and entrepreneurship, as witnessed by our hosting of the SPRING 2022 event and a noteworthy appearance at the VivaTech fair.

After being selected for a number of governmental calls for projects, the Institute has reinforced its financial capacities for the long term, thanks in no small part to new partnerships with sector-leading firms including energy supplier EDF, telecoms giant Orange, Vinci, Schneider Electric and donations from our patrons.

Committed to building a science and technology institute which is responsible, inclusive and compliant with the highest international standards, IP Paris has launched several projects to renovate the campus in a spirit of sustainability and energy efficiency.

In order to better support the campus’ international community and help them to master France’s language and culture, the Institute recently inaugurated its International Center for French Language and Culture. We have also adopted a Gender Equality Plan, and promoting gender equality at work remains a top priority.

In the space of just four years, the Institut Polytechnique de Paris has laid some solid foundations, successfully undertaken an ambitious project, secured substantial and lasting financial backing, and plotted out a course for the next five years. None of this would have been possible without the excellence and the dedication of our teams, our member Schools, their students, researchers, professors and staff.

I am confident that IP Paris will continue to live up to our high expectations, leading from the front as we take on the great challenges of the future.

Eric LABAYE
Chairman and President, Institut Polytechnique de Paris,
Chairman and President, École Polytechnique
Established in May 2019, the Institut Polytechnique de Paris is a science and technology institution of global importance, uniting the forces of 5 of France’s most prestigious engineering Schools: Ecole Polytechnique, ENSTA Paris, ENSAE Paris, Telecom Paris and Telecom SudParis.

Under the aegis of the Institute, these Schools have pooled together two centuries of expertise in the pursuit of three major goals: excellence in education, promoting cutting-edge research, and fostering innovation and entrepreneurship in pursuit of the greater good.

On 22 April, the Institut Polytechnique de Paris and its two supervising ministries - the Ministry for the Armed Forces and the Ministry for the Economy, Finance and Recovery - signed the Institute’s first Objectives and Performance Contract (OPC), a road map for the development of IP Paris in the period 2022-2026.

The major strategic priorities of IP Paris for this five-year period will be to take the Institute’s training, research and innovation to new heights, to develop the IP Paris Research Center, to renovate the campus to meet international standards and strict sustainable development norms, and to secure the resources needed to power this growth.

This first OPC should consolidate the Institute’s international standing as a leading force in higher education, research, entrepreneurship and innovation over the coming decade.

In 2022, the Institute was able to draw upon its internal mechanisms and assets to accelerate the deployment of the unification project. Improvements were made to IP Paris’ joint facilities, particularly the Graduate School, in order to better support our students, candidates and training participants.

Within the framework of our information systems strategy, the Institute continues to develop ambitious projects aimed at improving the student experience, including the new Learning Management System, and of course the Faculty Finder tool to boost the visibility of our research center.

In keeping with our business model, IP Paris is gradually putting the financial tools and systems in place to ensure that our rapidly-growing resources are allocated effectively.

As an experimental public institution, IP Paris has adopted an ambitious HR policy to ensure that we attract and retain the best talent. We also have an employee representation committee in order to promote social dialog.
Institut Polytechnique de Paris scored some noteworthy successes in government-backed calls for projects in 2022, testament to the good work done since the Institute’s creation and a source of encouragement as we continue to develop.

ExcellenceS call for projects: IP Paris secures funding of almost €28 million

With the STEP2 project, IP Paris was awarded the fourth largest grant in the second wave of the call for projects “Excellence in all its forms” launched by the Ministry for Higher Education and Research. Endowed with €800 million, the “ExcellenceS” program was created to support ambitious, transformative projects proposed by higher education and research institutions, helping them to attain the highest international standards on their own terms and using their own strategies.

The €28 million awarded to the Step2 project will be used to support the creation of an attractive range of research-led training programs, from undergraduate level through to doctoral studies, in order to attract the most talented students.

The funds will be used to support the development of scientific and technological research which is attuned to the social, economic and environmental challenges we face, promoting an integrated and socially-responsible vision of science and technology. In doing so these funds will contribute to the deployment of IP Paris’ international strategy, consolidating our visibility and reputation.

IP Paris awarded almost €10 million by the “Skills and Professions of the Future” program

Hi! PARIS, the interdisciplinary center for data analysis and artificial intelligence created by IP Paris, recently secured funding of €7.78 million for its AccelAILearning@Hi! PARIS project, submitted to the AI section of the «Skills and Professions of the Future” call for expressions of interest (AMI-CMA). The QuanTEDum-France project, submitted to the quantum category of the AMI-CMA call, was awarded €2.16 million. The «Skills and Professions of the Future” call for expressions of interest is a government initiative designed to help meet the future needs of businesses in terms of new skills and training capacities.
IP Paris is performing strongly in the most widely-respected global rankings, solidifying our reputation as one of the most influential institutions of scientific and technological research and teaching in France and the world.

<table>
<thead>
<tr>
<th>QS WORLD UNIVERSITY RANKINGS 2024</th>
<th>TIMES HIGHER EDUCATION LIST OF THE MOST INTERNATIONAL UNIVERSITIES 2023</th>
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<tbody>
<tr>
<td>38th in the world</td>
<td>34th in the world</td>
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<tr>
<td>2nd in France</td>
<td>1st in France</td>
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<td>10th in Graduates’ reputation with employers</td>
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<tr>
<th>QS WORLD UNIVERSITY RANKINGS BY DISCIPLINE 2023</th>
<th>TIMES HIGHER EDUCATION WORLD UNIVERSITY RANKINGS BY DISCIPLINE 2023</th>
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<tbody>
<tr>
<td>14th/2nd for Mathematics</td>
<td>26th/2nd in Physics</td>
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<tr>
<td>21st/1st for Engineering and Technology</td>
<td>46th/2nd in Computer Science</td>
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<tr>
<td>23rd/2nd for Natural Sciences, Statistics and Operational Research</td>
<td>43rd/4th in Life Sciences</td>
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<tr>
<td>31st/1st for Computer Science and Information Systems</td>
<td>120th/2nd for Engineering</td>
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<td>36th/4th for Physics and Astronomy</td>
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<td>45th/2nd for Engineering/Electricity and Electronics</td>
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<td>45th/1st for Mechanical Engineering</td>
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<td>65th/2nd for economy and econometrics</td>
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<td>101st/3rd for Environment Sciences</td>
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<th>TIMES HIGHER EDUCATION UNIVERSITY REPUTATION RANKING 2022</th>
<th>TIMES HIGHER EDUCATION RANKING 2023 OF UNIVERSITIES WITH THE BEST STUDENT-TO-STAFF RATIOS IN THE WORLD</th>
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<tr>
<td>80th in the world</td>
<td>58th in the world</td>
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<td></td>
<td>1st in France</td>
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SHANGHAI RANKING BY ACADEMIC SUBJECT, 2022

40th for Mathematics
50th for Physics
75th for Statistics

THE IMPACT RANKINGS 2022 FOR SUSTAINABLE DEVELOPMENT IN THE CATEGORY «INDUSTRY, INNOVATION AND INFRASTRUCTURE

16th in the world
First year of implementation of the Objectives and Performance Contract

**EDUCATION:**
An increasingly attractive offering that meets market needs
- Increase in the number of students
- Diversification of our training offer
- €8 million CMA-IA

**RESEARCH:**
New funding and an acceleration the development of interdisciplinary centers
- €28 million in funding
- A new interdisciplinary center
- €8 million in sponsorship for the center Energy4Climate

**INNOVATION:**
A stronger foothold in the national and international innovation and entrepreneurship ecosystem
- Setting up in Station F
- Vivatech 2022
- SPRING 2022
- France digitale Partnership
- Third Premat Call for projects

**STUDENT COMMUNITY:**
New facilities for students, the driving force of the campus life
- 3rd call for projects
- Raising awareness of gender-based and sexual violence
- PhD Talent Career FAIR

**CORPORATE PARTNERSHIPS:**
New corporate partnerships to meet today’s major challenges
- EDF
- Orange
- Engie
- Schneider Electric
- Vinci

**INTERNATIONAL PARTNERSHIPS:**
Strengthening links with universities worldwide and internationalization
- CESAER partnership
- EAIE 2022
- Launch of the International Center for French Language and Culture
- Rise in international rankings

**CAMPUS:**
Implementing the master plan: infrastructure and services projects for a campus with a high quality of life
- 5G OPEN ROAD program
- IP Paris Health Center
- Qare Partnership
« Our goal is to welcome 10,000 students by 2030 »
In order to meet France’s growing demand for engineers, scientists, researchers and entrepreneurs, the Institut Polytechnique de Paris and its member Schools are working to boost student numbers. Our goal is to welcome 10,000 students by 2030. This growth strategy will see student numbers increase by around 1,500 in the period 2022-2026, including doctoral students.

The program portfolio at IP Paris, established by the Graduate School, now includes 12 PhD Track programs closely aligned with the core research interests of our Research Center, along with 15 Master’s specializations.

The programs are proving to be highly attractive, with a new class of 700 students joining us for the 2022-2023 year and an increase of 53% in PhD Track applications and 39% for Master’s courses.

In 2022, almost 800 students graduated. Around 1,000 students are pursuing doctoral studies within the Institute, forming an essential pillar of our world-class research teams.

Doctoral training at IP Paris equips students with cutting-edge scientific knowledge, while also preparing them for positions of responsibility in both the public and private sectors. In order to secure the professional prospects of our doctoral students, in 2022 IP Paris formed a partnership with PhD Talent. This partnership helps IP Paris doctoral students to meet recruiters via the PhD Talent Career Fair, an event held in Paris bringing together numerous recruiters from the business world with doctoral students and graduates looking for career opportunities in the private sector.

Also in 2022, IP Paris launched its first continuing education course for senior executives, partnering with Orange to establish a cyber-security degree program: the Executive MSc in Cybersecurity.
Doctoral Schools Welcome Day

Held in December under the aegis of Adriana Tapus, Managing Director of the IP Paris doctoral school, and in collaboration with the doctoral students’ association, this welcome day provided an opportunity to showcase the research being done by our 40 second-year doctoral candidates, celebrated in the “Doctoral School of IP Paris Best Poster Awards.”

Launch of Executive MSc in Cybersecurity in partnership with Orange

This first degree program offered in continuing education format is aimed at senior executives in the cybersecurity sector. As cyberattacks continue to proliferate, reinforcing businesses’ knowledge and know-how in this domain is now more important than ever before. Such was the thinking behind the creation of our new Executive MSc in Cybersecurity, co-developed by IP Paris and Orange Campus Cyber, the company’s dedicated cybersecurity training institute. This new program is the fruit of the partnership formed by Orange and the Institut Polytechnique de Paris in March 2022.
EDUCATION

Graduation ceremony for the second class of Master’s, PhD Track and Doctorate students

IP Paris officially awarded degrees to two classes of Master/PhD Track and Doctoral graduates, at two graduation ceremonies held on 30 June and 1st July, with almost 2000 people attending in person and online. In total, 585 graduates from 14 Master and PhD Track programs picked up their degrees, along with 228 doctoral graduates from 7 disciplines. Among these new doctors, 7 graduates were awarded special thesis prizes for the exceptional quality of their work: Arthur Boutillon, Kamélia Daudel, Claire Amadio-Dessalles, Bozhang Dong, Guillaume Falmagne, Antoine Ferey and Kimia Nadjahi.

Inaugural IP Paris Winter School on micro-architectural security

The IP Paris Winter School on micro-architectural security, which ran from 5 through 9 December 2022 in Paris, was organized by the Information, Communications and Electronics Department at IP Paris. The organizing team behind this Winter School, led by Maria Mushtaq and Ulrich Kühne, both associate professors at IP Paris, brought together a varied panel of participants, doctoral students and industrial specialists from all over the world, with presentations from 11 international experts at the forefront of their respective fields.
« IP Paris has thus established a new research model, drawing upon the expertise of researchers and partners »
At present, the joint aim of IP Paris and its member schools is to cement their reputation in fields of great scientific and socio-economic interest, where they are capable of delivering real impact within the space of a few years.

In order to achieve that goal, IP Paris plans to capitalize upon its acknowledged areas of academic excellence, particularly mathematics, digital sciences and physics, while also continuing to work in partnership with the private sector to develop applied solutions for crucial fields including defense, security, artificial intelligence, the energy transition, healthcare and life sciences.

**IP Paris has thus established a new research model, drawing upon the expertise of researchers and partners from national research agencies, partner institutions and the world of business.**

In 2022, the development of IP Paris’ Research Center continued apace. The center continues to pursue an ambitious recruitment policy in order to strengthen the teaching faculty, while also reinforcing its constituent departments with the creation of a new interdisciplinary research center, as well as consolidating existing structures.

Joining our three existing interdisciplinary centers - Energy for Climate (E4C), focusing on the energy transition, Hi! Paris, devoted to artificial intelligence and data analysis, and the Interdisciplinary Center for Defense and Security Studies, conducting cutting-edge scientific research on defense-related subjects - IP Paris recently launched a fourth interdisciplinary research center: Engineering 4 Health (E4H), dedicated to biomedical engineering.

In the health sector, **IP Paris is also a founding member of the Paris-Saclay Cancer Cluster (PSCC) along with Institut Gustave Roussy, INSERM, pharmaceutical giant Sanofi and Paris-Saclay University.**

The Institute has also established its first joint laboratory devoted to high-intensity lasers, HERACLES3, in partnership with CNRS and Thalès.
Alain Aspect, Nobel Prize laureate in Physics and Professor at Ecole Polytechnique

Prof. Alain Aspect, emeritus CNRS research director at the Institut d’Optique Graduate School (Université Paris-Saclay - CNRS) and a professor at Ecole Polytechnique, was the joint winner of the Nobel Prize in Physics 2022. This Nobel Prize is testament to the superlative standard of Physics research and teaching at l’X and IP Paris as a whole. The 2022 Nobel Prize for Physics was shared by Alain Aspect, American scientist John F. Clauser and Austrian colleague Anton Zeilinger. The trio were recognized for their work on quantum entanglement.
Sylvie Méleard and Gaël Richard have secured Advanced Grants from the European Research Council (ERC) which will enable them to continue their research in the fields of applied mathematics and artificial intelligence.

ERC Starting grants were awarded to 408 promising academics all over Europe this year, including three researchers based at the Institut Polytechnique de Paris: Fabian Cadiz of the Laboratory of Condensed Matter Physics (PMC), Adrien Leblanc of the Laboratory of Applied Optics (LOA), Félix Tropf of the Center for Research in Economics and Statistics (CREST). These funds will allow them to form research teams and launch new projects in their respective fields.

To coincide with World Cancer Day, the Paris Saclay Cancer Cluster (PSCC), announced by French President Emmanuel Macron in June 2021, was officially inaugurated at Gustave Roussy Hospital on 4 February 2022, at a ceremony attended by Olivier Véran, Minister for Health and Solidarity, Frédérique Vidal, Minister for Higher Education, Research and Innovation, and representatives of the founding members: Sanofi, Gustave Roussy, INSERM and the Institut Polytechnique de Paris.

The PSCC has been selected for the Biocluster France 2030 program. It will receive funding of €100 million in order to bring together world-leading oncological expertise and advance the cause of research and innovation to cure cancer.
Launch of the Engineering for Health (E4H) center

The Institut Polytechnique de Paris, in partnership with INRIA and Paris Saint-Joseph Hospital, recently launched its 4th interdisciplinary center: Engineering for Health (E4H), dedicated to healthcare and engineering.

The purpose of the Engineering for Health (E4H) interdisciplinary research center is to capitalize on the strengths of IP Paris in the fields of physics, mathematics and social sciences, adopting a highly quantitative, interdisciplinary approach to life sciences and medicine.

E4H has three core missions: to unify the 120 research teams from across IP Paris working in the fields of life sciences and medicine, to recruit the best students, postdoctoral students and faculty members in these fields, and to nurture new collaborations with industrial, academic and hospital-based partners.

First annual E4H forum and launch of ‘PSCC Thursdays’

Nearly 250 researchers, students, doctors, engineers and industrial experts came together on 6-7 July at the Institut Polytechnique de Paris campus for the first edition of the annual E4H Forum, supported by the Bettencourt Schueller Foundation.

E4H's first academic symposium also saw the official inauguration of the E4H Center and the launch of the Paris-Saclay Cancer Cluster (PSCC) lecture cycle “PSCC Thursdays,” of which IP Paris is a founder member.
Promising steps on the funding front

The E4H Center has already attracted substantial funding via the STeP2 project, as well as financial backing from the Serge Schoen New Synergies Grant and the Bettencourt Schueller Foundation.

As a stakeholder in the STeP2 project (Science and Technology at Polytechnique Paris), a successful applicant to the “ExcellenceS” scheme, the E4H Center has secured €6.51million of funding to develop and promote research activities at IP Paris, with a particular focus on the comprehension of living systems, medical imaging, predictive modeling and bioengineering. These funds will allow us to recruit four new faculty members and get their research up and running, as well as covering the costs of numerous PhD Tracks, grants (of one or two years) for doctors and postdoctoral students, and supporting the development of the scientific and technical capacities of the E4H Center.

The Serge Schoen New Synergies Grant, funded by a generous donation of €300,000 from Serge Schoen, will be used to fund innovative research projects fostering interdisciplinary collaboration within the E4H community, supporting exploratory projects involving at least two researchers from two different IP Paris laboratories, and ideally from two different schools within the IP Paris group.

Under the banner of the “Biomedical Engineering Seed Grant” program, launched in 2019, the Bettencourt Schueller Foundation has renewed its support for the E4H center following a mid-cycle scientific and financial audit. This renewed support will ensure funding for five additional Biomedical Engineering BME Seed Grants worth €140,000 apiece, while also providing more training and support for researchers working on innovative subjects.
Hi! PARIS, up and running and bursting with initiatives

Founded in September 2020 by the Institut Polytechnique de Paris and HEC Paris, joined in July 2021 by INRIA (France’s national research institute for digital sciences and technologies, INRIA Centre Saclay), the Hi! PARIS interdisciplinary center is dedicated to data analysis and artificial intelligence (AI).

Since its inception, the center has received financial backing from five major donors: L’Oréal, Capgemini, TotalEnergies, Rexel and KERING. **Two new patrons joined that group in 2022: Vinci and Schneider Electric.**

Since the launch of Hi! PARIS, ten new professors of international standing have been recruited, and given the financial resources needed to put together their own research teams.

Five outstanding professors have been appointed to “academic excellence chairs” for a period of three years, permitting them to recruit researchers, fund doctoral theses and support an array of research activities. The center has also awarded 25 doctoral scholarships to students selected for their academic excellence and research potential.

**In September 2022, Raphaëlle Gautier, Director of Corporate Partnerships and Public Funding at HEC Paris, joined Hi! PARIS as Director of Operations, with a brief to deliver on the center’s ambitious targets and cement its position as one of the world’s leading centers of research on AI and data science.**

**First Hi! PARIS Symposium**

The Hi! PARIS center hosted its first Symposium on AI and society from 8 to 10 June 2022 at ENSAE Paris, on the IP Paris Campus. This three-day conference heard from 24 prominent international speakers. They included academics from prestigious institutions such as Berkeley, Chicago, Chile, TU Berlin, Luxembourg, Munich, NYU, Warwick, Milan, Jerusalem, Technion - Israel Institute of Technology, Cornell, Columbia and Princeton, not to mention a senior researcher from Microsoft.

**Hi! PARIS and the International Day of Women and Girls in Science**

To mark UNESCO’s International Day of Women and Girls in Science, on 11 February 2022 Hi! Paris took part in a high-profile event chaired by Cédric O, Secretary of State for the Digital Transition and Electronic Communication, and featuring Étienne Klein, physicist and philosopher of science, and Director of Research at the CEA. Professors and doctoral students from the Institut Polytechnique de Paris were among the speakers during the session on “AI, a force for more gender-balanced sciences?”
The 2nd edition of the Hi! PARIS Summer School ran from 4 through 7 July 2022 on the IP Paris campus at Telecom Paris, focusing on "AI & Data for Science, Business and Society". The Hi! PARIS Summer School brings together doctoral students, master’s students, academics and research engineers keen to expand their knowledge of different aspects of AI and data science. The event offered a busy program of tutorials, round-table discussion, seminars and debates, including a session on AI and society with some prestigious speakers and representatives of our corporate patrons.

The second edition of the Hi!ckathon Data Challenge for AI and Data Science, hosted by the Hi! PARIS Center on 5-6 March 2022, set a new attendance record with 236 students from a dozen schools and universities based in seven different countries. A total of 17 interdisciplinary teams completed the challenge, after several weeks of training and preparation. The goal was to create the most frugal AI model possible in response to a challenge focusing on "AI and sustainability," while also considering its commercial potential. The Hi!ckathonians were tasked with assessing the carbon footprint of a fleet of company vehicles.

From 22 through 26 August 2022, the Hi! PARIS center hosted two Data Science bootcamps. Over the course of the week, students from HEC Paris and the Institut Polytechnique de Paris had the chance to learn more about the current state of Data Science in business, develop their capabilities with Python and boost their programming, data cleaning, machine learning, optimization and EndtoEnd Data Science skills, with a clear focus on business and societal applications, reflected in the content of the lectures and case studies. This year’s big case study focused on fire detection and planning.

Hosted by Capgemini on 21 September, one of the Center’s major backers, this meet-up session looked at various aspects of computer vision, one of the most significant and high-profile breakthroughs in artificial intelligence in recent years.
E4C, living lab for the energy transition

The interdisciplinary research center Energy4Climate (E4C), established in June 2019 by the Institut Polytechnique de Paris and the École des Ponts ParisTech, is actively contributing to the energy transition through research, training and innovation.

E4C draws upon the scientific expertise of 34 partner laboratories and more than 240 researchers working on eight cross-cutting themes, all aimed at reducing greenhouse gas emissions, improving energy efficiency, expanding the distribution of renewable energies and evaluating public policy.

The center’s activities are defined and developed by its researchers in cooperation with industrial partners. They combine input from economics and social sciences, materials science and engineering, applied mathematics, computing and geophysics. The center is working to develop instrumentation platforms, energy forecasting models and a dedicated data center.

Training the next generation of energy experts is also a priority for E4C, which offers various master’s programs, a five-year doctorate and an entrepreneurship scheme for students keen to launch start-ups, as well as an international student challenge.

Staking out the priorities of its research program, in June 2021 E4C published a white paper which was evaluated by a committee of experts in 2022, in order to guarantee that the center’s scientific strategy is sound.

One of E4C’s goal is to develop demonstrators in collaboration with start-ups, small companies and multinationals, in order to conduct research into the large-scale implementation of solutions for the energy transition.

A series of experimental platforms and demonstrators have already been installed, and are now up and running on the IP Paris campus. The first to be completed was the Drahi-X Novation Center, the École Polytechnique’s in-house incubator, which was fitted out in collaboration with five corporate partners to provide an ideal arena for experimentation in the field of energy management. The facility boasts an exceptional array of solar panels, a battery system for energy storage, a Vehicle2Grid (V2G) charging station, smart meters, an electricity management system and a smart building management system.

Two more buildings on the IP Paris Campus have since been fitted with demonstrators: the Bachelor student halls of residence and the SIRTA observatory. The latter is home to the Nanogrid research and teaching lab (NRLab), solar panel test platforms and a solar-agriculture farm.
Within the next two years, thanks to the generous support provided in 2022 by the Ifker Climate Foundation, two decarbonization demonstrator units will be installed. A third demonstrator, for the SmartGarden concept, is currently in the design phase. All of these facilities will generate data which will be made available to the research community via the E4C DataHub.

Collectively, these life-size demonstrators installed across the campus make up the E4C Living Lab: an invaluable resource for demonstrating, testing, research, teaching, innovation and educating the public at large.

Energy4Climate center has already received a donation of €8 million from Agnès and Stéphane Ifker, which will help to cement its reputation as one of the world’s leading centers of expertise in this field.

Hosted by the Ecole Polytechnique Foundation, this new fund will be specifically dedicated to funding the “Reducing CO2 emissions: smart energy management and carbon capture” project launched by E4C.

Making a crucial contribution to the deployment of the energy transition in the field, this project will involve the creation of two new technology platforms: one devoted to extracting and recycling CO2 from the lake at École Polytechnique, as well as a life-size demonstrator for storing and optimizing thermal and electrical energy.

The thermal and electrical smart grid project, meanwhile, will focus on establishing an urban heat network for a residential neighborhood, allowing for inter-seasonal geothermal energy management and storage, combined with an electricity grid powered by solar panels, with storage batteries and charging stations for electrical vehicles. This demonstrator will be used to analyze the potential of smart synchronization between electrical and thermal networks, yielding forecasts at multiple timescales - from a few hours to whole seasons - while also enabling researchers to develop algorithms for optimization and management. It could allow for energy savings in the region of 60%.

The Ifker Climate Fund: An exceptional contribution to research into the energy transition

The Ifker Climate Fund, formally launched at Ecole Polytechnique on 14 September 2022, is the fruit of the exceptionally generous donation made by Agnès and Stéphane Ifker in order to accelerate research on the energy transition at the Energy4Climate interdisciplinary center.

The Ifker Climate Fund: formally launched at Ecole Polytechnique on 14 September 2022, is the fruit of the exceptionally generous donation made by Agnès and Stéphane Ifker in order to accelerate research on the energy transition at the Energy4Climate interdisciplinary center.

Signature of the convention establishing the Ifker Climate fund by Eric Labaye, President of Ecole Polytechnique and IP Paris, Agnès Ifker, senior executive in the education sector, Stéphane Ifker, Senior Partner at Antin Infrastructure Partners, and Jean-Paul Cottet, Deputy Director of the Ecole Polytechnique Foundation).
The **CIEDS has already launched its first research projects**, focusing on the development of new algorithms to improve drone operations in all environments (on land, in the air and at sea), the development of new imaging techniques for use in complex environments, and the construction of a demonstrator for testing digital attack and defense mechanisms for smart buildings.

The **CIEDS has formed a partnership with the Technology Transfer Accelerator based at Cluster Paris-Saclay (SATT Paris-Saclay)** in order to capitalize on its technological advances and lay the groundwork for their industrial deployment, for both civilian and military purposes. Founded in 2014 as part of the Future Investment program, SATT Paris - Saclay is a joint initiative of the Institut Polytechnique de Paris and Paris-Saclay University. With an investment capacity of €79 million spread over 11 years, it works to finance and support the wider deployment of research work from the ground level up, facilitating technology transfer for marketable applications.

It also seeks to develop scientific and technological systems not currently accessible for the armed forces but with the potential to generate considerable operational added value, helping to upscale such technologies and strengthen the industrial and technological bases of the defense sector.

The CIEDS is intended to bring together the research community, students, employees of the Ministry and its partners - national research bodies, funding agencies, businesses - with a shared interest in defense matters.
On 17 May 2022, the CIEDS was visited by the commander of the French navy, Admiral Pierre Vandier, who met researchers from the Laboratory for Applied Optics (LOA) along with a selection of entrepreneurs, discussing subjects of research and technological innovation. Two LOA researchers, Aurélien Houard and Davide Boschetto, introduced the admiral to some recent developments with potentially interesting Defense and Security applications. He then met the founders of young start-up Amphitrite, which provides civilian and military maritime operators with applications for processing satellite data, using artificial intelligence to map oceanic currents and optimize the trajectories of ships and submarines.

On 16 November 2022, CIEDS launched its new Defense Engineering and Innovation Lecture Series (2ID). This lecture series is one of the tools being used by CIEDS to foster, within the IP Paris community and beyond, greater awareness of strategic challenges such as tech sovereignty. The aim is for these lectures to also provide a forum for different stakeholders - researchers, industry representatives, students, employee of the Ministry for the Armed Forces - to meet and interact, creating the conditions for new and innovative defense projects to see the light of day.
« Building a thriving ecosystem for technological entrepreneurship and innovation »
The Institut Polytechnique de Paris and its member Schools are committed to an ambitious strategy which seeks to build a thriving ecosystem for technological entrepreneurship and innovation informed by four operational priorities: boosting our attractiveness in the field of innovation and entrepreneurship, fostering the emergence of ambitious student-led start-ups, encouraging the creation of Deeptech start-ups spun off from our laboratories, and reinforcing the IP Paris incubator ecosystem.

In this spirit, IP Paris hosted the SPRING 2022 fair, bringing together the leading forces in innovation from across the Saclay campus. The Institute was prominently involved with the VivaTech 2022 trade fair, one of Europe’s foremost entrepreneurship and innovation events, and was also a key partner of the second edition of the DeepTech Tour.

As a partner of France Digitale since 2019—an association which exists to create networking opportunities for investors and start-up directors - IP Paris recently participated in France Digital Day. This annual event creates countless opportunities for professionals to form new connections, some of which have resulted in major fundraising operations.

Since its inception, IP Paris has offered intensive support to researchers from its own laboratories working on innovative projects. These efforts include the Premat call for projects, aimed at facilitating the invention-to-market process and helping inventors to produce proof of concept, an important step in their development and a key asset when seeking external investment. The eleven winners of the 2022 edition, including researchers from Telecom Paris, Telecom SudParis and the Ecole Polytechnique, will share a total prize fund of €885,000. The winning projects span a wide spectrum of research fields, from materials physics to MedTech, the environment, networks and 5G.

In order to foster the development of ambitious student start-ups, particularly in the Deeptech sector, and to whet students’ appetite for innovation and risk-taking, IP Paris has published a guide for student entrepreneurs which includes detailed advice on launching a start-up. The guide also provides information on the exceptional range of resources available to support young start-ups in the IP Paris ecosystem, not least the schools’ incubators, which strive to provide the most effective possible support for student entrepreneurs and recent graduates.

The creation of the Telecom Paris incubator at STATION F marked the first big milestone in IP Paris’ new incubation strategy, establishing Europe’s biggest incubator in the very heart of Paris, dedicated to hosting projects funded or co-funded by alumni of our member schools, or nurtured within their own incubators.
**IP Paris hosts SPRING 2022**

This event, hosted on campus, attracted start-ups, investors, researchers, doctors, students and other innovation actors for a busy program of 30 round-table discussions, workshops and conferences. Numerous players from different parts of the innovation ecosystem were on hand to showcase their solutions at the event village, including 22 start-ups from the IP Paris stable. Two of our interdisciplinary centers - Energy4Climate (E4C) and Hi! Paris - were also in attendance, as were the incubators of our member schools: Telecom Paris, IMT Starter and Drahi X-Novation. Pathway, a start-up from the IP Paris ecosystem incubated at Drahi-X Novation, won the SPRING50 pitch contest in the Digital Tech category.

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**VivaTech 2022: Celebrating IP Paris’ start-ups and interdisciplinary centers**

IP Paris presented no fewer than 21 startups at the 6th edition of the VivaTech trade fair at Porte de Versailles, Paris. The innovations developed by these start-ups span various domains and sectors, including artificial intelligence, FinTech, HealthTech and MedTech, mobility, energy, BioTech, pharmaceuticals, cryptology, cybersecurity and SportTech.

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**VivaTech 2022: Workshop IP Paris**

The Workshop hosted by IP Paris at VivaTech 2022 provided an opportunity to turn the spotlight on some of the research projects and breakthroughs made possible by IP Paris’ interdisciplinary centers. Eric Labaye, President of the Institut Polytechnique de Paris, was on hand to discuss the Institute’s ambitions in terms of research and innovation, while Nicolas Glady, Director of Telecom Paris and President of the IP Paris Innovation Committee, introduced the IP Paris incubators and their strategy.
INNOVATION

IP Paris partner of the 2nd DeepTech Tour

The DeepTech Tour travels around France’s university campuses seeing to establish connections between academic research and entrepreneurship. On 31st May this year, IP Paris and Paris-Saclay University co-hosted a round-table discussion designed to inform researchers and doctoral students about the business creation, collaboration and career opportunities offered by DeepTech start-ups. The DeepTech Tour is part of the DeepTech strategy launched by the French government in 2019, with a budget of €2.5 billion to be spent over a five-year period, coordinated by BPI France.

IP Paris and “L’Instant SATT Paris-Saclay” 2022

This event, held on 24 November on the HEC Paris campus in Jouy-en-Josas, focused on technology transfer and DeepTech start-ups. Almost 400 participants gathered to hear from 20 projects now reaching maturity and 20 start-ups born of technology transfers, including several from the Institut Polytechnique de Paris. “L’Instant SATT Paris-Saclay” 2022 was supported by the Institut Polytechnique de Paris, the CNRS and Paris-Saclay University.

Inauguration of the Telecom Paris incubator at STATION F

This launch marked the first milestone in IP Paris’ new incubation strategy, making STATION F - Europe’s biggest incubator, located in the very heart of Paris - the home of projects funded or co-funded by alumni of our member schools, or nurtured at our three in-house incubators. Through this new program, IP Paris start-ups will be able to take full advantage of the expertise, facilities and networking opportunities on offer at STATION F.
« One of IP Paris’ great strengths is our capacity for forming close bonds with industrial partners »
One of IP Paris’ great strengths is our capacity for forming close bonds with industrial partners. These partnerships take the form of agreements or chairs within member schools or spanning IP Paris as a whole.

IP Paris’ partnership strategy is powered by two key tools - our inter-disciplinary centers and our joint laboratories - which are invaluable assets for attracting investment.
Strategic partnership with EDF

On 15 September 2022, the Institut Polytechnique de Paris and EDF signed a cooperation agreement which builds upon the collaborative relationship established over the past 15 years between the company and the member Schools of IP Paris. The agreement is also designed to support the emergence of new research projects on fundamental and applied subjects, including some of the key issues facing the energy sector (the transition, quantum energy, nuclear power, AI etc.). The signing ceremony was held on the IP Paris campus, and provided an opportunity to showcase some of the scientific and technological breakthroughs made by the Laboratory of Physics of Interfaces and Thin Films (LPICM), including new electrodes made using carbon nanotubes for use in batteries, as well as some of the research in progress at SIRTA, the Institut Pierre-Simon Laplace climate observatory (IPSL) and the Energy4Climate interdisciplinary center (E4C).

Strategic partnership with Orange

In April 2022, Orange and the Institut Polytechnique de Paris signed a cooperation agreement which lays the foundations for future joint projects aimed at developing secure, responsible and inclusive technologies. The agreement sets out the first milestones towards significantly strengthening and expanding the existing collaboration between Orange and IP Paris, pooling our resources and expertise in pursuit of shared goals: training engineers to meet the needs of the job market of the future, strengthening leadership for a responsible digital transformation, and promoting inclusion and diversity in the tech world.
Two new patrons for the Hi! PARIS interdisciplinary center

Two new corporate patrons have pledged their support to the interdisciplinary center Hi! PARIS: Vinci and Schneider Electric. Founded in September 2020 by the Institut Polytechnique de Paris and HEC Paris, joined in July 2021 by INRIA (France’s national research institute for digital sciences and technologies, INRA Centre Saclay), the Hi! Paris interdisciplinary center is dedicated to data analysis and artificial Intelligence (AI). Since its inception, the center has received financial backing from five major donors: L’Oréal, Capgemini, TotalEnergies, Rexel and KERING.

Technology for Change 2022

The Technology for Change chair at the Institut Polytechnique de Paris hosted its second annual summit from 4 to 6 April 2022 in Paris and Palaiseau. These discussions offered an overview of the current state of relations between technology, society and industry, with a view to bringing together multiple disciplines, rethinking old approaches and identifying opportunities for developing virtuous technologies capable of bringing about lasting change.

Launch of IP Paris’ first joint laboratory for high-intensity lasers, HERACLES³

On 1st February, the Institut Polytechnique de Paris, the CNRS and Thales signed a partnership agreement involving the creation of a new joint laboratory for research and development in the field of high-intensity lasers. The HERACLES³ joint laboratory (High Energy Research into the Laser-powered Acceleration of Electrons and Secondary Sources at Saclay) will focus on developing cutting-edge technologies using high-intensity lasers, with a host of potential industrial, medical and scientific applications.
« By 2026, IP Paris plans to sign 15 strategic agreements spanning 5 continents »
The Institut Polytechnique de Paris has adopted a two-pronged international partnership strategy: on the one hand, the high-level partnerships already formed by our member schools, and, on the other hand, our involvement with the leading international networks for higher education and research: the EuroTech university alliance, a network of prestigious science and technology universities, the U7+ Alliance, the leading international conference of university presidents, the Conference of European Schools for Advanced Engineering Education and Research (CESAER) and the Agence Universitaire de la Francophonie (AUF).

By 2026, IP Paris plans to sign 15 strategic agreements spanning 5 continents, including 2 in Sub-Saharan Africa.

Among the highlights of 2022 were the Institute's ratification as a member of both the EuroTech alliance and the CESAER network. It also saw the launch of a new program of travel grants and short-term exchanges (Summer Schools) aimed at encouraging students from Europe and the USA to visit IP Paris, and our own students to visit countries at the forefront of research, such as Japan, South Korea, Singapore and China.

In order to better support the campus' international community and help them to master France's language and culture, the Institute recently inaugurated its International Center for French Language and Culture.

To ensure that our ongoing development remains aligned with the strictest international standards, IP Paris receives guidance from the International Scientific Advisory Board, a panel of fifteen internationally-respected experts who met for the third time in 2022.
During this year’s MIT European Career Fair (ECF), held online on 17 February 2022, 12 program directors from the Institut Polytechnique de Paris (IP Paris) were invited to discuss the teaching and research opportunities on offer at the institute, championing our Master, PhD Tracks and doctoral programs. The ECF is an annual recruitment fair organized by MIT’s European Club, and generally hosted at the Massachusetts Institute of Technology (MIT).

IP Paris at EAIE 2022

IP Paris took part in the 32nd annual EIAE conference, a major international gathering of the higher education community, in Barcelona from 13 to 16 September 2022. This event provided a welcome opportunity to strengthen ties between IP Paris and our international partners, discussing future academic and scientific collaborations. It was also a chance for us to promote the range of courses on offer at IP Paris, and to seek out new partnership opportunities.
INTERNATIONAL PARTNERSHIPS

On 28 March 2022 IP Paris welcomed representatives of the European CESAER network, having been confirmed as a member earlier in the year. This visit provided an opportunity to learn more about the network and its activities within the Institut Polytechnique de Paris, and also to share IP Paris’ vision for research, higher education and innovation.

3rd meeting of the International Scientific Advisory Board (ISAB)

The board assembled on 20-21 April 2022, taking the time to meet with the heads of our research and teaching departments, representatives of the interdisciplinary centers and the Graduate school, and also to find out more about the Institute’s recent achievements and the strategic goals set out in the 2022-2026 OPC plan.

CESAER partnership

On 28 March 2022 IP Paris welcomed representatives of the European CESAER network, having been confirmed as a member earlier in the year. This visit provided an opportunity to learn more about the network and its activities within the Institut Polytechnique de Paris, and also to share IP Paris’ vision for research, higher education and innovation.
Inaugurated on 7 June 2022, the International Center for French Language and Culture (CILCF) is an umbrella organization bringing together the vast array of cultural, scientific and academic initiatives aimed at international members (students, researchers and staff) of the Institute and its schools.

Humanities, the Arts, Literature and Languages are among the ten fields of teaching and research represented at IP Paris, with leading researchers and PhD students working at state-of-the-art laboratories and facilities. The activities of the CILCF fall into three broad categories: culture, research and academic study.

Its aim is to coordinate activities of international importance on campus, to foster a real sense of synergy in the French-language programs available for international students and researchers, and to clearly present the numerous options available at IP Paris to study French language and culture regardless of your program of study (teaching in English and French).
In addition to the French classes taught at IP Paris and in its member schools, the CILCF organizes conferences, linguistic and cultural events, and MOOC modules for French learners.

The intermediate-level French MOOC (Level B1-B2) entitled Studying in France - launched in December 2016 by the Ecole Polytechnique - has attracted over 400,000 students from 160 countries all over the world, putting it at number 77 on the list of the world’s most popular MOOCs. The CILCF launched a second French language MOOC in late 2022, aimed at more advanced students (Level C1-C2).

The CILCF has also taken on the responsibility of organizing the “New Breakthroughs” contest, which receives hundreds of submissions each year. Established by ENSTA Paris, subsequently joined by the École Polytechnique, this short story competition invites candidates in five categories (students, secondary school students, global French-speakers, the general public, “art, science, citizenship”) to submit pieces on a given theme. In 2022 the theme was “Light,” and the prize-giving ceremony was held on 20 October at the Pantheon, Paris.
« IP Paris is committed to ensuring that its campus meets the highest international standards »
IP Paris is committed to ensuring that its campus meets the highest international standards, with infrastructure and services that satisfy two essential criteria: on the one hand, providing a living environment which is agreeable, attractive, functional and ecologically and socially responsible for all campus users; on the other hand, improving the quality of life on campus to ensure that all members of our community have a fulfilling experience here.

In 2022 our efforts in this direction were focused on improving public spaces on campus, developing facilities for students and staff, ameliorating local amenities and organizing a diverse array of cultural events to bring our various members schools together.

The Institute also put the finishing touches to its facilities management guidelines for research facilities and sports facilities. We are now working on plans for a multi-functional, unifying, landmark ‘Campus House’, and a shared Math Building.
France's first autonomous delivery vehicle system was inaugurated in December 2022 on the Institut Polytechnique de Paris campus. Operated by Goggo Network, the driverless electric delivery vehicle itself was designed by tech startup MILLA. It delivers baskets of groceries from the Carrefour pick-up point direct to students and residents of the Saclay campus.

This pilot project was officially inaugurated at the École Polytechnique by Christophe Béchu, French Minister for the Ecological Transition and Territorial Cohesion, Alexandre Bompard, CEO of Carrefour, Yasmine Fage, co-founder of Goggo Network, and Eric Labaye, President of École Polytechnique and the Institut Polytechnique de Paris. The project operates within the broader framework of the 5G Open Road program, led by Plateforme Automobile (PFA) and Nokia. 5G Open Road is one of Europe’s biggest programs aiming to support the deployment of driverless vehicles on open roads. Its members include sixteen major players in the future of transport, with funding of almost €90 million provided by these members, as part of the Investments for the Future program (PIA), along with BPI France.
A new fleet of electric vehicles

IP Paris has formed a partnership with Clem’, a leading force in electric car sharing and shared recharging, to handle the technical and commercial running of our electric car-share scheme, primarily focusing on the Paris-Saclay urban campus and open to all of our economic and academic stakeholders. This partnership is consistent with our ambition to develop green mobility solutions on campus. The scheme allows our students and staff to rent electric vehicles at subsidized prices, for short periods ranging from 30 minutes to 3 days.
« Students are at the heart of the Institut Polytechnique de Paris project »
STUDENT COMMUNITY

Students are at the heart of the Institut Polytechnique de Paris project, and recent improvements have focused on helping them fulfill their role as the driving force of campus life.

Our call for proposals from students is an opportunity to nurture and support numerous initiatives aimed at strengthening bonds within the IP Paris student community: forums, cultural and artistic events, sporting competitions and, of course, charity projects.

One major development on the Institut Polytechnique de Paris campus in 2022 was the inauguration of the new health center, followed swiftly by the roll-out of its first services and an information and prevention campaign focusing on sexual and sexist violence.
The CVEC committee: supporting student-led projects

In 2022, IP Paris formed a CVEC committee to decide how to distribute the funds from the student community contribution (VEC) among student projects, and to provide extra support to students experiencing financial difficulties.

The student community and campus contribution (CVEC) is a levy collected by the regional student affairs offices (CROUS) since 2018, and earmarked for efforts to improve campus life at France’s higher education institutions. Set at €95 for the year 2022-2023, this levy is payable by all students enrolled on full-time courses at higher education institutions in France. The CVEC is collected by the CROUS network and then split among higher education institutions and CROUS agencies, who allocate the funds to projects aimed at improving student life on campus.
STUDENT COMMUNITY

IP Paris call for student projects: unifying initiatives

Launched in 2020, the IP Paris call for student projects is an annual program awarding funds to fun, collective projects proposed by the IP Paris student community. The idea is to support unifying, fun activities with an eye on the future. The scheme was a great success in 2022, with more than 39 proposals received and 30 selected, including the Aster Forum, l’Ekiden du Platal, Fusion IP Paris, a hackathon and several cryptocurrency conferences.

L’Ekiden du Platal

The 2nd running of l’Ekiden du Platal, a marathon in relay format open to teams of 6 runners, was hosted by the Telecom Paris sports association on 12 May 2022. Students and staff from all of the Saclay schools, and of all levels of sporting ability, took on a course which passed through the IP Paris campus and the Palaiseau National Forest.

The ASTER Forum

The 1st edition of the Aster Forum - a gathering of eco-responsible businesses and students of the Institut Polytechnique de Paris and other schools on the Saclay campus - was held on 17 November in the Grand Hall at ENSTA Paris. This brand new job fair was devoted to professional opportunities in the field of sustainable development, with two guiding principles: a social future, and a responsible ecological transition.
Health, both mental and physical, is one of the key factors in academic success. The importance of health is increasingly acknowledged and taken into consideration in discussions of student life and well-being. This importance is clearly recognized by the Institute and its member schools.

### Development of the IP Paris Health Center

IP Paris and its member schools have decided to unite their efforts in order to provide a unified, extensive and practical range of healthcare services on the IP Paris Campus. Launched in 2021, the Institut Polytechnique de Paris Health Center is open to all employees and students at the Institute. In August 2022 a dedicated coordinator was appointed to run the Health Center, tasked with organizing the range of services, managing the center and ensuring that all employees and students on campus have access to the same level of service.

### Partnership with Qare

In 2022, IP Paris and its member schools formed a partnership with Qare, a company specializing in remote medical consultations. The aim of this partnership is to facilitate access to remote consultations with GPs and specialist doctors for our students and staff. Appointments are available from 6am to midnights, 7 days a week, with no advance payment required. This partnership also allows the members schools to access anonymized data and keep track of the demand for medical appointments among IP Paris students and staff.
Combating sexual and sexist violence

Under the banner of the national campaign launched by the Ministry for Higher Education and Research, the Institut Polytechnique de Paris ramped up its efforts to combat all forms of discrimination and violence in 2022. Various awareness-raising initiatives were organized for all students on Masters and PhD Track programs.

In addition to these efforts, and in order to build upon the work already done by the member schools, IP Paris has set up a dedicated reporting and handling system for incidents of sexist and sexual violence, incorporating special procedures for such cases into the internal regulations.

IP Paris Preventive Health Day

Students from IP Paris and the member schools took part in the second edition of the IP Paris Preventive Health Day, held on 12 August 2022 at Telecom Paris. They heard from a number of speakers on important subjects such as blood donation, HIV, first aid training and more. The program also included talks on subjects including consent, sexual and sexist violence and addiction.
« In an increasingly complex, fast-moving world, the Institut Polytechnique de Paris plays a major role in training tomorrow’s leaders, and in developing research and innovation for the common good »

Eric LABAYE  
Chairman and President, Institut Polytechnique de Paris  
Chairman and President, École Polytechnique