



# ANNUAL REPORT

2022



ÉCOLE  
POLYTECHNIQUE

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A word from the President  
Eric LABAYE



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X and IP Paris in the rankings





Eric Labaye  
President of École Polytechnique  
and Institut Polytechnique de Paris



## *All of the projects planned for the next five years are underway*



In 2022, École Polytechnique set in motion its plan for the next five years, described in the Objectives and Performance Contract signed with our supervising agency, the Ministry for the Armed Forces.

This plan has three major aims: further excel and build its renown in its three main missions of training, research and innovation, engage with and open up to the world, and actively contribute to the success of Institut Polytechnique de Paris.

The School continued to develop its multi-curriculum academic offerings. It has prepared to update its engineering program to reflect international standards and the challenges of tomorrow's world. The Bachelor's and MSc&T programs continued their growth and consolidated their firmly established international renown. The Executive Master's enjoyed continued success and Executive Education expanded its continuing education offer.

Research entered a new phase with its integration into Institut Polytechnique de Paris, which launched its new Engineering for Health (E4H) interdisciplinary center and the International Center for French Language and Culture.



Alain Aspect won the Nobel Prize in Physics for his work on quantum entanglement, **joining the list of École Polytechnique professors who have won this prestigious award**, and highlighting the excellence of our faculty made up of world-class researchers renowned for their cutting-edge research.

Innovation, X's most recent focus, **has also ramped up its development and there is an increasing focus on entrepreneurship in our students' training. Seven of the 28 French unicorns** –start-ups valued at least \$1 billion– **were founded by X alumni**, illustrating the vitality of the School's entrepreneurship and innovation ecosystem.

In 2022, École Polytechnique demonstrated its commitment to **sustainable development and diversity**. We made progress towards the aims set out in our Climate Plan, published in January 2022, which places sustainable development at the heart of our missions.

Benefiting from a financial position which is now consolidated, **the School obtained a loan from the European Investment Bank** which will allow us to renovate the main campus building in order to cut energy consumption.

While celebrating the fiftieth anniversary of the Polytechnique Engineering program exam being open to women, **the School pledged to step up efforts to increase gender diversity**. As such, it has set a target of at least 30% women in its various training programs by 2026, and 40% women in terms of the recruitment of teachers and researchers. **It has achieved gender parity in its Executive Committee.**

**We have continued to develop strong academic partnerships**, in particular with Columbia, Berkeley and the EuroTech alliance.

**Our achievements and successes in 2022**, which reflect the commitment of the entire École Polytechnique community, **give the School fresh impetus to build its future with confidence.**





# IP Paris, a new step in its development

After two years devoted to its founding and implementation, **Institut Polytechnique de Paris successfully launched the actions set out in its first Objectives and Performance Contract (OPC) 2022-2026**, developed in conjunction with that of École Polytechnique, one of its five founding Schools, along with ENSTA Paris, ENSAE Paris, Télécom Paris and Télécom SudParis.

In connection with École Polytechnique, **IP Paris' OPC seeks to bolster its position as a major player** in education, research and innovation by improving the student journey, boosting the attractiveness of its PhD program, increasing the role of teaching and research departments, accelerating the growth of its interdisciplinary centers and developing an ambitious innovation and entrepreneurship strategy.

**As the winner of the ExcellenceS call for projects**, through the Investments for the Future Program (PIA4), **IP Paris will benefit from €28 million in funding over a seven-year period** to accelerate its training and research strategy, as well as strengthen its international attractiveness and impact among outstanding researchers and students.

## Attractive training programs

IP Paris' academic offerings now include **12 PhD Track programs**, with strong links with topics studied at its research center, and 15 Master's specializations. The attractiveness of its programs has also grown, with a **new intake of 700 students for the 2022-2023 academic year** and applications up 53% for the PhD Track and 39% for Master's programs.

## Intensified growth of interdisciplinary centers

IP Paris research stepped up its growth with the **strengthening of its interdisciplinary centers on issues facing society**. The Energy for Climate Center (E4C), Hi! PARIS, dedicated to data science and artificial intelligence, and the Interdisciplinary Center for Defense and Security (CIEDS) continued their growth. **Energy4Climate received an exceptional €8 million donation from Agnès and Stéphane (X93) Ifker.**

**Several calls for projects selected through the Call for Expressions of Interest-Skills and Professions of the Future** will make it possible to develop projects in the area of quantum technology and training in Artificial Intelligence.

The CIEDS benefited from strong commitment from the Defense Innovation Agency (AID) to develop projects contributing to technological sovereignty and innovation for defense.

The launch of the Engineering for Health Center (E4H) helps contribute to the development of innovative approaches to medical practice and Life Sciences research. IP Paris is also one of the founding members of the **Paris-Saclay Cancer Cluster**.

Lastly, the **International Center for French Language and Culture** seeks to support the international community on campus by furthering knowledge and understanding of the French language and culture.

## A vibrant innovation and entrepreneurship ecosystem

The Institute continued to develop a rich innovation and entrepreneurship ecosystem. **IP Paris organized the SPRING 2022 Show at École Polytechnique**, bringing together leading innovation players from the Paris-Saclay cluster.

It had a strong presence at **VivaTech 2022**, with **21 start-ups from its incubators in attendance** and its running of the Workshop "Tech, the Challenge for Society".

The installation of the Télécom Paris incubator at STATION F was a first step in IP Paris' new incubation program, which seeks to develop **Europe's biggest incubator based in the heart of Paris**, to bring together projects founded or co-founded by alumni of IP Paris schools or incubated through its three incubators. Through this new program, **IP Paris will enable start-ups in its ecosystem to benefit from the expertise, facilities and network provided by STATION F.**

## New corporate partnerships

The development of partnerships continued with **two new sponsors for the Hi! Paris Center**, Schneider Electric and Vinci. **IP Paris and EDF signed a cooperation agreement**, strengthening the collaborations that have existed for over 15 years between the energy company and the five member schools.



The Institute also signed a **strategic cooperation agreement with telecom operator Orange** in order to build high-level programs in the most critical areas of digital expertise, support research-based training aims and take joint action to foster diversity equal opportunity in access to scientific education.



## Enhanced international renown

**IP Paris further improved its leading position in international rankings.** For its second time taking part in the QS World University Rankings (WUR), and for the second year in a row, the Institute ranked among the world's Top 50 universities, rising to 48th place. IP Paris was also ranked **12th worldwide in terms of its graduate employability.**



# HIGHLIGHTS

**7 JULY**

IP Paris launched its **4th interdisciplinary center, Engineering for Health (E4H)**, devoted to engineering and health.



**12 JULY**

With its **STeP2 project**, IP Paris was among the winners of the second round of the **“ExcellenceS in all its forms” call for projects** launched by the French Ministry of Higher Education and Research.



**4 FEBRUARY**

**Inauguration of the Paris Saclay Cancer Cluster with IP Paris.** To mark World Cancer Day, the Paris Saclay Cancer Cluster, announced by French President Emmanuel Macron in June 2021, which has now taken the form of an association, was inaugurated at the Gustave Roussy hospital. In attendance were Olivier Véran, French Minister for Solidarity and Health, Frédérique Vidal, Minister for Higher Education, Research and Innovation and representatives of the five founding members: Sanofi, Gustave Roussy, Inserm, Institut Polytechnique de Paris and Paris-Saclay University.



**30 JUNE AND 1 JULY**

**First in-person graduation ceremonies held for 2021 graduates of Master's, PhD Track and Doctoral programs.** In total, 585 Master's and PhD Track graduates in 14 programs and 228 graduates of doctoral programs in 7 fields were awarded degrees.



**1 FEBRUARY**

IP Paris, CNRS and Thales sign a partnership agreement to create a joint laboratory **HERACLES<sup>3</sup>** (High Energy for Research in Laser Electron Acceleration and Secondary Sources at Saclay) to develop cutting-edge technologies based on intense lasers.

**13 DECEMBER**  
**Hi! Paris partnership agreement SIGNED** with IP Paris, Schneider and HEC.



**15 TO 18 JUNE**

IP Paris takes part in the **6th Viva Technology show**, Europe's biggest start-up and tech event, presenting 21 start-ups developed at its 5 Schools and 3 incubators.



**20-21 APRIL 2022**

**3rd meeting of the International Scientific Advisory Board – ISAB**, an advisory body responsible for providing IP Paris with recommendations and strategic guidance, which comprises 15 internationally-renowned experts.



**12 MAY**

**E4C seminar on technology for the energy transition:** “Deploying hydrogen and decarbonizing its industrial uses.”



**28 MARCH**

IP Paris receives representatives from the **European CESAER network**, which it joined in 2022. CESAER is a major European player in issues related to higher education, research and innovation in science and technology.



# Supporting French and European sovereignty



*“In the face of rising international competition over the last two decades, École Polytechnique boasts wonderful assets, such as the high level of our students and training programs, our outstanding faculty, cutting-edge research and a dynamic innovation and entrepreneurship ecosystem.”*

**Laura CHAUBARD**

Engineer-General of Armaments,  
Director General of École Polytechnique

École Polytechnique’s humanist, sports and military training –which sets it apart from other French engineering schools– empowers students to strive for the common good and uphold the values of loyalty and solidarity, thereby fostering a spirit of defense and cohesion in future leaders, who will have a crucial role to play in national and European sovereignty.

Its excellent training and scientific research and focus on entrepreneurship and innovation also testify to its technological expertise, which is crucial to support developments in cutting-edge fields like artificial intelligence, quantum technology and intense lasers in order to ensure the implementation of increasingly complex industrial and weapons programs.

Founded in 2021 with strong support from the French Ministry for the Armed Forces and the Defense Innovation Agency (AID), the Interdisciplinary Center for Defense and Security (CIEDS) launched its first studies focused on developing new algorithms for operating drones in all types of environments (land, sea, air), developing techniques for imaging in complex environments and building an attack demonstrator and digital defense mechanisms in the field of smart building.

Amid the reemergence of bloc confrontation, persistent terrorist threats and pervasive health and climate risks, École Polytechnique’s missions of training, research and innovation help strengthen France’s industrial sovereignty and defense capabilities.



## HIGHLIGHTS

**5 OCTOBER**

**Laura Chaubard (X99) was appointed Director General of École Polytechnique and took office; she is the first woman to hold the position.** Laura Chaubard holds a PhD in Algorithmics from Paris Diderot University (Paris VII) and has technical management experience as a big data and artificial intelligence expert for the Directorate General of Armaments (DGA). As the head of the strategic SME office at the DGA, she was responsible for identifying and supporting 600 French SMEs to support defense. As the Innovation and Digital Advisor in the cabinet of the Minister of the Armed Forces, Florence Parly successfully led the creation of the Defense Innovation Agency, the “Definvest” investment fund, the Directorate General for Digital Technologies and the drafting of the “Artificial Intelligence” roadmap for the Ministry of the Armed Forces.



**14 OCTOBER**

**Minister of the Armed Forces, Sébastien Lecornu, presided over a military ceremony at X and gave a speech to Polytechnique students, calling on them to ensure French sovereignty.**



**14 JULY**

École Polytechnique’s traditional participation in the **Bastille Day military parade** featured a greater number of female Polytechnique students to celebrate the fiftieth anniversary of the Polytechnique Engineering program exam being open to women.

[Learn more >](#)



**17 MARCH**

While visiting École Polytechnique to talk to students and preside over the ceremony for the X2019 class leaving the campus, **Minister of the Armed Forces Florence Parly emphasized the need for top-flight engineers to meet the challenges of an increasingly dangerous world.**

[Learn more >](#)



**19 MAY**

**Ceremony to present and hand over the flag to the Class of 2021 attended by General Pierre Schill, Chief of Staff of the French Army.**

**17 MAY**

**Talk by Admiral Pierre Vandier, Chief of Staff of the French Navy, at X to discuss major geopolitical issues in the naval sector with Polytechnique students.**





FOCUS 3

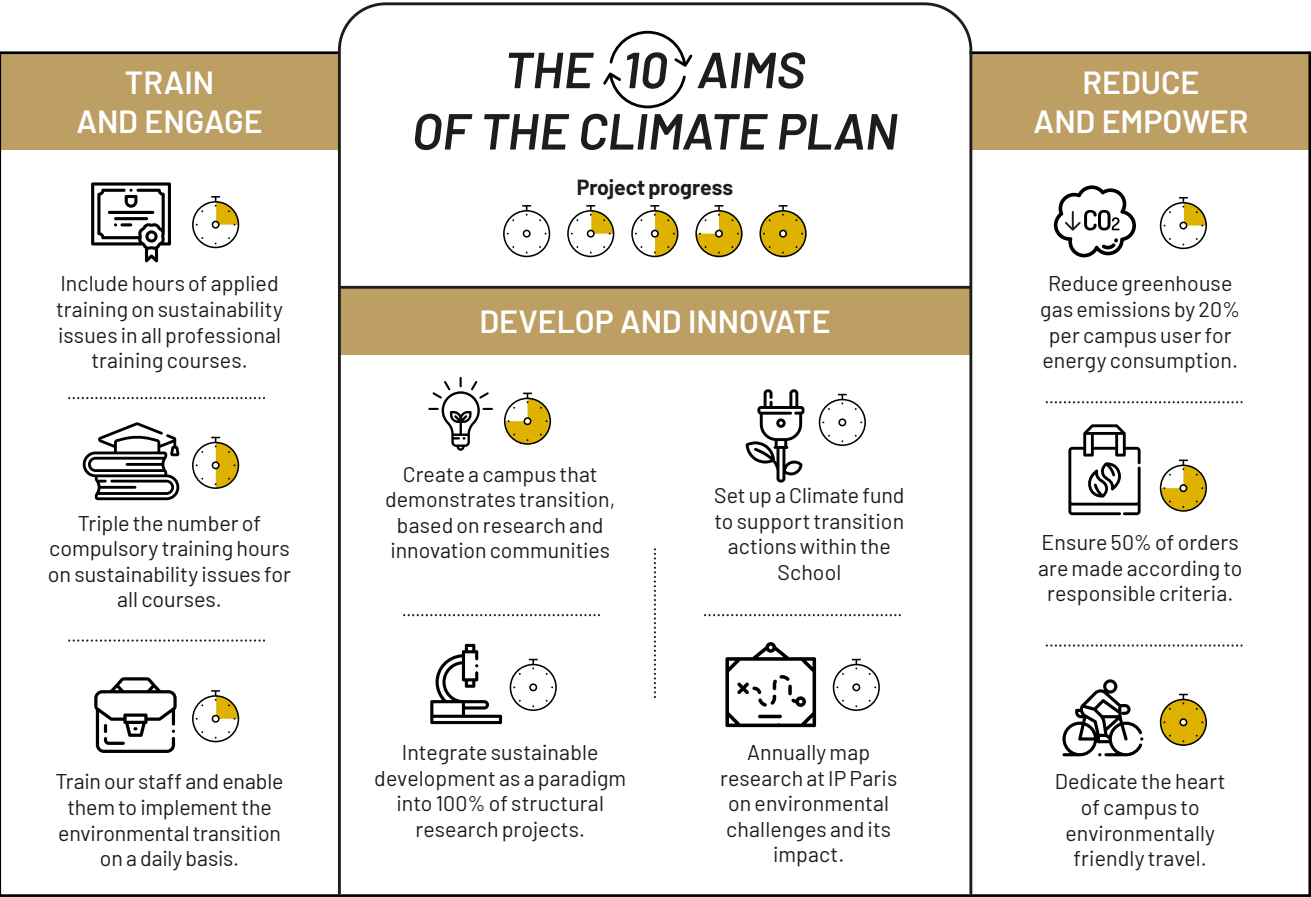
# Climate Plan: progress towards achieving the 10 aims

A year after the publication of the École Polytechnique Climate Plan and the School's pledge to place sustainable development at the center of its fundamental missions of training, research and innovation, progress has been made towards achieving the ten aims.



Download  
Climate Plan >

The X Climate Plan, published at the end of January 2022, integrates sustainable development in its fundamental missions of training, research and innovation as well as in campus operations. It sets out ten aims to be achieved within five years, divided into three focus points –train and engage, develop and innovate, reduce and empower– to transform behavior on a profound level and contribute to the emergence of responsible and sustainable prosperity.



## “TRAIN AND ENGAGE”



X awarded its first sustainable development certificates to students in the X19 class. This optional certificate provides in-depth training on sustainability issues for engineering students and Master of Science & Technology students. The certificate continued its growth, with 105 students enrolled for the class of 2021 (82 engineering students and 23 MSc&T students).



The School held its 4th Sustainable Development Seminar, which brought together 630 participants –engineering and Bachelor’s students– for two days of conferences and workshops and the opportunity to take the Sullitest.

Representatives from the various academic departments began preparatory work to develop a process for incorporating ecological transition issues in all courses. This first step will be continued in 2023 with a detailed review of academic offerings in light of the United Nations Sustainable Development Goals.





## "DEVELOP AND INNOVATE"

Since it was created in 2019, the **Energy for Climate (E4C) interdisciplinary center** has produced **46 publications** and contributed to the **first MEDDEC report, the Mediterranean IPCC**. The Center also contributed to the **GREC Ile-de-France**, a regional group for climate change and ecological transition expertise, **initiated in late 2020 by Institut Pierre-Simon Laplace (IPSL)**, a climate science research institute, and the **Institute for Environmental Transition of the Sorbonne University Alliance (ITE)**.

In collaboration with IPSL, **E4C launched its medialib, which offers 61 initial shared educational materials** on energy transition and sustainable development for teaching staff.

E4C continued to develop **new energy management solutions** with the installation of different types of platforms and demonstrators, including within two campus buildings (Building 103 and the SIRTa building).

**E4C benefited from €15 million in fundraising in 2022** including €8 million through sponsorship with the **creation of the Ifker Climate Fund**, €1.5 million in funding from Engie and €5.5 million through the fourth **Investments for the Future Program (PIA4), ExcellenceS**.

In 2022, **six GreenTech start-ups were supported by the Drahi-X Novation Center**, X's center dedicated to entrepreneurship and innovation. One of them, Amphitrite, was developed directly at X laboratories and five others were developed outside the school: Bluenrose Technologies, Sollys, Kalyosphere, H2YAM and Eurobreath.IT.



## "REDUCE AND EMPOWER"

As a sign of growing awareness among our entire community and the effectiveness of the implemented solutions, X's energy consumption trajectory shows an **8% decrease in electricity consumption per square meter between 2019 and 2022**, and a **12% decrease in gas consumption**.

The plan, which had been in the works for some time, to reserve **the campus exclusively for green mobility** was achieved in 2022, accompanied by **increased secure bicycle parking capacity** with over 100 places created since 2019.

In November 2022, **École Polytechnique was awarded the Trophées de l'achat d'innovation (Innovative Procurement Awards)** created by the French State Procurement Department (DAE) for a technical building management project **that uses artificial intelligence to optimize "heating, ventilation and air conditioning" costs**, a solution developed by the start-up Accenta.

Efforts to **sort and recover waste** on campus underway for several years **were expanded with two clothing donation bins** placed close to student housing.

Prepared in 2022, **the integration of sustainable development in X's staff training plan** will come into effect in 2023.

In addition to this operational implementation, **École Polytechnique enhanced its Climate Plan governance in 2022**. A Strategic Committee has been set up to prepare for and oversee the planned changes, supported by **an Advisory Board made up of individuals from outside the institution**. The sustainable development delegation coordinates and supports projects across all of the School's departments, divisions and laboratories. A Steering Committee brings together the community of project leaders **and supports the cross-cutting approach to this large-scale plan**.



# HIGHLIGHTS

**SEPTEMBER 14**

The launch of the Ifker Climate Fund at École Polytechnique formalized the exceptional donation by Stéphane (X 93) and Agnès Ifker to accelerate research for energy transition conducted at the Energy4Climate Interdisciplinary Center.



**6-18 NOVEMBER**

École Polytechnique was granted observer status as a Research and Independent Non-Governmental Organization (RINGO) at COP27, the United Nations Climate Change Conference held in Charm el-Cheikh, Egypt.



**4 APRIL TO 20 DECEMBER**

An exhibition on display from April to December at Mus'X on today's research for tomorrow's energy featured the work of several research laboratories from Palaiseau and Orsay.



École Polytechnique was awarded by the Trophées de l'achat d'innovation (Innovative Procurement Awards) created by the French State Procurement Department for a technical building management project that uses artificial intelligence to optimize "heating, ventilation and air conditioning" costs.

[Learn more >](#)



**28 SEPTEMBER TO 30 SEPTEMBER**

NeXt, an X student association dedicated to ecological transition and environmental protection, organized the 15th Ecological Awakening Week (SREX) comprising a series of conferences, workshops, events and debates on this topic.

[Learn more >](#)



**DECEMBER**

**Campus center and green mobility.**

The plan to reserve the campus center exclusively for green mobility came into effect in December 2022.



Over 100 bicycle parking places created since 2019.



# Social and gender diversity: a drive for inclusion

École Polytechnique, an institution founded to recruit and train the brightest scientific minds to serve the country, seeks out excellence in all parts of society to enable everyone –regardless of gender, social background or place of residence– to receive a high-level scientific education. The School continues its drive to promote gender equality and combat gender-based and sexual violence.

## A new dimension in identifying and supporting talent

Operation Monge doubled its impact in its second year. Nearly 400 students in the X2021 class helped achieve a successful outreach campaign to introduce high school students to high-level scientific studies, **by meeting with nearly 21,000 students at 420 high schools** throughout France from January to March. **A dozen X Campus days were held** over the course of the 2022-2023 school year, each of which gave approximately 40 high school students the opportunity to take a first-hand look at life at a prestigious engineering school and attend presentations of programs by engineering students. **Through the Cordée de la Réussite X Île-de-France tutoring program, 35 École Polytechnique students were assigned to 26 high schools** in economically and socially disadvantaged areas in Ile-de-France to provide scientific tutoring to sophomores, juniors and seniors selected based on their promising scientific potential and social criteria. **250 high school students and 80 tutors took part in the online “#GENIUS” excellence tutoring program** throughout the 2021-2022 school year.

## Gender Equality Plan implemented

The School implemented the **Gender Equality Plan** approved by its Board in 2021.

## Action plan to combat gender-based and sexual violence

A large-scale student survey conducted in late January showed that X is not spared from such violence, some of which is extremely serious. **An action plan was developed with students and made available online.** It calls for:

- the direct involvement of all stakeholders to help develop individual and collective responsibility
- strengthening measures to prevent harassment, discrimination and gender-based and sexual violence and mental health support to encourage people to speak up
- formalization of the School’s “zero tolerance” policy and the processes required to establish sanctions
- training for students with extra programs for student life leaders

# HIGHLIGHTS



**X welcomed 180 female high school students for another session of its “Girls, Mathematics and Computer Science” Day**

In 2022, 15 École Polytechnique alumnae working in a wide range of fields discussed their experience with female high school students, accompanied by 15 female students from École Polytechnique who are members of the “X au féminin” association, which also took part in the day.

**JULY**

**X Science Camp brought together 40 high juniors (20 girls and 20 boys), selected based on their outstanding academic performance in science and social criteria, on campus in July.**



**NOVEMBER**

**An advanced mathematics camp was organized the week of All Saint’s Day 2022 in La Ciotat for high school students who had enrolled in a preparatory class following X Science.**



**700 middle and high school students for the “Entretiens de l’Excellence”**

Students from some thirty Ile-de-France schools had the opportunity to discuss with professionals from different backgrounds during workshops and benefit from advice and testimonials about programs offered at Grandes Écoles and their career prospects.





# 1972-2022: 50 years of women at X

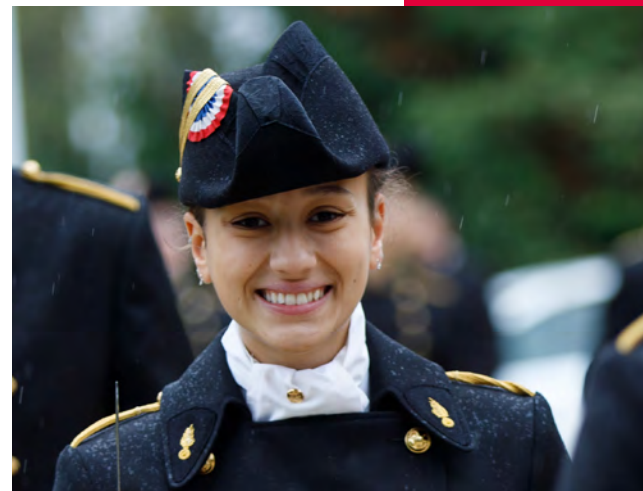
In 2022, **École Polytechnique** celebrated the fiftieth anniversary of the Polytechnique Engineering program exam being open to women.

To mark the historic anniversary, it **pledged to step up efforts to increase gender diversity**. It has set a target of at least 30% women in its various training programs by 2026, and 40% women in terms of the recruitment of teachers and researchers. It has achieved gender parity in its Executive Committee.

It was in August of 1972 that seven trail-blazing women enrolled in the Polytechnique Engineering program following a decree issued the year before by then-Minister for Defense, Michel Debré, opening senior officer careers to women. Nearly 2,700 women have since graduated from X's engineering program.

The School organized a series of events throughout the year to mark this important anniversary with a **traveling exhibition entitled: "50 years of women at X: Celebrating and Inspiring"**, opened on 31 March in the presence of many alumnae.

French Prime Minister **Élisabeth Borne (X81)** gave the closing remarks at an evening ceremony organized by the School on 15 November to celebrate this fiftieth anniversary. The event held at École Militaire in Paris brought together many women alumnae and representatives of



the Polytechnique community as well as 50 female high school students who hope to pursue scientific studies. In her remarks, Élisabeth Borne advocated for gender diversity in scientific studies and careers and called for "advancing and breaking down the stereotypes to get young women into scientific studies and careers."

Her speech was preceded by a **screening of the documentary "Polytechnicienne"**, featuring testimonials from seven alumnae of École Polytechnique: Aude Nyadanu (X2011), founder and CEO of the start-up Lowpital, Sonia Fliss (X2000), research professor at ENSTA Paris, Christel Heydemann (X94), CEO of the Orange Group, Laurence Jacques, (X88), Managing Director of EcoXtract, Anne-Marie Lagrange (X82), astrophysicist, Dominique Senequier, President and Founder of Ardian, and Anne Duthilleul-Chopinnet, both of whom were pioneering members of the X72 class. Their testimonials informed round-table debates on the topic: "Science and gender diversity: how to solve the equation?"

## HIGHLIGHTS

**31 MARCH**

*Fifty years after the Polytechnique Engineering program exam was opened to women, X inaugurated an exhibition entitled "50 years of women at X: Celebrating and Inspiring", devoted to the history of women attending X and to the inspiring careers of female graduates, in the presence of many of the women featured in the exhibition.*



**NOVEMBER 15**

*Prime Minister Élisabeth Borne (X81) gave the closing remarks at an evening ceremony organized by École Polytechnique to celebrate the fiftieth anniversary of women's arrival at X.*

*Round table session on the topic: "Science and gender diversity: how to solve the equation?" at the evening celebrating the fiftieth anniversary of women at X.*





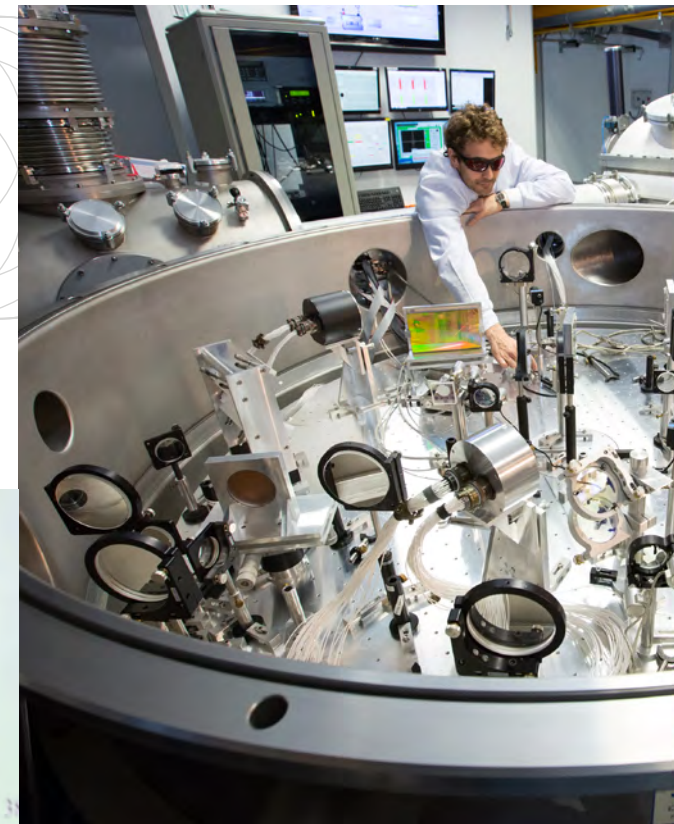
# OUR MISSIONS

## 1. TRAINING PROGRAMS



*"Based on a multidisciplinary and systemic approach, the scientific research, education and innovation policy developed at École Polytechnique make it especially well-equipped to address the complex challenges posed by the transgression of planetary boundaries."*

Dominique ROSSIN  
Vice President for Academic Affairs  
and Research



## 2. RESEARCH



## 3. INNOVATION

OUR MISSIONS



## OUR MISSIONS

# 1.

# TRAINING PROGRAMS



*“École Polytechnique continues to develop its multi-curriculum training programs as we prepare to update the engineering program, continue to grow the Bachelor’s and MSc&T programs, support the continued success of the Executive Master’s and expand the Executive Education offer.”*

Laura FIONI  
Vice-Provost for Education



**3,700**  
students in  
initial education

**497**  
teaching and  
research staff  
members

**40%**  
international  
students

**24%**  
female students

Upholding high scientific, human and public interest values, École Polytechnique trains students for industry, government departments and academia to meet the societal and economic challenges of tomorrow.

Its various initial, continuing and certified training programs are recognized for their excellence, engagement, leadership, multidisciplinary and creative aspects.

École Polytechnique launched a process to integrate sustainable development and ecological transition issues in all of its programs.

With over 100 nationalities present on campus and individuals from a wide variety of social and cultural backgrounds, it promotes inclusion, mutual respect and empathy.







## ENGINEERING PROGRAM

### Guidelines for updating the program adopted

The admission exam for the Polytechnique Engineering Program went smoothly, with 5,300 French candidates enrolled for the 431 available places and 1,209 international candidates for the 140 available places. Notably, the exam **was marked by a higher proportion of female candidates, reaching 20% for the 2022 exam**, up from 17% in 2021. Preparations for updating the engineering program continued, with guidelines set out for increasing its relevance and maintaining its level of excellence in the future. The guidelines plan to promote the program's multidisciplinary, foster an outward-looking perspective, especially in terms of international exposure, encourage greater consideration of contemporary issues such as climate change and security and offer personalized curricula and paths.

## BACHELOR'S PROGRAM

### The Bachelor's program continues to grow

The Bachelor's program continues to grow to reach the target of **480 students across the three-year program**. Launched in 2017, this program celebrated its third graduating class in 2022, opening the door to high-level programs in France and internationally.

**Its international appeal and exposure were confirmed with an average of 67% international students enrolled** (not counting French students with dual nationality, 77% if they are included) with 37% female students across the three cohorts. The Bachelor's program intensified its development with the **signing of a dual Bachelor-Master degree agreement with Columbia University**.

This program, which will be launched in the fall of 2024, will build on the existing mathematical and scientific foundation by addressing global issues, to train international leaders who are ready to face the challenges of today and tomorrow.

## MSC&T

### A gain in momentum, an enrichment of the program

There are 255 students enrolled in the **Master of Science and Technology (MSc&T) program** in 2023. **Its offerings are gradually being expanded**, with two new programs opened in the Fall of 2023, in partnership with IP Paris and HEC. A plan to open two other MScT programs in 2024 is being explored, **with the aim of reaching over 420 students across the two years of the program by 2025**. The MScT programs aim to strengthen their strongly international character by establishing partnerships and dual degrees with prestigious universities (such as Berkeley and MBZUAI). **The second MSc&T First Job survey** on the class of 2019 (who graduated in 2020) **highlighted the program's success with employers with 80% of graduates hired**

**before graduation**. The Master of Science and Technology in Data Science for Business led by École Polytechnique and HEC **confirmed its third place position out of 120 comparable programs worldwide** for its second entry in the *QS Business Masters Rankings: Business Analytics*, published in September 2022.

## EXECUTIVE MASTER'S

### Sixth cohort of students and continued success

Building on its success, the Executive Master's continued its growth in 2022 by welcoming its sixth cohort of **36 participants** in September and celebrating its 150th degree! This prestigious X degree **for executives is about to take a new step by opening its doors to a second annual cohort of students starting in March 2023**. While the educational format will largely stay the same, **all of the courses will be taught in English, to train a non-French speaking public in topics related to innovation and technology** and contribute to École Polytechnique's international renown.

## EXECUTIVE EDUCATION

### Expanded offerings

The Executive Education program expanded its offerings with **Blockchain programs** and by creating **a cybersecurity degree program** in partnership with Orange and Institut Polytechnique de Paris. Executive Education professional training courses **combine the latest scientific and technological breakthroughs with current trends in management and innovation**. The highly original programs provide a unique combination of hard and soft skills, offering multidisciplinary professional training **that addresses the issues and challenges facing companies and public organizations**.

## ONLINE TRAINING COURSES

### New content

The winner of a call for projects launched by the Investments for the Future Program, the **#GENIUS project – which offers online course content for students in their last two years of secondary school and first two years of post-secondary studies** to promote scientific excellence programs in higher education – **developed four new courses**: Promenades mathématiques; #GENIUS: Au cœur de la physique ; #GENIUS Chimie - Comment concevoir des batteries grâce à l'électrochimie ? ; #GENIUS Chimie -Comment fabriquer des médicaments ? This course content, which supplements academic programs, was created by X students under the leadership of higher education professors and the supervision of the School's laboratories.

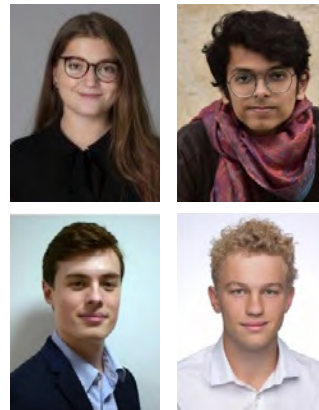


## HIGHLIGHTS

**3 OCTOBER**

**Four Bachelor's graduates honored by 2022 Global Undergraduates Awards.**

Two Bachelor's graduates –Guruprerana Shabadi and Vincent Sietses– were among the 25 winners of the 2022 Global Undergraduate Awards and two others –Estelle Martin and Rémy Seassau– were among the highly recommended students.

**19 APRIL**

**Finals of the 2022 Bachelor Speech Contest, the public speaking competition for the Bachelor's program.**


[Learn more >](#)
**16 MAY**

For the third time, an X team won the **International Physicists' Tournament**, which was held in Columbia in 2022.

**12 SEPTEMBER**

**Three group scientific projects from the X20 class awarded.** The leaders of 13 Collaborative Scientific Projects (PSC) selected by teaching and research departments, out of the 111 PSCs carried out by the X2020 class, were presented to a jury of prominent academics and industry professionals.

[Learn more >](#)
**23 MARCH**

**19 X alumni among the economic leaders of tomorrow under the age of 40** selected by the 2022 Choiseul Rankings. **Seven of them are in the top 100.**

[Learn more >](#)
**30 AUGUST**

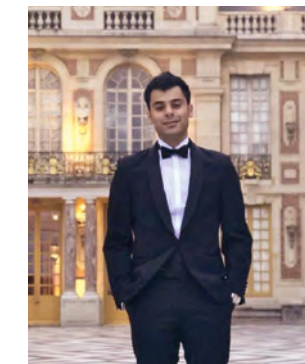
**Augustin Reboul (X20) won gold and silver medals at the European junior kayak championship.**



**Julia Tournant (DSB student) won the French University Golf championship.**

[Learn more >](#)
**17 MAY**

**Two X alumni made Forbes Europe's 30 under 30 list** David Henri and Paul Lascombes, two of the four **founders of the start-up Exotrail**, were among the 300 under-30s selected by the European edition of Forbes magazine for their innovative projects. The founders of Exotrail, David Henri and Paul Lascombes, second and third from the left, respectively.

[Learn more >](#)


**Shayan Khan, an alumnus of the MSc&T IoT is the chairman of the non-profit organization U7+ Student.**

[Learn more >](#)


**Alicia Nitsch, a second-year student in the MSc&T Economics for Smart Cities and Climate Policy program, received the Congratulations Award from the department of economics for her report on her internship at HSBC Asset Management on "Net-Zero Portfolio Construction".**

[Learn more >](#)


**Two MSc&T teams in the finals of the EuroTeQaThon.**

[Learn more >](#)



OUR MISSIONS

# 2. RESEARCH



*“In 2022, research at X continued its integration into Institut Polytechnique de Paris with the creation of a new interdisciplinary center for health. X researchers stood out by producing new knowledge, disseminated in numerous top publications. Many of our researchers received prestigious awards and funding.”*

**Kees VAN DER BEEK**  
Director of Research,  
Deputy Director of Teaching  
and Research at École Polytechnique

Within Institut Polytechnique de Paris, École Polytechnique has 23 laboratories, including 22 joint research units with the CNRS.

Drawing on its unique facilities and internationally-renowned expertise, its research staff combine the exploration of the most fundamental aspects of research to further knowledge with the development of major, more applied fields that address the scientific, technological and societal challenges of the 21st century.



An animated digital brochure to learn about Research at X

[See the document >](#)

OUR MISSIONS / 2. RESEARCH

**23**  
laboratories

**1,800**  
research staff

**2,640**  
publications

**70%**  
international co-publications



ENGINEERING 4 HEALTH CENTER

A new interdisciplinary center for health

To develop further synergy and boost health-related research at IP Paris, the Engineering 4 Health Center (E4H) was created on 7 July in partnership with Inria and the Paris Saint-Joseph Hospital Group with support from the Bettencourt Schueller Foundation. It joins the school's other interdisciplinary centers, Energy4Climate (E4C), Hi! Paris and CIEDS, which promote interdisciplinary research at the 5 Schools.

IFKER FUND AND ALEXANDRE FRIEDMANN FUND

Two new Funds to support research and education

Thanks to the X Foundation and the support of private donors, two new funds were created: the Ifker Climate Fund and the Alexandre Friedmann Fund to support scientific activities in cosmology at X. The latter fund was launched on 5 December at a talk by Frank Eisenhauer from the Max Planck Institute for Extraterrestrial Physics.



X as committed as ever to mathematics education and research

École Polytechnique continues to uphold its reputation in the field of mathematics, a discipline at the heart of its education since the school was founded. Grégoire Allaire, professor at École Polytechnique and Director of the Center for Applied Mathematics (CMAP) co-chaired research for the national report and foresight on mathematics published in early November and carried out under the aegis of the High Council for the Evaluation of Research and Higher Education.

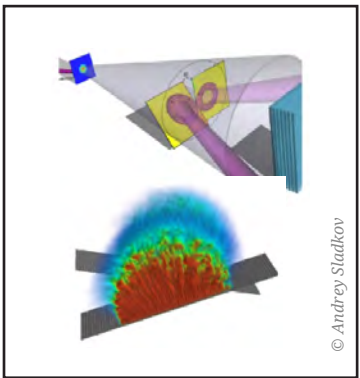
The X-UPS Mathematics Days were organized in April by the Laurent Schwartz Mathematics Center (CMLS) for preparatory class mathematics professors. This year's topic was "mathematics and biology" Lastly, research in mathematics at École Polytechnique laboratories was also honored by awards, including four prizes awarded by the French Academy of Sciences to Cécile Huneau (CMLS), Xavier Allamigeon (CMAP), Aline Lefebvre-Lepot (CMAP), Marc Massot (CMAP). Joris van der Hoeven (LIX) was awarded by the Royal Dutch Mathematical Society for his work on the complexity of multiplication and Ahmed Shokry, a research engineer at CMAP, won the 2022 Excellence Award for computer-aided process engineering from the European Federation of Chemical Engineering.

Scientific breakthroughs



Phagocytosis makes the front page of the Biophysical Journal

A study on the mechanical properties of white blood cells, carried out in collaboration between École Polytechnique's Hydrodynamics Laboratory and the Institute of Physical Chemistry at Paris-Saclay University, made the cover of the Biophysical Journal in April 2022. The researchers explored the role of stiffening and spreading of white blood cells during phagocytosis.



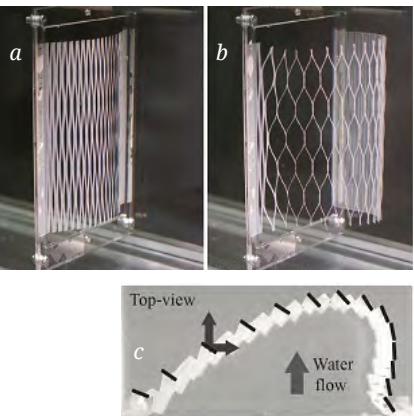
Magnetic reconnection studied in the laboratory

In a paper published in Nature Communications in October 2022, a team including researchers from the Intense Laser Laboratory and the Plasma Physics Laboratory shows that the geometry of these magnetic field lines is crucial to magnetic reconnection, which plays a role in solar flares, for example. In the laboratory astrophysics experiment (above), two laser beams focused on targets create two magnetic structures. Numerical simulations reproduce this phenomenon (below).



Polarized light detected by spin photodiodes

An international collaboration involving the Irradiated Solids Laboratory described the mechanisms for detecting circularly polarized light using spin photodiodes in Physical Review Letters. It points the way to the future development of efficient detectors that could be used for telecommunications, information processing and medicine.



The art of kirigami helps develop new materials

Research conducted at École Polytechnique's Hydrodynamics laboratory by Sophie Ramananarivo has drawn inspiration from kirigami, the Japanese art of paper cutting, to study materials that can deform when immersed in a fluid. The work was published in the journal Physical Review Fluids in February 2022. A kirigami pattern is cut out of a plastic sheet (a and b). The sheet can then unfold in a stream of water. (c) Seen from above, the blades (in black), due to the geometry of the cutting pattern, cause an asymmetric swelling.



AWARDS FOR RESEARCHERS

Researchers awarded for their work

Many scientists conducting their research at École Polytechnique received awards this year. **Marie-Paule Cani**, from École Polytechnique’s Computer Science Laboratory (LIX) received the Eurographics Distinguished Career Award. **Pascal Chabert**, a researcher at the Plasma Physics Laboratory, received a CNRS Silver Medal. **Patrick Huerre** (Hydrodynamics Laboratory (LadHyX) and **Jean-Jacques Marigo** (Solid Mechanics Laboratory) were awarded prizes by the European Mechanics Society. **Manas Upadhyay** (LMS) was awarded the Jean and André Rist Medal by the French Society for Metallurgy and Materials. **Marie Cherasse**, a PhD student at the Irradiated Solids Laboratory, and **Angèle Niclas**, a postdoctoral researcher at the Center for Applied Mathematics, are among the recipients of the 2022 L’Oréal-UNESCO Women in Science Awards (along with four X alumni). **Alexis Louaas** and **Pierre Picard**, received a Financial Times Academic Research Award for their work at CREST on insurance mechanisms to help farmers in developing countries. **Catuscia Palamidessi** (LIX), **Charles Baroud** (LadHyx), **Jean-François Guillemoles** (IPVF) and **Hamed Merdji** (LOA) won French Academy of Sciences awards. **Sébastien Michelin** (LadHyX) shared the François Frenkiel Prize and **Gérard Mourou**, a Physics Nobel prize winner and member of the High College of École Polytechnique shared the Golden Goose Award for applying ultrafast lasers to treat eye diseases.



Alain ASPECT, winner of the 2022 Nobel Prize in Physics and Professor at École Polytechnique

With the Nobel Prize in Physics being awarded to Alain Aspect, the excellent physics education provided by X was also recognized. The physicist, who was awarded for his discoveries on quantum entanglement, a mechanism where two quantum particles are perfectly correlated regardless of the space between them, conducted his now-famous experiments in the early 1980s at the Institut d’Optique. He is strongly committed to the transmission of knowledge and to training young scientists and has also been a professor in École Polytechnique’s physics department

since 1994, where he teaches quantum optics and where he’s developed two online courses (MOOC) explaining the basic concepts of quantum entanglement underlying his research. The École Polytechnique community celebrated this Nobel Prize at exceptional physics department seminar given by Alain Aspect shortly after the announcement from the Royal Academy in Sweden.

See the video >

Winners of European Research Council Grants (ERC)



Sylvie MÉLÉARD  
Researcher at the Applied Mathematics Center, ERC Advanced Grant

The SINGER project studies the stochastic dynamics of individual cells. Her research is at the interface of mathematics and biology.



Eric MOULINES  
Researcher at the Applied Mathematics Center, ERC Synergy Grant

Led in collaboration with Michael Jordan at UC Berkeley, Christian Robert, at Paris Dauphine University-PSL and Gareth Roberts at the University of Warwick, the OCEAN project seeks to lay the theoretical foundations for the future generation of artificial intelligence algorithms.



Fabian CADIZ  
Researcher at the Condensed Matter Physics Laboratory, ERC Starting Grant

Two-dimensional semi-conductors may have “defects” that can trap electrons locally and behave like artificial atoms, spins. The OneSpin project seeks to observe and manipulate these spins at the individual level.



Adrien LEBLANC  
Researcher at the Applied Optics Laboratory, ERC Starting Grant

The EXAFIELD project aims to generate an intense electromagnetic field using a relativistic plasma mirror to collide it with electrons. The aim is to detect sufficient strong-field quantum electrodynamics effects to improve our understanding of this theory.



Félix TROPF  
Researcher at the Center for Research in Economics and Statistics, ERC Starting Grant

How much of the inequalities in our wealth, health and family planning can we explain by our current statistical models and current data? This is one of the questions the FINDME project seeks to answer.



Oana GOGA  
Researcher at École Polytechnique’s Computer Science Laboratory, ERC Starting Grant

In the past, people used to actively select their information sources. Today, third parties can pay to display specific information to other people online through ads powered by algorithms. The MOMENTOUS project seeks to measure and mitigate the risks of this AI-driven technology.



OUR MISSIONS

# 3.

## INNOVATION



*“With a growing community of start-ups supported, a successful X-UP program that now lasts 8 months, the development of partnerships such as with French Tech Paris - Saclay, the French Tech Tremplin, and prestigious technological awards such as the i-Lab 2022 competition won by two of our incubated start-ups, the Drahi X-Novation Center has shown that it is a driving force for incubating Deeptech projects on the Saclay plateau.”*

**Bruno CATTAN**  
Director of Business,  
Entrepreneurship, Innovation



**1000 m<sup>2</sup>**  
of prototyping  
space

**175**  
start-ups  
supported  
since 2015

**24**  
spin-offs from  
X laboratories



École Polytechnique’s entrepreneurship and innovation ecosystem made its mark in 2022, with the Demoday for the 14th cohort of the X-Up incubator, its presence at major French and European tech shows including Paris-Saclay Spring and Vivatech, and its strong showing in innovation challenges and start-up rankings.



PARIS-SACLAY SPRING 2022

X campus welcomes the 5th edition of the event

The École Polytechnique campus welcomed Paris-Saclay Spring 2022, the 5th edition of the annual event **dedicated to innovation and entrepreneurship in the Saclay Plateau**. **Fifty innovative start-ups from the Paris-Saclay Cluster, the Spring 50, were honored** at the event, including **eleven innovative start-ups incubated at the Drahi-X Novation Center and/or founded by X alumni**. Among the eleven start-ups, three work in the GreenTech sector (Invisensing, HiPERSSYS, SpaceSense), three others in the Health-Biotech sector (InSpek, epiLab, GammaPulse), two in the Digital Technologies sector (Amphitrite, Navalgo), and two in the Mobility sector (Mandarine Robotique, Faure Engineering), and one focuses on FoodTech (Proteme).

VIVATECH 2022

Eight X start-ups present with Institut Polytechnique de Paris

Eight X start-ups were among the 21 start-ups from the entrepreneurship and innovation ecosystem presented by Institut Polytechnique de Paris at VivaTech, Europe’s biggest start-up and tech event. The following X start-ups attended VivaTech: Amphitrite, InSpek, ShareMySpace, ProfessorBob.ai, AtmosGear, Oudja, Phyling and DocMe.



I-LAB COMPETITION

Six start-ups launched by alumni awarded



Six start-ups created or run by X alumni were awarded at the 24th i-Lab innovation competition, funded by the Investments for the Future Program and run by Bpifrance. This competition seeks to identify innovative technology start-up projects and support the best ones through funding and tailored support. Two of these start-ups –Rundblind and InSpek– are supported by the X-TECH incubator at the Drahi-X Novation Center. The four others are: Enginn Technologies, Ever Dye, S2S and Siling.

INNOVATION DEFENSE LAB

Demoday for the 14th cohort of the X-UP incubator

Fourteen start-ups from the École Polytechnique incubator, the Drahi-X Novation Center, along with its entire team, were welcomed at the Innovation Defense Lab facilities for Demoday X-UP Promo#14. The fourteen start-ups had the opportunity to pitch to a panel of business angels, VCs, investment funds and potential partners. The program included over a hundred personalized one-to-one meetings between investors and start-ups and an evening devoted to “networking and socializing” for start-ups, experts, mentors and partners.





# CORPORATE PARTNERS

Close ties with companies to meet increasingly complex societal challenges

Through their commitment and generosity, companies play a key role in École Polytechnique’s development, increasing its attractiveness and improving its training and research programs. They also provide a wide range of opportunities for students, many of whom are hired by companies before graduating.

With its 42 active chairs and sponsorship programs, 75 sponsors since 2003, École Polytechnique has forged close ties with companies to meet increasingly complex societal challenges such as artificial intelligence and digital technology, quantum technology, new materials, the energy transition, new mobilities and health.

At the Institut Polytechnique de Paris level, X draws on its innovative partnerships based on an innovative model allowing for ongoing, recurrent funding for interdisciplinary centers and joint laboratories.

The School’s reputation with employers, illustrated by the success of its business forums, is regularly recognized in national and international rankings. Institut Polytechnique de Paris ranks 12th worldwide and 1st in France for graduate employability in the 2022 QS Graduate Employability Rankings 2022.



# HIGHLIGHTS



**Renewal of the “Mathematical Modeling” and Biodiversity” Chair**, supported by Veolia and led by Sylvie Méléard, Professor at the Applied Mathematics Center (CMAP, joint research unit between CNRS, École Polytechnique - Institut Polytechnique de Paris) and Member of the Institut Universitaire de France. (20/04/2022)



**“Data Science & Industrial Processes” Chair renewed for five years.** The chair was launched in 2008 in partnership with Université Mohammed VI Polytechnique (UM6P) and the École Polytechnique Foundation, supported by the industrial group OCP. It is led by Eric Moulines, a researcher at the Applied Mathematics Center (CMAP, joint research unit between CNRS, École Polytechnique - Institut Polytechnique de Paris). (01/09/2022)



**École Polytechnique won 3rd place in the 2022 AGIRES SYNERGIE Awards** in the “Best Corporate Relations –Engineering School Category. (05/07/2022)



**The X-Forum brought together nearly 2,000 students from Institut Polytechnique de Paris, including 1,000 École Polytechnique students, along with 160 companies and international higher education institutions.** Organized by a team of 50 motivated students who work to help students at École Polytechnique and Institut Polytechnique de Paris, the forum illustrated employers’ recognition of X training programs and their excellence, engagement, leadership, multidisciplinary and creativity. (11-12/10/2022)



**École Polytechnique’s Computer Science Department (DIX) organized a day for students to meet and discuss with companies at the Computer Science Laboratory (LIX) with around twenty partner companies. (12/5/2022)**



# INTERNATIONAL

## Positioning X on the international stage and fostering exchange and cooperation



*“With the easing of Covid restrictions, 2022 was devoted to resuming international academic and research exchanges and to renewing École Polytechnique’s relationships with our partners around the world.”*

Gaëlle LE GOFF

Director of International Relations at École Polytechnique

### Sustainable development at the heart of European networks



Since June 2022, President of École Polytechnique Eric Labaye has been president of the EuroTech university alliance, which brings together six leading European science and technology universities. Eric Labaye has made **sustainable development a central priority** of his presidency in 2022-2023, supported by actions implemented through the EuroTeQ European University, especially in the area of educational innovation with the development of a course

called EuroTeQ Collider. It gives students the opportunity to work with professors and industry partners on real-world environmental challenges to help find sustainable solutions at the European level.

### Strengthening transatlantic partnerships

The School has expanded its range of its partnerships with prestigious institutions in the United States, including **Brown University** and **the University of Chicago**. X also announced that it had teamed up with the **School of Engineering and Applied Sciences at Columbia University** to create a joint Bachelor’s/Master’s degree in science and engineering. This new dual degree program will welcome its **first cohort of students** in the fall of 2024.

### Exchanges with Asia and Australia resume

With the easing of Covid restrictions, **X students** were once again able to **benefit from** mobility opportunities and bring to life **new partnerships** signed with the universities in Korea, Japan, Singapore and Australia.

# HIGHLIGHTS

13 TO 14 JUNE

## **Finals of the U7+ Alliance student challenge**



École Polytechnique, a founding member of the international U7+ alliance, hosted the final round of the U7+ student challenge on campus on 13 and 14 June 2022. Students worked in teams to address issues related to technology and the United Nations’ sustainable development goals (SDGs). Teams from Ashesi University (Ghana), the University of Ottawa (Canada), Northwestern University (United States) and X took part in the event.

[\*\*Learn more >\*\*](#)



## **Thirteen X students among the winners of Eiffel Excellence Scholarships**

Reasserting the academic excellence and international diversity of École Polytechnique students, the Ministry for Europe and Foreign Affairs awarded Eiffel excellence scholarships to thirteen international students at École Polytechnique during the 2022 campaign.



**1 JUNE*****Eric Labaye, president of X, takes over as president of the EuroTech Alliance***

On 1 June 2022, Éric Labaye, President of École Polytechnique and Institut Polytechnique de Paris, took over as president of the Eurotech alliance for 2022-2023. The alliance, which brings together six leading European science and technology universities to conduct joint research projects at the European level, upholds strong values and is committed to helping build a strong, sustainable and sovereign Europe.

**[Learn more >](#)*****Innovative educational format launched through EuroTeQ university***

The first sessions of the new “EuroteQ Collider” collaborative course format were run in 2022. This course was developed through the EuroTeQ European University, of which the School is a founding member. It brings students together to work on real-world environmental challenges related to waste reduction and encourages them to develop solutions to the challenges proposed in conjunction with industry partners. Other initiatives were also launched through EuroTeQ: A shared course catalog, allowing students to take courses offered by partner universities. Faculty and staff can benefit from professional mobility opportunities.

**[Learn more >](#)*****Strengthening preparatory classes in Côte d'Ivoire***

Since 2018, École Polytechnique has helped structure preparatory classes for Grandes Écoles in Côte d'Ivoire, working with Institut National Polytechnique Felix Houphouët-Boigny (INP-HB) and Lycée Louis-Le-Grand through a support project. The partners celebrated the program's success at the closing ceremony held in October 2022. Since 2018, 33 candidates from INP-HB preparatory classes have successfully passed the École Polytechnique admission exam.

**[Learn more >](#)*****École Polytechnique and Columbia University create a joint degree program***

École Polytechnique and Columbia University, longstanding partners through the Alliance program, strengthened their collaboration by creating a new dual degree program in science and engineering. The program announced on 10 October 2022 will offer students a

well-rounded educational experience in France and the United States. Students graduating from the new program will receive both a Bachelor of Science degree from École Polytechnique and a Master's degree from Columbia University. The four-and-a-half-year program will include jointly taught courses and innovative learning formats.

**[Learn more >](#)****13 TO 15 OCTOBER**  
***Erasmus Days at X***

École Polytechnique participated in Erasmus Days held around the world from 13 to 15 October by showcasing the many international mobility opportunities it offers students, PhD candidates and faculty and staff to support them with their projects. In 2022, **39 X students benefited from an Erasmus grant** to take part in an academic exchange in a foreign country and **the School welcomed 48 international students** for an academic exchange at X through the Erasmus+ program.

**[Learn more >](#)**



# RANKINGS

In France, École Polytechnique confirmed its leading position in various engineering school rankings and strengthened its reputation with French and international employers. Institut Polytechnique de Paris further improved its leading position in international rankings and its graduate employability was once again asserted.

## ÉCOLE POLYTECHNIQUE

IN RANKINGS

**X, France's  
number-one  
engineering  
school**

École Polytechnique takes first place for French engineering schools in the Figaro, Usine Nouvelle and L'Étudiant rankings.

LE FIGARO  
l'Étudiant  
L'USINE NOUVELLE



**MSc&T Data Science  
for Business ranked in  
the QS World's Top 3  
and is 1st in Europe**

The Master of Science and Technology (MSc&T) in Data Science for Business X-HEC came in third worldwide and first in Europe out of 120 comparable programs.

QS WORLD  
UNIVERSITY  
RANKINGS

QS WORLD  
UNIVERSITY  
RANKINGS

**IP Paris, 48th  
internationally  
and 2nd in France**  
in the ranking of the  
world's best universities

**12th in the world**  
for graduate employability

**IP Paris  
in the world's Top 30**  
in 4 disciplines,  
in the Top 50 for 4 others.

THE  
Times  
Higher  
Education

**IP Paris, 34th internationally  
and 1st in France**

In the ranking of the  
most international universities.







## ÉCOLE POLYTECHNIQUE

[www.polytechnique.edu/en](http://www.polytechnique.edu/en)

[www.ip-paris.fr/en](http://www.ip-paris.fr/en)

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