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A word from the President
Eric LABAYE

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X and IP Paris in the rankings
In 2021, École Polytechnique paved the way for its future during a year that was still feeling the effects of the complicated, unpredictable context of the COVID-19 pandemic and called for ever-growing resilience and commitment on the part of everyone.

With the drafting of its Objectives and Performance Contract (OPC) 2022-2026, École Polytechnique set its aims for the 5 years to come and implemented the means to achieve those aims with the full support of its overseer, the Ministry for the Armed Forces. Produced for the first time in association with the other member schools of Institut Polytechnique de Paris, this new OPC set out its strategic objectives to excel further in the quality and renown of its research and multi-curriculum training programs, boost innovation tailored to a responsible and ethical society, and launch the renovation of the campus to provide an enhanced experience for all users.

The efforts made in terms of management by the whole School in 2021 led to a positive result for the first time in several years, thus ensuring a healthy financial basis for the OPC 2022-2026.

With the publication of its Climate Plan, the fruit of a collective effort, the School reiterated its aim to work towards more durable prosperity and to place sustainable development at the heart of all its missions.

With its ongoing engagement in favour of the development of Institut Polytechnique de Paris, X also contributed to the creation of a
world-class science and technology institution; a European leader in cutting-edge research and outstanding training with strong international reach.

With heightened actions for social and gender diversity, in addition to gender equality, the School demonstrated its determination to enroll an ever-growing number of students in its excellence training programs and attract the best talents to its teacher-researcher and administrative teams.

I am confident that, thanks to the progress of these many projects and the collective effort that has led to their achievement, the School is laying the foundations for its future success.
FOCUS 1

OPC: An ambitious strategy for 2022-2026

François BOUCHET
Engineer-General, Senior Class (IGHCA) of École Polytechnique

“The OPC 2022-2026 is a major step towards the development and international renown of École Polytechnique. Its objectives are in keeping with the School’s ambition to become a key driver of French and European power by attracting the world’s finest students and researchers; those who will create the solutions of the future in a sustainable and resilient environment.”

The drafting of the new Objectives and Performance Contract, which sets out the strategic aims of the school for 2022-2026, called on the active contribution of the School’s teams and enabled us to identify the priority areas to boost its growth and confirm its attractiveness within the Institut Polytechnique de Paris.

The key focus areas are thus growth in student numbers, the integration of research work into an IP Paris research center, and the launch of renovation works to the school’s historical buildings, which will enable us to welcome teachers, researchers and students in optimal conditions.

The developments linked to internationalization, ecological transition, the fostering of social and gender diversity, and attracting women to science continue to engage the School as a whole and on every level.

To meet society’s expectations and strengthen its international appeal, the X research center, which has joined the IP Paris research center, will be taken to a new level, thanks to enhanced promotion of its research, the continuation of its partnership policy and increased financial resources, more particularly from external sources, in the strictest respect for academic freedom.

École Polytechnique will bolster its range of multi-curriculum excellence programs to welcome greater numbers of students. This increase will represent around 700 additional students trained at X for the OPC period.

To raise the IP Paris campus to the highest international standards, transform it into a model of sustainable development and offer an attractive experience to all students and staff, École Polytechnique is to undertake a major overhaul of its facilities.
In the framework of this new OPC, École Polytechnique has set 10 aims for the coming years

1. Integrate the need for sustainable development as a paradigm in all areas

2. Pursue growth in student numbers in keeping with the extension of IP Paris, while consolidating the leading role of École Polytechnique training

3. Bolster the impacts of research, via IP Paris, the growth in own resources, participation in the creation of interdisciplinary centers (Bio-medical, Digital, Quantum Science and Materials, etc.) and the creation of joint laboratories with industrial players.

4. Double the flow of start-ups at the innovation center and contribute to the development of the innovation park in association with the laboratories

5. Launch renovation works to School facilities and improve the campus experience for students, teacher-researchers and staff

6. Highlight the internationalization actions of X by integrating them into IP Paris

7. Act for social and gender diversity at all levels of the organization, and more specifically, boost upstream actions to expand its recruitment pools

8. Modernize X support roles with a focus on service, via the implementation of an ambitious human resources policy

9. Pursue the strategic partnership policy with National Research Bodies, French and overseas higher education & research institutions, businesses and the innovation ecosystem.

10. Increase public and own resources through innovative forms of funding, while securing their sustainability.
FOCUS 2

Climate Plan: Ecological transition at the heart of X’s missions

The École Polytechnique Climate Plan, published in early 2021, highlights its commitment to ecological transition and its contribution to the emergence of a more sustainable world.

This Climate Plan reiterates the School’s aim to fully integrate ecological transition in all its training, research and innovation missions, in addition to the running of its campus.

Since its creation, École Polytechnique has never ceased to embrace and shape the successive economic, technical and societal transformations heralding progress for all.

The School’s engagement for sustainable development is in perfect keeping with its original mission to promote science through training, research and innovation, at the highest level and for the common good. Complex and global, environmental challenges must be faced with humility, agility, a long-term view and in the framework of the multi-disciplinary approach inherent to the school since its earliest days.

The fruit of a broad-ranging and participative process which involved staff, students and partners of the School, this Climate Plan sets out 10 achievable aims in 5 years, organized around 3 focus points: train & engage, develop & innovate and reduce & empower, to transform behavior on a profound level and contribute to the emergence of responsible and sustainable prosperity.

The École Polytechnique Climate Plan is in keeping with the active engagements to fight climate change taken by the School during its international symposium "RefleXions: researching, educating and acting for sustainable development", organized in June 2019 as part of its 225th anniversary events.

In 2021, the School continued to roll out its modules in sustainable development training, in addition to the research actions of the IP Paris interdisciplinary center, Energy4Climate (E4C).
The 10 aims of the 5-year Climate Plan

1. Incorporate applied training hours on sustainability issues in all professional programs
2. Triple the number of mandatory training hours in sustainability across all programs
3. Provide training to our staff and enable them to apply ecological transition on a daily basis
4. Create a model campus for transition, with the support of its research and innovation communities
5. Integrate sustainable development as a paradigm in 100 structural research projects
6. Contribute to a climate fund aimed at supporting transition actions within the School
7. Produce an annual map of research on the level of IP Paris, related to environmental issues and their impact
8. Reduce greenhouse gas emissions from energy use by 20% per campus user
9. Ensure 50% of orders comply with responsible criteria
10. Safe-guard a campus heart reserved for soft transport modes
FOCUS 3

Diversity: Ongoing engagement

École Polytechnique is engaged in a move to foster background and gender diversity, to provide its excellence training to an ever-growing number of students, and to attract the finest talents to its teacher-researcher teams and staff.

The setting up of a diversity task force in March 2020 provided École Polytechnique with the means to enhance its engagement in this fundamental area via a dedicated organization.

In the two years following the publication of its report in October 2019 on social diversity in the engineering cycle, École Polytechnique implemented actions and broadened the number of impacted young people. Launched in January 2021 and organized by the School’s Diversity & Success Center (DSC), with the support of the X alumni association (AX), the Monge operation rallied 200 students from the class of X 2020, who visited more than 20 high schools to present their engineering studies. Despite the COVID-19 situation, they met 12,000 high school students in person, in 28 education authority areas throughout Metropolitan and Overseas France.

Via this pool and that of the “Cordées de la Réussite” State program, the School provides support for students selected on social and excellence criteria, from high school to preparatory class level. This support scheme is also open to talented young women, regardless of their background. In 2021, the DSC thus organized awareness events, such as the Girls & Maths Day, excellence online and in-person tutoring, or a one-week summer Science Camp for high school students, with total immersion on campus.

The School drafted a gender equality plan, which was approved by its Board in March 2021.

See the action plan for gender equality at X

In late 2021, X carried out a major survey on sexist and sexual violence committed towards the School’s pupils and students during their studies, and assessed the preventative and alert measures set up in 2017 in the framework of the anti-harassment, discrimination and sexist or sexual violence unit (HDVS).

Operation Monge: X transmits its values throughout France

The 2021 edition of the X Science Camp attracted 700 candidates
FOCUS 4

IP PARIS: New ambitions with the full support of X

The Institut Polytechnique de Paris (IP Paris), which encompasses École Polytechnique, ENSTA Paris, ENSAE Paris, Télécom Paris and Télécom SudParis, has become a renowned institution for science and technology teaching and research, both in France and overseas.

An ambitious strategy
The preparation of the Objectives and Performance Contract (OPC) 2022-2026 was carried out jointly between the Member Schools and in line with the École Polytechnique OPC. It provided an opportunity to set out new and shared ambitions founded on eight strategic focus points, aimed at upscaling training, setting up research centers, raising campus facilities to international standards and boosting resources to support this growth. Beyond the OPC deadlines, IP Paris aims to double in size within the next 10 years.

International renown
In 2021, the founding schools of IP Paris featured in international rankings under their common banner. IP Paris thus entered the international rankings for the first time, with a listing in the World Top 50, and earning 2nd place in France in the Quacquarelli Symonds (QS) 2022 ranking of world universities. IP Paris is in 41st place in the world ranking and 2nd in the France ranking by the Center for World University Rankings (CWUR).

Consolidated training, the launch of the campus overhaul
For its second academic year, IP Paris welcomed more than 700 students enrolled in the brand new classes of 73 Masters programs with 14 different specializations, and 12 IP Paris PhD tracks. The election of heads to the 10 teaching and research departments marked a new milestone in the coordinated efforts of teaching teams, staff and students. The training offer was expanded with the launch of a new Masters in Transport & Sustainable Development and two new PhD Tracks to train engineers in quantum science and advanced materials. Lastly, a wide-reaching consultation was carried out during the year on the urban, architectural and landscape plan for the IP Paris and École Polytechnique campus, in association with the Paris-Saclay Public Development Establishment and Palaiseau municipal authorities.
**Vibrant research activity**

The French and international renown of IP Paris research was consolidated by the boosting of inter-disciplinary centers devoted to the most urgent challenges, with a high level of involvement on the part of École Polytechnique laboratories. The Inter-Disciplinary Center for Defense & Security (CIEDS) was launched in association with the Ministry for the Armed Forces and the Defense Innovation Agency, to create and develop solutions for the technological needs of the Defense sector.

IP Paris created the CIEDS. (Inter-Disciplinary Center for Defense and Security) to create and develop solutions to meet the technological needs of the Defense sector.

The Energy4Climate Center published its first white paper, presenting its researchers’ major ongoing or completed projects in the field of energy transition. The Hi! Paris Center for artificial intelligence and data science moved a step further with the integration of INRIA into its governance, in the framework of a strengthened partnership between IP Paris and this national research body. Alongside the Sanofi pharmaceutical group, the Gustave Roussy Institute, INSERM and Paris-Saclay University, IP Paris is a founding member of the Paris Saclay Cancer Cluster, a unique project in Europe which brings together the cream of expertise to boost the discovery of tailor-made cancer treatments. As a firm advocate for the links between education and research, IP Paris took part in the 30th edition of the Science Festival. Likewise, the E4C and Hi ! Paris centers organized their first summer schools.

**A catalyst for innovation**

IP Paris launched its 3rd call for projects to detect and support innovative projects. By developing a cutting-edge innovation policy to boost the societal impact of IP Paris, this program enables the winning projects to produce a world first. Ten projects were selected for a total endowment of €840,000. IP Paris partnered the Paris Saclay SPRING event, which enabled it to showcase the start-ups in its eco-system, and more particularly those supported by École Polytechnique. Lastly, 21 start-ups from the eco-systems of École Polytechnique and other IP Paris schools were a notable presence at the Viva Technology international fair.

IP Paris was a partner of the 2021 Spring! virtual fair
“In the face of rising competition in the last two decades, École Polytechnique boasts wonderful assets, such as the very high level of its students and training programs, the quality of its teaching body, the excellence of its research and the vibrancy of its entrepreneurial and innovation eco-system.”
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“The bearer of high scientific, human and common good values, École Polytechnique continues to develop its training programs to uphold their appeal, readability and position of excellence. It thus launched reviews to adapt its engineering cycle, France’s leading engineering program, and pursued its efforts to welcome an ever-growing number of students to new programs (Bachelor, Master of Science and Technology) developed by capitalizing on the success of its continuing education programs and by boosting its online course offer.”
In order to meet societal and economic challenges through the training of students for industry, government departments and the academic sphere, in 2021, the School consolidated its various initial, continuing education and certified training programs while confirming their excellence, engagement, leadership, multi-disciplinary and creative aspects, all of which are widely recognized by employers. The School thus earned 30th place among the world’s best universities in the Times Higher Education (THE) 2021 employability ranking.
ENGINEERING CYCLE
An overhaul making good progress

The 2021 admission exam for the Polytechnic Engineer Cycle went smoothly, despite the ongoing COVID-related situation, and all the places for the French admission were attributed, with all incoming students having requested the School as their top choice. For international recruitment via the university sector, the admission exam was pooled with IP Paris. Reviews for the overhaul of the Engineering Cycle continued, around four key structural points, with the aim of boosting its appeal and readability on an international level while fostering space for exchange and openness for all X students. The excellence and multi-disciplinarity of the cycle are characteristic aspects which will be maintained, in addition to the humanist and military training. In 2021, the Engineering Cycle upheld its leading position in all French engineering school rankings.

BACHELOR
A sharp rise in applications, recruitment targets met

With the arrival of 157 new students in 2021 and a sharp rise in applications, the Bachelor program is very close to its target of stability in yearly intake, reaching 480 students across a three-year program. Launched in 2017, this program celebrated its second graduation in 2021, thus opening the way to excellence programs both in France and overseas. The international renown of the program was confirmed with overseas students from 40 countries making up 81% of intake for its most recent class.

MSC&T
A gain in momentum, an enrichment of the program

The Master of Science and Technology (MSc&T) program welcomed almost 200 incoming students in 2021, for a total of 315 students in all programs and all years, in line with the target. The program is to be gradually enriched with the creation of new courses, in association with IP Paris and HEC, and the setting-up of international partnerships with a view to reaching an ultimate target of 500 students across the 2-year program by 2025. The second MSc&T First Job survey of the class of 2019 (graduating in 2020) highlighted the success of the program with employers: two out of three graduates were recruited before
the end of their studies. The Master of Science and Technology in Data Science for Business led by École Polytechnique and HEC earned third place out of 120 comparable programs worldwide for its first entry into the QS Business Masters Rankings: Business Analytics, published in September 2021.

EXECUTIVE MASTER
Proven success, new leadership and internationalization in the pipeline

As in 2020, the Executive Master reached maximum capacity once more with 36 participants in 2021. Boosted by this success, plans for internationalization are being examined with the opening of a second class taught exclusively through English and geared in particular towards international participants based in France. Nicolas Mottis, creator and Dean of the Executive Master from the outset, and professor with the Innovation and Entrepreneurship Management Department (MIE) entrusted Cécile Chamaret, MIE lecturer since 2017, with leading the next steps in the development of the program as of the start of the 2021-2022 academic year.

EXECUTIVE EDUCATION
A must in the professional training field

Since its creation in 2015, X-EXED has become a benchmark in the field of professional training developed by higher education institutions. In 2021 Executive Education pursued its development with its unique training offer combining the mastery of new technologies, innovation and major project management, leadership development and change management. More than 60 teacher-researchers from X contribute to the creation of these programs which bring participants into direct contact with the latest developments from École Polytechnique research.

ONLINE TRAINING COURSES
An enriched offer

A French pioneer in the development of open online courses (MOOCs), École Polytechnique bolstered its offer in 2021 with the launch of a MOOC on renewable energy for the electricity network and an innovative course, developed in collaboration with the teacher-researchers of Télécom Paris, on the new rules for business and entrepreneurship in the digital sphere.
Students from X and IP Paris were consulted on the France 2030 Recovery Plan and presented the conclusions of their work to the State Secretary for Digital Transition, Cédric O.

Former Prime Minister Edouard Philippe speaking at École Polytechnique during the Tribunes de l’X.

The CEO of Schneider Electric, Jean-Pascal Tricoire, speaking from China during a virtual conference with the students of X.

ICPC:
The team from X in the world top 25, a first for France

X in the running at the International Mathematics Competition

Two silver medals for X in the SWERC programming contest
Nicolas Mottis and Cécile Chamaret at the graduation ceremony for the 3rd Executive Master class at the Maison des Polytechniciens in Paris

(Re)live the event on video

Graduation ceremony for the Bachelor class of 2021, BX21, at École Polytechnique

The virtual graduation ceremony for the third MSc&T class in the presence of Eric Labaye, President of École Polytechnique, and Mercedes Erra, Founding President of BETC Group

Executive Master: Immersion into the heart of aeronautics and European aerospace

Students present their work at a major conference on AI

The student Space Center presents its work at the International Astronautical Congress in Dubai. Their projects were based on a miniature satellite and the re-use of rocket boosters
A school attached to its status and military values

The strong show of engagement by engineer students and more widely by the whole Polytechnique community in the fight against COVID-19 which marked 2020, continues to this day and demonstrates the values of self-sacrifice, the sense of common good and protection of co-citizens embodied by Polytechnique students and their military status.

With the alleviation in the health crisis, the School was able to return to the high points of its humanist and military training, in addition to the military ceremonies which are unique to the school or an inherent part of major national commemorations.

The 250th anniversary of the death of Napoleon I, who granted the School its military status, provided an opportunity to recall the Emperor’s links with X and to reiterate the meaning and scope of its military identity.

In 2021 and a context marked by the emergence of new geopolitical equilibriums, an acceleration in scientific and technological breakthroughs, digital transitions, climate change and health risks, the military status of X took on new meaning.

École Polytechnique is in fact the only major French school whose students are called to play a key role in the defense (in the broadest sense) of the nation and the development of its interests, and are exposed to the military world and geo-strategic challenges.
Highlights

In dress uniform, two hundred and forty-six École Polytechnique pupils out of the 551-strong class of X2020 took part in the Bastille Day military parade, with a clear focus on the future and high technology. In 2021 the dress uniform for female students changed; they now wear pants and boots like their male counterparts.

To mark the bicentenary of Napoleon's death, École Polytechnique and its museum, Mus’X, designed and produced a virtual series in 13 episodes and a historical tour through the Palaiseau campus revisiting the links between Napoleon Bonaparte and École Polytechnique, which owes its military status, flag and motto to the Emperor: “Pour la Patrie, les Sciences et la Gloire.” ["For the homeland, science and glory"]

See the exhibition ▶

ORSEM training preparation relocated to X: a first. The preparatory course for the Higher School of Special Reserve Staff Officers (ORSEM) was relocated to X for the first time. General Pineau, Deputy Director of the Command Doctrine and Education Center (CDEC) visited trainees and met with X authorities.

Twenty-five Polytechnique students of the classes of X18 and X19 carried out a week’s immersion from February 15 to 20 at the 4th regiment of Castelnaudary, with military instruction, physical activities, encounters and insight into the regiment and its traditions.
“In 2021, research at X carried on with its integration into the Institut Polytechnique de Paris, which offers it the means and prospects for advanced growth. École Polytechnique researchers and laboratories consolidated their international renown and resumed the momentum of high-level scientific exchange which the COVID-19 pandemic had disrupted.”
École Polytechnique brings together 23 laboratories, including 22 joint units with the CNRS. Benefiting from unique facilities and boasting world-renowned expertise, our research staff combine the exploration of the most fundamental aspects of research to further knowledge with the development of more applied major fields which will address the scientific, technological and societal issues of the 21st century.
Integration with the IP Paris research center continues

The 23 laboratories of École Polytechnique are now integral parts of the IP Paris research center. The latter opened ten disciplinary departments and fosters the development of inter-disciplinary centers around societal issues. Following the successful launch of the E4C center for energy transition in the context of climate change and that of Hi! Paris devoted to artificial intelligence and data science, IP Paris created the CIEDS (Inter-Disciplinary Center for Defense and Security) in 2021, which receives strong backing from the Ministry for the Armed Forces and the Innovation and Defense Agency.

Renewed partnership with the CNRS

École Polytechnique and the French National Scientific Research Center (CNRS) renewed their historical partnership in 2021. The agreement signed for the 2020-2025 period is in keeping with an active and strategic collaboration implemented in 2009 between École Polytechnique and the national research body. ENSTA Paris and the Groupe des Écoles Nationales d’Économie et Statistique (GENES) were included in this agreement for their joint laboratories with X. The vast majority of X laboratories are co-supervised by partner National Research Bodies (NRB), in particular the CNRS, INRIA and the CEA. Since the creation of IP Paris, all these players have been looking closely into ways of optimizing interactions and jointly defining a scientific strategy for the Institute.

Consolidating international renown

The School maintained its position of excellence in several rankings, including the QS WUR by subject. The quality of its researchers’ work and their numerous publications have contributed greatly to the scientific renown of the Institut Polytechnique de Paris.

Facilities

Inauguration of SIRTA, the new atmospheric research observatory. This new instrumental site for research by remote detection, located on the École Polytechnique campus, will also be open to the public, to present climate and environmental science.
A large-sized drill was delivered to the Leprince-Ringuet Laboratory. It will be used specifically to create mechanical parts for one of CERN’s particle detectors.

The start of works to the future IP Paris Mechanics Center, where more than 10,000 m² will house the research laboratories in solid mechanics, hydrodynamics and life mechanics of École Polytechnique and ENSTA Paris.

A promising enzyme for green chemistry in Science magazine

The workings of an enzyme, which could be used to produce bio-fuels and green chemistry, have been decoded. This result called on an international team of scientists with a significant contribution from the Optics and Bio-Science Laboratory. The discovery was published in Science magazine on April 9, 2021.

Digital simulation in a laboratory of the generation of a non-colliding shock wave

Julien Fuchs, LULI

Polarized light, a new tool for bio-medical diagnosis

A scientific collaboration initiated by the Interface Physics and Thin Layers laboratory led to the development of a polarimetric imaging system which examines the micro-structure of the uterine cervix in vivo and in real time. It may help to improve detection of cervical cancer and the risk of premature births.

Understanding the generation of cosmic rays in the laboratory

By combining power lasers and intense magnetic fields, researchers from the National Intense Magnetic Fields Laboratory (LNCMI, CNRS) and the Intense Laser Laboratory (LULI, CNRS, Ecole Polytechnique/Sorbonne University) notably, managed for the first time to create laboratory conditions for the emission of accelerated particles during a collision between the inter-planetary environment and the Earth’s magnetic field.

“Emotive” algorithms exposed to art

How can we reproduce human emotional perception of an image? Such is the challenge set by Maks Ovsjanikov, professor at the X Computer Science Laboratory, and his colleagues from Stanford and KAUST. They created the ArtEmis project to teach algorithms to reproduce human emotions when exposed to works of art.
Numerous publications and contributions

Throughout the year, the School's laboratories contributed their research to renowned publications. A total of 2,600 publications were noted, including one in *Science* on the work of the Optics and Bio-science Laboratory (LOB) in the framework of an international research consortium.

The momentum relaunched for high-level scientific exchange

Disrupted by the COVID-19 pandemic, exchanges within the scientific communities affiliated with the X laboratories regained their momentum with the organization of numerous seminars and in particular the 12th European CubeSat Symposium, which brings together academic and industrial experts in space; the organization of a symposium in human sciences, “What escapes artificial intelligence?” or the First Congress of Young Researchers in Applied Mathematics.

Awards for researchers

Our teacher-researchers won several awards, including two bronze medals from the CNRS for Eleonora Di Nezza from the Laurent Schwartz Mathematics Center and Béatrice Cherrier, a researcher in economic history at CREST. Mathieu Desbrun teacher at the École Polytechnique Computer Science Laboratory (LIX), was appointed ACM Fellow 2021 for his contribution to computer science. The work of Marcel Filoche, CNRS research fellow at the Physics and Condensed Matter Laboratory (PMC), on wave localization was awarded by the French Academy of Science. CNRS research fellow at the Molecular Chemistry Laboratory (LCM) and professor at École Polytechnique, Grégory Nocton was awarded the young researcher prize by the Société Chimique de France. The work of Cédric Thaury, researcher at the Applied Optics Laboratory (LOA) was awarded by the French Physical Society, and Josselin Garnier received the Grand Prix Scientifique from the Del Duca Foundation for his work in applied mathematics.

Conferences & Symposiums

Small satellites were at the center of discussions at the 12th European CubeSat Symposium, held at École Polytechnique.
For the first days of joint research on cold plasmas, École Polytechnique brought together more than one hundred researchers from all over France to study cold plasma ionized media created by discharge and laser.

“What escapes artificial intelligence?” symposium The inter-disciplinary laboratory of École Polytechnique (LinX) organized an international symposium to bring together diverse views from the field of human sciences on the question of artificial intelligence.

Portraits of prize-winning researchers

/ Theorist and modeling expert Marcel Filoche won a French Academy of Science prize for his work on wave localization and the discovery of the “localization landscape”.

/ An assistant professor and researcher at the Solid Mechanics Laboratory, Laurence Bodelot studies the influence of multiscale effects and multi-physics coupling on the behavior of materials. Her work earned her the Jean Mandel Prize.

/ A bronze medal from the CNRS for Eleonora Di Nezza. The mathematician, Monge professor at École Polytechnique and researcher at the Laurent Schwartz Center for Mathematics, was among the 2021 winners of this CNRS award.

/ Researcher at the Center for Applied Mathematics, Josselin Garnier has just been nominated by the French Academy of Science and awarded the 2021 Grand Prix Scientifique 2021 by the Simone et Cino Del Duca Foundation for his work on scattering phenomena.

/ The Ile-de-France branch of the French Chemistry Society has awarded a prize to Céline Dorval for her doctorate work carried out at the Molecular Chemistry laboratory on the development of new cobalt-catalyzed methods.

/ Cédric Thaury, researcher at the Applied Optics Laboratory has won an award from the French Physical Society for his work on laser-plasma acceleration.
Innovation

"Thanks to a unique position in the French Tech ecosystem, École Polytechnique aims to double the flow of start-ups it supports by capitalizing on its integration in IP Paris and the boosting of its X-Novation Center brand beyond the organization’s walls.”

Bruno CATTAN
Director of Entrepreneurship and Innovation
The innovation and entrepreneurship eco-system of École Polytechnique was bolstered in 2021 by the definition and development of the support to be provided by the Drahi X-Novation Center, the launch of the Polytechnique Ventures seed fund and the first signs of interest for the new business, innovation and research park. Its vibrancy was demonstrated by the awards given throughout the year to numerous start-ups supported by Drahi X-Novation Center or created by alumni.
A new momentum to support start-ups

The Drahi X-Novation Center, a venue devoted to entrepreneurship and innovation on the School’s campus, supports start-ups in IP Paris’ fields of interest, in particular Deeptech, Artificial Intelligence, Data Science, Health and Defense. Its value proposition is based on the X-UP and X-TECH incubators and the X-FAB prototyping space. In 2021, twelve new start-ups joined one of the Drahi X-Novation Center’s programs, and special emphasis was placed on the revitalization of the X-TECH incubator for start-ups in their acceleration phase, in addition to the launch of an overhaul of the X-UP program.

Launch of Polytechnique Ventures

École Polytechnique’s entrepreneurship and innovation eco-system was boosted by a major new player with the launch of Polytechnique Ventures, a seed fund initiated by X alumni which will invest in innovative technology start-ups from the School’s entrepreneurship and innovation eco-system. This fund was endowed with €20 million upon its creation and made three investments in 2021.

Denis Lucquin and Cécile Tharaud, Chairman and Managing director of Polytechnique Ventures
Eleven start-ups presented their projects to business angels, investment funds and potential partners, during Demoday XUP#13, organized by École Polytechnique’s incubator, Drahi-X Novation Center.

The X-Impact Tech 2021 Prize goes to women entrepreneurs. Led by X Executive Master graduates with the support of the X Foundation and the X-UP incubator, 4 start-ups were awarded: Inclusive Brains, Hipersys, Beyond Aero et SmartBack.

The Gerondeau - Safran prize was awarded to 3 start-ups (Beyond Aero, Manitty and PaIRe) for their respective innovations in the fields of aeronautics, bio-technology and nuclear medicine.
Creation of the Innovation Park

Led by the Paris-Saclay Public Development Establishment (EPA), this business, innovation and research park is now open and has already seen signs of interest. It will foster closer links between public research and private R&D, enable the creation of a PhD employment pool and boost funding for projects and theses, in addition to the development of an innovation eco-system on the scale of IP Paris.

Acclaimed start-ups

X start-ups, supported by the various programs offered by Drahi-X Novation Center, or created or run by alumni, featured yet again in numerous rankings. Nine start-ups made it into the French Tech Next 40 list, and 16 others to the French Tech 120, while seven were rewarded at the i-Lab competition and 12 were listed in Challenges magazine’s annual “100 start-ups to invest in”.

OUR MISSIONS
The start-ups Escape and Flyinstinct, winners of the X-Grant Silicon Valley prize. The Master X-HEC Entrepreneurs’ Demo Day, which traditionally ends the year’s program for students, was also the occasion to award the first joint X-Grant Silicon Valley and HEC Innovation Prize 2021. The X-Grant Silicon Valley prize, created in 2013, is funded equally by the Ecole Polytechnique Foundation and the Friends of Ecole Polytechnique, its sister structure in the USA.

The second edition of the two leading rankings of France’s most promising start-ups includes 9 founded or run by members of the Polytechnique community in the Next 40 and 16 more in the French Tech 120.

Seven start-ups created or run by X alumni were singled out by the i-Lab competition, including C12 Quantum Electronics.
“With multi-disciplinary teaching and research programs at the crossroads of industrial and societal issues, patronage chairs offer an advantageous framework for the development of partnerships with the corporate world.”

The X-Forum Association team, organizer of the École Polytechnique Forum, an annual event which enables some 2,000 students including 1,000 Polytechnicians to meet with 160 companies, schools and international universities on the X campus.
In 2021, Ecole Polytechnique consolidated its partnerships with companies by addressing increasingly complex societal issues, while preserving its academic freedom.

The close relationship between X and its corporate partners enables us to develop international research and teaching programs that address questions of sovereignty, such as artificial intelligence (AI), energy transition, digital science, health, mobility and new materials; through funding innovative and inclusive research, attracting more students of excellence, granting scholarships and boosting international visibility, via partnerships and the hosting of world experts.

In line with the Institut Polytechnique de Paris strategy, chairs are a means to boost impact. They fund inter-disciplinary centers, contribute to the scientific reach of the institution via their patrons and develop collaborative projects and international communities.
PARTNERSHIP

NEW CHAIR
IP Paris x Accenture
The creation of a new chair at the Institut Polytechnique de Paris, "Technology for Change: Environment, Society, Industry", led by Thierry Rayna, researcher at the Center for Management Research and the interdisciplinary institute for innovation (I3-CRG) with the patronage of Accenture. The chair focuses on addressing the major challenges currently raised by science and technology. Its kick-off on October 25, 2021 focused on the industry of the future.

PROGRAM SIGNATURE
“Decarbonize the economy”
The signing of the “Decarbonize the Economy” program in November 2021, in the framework of the E4C Center and supported by BNP Paribas, aims to boost research in the evaluation of low carbon investments and the development of environmental impact measurement tools.
2 NEW PATRONS FOR THE “Blockchain & B2B Platforms” chair
Two new patrons, Nomadic Labs and La Caisse des Depots join the chair. The chair thus links three areas of innovation in the sector: blockchains thanks to Capgemini, non-permissible blockchains thanks to Nomadic labs and payment systems with La Caisse des Depots.

DATA SCIENCE INSTITUTE Revised program
The patronage program of the Data Science Institute, devoted to teaching data science in the Ivory Coast, has been renewed. The revision in January 2021 of this teaching program also included the development of its research aspect.
Position X on the international stage and foster exchange and cooperation

Gaëlle LE GOFF
Director of International Relations at École Polytechnique

“Impacted by the COVID-19 crisis, École Polytechnique and its international partners strove to preserve their ties and develop cooperation, despite the challenges facing mobility.”

In 2021, École Polytechnique continued to uphold the balance of its relations with international partners and further their development, in Europe particularly, via the setting-up of the European university EuroTeQ and the strengthening of the IP Paris brand.

Active involvement in the U7+ worldwide network
In 2021, École Polytechnique remained highly involved in the worldwide network of university presidents, U7+, of which the School was a founding member. U7+ is a space for discussion and reflection on the challenges faced by us all, and which this generation of students is actively addressing.

Roll-out of the European University EuroTeQ
In association with its European partners, and with the support of its students, teacher-researchers and industrial partners, École Polytechnique set up the EuroTeQ European university on its campus, which celebrated its first anniversary.

Acclaimed welcome facilities, renowned international reach
2021 also saw the gradual end of the COVID-19 crisis and the return of international mobility for students and teacher-researchers. The international reach and high-quality welcome of the School were acknowledged once more by the THE 2021 ranking which positions École Polytechnique as France’s most international higher education and research institution.
EUROTEQ ENGINEERING UNIVERSITY
Training the engineers of the future
The European university, “EuroTeQ Engineering University”, supported by the European Union and the French Government with a view to building a European space for training, teaching, innovation and research, celebrated its first anniversary in November 2021. Alongside the five science & technology university partners, Ecole Polytechnique is investing in this ambitious project to train the engineers of the future. In 2021 the first virtual mobilities were set up, allowing teacher-researchers and students to experiment with new teaching and learning formats, with the involvement of partner companies.

AN IVORY COAST MINISTERIAL DELEGATION at X
The Ivory Coast Minister for Higher Education and Scientific Research, Adama Diawara, paid a visit to X in the company of Mr. Moussa Diaby, the new director of the Félix Houphouet-Boigny National Polytechnic Institution (INP-HB), a key partner with whom the School co-built a Master’s in New Energy, at the Ivory Coast university, inaugurated in October 2021.

INTER-GENERATIONAL CONFERENCE CYCLE by the Alliance U7+
In the framework of its involvement in the international university network, U7+, Ecole Polytechnique organized an inter-generational round table on “Scientific and technological innovation for a sustainable future”, on June 29 2021. The event attracted students and teacher-researchers from U7+ Alliance universities around the world.
A FINE EXAMPLE OF INTERNATIONAL COLLABORATION
EuroTech Innovation Day
Co-organized by Drahi-X Novation Center, the entrepreneurship & innovation center of Ecole Polytechnique, EuroTech Innovation Day brought together teachers, researchers, students and alumni from the six member universities of the EuroTech alliance, and was an opportunity to hear from several business and start-up creators accelerated or incubated at Drahi-X Novation Center.

AGENDA 2030
At the core of the world forum for university presidents
Eric Labaye, President of Ecole Polytechnique and Institut Polytechnique de Paris, spoke at the World Forum for University Presidents, organized by the Zhejiang University on March 24, 2021. During this virtual event which brought together university presidents and UN representatives to discuss the key role universities play in the implementation of Agenda 2030, Eric Labaye presented the engagement and actions of Ecole Polytechnique to reach the UN Sustainable Goals.
FURTHER COLLABORATION WITH THE NANYANG TECHNOLOGY UNIVERSITY

Ecole Polytechnique and the Nanyang Technology University in Singapore (NTU) have been working alongside each other for several years in the framework of various research projects.

In 2021, both institutions furthered their collaboration by enabling X Bachelor students and NTU students to spend a semester on their partner’s campus.

FIRST-CLASS HIGH SCHOOLS around the world

With its aim to continue attracting outstanding international students to its Bachelor program, Ecole Polytechnique initiated collaborations with several high schools across the world, all renowned for the quality of their teaching. This cooperation enables partner high schools to pre-select exceptionally talented students and introduce them to the multi-disciplinary Bachelor of Science program at Ecole Polytechnique.
X and IP Paris in the rankings

In France, École Polytechnique confirmed its leading position in various engineering school rankings and strengthened its reputation with French and international employers.

In 2021, the founding schools of IP Paris featured in international rankings under the common banner of the Institut Polytechnique de Paris.

**X, France’s 1st engineering school**

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

**MsC&T Data Science for Business ranks in the QS World’s Top 3**

The Master of Science and Technology (MSc&T) in Data Science for Business X-HEC comes in third out of 120 comparable programs for its first QS ranking.
IP Paris, 48th internationally and 2nd in France.

IP Paris, 11th internationally and 1st in France for graduate employability.

IP Paris, 43rd internationally and 1st in France in the THE ranking of the best international universities.