INSTITUT POLYTECHNIQUE DE PARIS

ÉCOLE POLYTECHNIQUE

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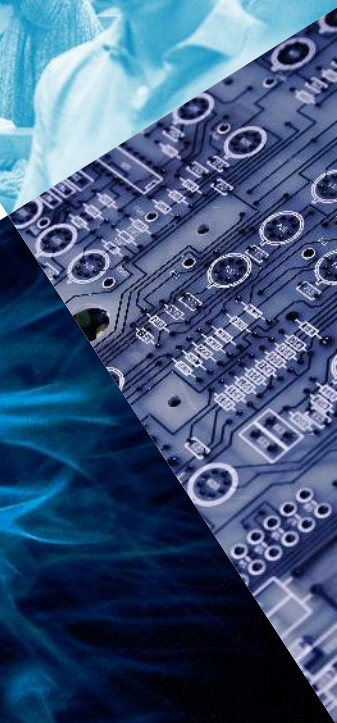
Institut Polytechnique de Paris
巴黎综合理工大学

Educate, Research & Innovate for a Better Future



RÉPUBLIQUE FRANÇAISE
Liberté
Égalité
Fraternité

ip-paris.fr

Institut Polytechnique de Paris – CSC Programme

Enjoy research in a World-class Institute of Science and Technology !

PhD programs @ IP Paris

IP Paris :
A World-class Institute of Science and Technology

QS GRADUATE EMPLOYABILITY RANKINGS

INSTITUT POLYTECHNIQUE DE PARIS

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N° 12 WORLD

N° 1 FRANCE

THE WORLD UNIVERSITY RANKINGS

THE WUR first entry:
91st World
3rd in France

Physical Sciences n°26 worldwide, n°2 in France
Computer Sciences n°46 worldwide, n°2 in France
Life Sciences n°83 worldwide, n°4 in France

QS WORLD UNIVERSITY RANKINGS

QS WUR 2023:
48Th World
2nd in France

ACADEMIC RANKING OF WORLD UNIVERSITIES

Shanghai WUR ranking:
Maths 31st, Physics 42nd, Statistics 50th

IP Paris :
Identity & Objectives

5

INSTITUTIONS

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

3 MAIN OBJECTIVES

1. **Providing top level education in a wide range of fields**
2. **Leading cutting-edge research to answer global challenges**
3. **Fostering innovation & entrepreneurship**

Educational programs of IP Paris and its schools

Bachelor

3 year

Engineer Degree

3 year

Master / MSc&T

2 year

PhD / PhD Track

2 year + 3 year

Executive Master

14 months

Advanced Master

Executive Education

IP PARIS:
KEY FACTS & FIGURES

8 200 students (39% international)

1300 Faculty members

1000 PhD students

30 Laboratories

3 incubators accompanying 800 start-ups

- **Centuries of experience in education and research** (Since 1749)
- **World-Class Research Infrastuctures**
- **A campus in the 8th global innovation hub**
  30 min away from Paris
- **High employability rate**
  95% employability rate after graduation
- **Strategic education & Research partnerships**
  >40 corporate partners //>200 academic partners

Research @ IP Paris

Cutting-edge research to answer global challenges

30 Laboratories

3 700 Publications per year

1000 Faculty members

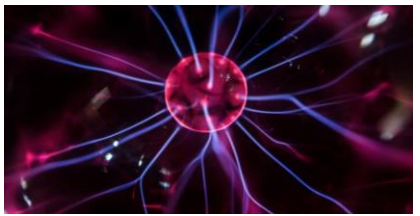
1000 PhD students

230 Post-doctoral students

10 Research & education departments

1 Grants' Office

Research @ IP Paris



IP Paris Research Center

10 Departments

- Department of Biology
- Department of Chemistry and Processes
- Department of Mathematics
- Department of Physics
- Department of Mechanics and Energetics
- Department of Computer Science, Data and Artificial Intelligence
- Department of Information, Communication and Electronics
- Department of Economics
- Department of Social sciences and Management
- Department of Humanities, Art, Literature and Languages

4 interdisciplinary centers on key societal challenges

E4C INTERDISCIPLINARY CENTER

Energy for Climate Center addressing the systemic complexity of energy transition

Hi! PARIS
PARIS ARTIFICIAL INTELLIGENCE FOR SOCIETY

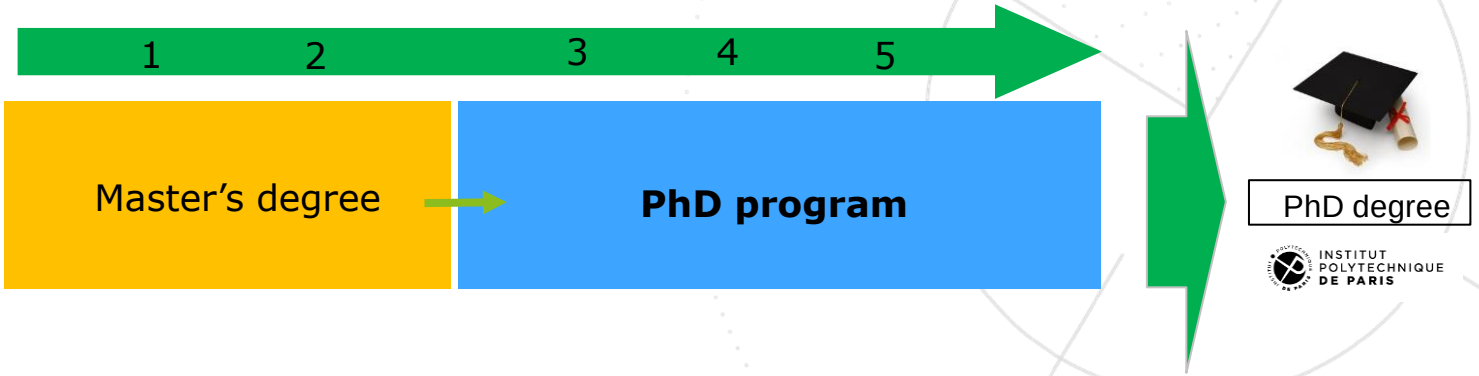
Putting Artificial Intelligence and Data Science at the service of business and society

Interdisciplinary Center for Defense & Security

Engineering for Health Interdisciplinary Center

PhD programs @ IP Paris

Research at IP Paris : PhD programs



A focus on PhD programs

- Earn a PhD degree from a top ranked Institute of Science and Technology!
- IP Paris offers 3-year or 4-year PhD programs in a wide variety of disciplinary fields. The doctoral research conducted within IP Paris is based on 30 laboratories and takes place in a high-quality scientific environment. PhD students are also offered the opportunity to conduct their PhD with companies with renowned R&D Departments.
- **Two doctoral schools**:
  - ED IP Paris : **IP paris Doctoral School**, an interdisciplinary doctoral school, co-accredited with HEC Paris
  - EDMH : **Hadamard Doctoral School of Mathematics**, co-accredited with University Paris-Saclay and University PSL
- PhD graduates **recruited in top companies**
- **Personalized supervision** of PhD students in order to improve their training and increase their **employability**

IP Paris Doctoral School

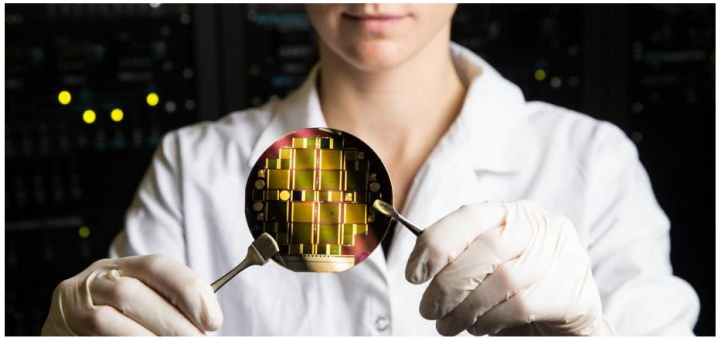
READ MORE

Hadamard Doctoral School of Mathematics

READ MORE

PhD programs at IP Paris

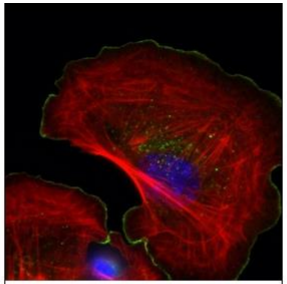
IP Paris Doctoral School



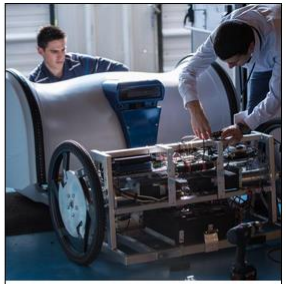
900 PhD students (45% international), supervised by more than 800 researchers in 30 research laboratories

ED IP Paris offers a rich doctoral training through the research component ranging from basic research to applied research and prepares students for successful scientific career opportunities (research, teaching, project management, etc.) in universities and the private sector.

PhD in Physics



PhD in Biology and Chemistry



PhD in Engineering, Mechanics and Energy

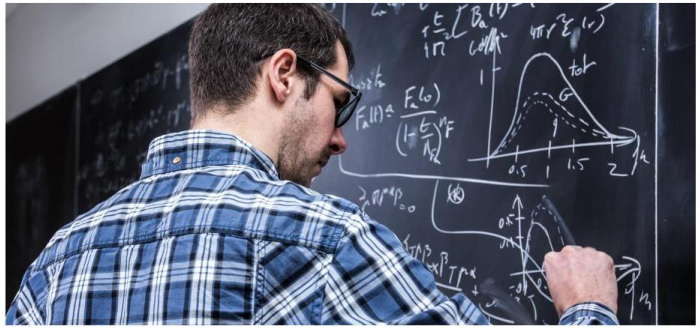
PhD in Computing, Data and Artificial Intelligence

PhD in Information, Communications and Electronics

PhD in Economics, Management and Social Sciences

PhD programs at IP Paris

Hadamard Doctoral School of Mathematics



Training from pure mathematics to the most applied mathematics, including subjects at the interface with mathematics (particularly with economics, IT, mechanical engineering, physics, engineering, and life sciences).
More than 300 PhD students, and more than 240 accredited PhD supervisors.

IP Paris laboratories associated to EDMH Doctoral School:

École polytechnique
- Centre de mathématiques appliquées
- Centre de mathématiques Laurent Schwartz

ENSTA Paris
- Unité de Mathématiques Appliquées de l'ENSTA Paris

ENSAE Paris
- Centre de Recherche en Économie et Statistique

Télécom Paris
- LTCI

Télécom SudParis
- SAMOVAR

PhD Admissions 2023-2024

- Open to students holding a Master's degree
- The program takes 3 to 4 years
- Specific PhD proposals for the IP paris – CSC cooperation program are posted by IP Paris labs on the website of the two Doctoral schools
- Applications are submitted exclusively online on the website of the two Doctoral schools.

Admissions calendar:

- Opening of applications on **8 November 2022**
- Deadline for applications: **5 January 2023**
- Interviews from mid-January to mid-february

Apply here:
https://www.adum.fr/as/ed/proposition_Setab.pl?site=IPParis&type=Financement%20CSC

- **Learn more!**

PhD proposals 2023-2024 – Applied Mathematics

Unsteady Simulations of Suspensions of Solid Inertial Particle	Inertial Suspensions, Instabilities, Numerical methods, Stokes, HPC	École polytechnique
Analysis of neuron morphological characteristics using a PDE model for diffusion MRI	Bloch-Torrey PDE, diffusion magnetic resonance imaging, finite elements, simulation, neurons, machine learning	ENSTA

- **Learn more!**

PhD proposals 2023-2024 - Biology&Chemistry

Isothermal amplification for diagnostics	DNA polymerase, Isothermal amplification, Cas	École polytechnique
Selective recognition of nucleic acid secondary structures with electron-deficient ligands	nucleic acids, secondary structures, G-quadruplex, DNA/RNA ligands, radical anions/dianions	École polytechnique
Functional 2D MXene Materials for Efficient Air Quality Monitoring	Sensors, MXene, Functionalization	École polytechnique
A Unified Route to Polycyclic Terpenes	Radical additions, Natural products	École polytechnique
Plasmonic nanocrystals for infra-red optics : synthesis and application for solar control	Nanocristals, Plasmonics, oxides, functionnal coatings, solar control, optics	École polytechnique
SYNTHESIS AND CHARACTERIZATION OF ALLOY BASED OXIDES MODEL CATALYSTS FOR WATER SPLITTING	Electrocatalysis, transition metal oxide synthesis, surface structure and oxidation state, in operando characterizations	École polytechnique
Coprecipitation synthesis and application of WO3-x	tungsten oxide, coprecipitation, nanostructures, soft chemistry, electrochromism	École polytechnique
New approaches in Isocyanide Based Multicomponent Reactions	isocyanide, catalysis	ENSTA
Metal-catalyzed C(sp3)-H functionalization of primary aldehydes controlled by transient directing group	C-H activation, catalysis, transient directing group, aliphatic aldehyde	ENSTA
PREDICTIONS OF THE PHYSICAL PROPERTIES OF REFRIGERANTS OF THE NEXT GENERATION. APPLICATION TO THE SIMULATION OF FLUID FLOWS AND HEAT TRANSFER FOR GLIDE WORKING FLUIDS	refrigerant, thermodynamic cycles, energy efficiency, CFD calculation	ENSTA
GREEN HYDROGEN PRODUCTION BY USING TIO2 PHOTO-CATALYSTS SYNTHESIZED UNDERMILD CONDITIONS AND DOPED WITH METAL NANOPARTICLES	Green Hydrogen , Photocatalysis, Mild Synthesis, Titanium oxides, Metal nanoparticles, Pressure	ENSTA

- **Learn more!**

PhD proposals 2023-2024 - Biology&Chemistry

Structure-function analysis of the ribosomal RNA 3-amino-3-carboxypropyl (acp3) transferase Tsr3	Archaea, Ribosome, RNA modification	École polytechnique
Development of orthogonal biosynthetic ribosomes for the targeted production of biomolecules in archaea.	Ribosome, Archaea, Traduction, Synthetic Biology	École polytechnique
Human RNA modification enzymes : biological functions and roles in brain development.	RNA modification, Neurodevelopmental disorders, Protein synthesis, Cell biology, Biochemistry	École polytechnique
Identification and functional characterization of RNA-binding proteins and protein-protein interactions in the model archaea H. volcanii and S. acidocaldarius	Archaea, RNA, Protein-Protein interaction, RNA binding protein, Cross-linking	École polytechnique
TRANSLATION INITIATION OF LEADERLESS MRNA IN DEINOCOCCUS DESERTI	Ribosome, Cryo-EM, Leaderless mRNAs, Translation initiation factors, Evolution, Biochemistry	École polytechnique
Novel Functions of Branched Actin Networks	Arp2/3, Cell Migration, Intracellular Trafficking	École polytechnique
Coordination Chemistry and catalysis with iminophosphorane based ligands	coordination chemistry, ligands, catalysis, heterochemistry	École polytechnique
Stabilized Pd(IV) species for alkyl-alkyl coupling	Organometallic chemistry, Paladium, Nickel, Divalent lanthanides, Isomerisation, Coordination chemistry	École polytechnique
Transformation of Gaseous Pollutants by Low-Valent Lanthanide Complexes	Organometallic chemistry, Small molecule activation, Oxophilic metals, Divalent lanthanides, CO and CO2 functionalization, Coordination chemistry	École polytechnique
Molecular and cellular bases of collective migration in the zebrafish embryo.	cell migration, zebrafish, live imaging, development, morphogenesis	École polytechnique
Characterization of flavoproteins by computer simulations and ultrafast spectroscopic experiments	computer modeling, ultrafast spectroscopy, molecular dynamics, photo-reaction	École polytechnique

- **Learn more!**

PhD proposals 2023-2024 – Engineering, Mechanics & Energy

Impact of drops on concave surfaces and plant dispersal by rain	Two-phase flows, drop dynamics, dispersal	École polytechnique
Effective rheology of reactive suspensions	Viscous flows, Suspensions, Numerical simulations , Rheology, Active particles	École polytechnique
Self-healing kinetics of soft materials	Reversible crosslink, Spontaneous forming, Soft active material, Healing kinetics	ENSTA
Fatigue behaviours of toughened hydrogels	Toughened hydrogels , Fatigue behavior, Fatigue mechanisms, Biomedical, Cyclic behavior	ENSTA
Multi-physics coupling in ionic gels	Soft smart materials , Iono-magneto-mechanical coupling, Biocompatibility	ENSTA
Development of an 'intelligent' damping device by additive manufacturing	Shape memory alloys,, Additive manufacturing, Damping, Cellular structures, Optimization	ENSTA
Electromagnetic forcing of surface modes: application to aluminium electrolysis cells	Surface modes, magnetohydrodynamics, Electrolysis cells, conductive fluid, sloshing, Hall-Héroult	ENSTA

- **Learn more!**

PhD proposals 2023-2024 - Physics

Quantum simulation of quasicrystals of Ultracold Atoms	Quantum simulation, Ultracold quantum gases, Quantum Monte-Carlo	École polytechnique
Characterizing the color screening mechanism of the Quantum Chromodynamics with the LHCb experiment	LHCb, QCD, Charmonium, Fixed-target	École polytechnique
Nanoscale X-ray diffractive imaging	imaging, X-ray diffraction	École polytechnique
In vivo nonlinear optical microscopy of nervous tissue: lipid and metabolism imaging	microscopy, nonlinear optics, tissues, imaging, lipids, metabolism	École polytechnique
Monte Carlo modeling of polarized light interaction with scattering and anisotropic media for biomedical diagnosis	optical polarization, Monte Carlo approach, biophotonics, optical biopsy of tissue	École polytechnique
Cold Atmospheric Plasmas interacting with biological materials	Cold Atmospheric Plasmas , Interaction Between cold Plasmas and biological materials , bioengineering	École polytechnique
Theoretical study of hot carrier dynamics and electronic transport in III-V/Si heterostructures, for potential energy harvesting applications.	condensed matter theory, density functional theory, hot electron relaxation, interface, heterostructure, electronic transport	École polytechnique
Ion Acceleration with few cycle laser pulses	Ion Acceleration, laser pulse compressions	École polytechnique
Tomographic imaging of nanocrystal assemblies for versatile applications in biomedicine, energy, and display devices	nanoparticles, rare earths, luminescence, self-assembly, microfluidics, liquid crystals	École polytechnique
Launching strong laser field at remote distance in the atmosphere with temporal and spatial structuration of a femtosecond laser pulse	femtosecond laser, atmospheric propagation, High fields	École polytechnique

- **Learn more!**

PhD proposals 2023-2024

Computer Scicence, Data Science, Artificial Intelligence

Rigorous analysis of state-of-the-art multi-objective evolutionary algorithms	algorithms, theory, heuristics, artificial intelligence	École polytechnique
Wireless Sensing for Smart Homes	Smart Home, Wireless Sensing, Wireless Networks, AI/ML	École polytechnique
Multimodal estimation of the patient's motivation by biomarker analysis for a robot coach for physical rehabilitation.	social robotics, deep learning, assistive robotics, machine learning, intrinsic motivation, facial emotion analysis	ENSTA
Graph neural networks for text mining	Graphs, Text mining, Deep learning, Graph neural networks	Télécom Paris
Advanced techniques and hardness foundation of efficient lattice-based zero-knowledge proofs	Cryptography, Zero knowledge, Post quantum, Lattices	Télécom Paris
Computational models in quantum cryptography	cryptography, quantum cryptography	Télécom Paris
Unbiasing Deep-Learning on Medical Images with Respect to Inferable but Confusing Biomarkers	Medical Imaging, Deep-Learning	Télécom Paris
Learning Dynamic Rules for Complex Event Processing	Complex Event Processing (CEP), Dynamic rules , Machine-Learning, Distributed deep learning	Télécom-SudP
Graph-Based Reinforcement Learning Optimization to Optimize Urban Mobility	Reinforcement Learning, Mobility, Open data, Smart cities	Télécom-SudP

- **Learn more!**

PhD proposals 2023-2024

Computer Scicence, Data Science, Artificial Intelligence

Transfer Learning for Recognition of Activities of Daily Living in Videos and IoT sensors	Machine learning, Human activity recognition, Transfer learning, Computer vision, Smart home, IoT sensors	Télécom-SudP
Cross-lingual hate speech detection using transfer learning	NLP, Transforfers, GAN, few shot learning	Télécom-SudP
Introduction of timing aspects into Event-B	Event-B formal method, Timing aspect, Refinement, Proof, Correction	Télécom-SudP
Towards responsible algorithms in smart cities	Verifiable computing, Artificial Intelligence	Télécom-SudP
Multimodal 3D Object detection, tracking and recognition	computer vision , computer graphics	Télécom-SudP
Deep learning-based methods for 3D reconstruction	3D modelling, image processing	Télécom-SudP
Multimodal Dense Video Captioning	multi-modal video analysis , automatic image/vieo captioning	Télécom-SudP
Contribution of graph networks to the classification of white blood cells on computational microscopy images	machine learning, white blood cell classification, graph neural network, semi-supervised labelisation, graph clustering	Télécom-SudP

- **Learn more!**

PhD proposals 2023-2024

Information technology, communication, electronics

Quantum dot micro-lasers for neuro-morphic computing applications	Semiconductor lasers, Micro-ring, Quantum dots, silicon photonics	Télécom Paris
Statistical Modeling of MIMO Antennas Disturbed by their Close Environment, based on Machine Learning and other Regression Techniques, in the Context 5G & Beyond Wireless Networks	Array antenna, MIMO, Massive MIMO, Machine Learning, Antenna statistical modeling	Télécom Paris
MIMO Antenna Multi-objective Optimization Based on Machine Learning and other Order Reduction Techniques for 5G NR & Beyond Wireless Networks	Array antenna, MIMO, Massive MIMO, Machine Learning, Antenna optimization	Télécom Paris
Energy efficient and secure architectures Blockchain based for smart cities	Blockchain, smart cities	Télécom-SudP
Efficient Implementation of QCQP Solver in Embedded Systems using First Order Methods	QCQP, Embedded System, First-Order Method, Optimization	Télécom-SudP

- **Learn more!**

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