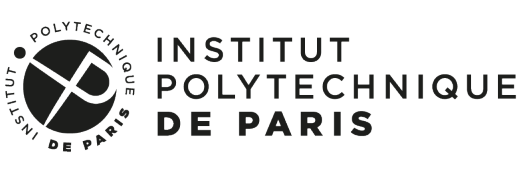
Master 2 Data Science, IP Paris

Journée de pré-rentrée/Kickoff meeting, Year 2025-2026

September 2, 2025, École Polytechnique



Organization of the meeting

Morning (10:00-13:00)

10:00 Presentation of the M2DS

10:30 Courses presentations

11:20 Short pause (15 min)

11:40 Courses presentations

12:30 Hi! Paris industrial partner: L'Oreal

12:40 Alumni club of M2DS

Lunch break (13:00-14:00)

13:00 Free buffet (Financed by QRT)

Afternoon (14:00-17:30)

14:30 Courses presentations

17:00 Discussions and questions

Alumni event (18:00)

18:00 Promotion bar at Bobar

M2 Data Science

Objectives

- Become expert in the field of Data Science, machine learning and artificial intelligence.
- Skills in mathematics of statistics, optimization, machine learning, computer science, big data infrastructure.
- Fast moving domain: learn to adapt.
- Multidisciplinary competency: not one good profile.

Facts

- IP Paris and Hi! Paris are major world actors in the domain.
- ≈130 students, 50-60% from IP paris engineer schools.
- 25% of students pursue with a PhD, the rest pursue industry.

Administrative requirement and information

Mandatory registrations:

- **Administrative registration** In your institution of origin (ENSAE,ENSTA, Telecom paris, Telecom SudParis) or École Polytechnique for new students of IP Paris.
- **PhD Track Students** Additional registration with the lab of your supervisor (ask them directly, it depends on the lab).
- **Pedagogical registration at École Polytechnique**
  - Contact : `master-admission@ip-paris.fr`
  - Contact for international students : `internationalstudents@ip-paris.fr`
- IP Paris registration unlocks your `@polytechnique.edu` (synapse/moodle)

Student Card/Badge

- Available only AFTER registration.
- Badge service near reception (with ID from 9.00:12:00 and 13:00-15:00)
- Access to buildings (update on terminals at Télécom/ENSAE/Magnan).

Contact : administrative questions

- Main email : `staffmasterdatascienceipparis@polytechnique.fr`
- Stéphanie Clevenot : `stephanie.clevenot@polytechnique.edu`

Pedagogical contract

Validation of the Master DS

- 42 ECTS from courses :
  - 3 ECTS Data camp (mandatory)
  - 3 ECTS : Master classes and Hi!ckathon (mandatory, evenings +1 weekend)
  - 6 ECTS : CAPSTONE Project or ML research seminar (choice).
  - 30 ECTS from selection of courses.
- 18 ECTS internship (public or private sector).

Rules

- Pedagogical contract must be signed at the beginning of the year.
- Courses and internship are validated for a grade greater or equal to 10/20.
- You can validate two courses in other masters (max 10 ECTS) but it needs agreement from one of the M2 coordinators (and of the other institution).
- ENSAE and ENSTA student can count 10 ECTS from the engineer school.
- M2 year validated when 60 ECTS (42+18) have been validated.
- Retake-exams possible but no compensations (60 ETCS required)

Courses organization

Calendar: `https://tinyurl.com/agenda-m2ds`

The year in 4 parts (parts 1-2 $\approx$ semester 1, parts 3-4 $\approx$ semester 2))

- **Part 1:** Courses 08/09-17/10, Exams 20-24/10
- **Part 2:** Courses 03/11-12/12, Exams 05-09/01, Hi!ckathon 28/11-01/12, Data Camp 15-19/12
- **Part 3:** Courses 12/01-20/03, Exams 23-27/03
- **Part 4:** Internship from 01/04, Defense in August/September/October

Hollidays/Vacations

- Fall : 27/10-02/11
- Winter : 22/12-04/01

M2DS Courses

Syllabus: `https://tinyurl.com/syllabus-m2ds`
Moodle: `https://moodle.ip-paris.fr/`

Part P1 & P2

Course name	Professors	Part	ECTS
Monte Carlo methods and approximate inference	Randal DOUC - Sholom SCHECHTMAN	P1	3
Practical introduction to machine learning	Rémi FLAMARY	P1	3
Kernel Machines: from shallow to deep learning	Florence d'ALCHE	P1	3
An Introduction to Machine Learning Theory	Stephan CLEMENCON	P1	3
Deep Learning I	Geoffroy PEETERS	P1	3
Big Data Framework	Duc PHAM-HI	P1-2	3
Optimization Meets Generalization: Insights from Statistical and Neural Network Learning	Aymeric DIEULEVEUT - Claire BOYER	P1-2	6
Advanced AI for text and graphs	Michalis VAZIRGIANNIS	P1-2	6
Optimization for Data science	Alexandre GRAMFORT - Samuel VAITER	P1-2	6
Convex Analysis and Optimization Theory	Pascal BIANCHI - Olivier FERCOQ - Walid HACHEM	P1-2	6
Statistical Learning Theory	Jaouad MOURTADA	P1-2	3
Machine Learning with Graphs	Jhony GIRLADO	P1-2	3
Hidden Markov models and Sequential Monte Carlo methods	Nicolas CHOPIN	P1-2	3
Nonparametic estimation and testing	Vincent DIVOL	P1-2	3
High-dimensional statistics	Alexandre TSYBAKOV	P1-2	3
Natural Language Processing and Sentiment Analysis	Mathieu LABEAU	P1-2	6
DATA stream processing	Maurras TOGBE - Jérémie SUBLIME - Mariam BARRY	P1-2	6
Machine Learning for Climate and Energy	Bruno DEREMBLE - PELLET Victor	P1-2	3
Masterclasses and Hi!ckathon		P1-3	3
Data camp (mandatory course)	Thomas MOREAU- Pedro RODRIGUES	P2	3

M2DS Courses

Syllabus: `https://tinyurl.com/syllabus-m2ds`
Moodle: `https://moodle.ip-paris.fr/`

Part P2 & P3

Course name	Professors	Part	ECTS
Law and ethics of artificial intelligence	Tiphiane VIARD Thomas LE GOFF	P2	3
Reinforcement learning	Luis CHAMON	P2	3
Operator Learning, applications in dynamical systems and uncertainty quantification	Karim LOUNICI	P2	3
Introduction to Generative models	Alain DURMUS-Yazid JANATI	P2	3
Partially observed Markov chains in signal and image (French)	Wojciech PIECZYNSKI	P2	3
Introduction to Operation Research	Eric SOUTIL	P2	3
AI Driven Transformation	Denis OBLIN	P3	3
Cloud data infrastructure	Nicolas TRAVERS	P3	3
Deep learning for time series	Romain TAVENARD	P3	3
Generative models for visual content prediction	David PICARD	P3	3
Introduction to eXplainable Artificial Intelligence : interpretable models, post-hoc explanability and causality	Mariane CLAUSEL	P3	3
Deep learning for Computer Vision	Stéphane LATHUILIERE - Jhony GIRLADO	P3	3
Representation Learning for Computer Vision and Médical Imaging	Pietro GORI - Loîc LE FOLGOC	P3	3
AI for Sound : Analysis Processing and generation	Geoffroy PEETERS-Gael RICHARD	P3	6
Tail events analysis: robustness and anomaly detection	Pavlo MOZHAROVSKY	P3	3
Stochastic approximation and reinforcement learning	Pascal BIANCHI - Walid HACHEM	P3	3
Deep Learning II	Yohan PETETIN- Alasdair NEWSON	P3	3
Recent Developments in Responsible AI	Charlotte LACLAU - Florence D'ALCHE-BUC	P3	3
Optimal Transport: Theory, Computations, Statistics, and ML Applications	Marco CUTURI	P3	3
Online learning and aggregation	Alexandre TSYBAKOV	P3	3
Cooperative Optimization for Data Science	Andrea SIMONETTO	P3	3
Integer Optimization for Machine Learning	Zacharie ALES	P3	3
Capstone Project	Charles-Albert LEHALLE - Anna KORBA	P3	6
Machine Learning Research Seminar	El Madhi EL MHAMDI - Clément BONET	P3	6

M2DS Courses

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Courses registration

Registration link

`https://m2ds.flamary.com/`

Limit date for submission: 04/09/2025 23:59

Requirements

- Select at least 42 ECTS, no more than 48 ECTS.
- No conflicts possible (only one course per 1/2 day).
- For course selected outside of the master: pick one from M2DS (without numerus clausus) and contact us afterward to change it.
- Use your unique email (allows update of selection).
- Select supplementary courses after 42 ECTS.

Suggestions

- Spread the courses between P1/P2/P3 (P3 has ML seminar or capstone).
- Limit the number of courses with numerus clausus.
- Be curious, have fun, you have access to materials even if not selected.
- Some suggested "tracks" in the next slides.

Track : Research in theoretical ML

Example track

P1-P2

- Deep Learning I
- An Introduction to Machine Learning Theory
- Monte Carlo Methods and approximate inference
- Kernel Machines: from shallow to deep learning
- High-dimensional statistics
- Optimization Meets Generalization: Insights from Statistical and Neural Network Learning

P3-P4

- Operator Learning, applications in dynamical systems and uncertainty quantification
- Online learning and aggregation
- Intro. to eXplainable AI: interpretable models, post-hoc explanability & causality
- Optimal Transport: Theory, Computations, Statistics, and ML Applications
- ML Research Seminar
- Internship in a research lab.

Track : Optimization for ML and data science

Example track

P1-P2

- Deep Learning I
- Convex Analysis and Optimization Theory
- Optimization for Data science
- Reinforcement learning
- Introduction to Operation Research
- Data Camp

P3-P4

- Integer Optimization for Machine Learning
- Cooperative Optimization for Data Science
- Introduction to eXplainable Artificial Intelligence : interpretable models, post-hoc explanability and causality
- Optimal Transport: Theory, Computations, Statistics, and ML Applications
- ML Research Seminar or CAPSTONE Project

Track : ML and applications

Example track

P1-P2

- Deep Learning I
- Practical introduction to machine learning
- Natural Language Processing and Sentiment Analysis
- Partially observed Markov chains in signal and image
- Data Camp

P3-P4

- Deep learning for time series
- Machine Learning for Climate and Energy
- Recent Developments in Responsible AI
- AI for Sound: Analysis Processing and generation
- Generative models for visual content prediction
- Capstone Project

Track : Data science for industry

Example track

P1-P2

- Practical introduction to machine learning
- Deep Learning I
- Natural Language Processing and Sentiment Analysis
- Big Data Framework
- Law and ethics of artificial intelligence
- DATA stream processing
- Data Camp

P3-P4

- Representation Learning for Computer Vision and Médical Imaging
- Recent Developments in Responsible AI
- Deep learning II
- Capstone Project
- Internship in a company

Internship

Schedule and contact

- Internship can start from April 1 2025, minimum 16 weeks.
- Start looking for interships early (December at least).
- Subject: need to have contributions in the field of data science and must be validated by an "enseignant référent".
- Contact **after** subject validation : julie.ponce@polytechnique.edu

Internship subject validation (enseignants référents)

- **X/Polytechnique** Rémi Flamary, El Mahdi El Mhamdi
- **ENSAE** Anna Korba
- **ENSTA** Zacharie Ales
- **Télécom Paris** Olivier Fercoq
- **Télécom SudParis** Randal Douc
- **ISEP** Jérémie Sublime
- **ECE** Duc Pham Hi
- **ENPC** Pascal Monasse

IP Paris Campus

Campus de l'École polytechnique - IP Paris

Ⓐ Bâtiment S7 – Informatique
Ⓑ Bâtiment 8 – Centre Poly-média – Langues – HSS – PC
Ⓒ Bâtiment 13 – Ensemble Central (DRH)
Ⓓ Bâtiment 21 – Pôle Social – Moyens Généraux – Aumôneries
Ⓔ Bâtiment 28 – Boncourt – Présidence – Direction générale
Ⓕ Bâtiment 69 – Bachelor – Executive Master
Ⓖ Bâtiment 81 – Finances – Achats
Ⓗ Bâtiment 86 – Drahi-X Novation Center
Ⓘ Bâtiment 409 – Bienvenüe (CASEP – CSX)
Ⓙ Bâtiment 411 – EXED

① Accueil
② Accueil livraison
③ Amphithéâtres
④ Bibliothèque – Mus'X
⑤ Centre aquatique et sportif
⑥ Cour des Cérémonies
⑦ Cour Vaneau
⑧ Direction du Concours
⑨ Présidence & Direction générale
⑩ Direction Graduate Degree – 1er étage
Direction Bachelor – RDC
⑪ Direction Master / Doctorat – SOIE
⑫ Executive Education
⑬ Bureau logements
⑭ Grand hall
⑮ Laboratoires / Départements
⑯ Drahi - X Novation Center
⑰ LIX, Inria, MSR – Bât. Alain Turing
⑱ Laboratoire d'Optique Appliquée
⑲ Centre de secours
⑳ Restauration – Conciergerie
㉑ Magasin de produits chimiques

Crous truck
Arrêts Bus 91.06

Other information

Access to campus

- From Paris : RER B (to Massy Palaiseau or to Lozere) or RER C (to Massy Palaiseau)
- From Massy Palaiseau: TransEssonne 91.06 ou 91.10
  `http://www.albatrans.net/les-lignes-les-horaires/`
  `https://me-deplacer.iledefrance-mobilites.fr/`
- IP Paris Campus smartphone App.

More information : `https://www.ip-paris.fr/acces-et-mobilite`

Restaurants and student life

- Several restaurants on the Campus
- Restaurant Magnan (polytechnique) requires to activate the Student ID card.

More information :
`https://www.ip-paris.fr/campus/vie-etudiante/vie-pratique`