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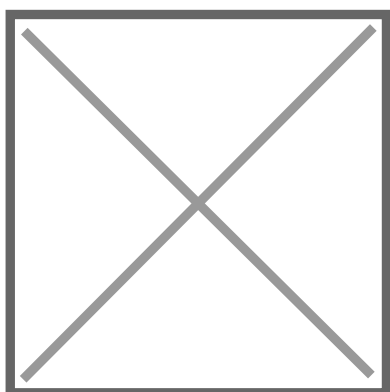
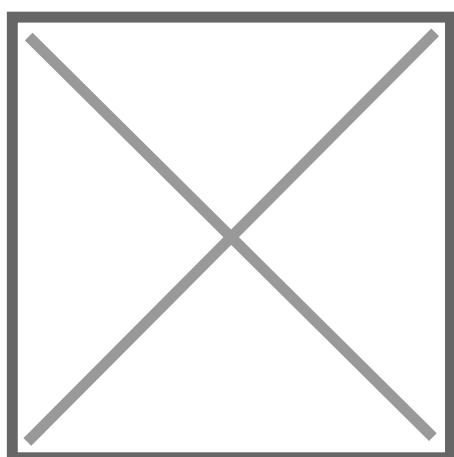
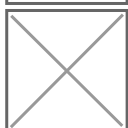
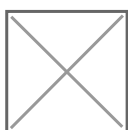
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M2 Molecular Chemistry and Interfaces



Master's degree

Specialisation Chemistry

Enrolment type

Full-time academic programmes

Language(s) of instruction

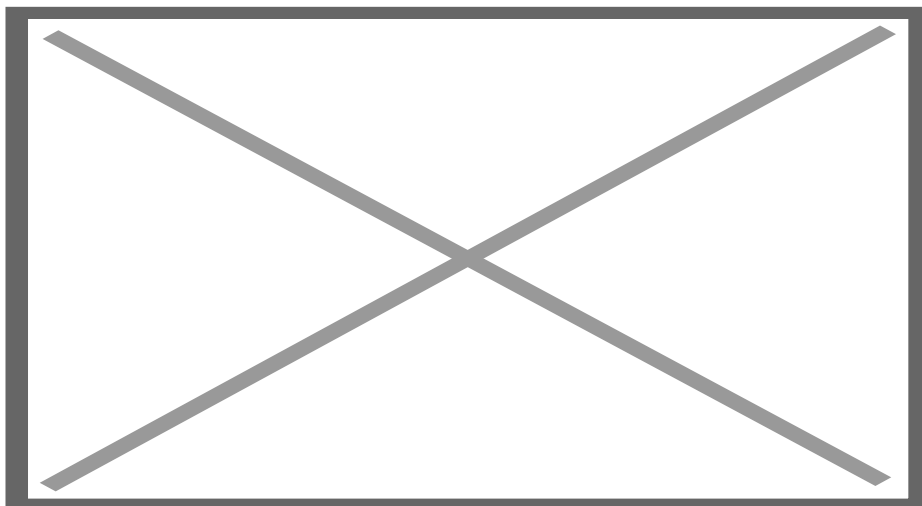
English

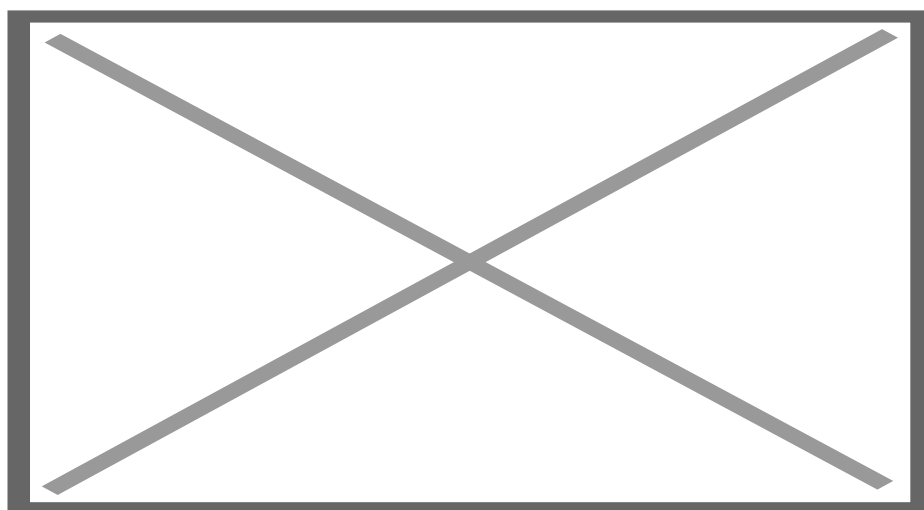
The Master 2 in Molecular Chemistry and Interfaces (MOCHI) is a master's degree jointly accredited by ENS Paris-Saclay and the Institut Polytechnique de Paris (IPP). Taught entirely in English, this program in molecular chemistry and its interfaces is geared toward research and development for various applications in biology, health, the environment, digital chemistry, and materials science.

Taught entirely in English, this program offers a compulsory core curriculum including a practical module, supplemented by à la carte training consisting of a choice of 10 course units from a panel of 17, allowing each student to create their own profile in molecular chemistry and its interfaces with biology, health, the environment, digital chemistry, and materials science. The theoretical training (4 months) will be supplemented by a bibliographic project and a six-month research internship.

[Télécharger la fiche détaillée](#)

[Apply Now](#)





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Information

- [Overview](#)
- [Application requirements](#)
- [Schedule](#)

Présentation

Skills

- Present scientific results in English, orally and in writing, be able to communicate information and results to different audiences.
- Proficiently use bibliographic research tools, collect and analyse articles.
- Develop an experimental approach as part of a research project; learn to work independently, with a rigorous scientific approach, in compliance with hygiene & safety regulations.
- Develop a scientific strategy to design, synthesize and evaluate new molecules or new access routes to compounds of interest; acquire good command of synthesis and characterisation techniques in an experimental context.
- Develop a strategy for modeling the structure, reactivity and/or propriety of molecules or materials, using computing tools to predict and process spectral data.

- Understand the biological or physical-chemical properties of molecules or materials.

Objectives

This program aims to train students to a very high scientific level, enabling them to adapt to a wide range of issues in molecular chemistry, as well as in related fields such as biology, health, the environment, and materials science (as doctoral students or in the job market).

Débouchés

Career prospects

After a Master's or Master's + PhD: engineer (R&D, control, production, etc.)

After a Master's or Master's + PhD: researcher or lecturer

After a Master's or Master's + PhD: engineer (research and development, control, production, etc.) in the fields of health, pharmaceuticals, agri-food, biotechnologies, instruments and reagents, cosmetics, pollution control and the environment.

After a Master's + PhD: researcher or lecturer

After a Master's or Master's + PhD: engineer (Research & Development, control, production, etc.)

Raw materials project manager or researcher

After a Master's degree: Research analyst

chemical-environmental engineer

Project officer sustainable development

Research officer in sustainable development

Assistant Product Manager

Design engineer in the industrial sector

Design engineer in the research / scientific sector

Design engineer industry / public research

Project Manager / Researcher in biodiversity and sustainable development

Academic staff

Research & Development Engineer

Research and Innovation Manager

Project Manager

Scientific communication, technology watch or technology transfer Officer

Research & Development Engineer

Cultural outreach professions

Research or Design Engineer

Research professions

Lecturer (after a PhD)

Head of mission / projects

Design-Production Engineer

Research officer

Further Study Opportunities

Head of project/mission

R&D researcher or data modelling and analysis expert in leading-edge companies or laboratories.

PhD in Chemistry / Biology

Interdisciplinary PhD in Sustainability Science (many disciplines possible)

Engineering, research and development

the curriculum also enables students to enter the corporate world directly after their graduation, in positions such as Data Scientist, Data Analyst or Machine Learning Engineer.

Students in this track can turn to research at the end of the 2nd year Master's.

Students with a 2nd year Master's degree have the possibility to pursue doctoral research.

Master of Education and Teaching Professions

Calendar

Start of programme (indicative date)

04/09/2026

End of programme (indicative date)

30/07/2027

Admission

Admission Route

Public Administration

Chemistry

Capacity

Available Places

25

Target Audience and Entry Requirements

Applicants must have completed a Master 1 degree in Molecular Chemistry or equivalent. A solid knowledge of molecular chemistry and a basic knowledge of general chemistry, physical and theoretical chemistry, and chemistry for biological systems will be necessary to follow this Master's 2 program.

Période(s) de candidature

Inception Platform

From 01/03/2026 to 30/06/2026

Supporting documents

Compulsory supporting documents

Copy diplomas.

Copy of passport.

Letter of recommendation from a trainee.

Certificate of English level (compulsory for non-English speakers).

Details of the UEs taken for candidates outside the M1 Paris Saclay.

Additional supporting documents

Rank of previous year and size of the promotion.

Programme

Molecular chemistry and interfaces with biology, health, environment, digital chemistry, and materials science

Subjects	ECTS	Semester	Lecture	directed study	practical class	Lecture/directed study	Lecture/practical class	directed study/practical class
Outstanding molecules and organic materials	3	Semestre 1	18	2				
■								

Outstanding molecules and organic materials

ECTS : 3

Semester: Semestre 1

Detail

Lecture: 18

Directed study: 2

Language(s) of instruction

Anglais

Remote teaching

non

Programme/contents

Stimuli-responsive molecules/materials for optoelectronics, sensors, information storage

Learning objectives

Synthesis and properties of advanced molecular materials

Type of assessment

Evaluation Continue non Intégrale

Molecular Modelling	3	Semestre 1	16	4
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Subjects	ECTS	Semester	Lecture	directed study	practical class	Lecture/directed study	Lecture/practical class	directed study/practical class
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Molecular Modelling

ECTS : 3

Semester: Semestre 1

Detail

Lecture: 16

Directed study: 4

Language(s) of instruction

Anglais

Remote teaching

non

Type of assessment

Evaluation Continue Intégrale

[Chemical biology](#)

[and](#)

[photopharmacology](#)

3

Semestre
1

18

2

Chemical biology and photopharmacology

ECTS : 3

Semester: Semestre 1

Detail

Lecture: 18

Directed study: 2

Language(s) of instruction

Anglais

Remote teaching

non

Prerequisites

Basic knowledge in synthetic organic chemistry

Programme/contents

Bioconjugation, bioorthogonal chemistry, biomolecule labeling, cell/virus imaging, chemical inducers of proximity, photocaging, photoswitchable strategies

Learning objectives

Design fluorescent probes, understand light-controlled biological systems

Special teaching arrangements

lectures and tutorials

Type of assessment

Evaluation Terminale

Advanced digital chemistry	3	Semestre 1	18	2
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Advanced digital chemistry

ECTS : 3

Semester: Semestre 1

Detail

Lecture: 18

Directed study: 2

Language(s) of instruction

Anglais

Remote teaching

non

Programme/contents

Accelerating molecular/materials science: data treatment (literature), machine learning, automated analyses, combinatorial approaches, self-driving laboratories

Learning objectives

Identify strategies to accelerate molecular/materials discovery, use DFT-databases, generative AI for literature, ML tools, Python for automated analyses.

Type of assessment

Evaluation Terminale

Multiscale materials modelling	3	Semestre 1	18	2
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Subjects	ECTS	Semester	Lecture	directed study	practical class	Lecture/directed study	Lecture/practical class	directed study/practical class
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Multiscale materials modelling

ECTS : 3

Semester: Semestre 1

Detail

Lecture: 18

Directed study: 2

Language(s) of instruction

Anglais

Remote teaching

non

Programme/contents

Atomic-scale and beyond modeling: DFT, molecular dynamics, Monte-Carlo, coarse-graining, MLIP

Learning objectives

Understanding of advanced modeling techniques

Type of assessment

Evaluation Terminale

Eco-conception of materials	3	Semestre 1	18	2
---	---	------------	----	---

Eco-conception of materials

ECTS : 3

Semester: Semestre 1

Detail

Lecture: 18

Directed study: 2

Language(s) of instruction

Anglais

Remote teaching

non

Programme/contents

Focus on element selection, low-energy fabrication, device recycling, and second life

Learning objectives

Modern and sustainable approaches to materials design

Type of assessment

Evaluation Terminale

Subjects	ECTS	Semester	Lecture	directed study	practical class	Lecture/directed study	Lecture/practical class	directed study/practical class
Eco-conception of molecules	3	Semestre 1	18	2				
■								

Eco-conception of molecules

ECTS : 3

Semester: Semestre 1

Detail

Lecture: 18

Directed study: 2

Language(s) of instruction

Anglais

Remote teaching

non

Programme/contents

Eco-design in synthesis, soft activation techniques, environmental catalysis, small molecule activation, photochemistry, photoelectrochemistry, electrosynthesis, plasma chemistry

Learning objectives

Design sustainable and efficient chemical processes

Type of assessment

Evaluation Terminale

Outstanding inorganic materials	3	Semestre 1	18	2
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Outstanding inorganic materials

ECTS : 3

Semester: Semestre 1

Detail

Lecture: 18

Directed study: 2

Language(s) of instruction

Anglais

Remote teaching

non

Programme/contents

Materials with advanced properties: fluorescence, piezoelectricity, mechanical strength, ion conduction, gas storage, semiconductors, plasmon effects

Learning objectives

Link composition to properties, propose dopants, identify characterization techniques.

Type of assessment

Evaluation Terminale

[Physical chemistry](#)

[of low-dimensional](#) 3

[materials](#)

Annualisé 18

2

Physical chemistry of low-dimensional materials

ECTS : 3

Semester: Annualisé

Detail

Lecture: 18

Directed study: 2

Language(s) of instruction

Anglais

Remote teaching

non

Programme/contents

Synthesis, characterization, and applications of nanomaterials (catalysis, optical properties)

Learning objectives

Knowledge of nanomaterial properties and applications

Type of assessment

Evaluation Terminale

[Advanced medicinal chemistry](#)

3

Semestre
1

18

2

Subjects	ECTS	Semester	Lecture	directed study	practical class	Lecture/directed study	Lecture/practical class	directed study/practical class
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Advanced medicinal chemistry

ECTS : 3

Semester: Semestre 1

Detail

Lecture: 18

Directed study: 2

Language(s) of instruction

Anglais

Remote teaching

non

Programme/contents

Drug development, therapeutic targets, hit identification, ADMET, vaccines, formulation, drug carriers

Learning objectives

Understand drug development pathways, design MedChem projects

Type of assessment

Evaluation Terminale

Medicinal organic chemistry	3	Semestre 1	18	2
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Subjects	ECTS	Semester	Lecture	directed study	practical class	Lecture/directed study	Lecture/practical class	directed study/practical class
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Medicinal organic chemistry

ECTS : 3

Semester: Semestre 1

Detail

Lecture: 18

Directed study: 2

Language(s) of instruction

Anglais

Remote teaching

non

Programme/contents

Based on case studies in drug and natural product synthesis, modern synthetic organic chemistry in a medicinal context

Learning objectives

Solve synthetic problems, analyze synthetic works and methodologies

Type of assessment

Evaluation Terminale

[Analytical chemistry](#)

3

Semestre
1

18

2

Subjects	ECTS	Semester	Lecture	directed study	practical class	Lecture/directed study	Lecture/practical class	directed study/practical class
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Analytical chemistry

ECTS : 3

Semester: Semestre 1

Detail

Lecture: 18

Directed study: 2

Language(s) of instruction

Anglais

Remote teaching

non

Programme/contents

Analytical method setup/optimization, MS/NMR developments, omics workflow, statistical analysis

Learning objectives

Develop analytical methods, interpret NMR/MS data, choose MS instruments for omics

Type of assessment

Evaluation Terminale

[Chemistry beyond the planetary boundaries](#)

3

Semestre
1

18

2

Subjects	ECTS	Semester	Lecture	directed study	practical class	Lecture/directed study	Lecture/practical class	directed study/practical class
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Chemistry beyond the planetary boundaries

ECTS : 3

Semester: Semestre 1

Detail

Lecture: 18

Directed study: 2

Language(s) of instruction

Anglais

Remote teaching

non

Programme/contents

Water cycle, ocean acidification, soil use, phosphorus/nitrogen cycles, new entities, climate change, biodiversity, ozone layer, aerosols

Learning objectives

Understand chemical impacts on planetary boundaries

Type of assessment

Evaluation Terminale

[Rare earths and actinides for technologies](#)

3

Semestre
1

18

2

Subjects	ECTS	Semester	Lecture	directed study	practical class	Lecture/directed study	Lecture/practical class	directed study/practical class
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Rare earths and actinides for technologies

ECTS : 3

Semester: Semestre 1

Detail

Lecture: 18

Directed study: 2

Language(s) of instruction

Anglais

Remote teaching

non

Programme/contents

General properties, electronic structure, coordination chemistry, organometallic chemistry, solid-state chemistry, reactivity, magnetism, optical properties, nuclear cycle, environmental chemistry

Learning objectives

Knowledge of f-element chemistry and applications

Type of assessment

Evaluation Terminale

[Optical sensors for environmental and health applications](#)

3

Semestre
1

18

2

Subjects	ECTS	Semester	Lecture	directed study	practical class	Lecture/directed study	Lecture/practical class	directed study/practical class	distance learning
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Optical sensors for environmental and health applications

ECTS : 3

Semester: Semestre 1

Detail

Lecture: 18

Directed study: 2

Language(s) of instruction

Anglais

Remote teaching

non

Programme/contents

Overview of sensors, fluorescent molecular probes, fluorescent organic nanoparticle probes, nano-hybrid systems, photoluminescent sensors for environment/health

Learning objectives

Design and apply optical sensors for monitoring and diagnostics

Type of assessment

Evaluation Terminale

[UE libre Catalogue S1](#)

2.5

Semestre
1

UE libre Catalogue S1

ECTS : 2.5

Semester: Semestre 1

Language(s) of instruction

Français

Remote teaching

non

Type of assessment

Evaluation Terminale

Bloc pratique 1

Subjects	ECTS	Semester	Lecture	directed study	practical class	Lecture/directed study	Lecture/practical class	directed study/practical class	distance learning
Advanced practical	3	Semestre 1			20				

Subjects	ECTS	Semester	Lecture	directed study	practical class	Lecture/directed study	Lecture/practical class	directed study/practical class	distance learning
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Advanced practical

ECTS : 3

Semester: Semestre 1

Detail

Practical study : 20

Language(s) of instruction

Anglais

Remote teaching

non

Programme/contents

- Hands-on lab sessions in small groups on various techniques (e.g., simulations, NMR, mass spectrometry, laser, nanomaterial synthesis, XRD, AFM, TEM, electrical measurements, modeling, optical measurements).
- Microfluidic sensor fabrication (6h), molecular fluorescent probes (4h), photoswitching (4h).

Overall organisation

Proficiency in measurement techniques

Type of assessment

Détail renseigné au niveau Élément

Constitutif

Bibliographic Research

Subjects	ECTS	Semester	Lecture	directed study	practical class	Lecture/directed study	Lecture/practical class	directed study/practical class	distance learning
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[Bibliographic report](#) 2 Semestre 1

Subjects	ECTS	Semester	Lecture	directed study	practical class	Lecture/directed study	Lecture/practical class	directed study/practical class	distance learning
■									

Bibliographic report

ECTS : 2

Semester: Semestre 1

Language(s) of instruction

Anglais

Remote teaching

non

Programme/contents

Literature review and report on a selected topic in chemistry

Learning objectives

Mastery of scientific literature analysis and synthesis

Type of assessment

Evaluation Terminale

Stage de recherche

Subjects	ECTS	Semester	Lecture	directed study	practical class	Lecture/directed study	Lecture/practical class	directed study/practical class	distance learning
Research internship	25	Semestre 2							
■									

Research internship

ECTS : 25

Semester: Semestre 2

Language(s) of instruction

Anglais

Remote teaching

non

Prerequisites

being part of the MOCHI Master

Type of assessment

Evaluation Continue non Intégrale

Teaching Location(s)

GIF SUR YVETTE

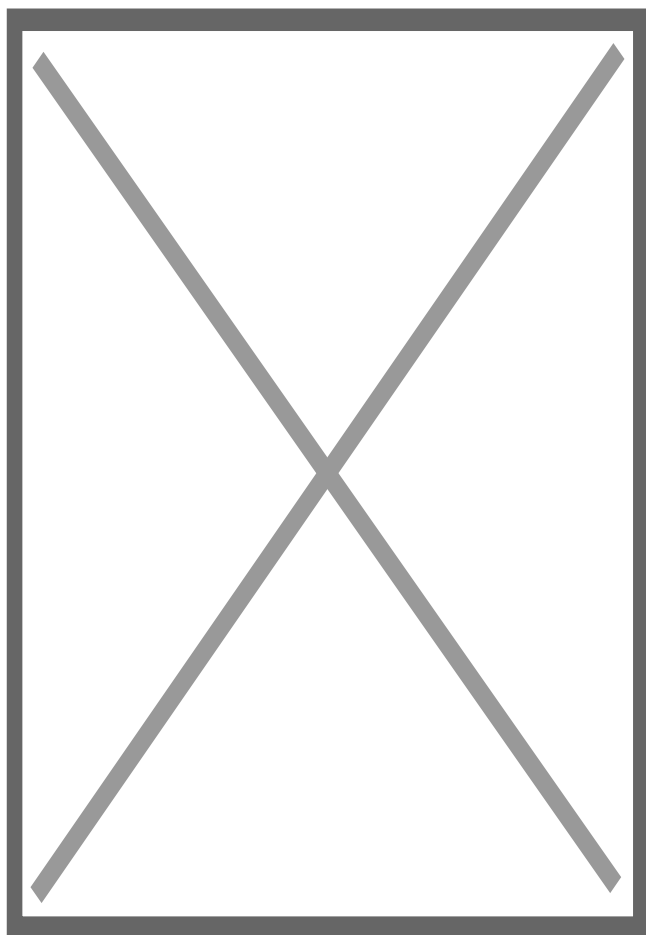
PALAISEAU

Academic Partner(s)

Ecole Polytechnique, ENSTA

Training campus

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Student restaurant (CROUS)

Library

Sports facilities

Student residence

Contact

- **Joanne Xie**

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