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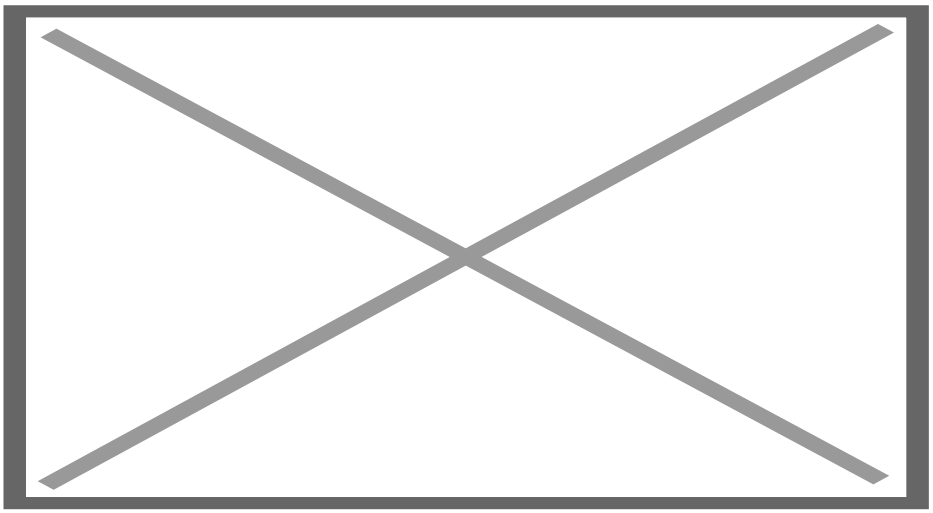
M1 Functional Materials

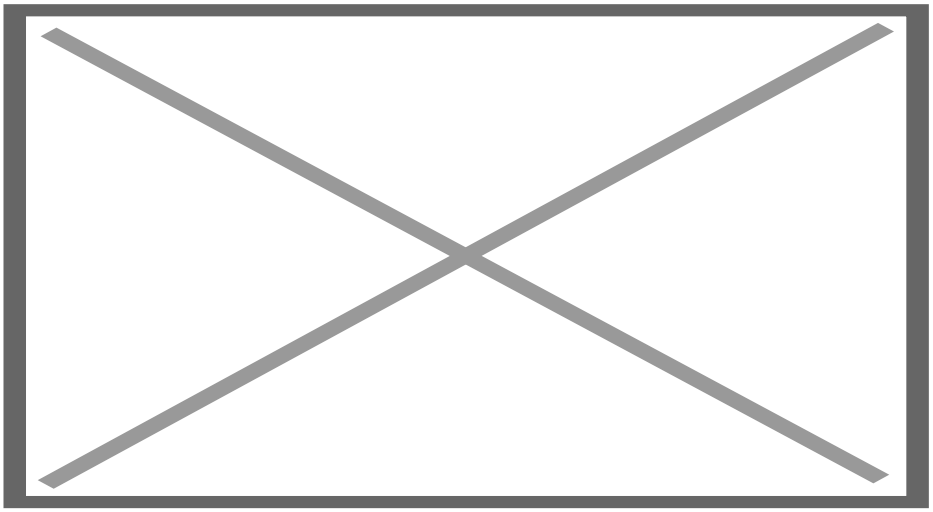
Master's degree
Specialisation Materials Science and Engineering
Language(s) of instruction
French

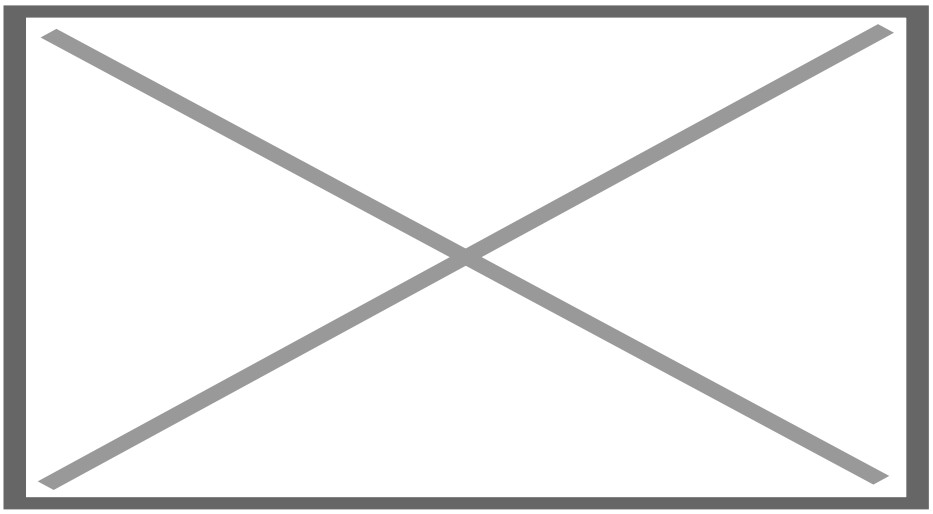
The M1 Functional Materials program provides a rigorous and dynamic education in materials science, combining an experimentally driven approach for the Functional Materials and Applications track with a computational focus for the Computational Materials Science track. It equips students with a strong and comprehensive foundation in theoretical and practical knowledge, encompassing material classes, characterization techniques, and functional properties.

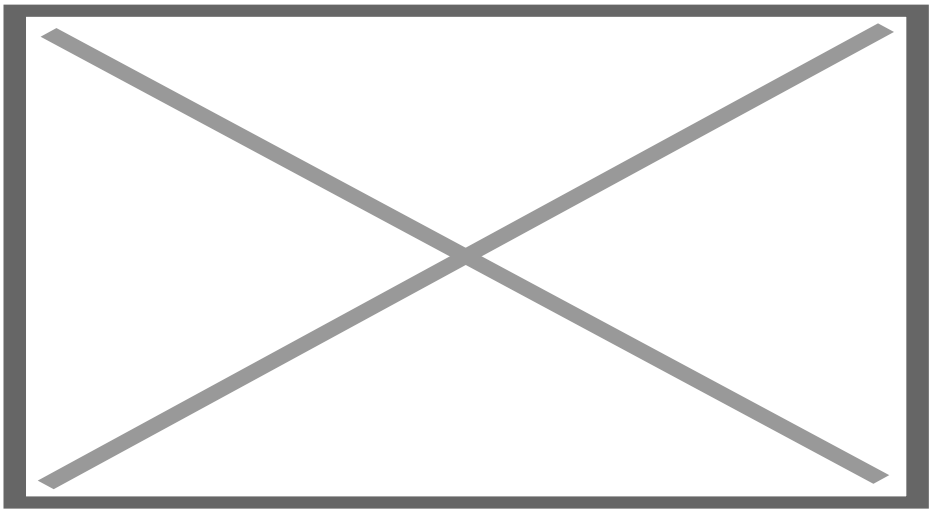
The M1 Functional Materials is a graduate program offering two complementary pathways Functional Materials and Applications (FMA) and
Computational Materials Science (CMS).
Both pathways provide a solid foundation in materials science, covering a broad spectrum of skills, from the chemistry and physics of materials to their functional properties and advanced characterization techniques. The FMA pathway is experimentally focused, combining theoretical knowledge with hands-on training on state-of-the-art laboratory platforms. The CMS pathway is unique in France, bridging solid-state physics, chemistry, and scientific computing, enabling students to develop expertise in Python programming, artificial intelligence, and advanced multi-scale modeling at the electronic and atomic levels.

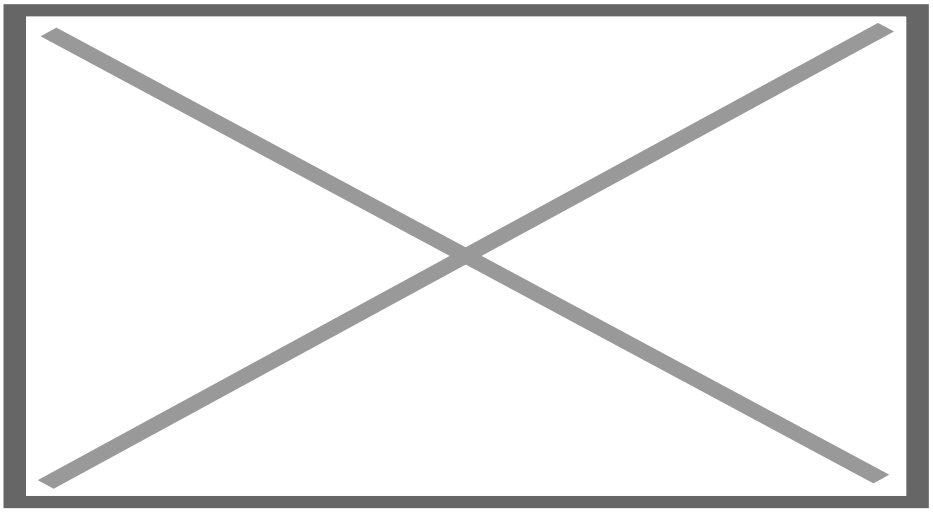
Télécharger la fiche détaillée
Apply Now











Information

- Overview
- Application requirements
- Schedule

Présentation

Skills

Upon completing the *Functional Materials and Applications (FMA)* track, students will be able to:

- Master the structure–property relationships of different classes of materials.
- Understand particle–matter and photon–matter interactions for material characterization and select appropriate characterization methods.
- Apply computing tools in the field of materials science.
- Synthesize, format, and present scientific results in a clear and rigorous manner.
- Contribute to or lead a scientific project within a collaborative team.

Upon completing the *Computational Materials Science (CMS)* track, students will be able to:

- Master fundamental concepts in solid-state physics and chemistry.
- Program efficiently for scientific computing in Python.
- Manage and exploit databases and process large datasets using artificial intelligence (AI and Big Data).
- Perform simulations at electronic and atomic scales.
- Utilize professional databases and process large datasets using artificial intelligence (AI) and big data modeling and simulation software (VASP, Quantum Espresso, LAMMPS).
- Integrate scientific and computational knowledge to solve complex problems in research and industry.
- Prepare for M2 SMC, with autonomy in designing and analyzing digital projects applied to materials.

Objectives

The **Functional Materials and Applications** (FMA) track is designed to provide students with a solid theoretical foundation and essential practical tools to master the field of materials science. It prepares students to adapt effectively to the evolving careers in materials science, whether in industry or academic research. The first year is intentionally generalist, offering broad disciplinary exposure and allowing students to freely choose their orientation in the second year (M2). The curriculum is organized around three main pillars:

- Structure–property relationships of materials;
- Characterization of materials' structures and properties, with strong support from advanced teaching and research platforms;
- Applied computing in materials science.

By the end of the pathway, students will have acquired a comprehensive understanding of both the experimental and theoretical fundamentals of materials science. They can pursue a Master 2 focusing on materials physics and/or chemistry, or join materials science and engineering programs in leading engineering schools.

The **Computational Materials Science (CMS)** track trains specialists in a rapidly expanding field at the interface of physics, chemistry, and scientific computing. This program combines solid foundational knowledge with advanced practical skills, preparing students for Master 2 CMS, a PhD, or an industrial career.

Students first gain an in-depth understanding of solid-state physics and chemistry, then develop competencies in:

- Scientific programming (Python);
- Management and analysis of large datasets (Big Data);
- Artificial intelligence applications in materials science;
- Atomistic numerical modeling at the electronic and atomic levels.

Training is supported by the use of state-of-the-art tools, such as VASP, Quantum Espresso, and LAMMPS, which are widely employed in both academic research and industry.

The objectives are the following:

- Build a strong foundation in materials science and scientific computing;
- Develop advanced skills in programming, database management, and AI;
- Master multi-scale modeling with professional software;
- Meet the increasing demand for numerical simulation expertise in academic and industrial environments.

Débouchés

Further Study Opportunities

Engineering school

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

Calendar

Start of programme (indicative date)
01/09/2026
Admission

Admission Route

Physics
Chemistry
Physics, Chemistry
Science and Technology

Capacity

Available Places

50

Target Audience and Entry Requirements

The program is open to students holding a bachelor’s degree in Physics, Chemistry, or Materials Science, or at the interface of these disciplines. For non-French-speaking applicants, a minimum B2 level in French is strongly recommended.

The *Computational Materials Science (CMS)* track is specifically designed for students who wish to develop advanced skills in numerical simulation, artificial intelligence, and materials modeling. Applicants should have a solid grasp of fundamental concepts in physics and chemistry, strong applied mathematics knowledge, and possess basic programming and computing skills. Scientific curiosity, analytical rigor, and the ability to work on complex multidisciplinary projects are also essential.

Période(s) de candidature

Inception Platform

From 15/01/2026 to 16/03/2026

From 19/06/2026 to 25/06/2026

MonMaster Platform

From February 17th to March 16th, 2026

To find out which platform you should apply through, please see the Masters' applications and enrolment page.

Supporting documents

Compulsory supporting documents

Motivation letter.

All transcripts of the years / semesters validated since the high school diploma at the date of application.

Curriculum Vitae.

Detailed description and hourly volume of courses taken since the beginning of the university program.

Additional supporting documents

Certificate of French (compulsory for non-French speakers).

VAP file (obligatory for all persons requesting a valuation of the assets to enter the diploma).

Supporting documents :
- Residence permit stating the country of residence of the first country
- Or receipt of request stating the country of first asylum
- Or document from the UNHCR granting refugee status
- Or receipt of refugee status request delivered in France
- Or residence permit stating the refugee status delivered in France
- Or document stating subsidiary protection in France or abroad
- Or document stating temporary protection in France or abroad.

Programme

Subjects	ECTS	Semester	Lecture	directed study	practical class	Lecture/directed study	Lecture/practical class	directed study/practical class
Socle scientifique matériaux	0	5	22,5	7,5				
Enseignement général	0	3	22,5	7,5				
Socle scientifique matériaux et applications	0	6	22,5	7,5				

Subjects	ECTS	Semester	Lecture	directed study	practical class	Lecture/directed study	Lecture/practical class	directed study/practical class
Insertion professionnelle et projets	0	3	22,5	7,5				

Subjects	ECTS	Semester	Lecture	directed study	practical class	Lecture/directed study	Lecture/practical class	directed study/practical class
Socle scientifique matériaux	0	4	22,5	7,5				
Enseignement général	0	5	22,5	7,5				
Socle scientifique matériaux et applications	0	6	22,5	7,5				
Insertion professionnelle et projets	0	2	22,5	7,5				

Teaching Location(s)

ORSAY

Training campus

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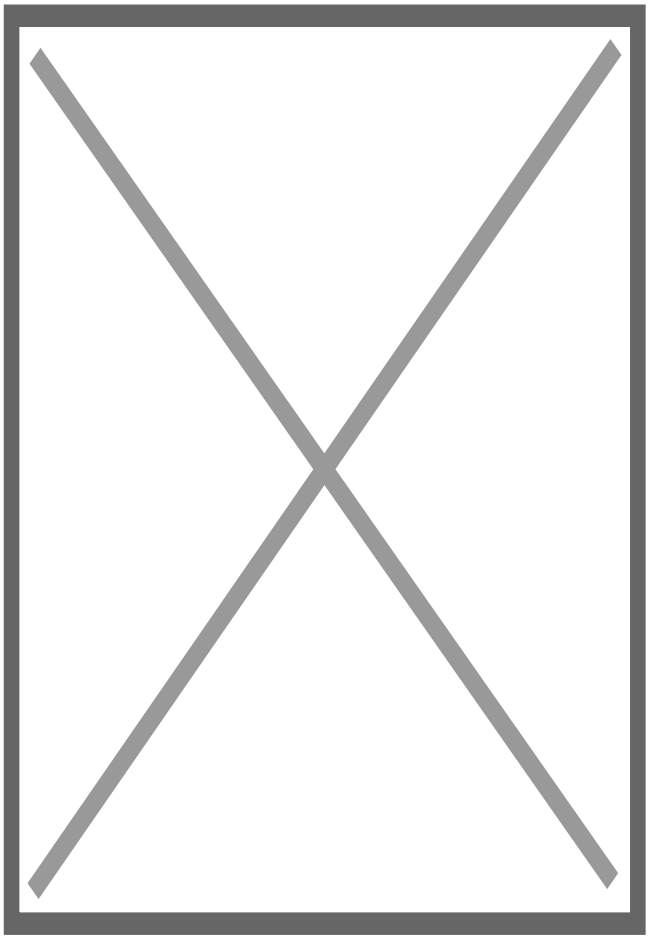

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Voir
Student restaurant (CROUS)
Library
Sports facilities
Student residence

Contact

- **David BERARDAN**

  Responsable EF PR1439

- **Michele AMATO**

  Responsable M2 SMC

http://www.universite-paris-saclay.fr/formation/master/sciences-et-genie-des-materiaux/m1-materiaux-fonctionnels