

Master 2 LMFI

Mathematical Logic and
Foundations of Computer Science

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Start-of-year meeting, September 2026



**INSTITUT DE
MATHÉMATIQUES**
JUSSIEU - PARIS
RIVE GAUCHE



Today

1. Welcome
2. Four branches, one subject
3. The shape of the year
4. First semester
 - The core courses
5. Second semester
 - Advanced courses
 - *Overture* courses
6. The research internship
7. Practicalities
 - Credits and calendar
 - Five pieces of advice
 - And afterwards?
 - Contacts

You are joining the only master's programme in France devoted entirely to **mathematical logic** and its links with **computer science**.

Two host laboratories

- Équipe de Logique Mathématique
- Preuves, Programmes, Systèmes

IMJ-PRG
IRIF

One aim

- to bring you to research level in one year
- in mathematical *and* computational logic

Four branches, one subject

Set theory

Ordinals, cardinals, ZFC, L , forcing, large cardinals.

Model theory

Compactness, quantifier elimination, spaces of types, classification.

Computability and complexity

Recursive functions, undecidability, incompleteness, complexity classes.

Proofs and programs

Sequent calculus, λ -calculus, Curry–Howard, proof assistants.

In the first semester **you take all four.**

The shape of the year

- **September – December** core: four fundamental courses and their exercise sessions
 - **January – March** specialisation: advanced and *ouverture* courses
 - **April – September** research: internship, *mémoire*, defence
- An **intensive preliminary course** precedes the start of term – optional, 18h, Patrick Simonetta: first-order logic, cardinality, basic topology.
 - Courses are usually taught **in English**.

Four fundamental courses

- Model theory, 4 ECTS, 28h + 15h
- Set theory, 4 ECTS, 24h + 12h
- Proof theory, 4 ECTS, 24h + 12h
- Computability, incompleteness, complexity, 8 ECTS, 48h + 18h

Tamara Servi, Patrick Simonetta

Alessandro Vignati

Dominik Kirst, Thierry Joly

Arnaud Durand

Hours are lectures + exercise sessions.

Exercise sessions

Attached to each course – this is where the material is really learned. Attempt the exercises *before* the session, however badly.

Assessment is by midterms, exams, etc.

Two per branch, 8 ECTS and 48h each

- Model theory: classical tools	<i>Tomás Ibarlucía</i>
- Model theory: NIP fields	<i>Sylvy Anscombe</i>
- Set theory: classical tools	<i>Boban Velickovic</i>
- Set theory: descriptive set theory	<i>Dominique Lecomte</i>
- Proofs and programs: classical tools	<i>Guillaume Geoffroy, Hugo Herbelin</i>
- Linear logic and quantitative semantics	<i>Alexis Saurin</i>

Choose these in line with the internship topic you have in mind – and come and discuss it with us.

24h each

- Category theory
- Model-checking of finite structures
- Modal, temporal and strategic logics
- Philosophy of mathematics

Muriel Livernet

Sylvain Schmitz, Patrice Ossona de Mendez

*Catalin Dima, François Laroussinie,
Stéphane Demri, Vadim Malvon*

Brice Halimi

An *ouverture* course may also be a module from another M2 – Mathématiques fondamentales, or the MPRI – with the directors' agreement.

16 ECTS – April to September – *mémoire* and defence.

Where?

- IMJ-PRG (Équipe de Logique) or IRIF
 - other Paris laboratories
 - elsewhere in France
 - in Europe
- ENS (DMA), Paris-Saclay...
Lyon 1, Aix-Marseille...
Turin, Pisa, Münster, Freiburg, Florence...

When to deal with it

- **now**
 - **November – December**
 - **January – February**
- notice which topics appeal to you
talk to possible supervisors
topic settled

Erasmus+ mobility is possible in both directions with our partner universities.

60 ECTS

- Four fundamental courses	20 ECTS
- Two advanced courses	16 ECTS
- <i>Ouverture</i> : two courses, or a third advanced course	8 ECTS
- Internship and <i>mémoire</i>	16 ECTS

Provisional calendar

- Early September	intensive preliminary course (optional)
- Mid-September – early December	fundamental courses and exercise sessions
- Mid-December	first-semester examinations
- January – late March	advanced and <i>ouverture</i> courses
- Early April	second-semester examinations
- Mid-April – early September	internship, <i>mémoire</i> , defence

1. **Do the exercises**, even partially.
2. **Follow a seminar** from this year on: mathematical logic at IMJ-PRG, the IRIF seminars.
3. **Talk to the staff** – we are your future supervisors.
4. **Work together**: the cohort is small, which is an advantage.
5. **Do not stay stuck alone** on a missing prerequisite.

- More than half of each cohort goes on to a **PhD**, in mathematical logic or in theoretical computer science.
- Academic research and public research bodies CNRS, Inria, CEA...
- Industrial R&D verification, certification, security

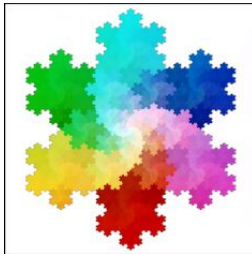
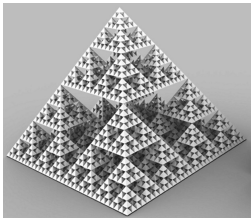
The M2 LMFI is, first of all, a year of preparation for research.

The programme

- Directors Antonio Bucciarelli (IRIF), Sylvy Anscombe (IMJ-PRG)
- Administration Mme Chatoux, Bâtiment Sophie Germain, office 1011
- Website master.math.u-paris.fr

Where to find me

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Bienvenue ! Welcome! Willkommen!
Questions are very welcome.

