M2RI - First Meeting

François Chapon - Grégory Faye - Maxime Wolff

Université de Toulouse

September 01, 2025

Contacts

M2RI-UPS:

- François Chapon: probability, statistics (francois.chapon@math.univ-toulouse.fr)
- Grégory Faye: analysis, PDEs (gregory.faye@math.univ-toulouse.fr)
- Maxime Wolff: geometry, algebra (maxime.wolff@math.univ-toulouse.fr)

Masters Mathematics at UPS: Clément Pellegrini.

INSA:

- Aude Rondepierre

ISAE:

- Michel Fournié: deterministic option,
- Florian Simatos: probabilistic option.

Pedagogical secretariat: Clément Nicolas (clement.nicolas2@utoulouse.fr)

Webpage:
`https://departement-math.univ-tlse3.fr/m2-research-innovation`

Schedule

semaine calendaire	Du	Au	
36	01-Sep	05-Sep	
37	08-Sep	12-Sep	
38	15-Sep	19-Sep	
39	22-Sep	26-Sep	
40	29-Sep	03-Oct	S1
41	06-Oct	10-Oct	
42	13-Oct	17-Oct	
43	20-Oct	24-Oct	
44	27-Oct	31-Oct	Holidays
45	03-Nov	07-Nov	
46	10-Nov	14-Nov	
47	17-Nov	21-Nov	
48	24-Nov	28-Nov	EXAMS S1
49	01-Dec	05-Dec	
50	08-Dec	12-Dec	
51	15-Dec	19-Dec	
52	22-Dec	26-Dec	Holidays
1	29-Dec	02-Jan	
2	05-Jan	09-Jan	
3	12-Jan	16-Jan	
4	19-Jan	23-Jan	S2
5	26-Jan	30-Jan	
6	02-Feb	06-Feb	
7	09-Feb	13-Feb	
8	16-Feb	20-Feb	EXAMS S2
9	23-Feb	27-Feb	
10	02-Mar	06-Mar	
11	09-Mar	13-Mar	
12	16-Mar	20-Mar	
13	23-Mar	27-Mar	
14	30-Mar	03-Apr	
15	06-Apr	10-Apr	
16	13-Apr	17-Apr	
17	20-Apr	24-Apr	Internship
18	27-Apr	01-May	
19	04-May	08-May	
20	11-May	15-May	
21	18-May	22-May	
22	25-May	29-May	
23	01-Jun	05-Jun	
24	08-Jun	12-Jun	
25	15-Jun	19-Jun	
26	22-Jun	26-Jun	
27	29-Jun	03-Jul	
28	06-Jul	10-Jul	Defense

Detailed schedule is available on CELCAT (link on the webpage)

Choice of courses - Semester 1

Choose 4 courses (at least 3 among A1-A9)

- A1: Algebraic Topology (R. Campos)
- A2: An introduction to hyperbolic and translation surfaces (C. Boissy)
- A3: Introduction to Complex Analytic Geometry (D. Popovici)
- A4: Introduction to Optimal Mass Transport (J. Bertrand)
- A5: Elliptic PDEs and Evolution Problems (M. Maris)
- A6: An introduction to the theoretical and numerical analysis of scalar conservation laws (T. Crin-Barat and C. Negulescu)
- A7: Convergence of Probability Measures and Optimal Transport (F. Chapon)
- A8: Stochastic Calculus (S. Cohen)
- A9: Asymptotic Statistics (C. Lalanne, P. Neuvial)

- - - - -

- A10: Approximation of PDEs (G. Haine, D. Matignon,...)
- A11: Advanced statistical methods (B. Bobbia and F. Simatos)
- A12: The Dynamical System of Billards ("inverted class", P. Roesch)
- A13: Controlled Dynamical Systems: Structured Modelling and Numerical Methods (A. Brugnoli, M. Fournié, ...)
- A14: MINT course at INSA On biological science and climate modeling (F. Filbet and P. Noble)

Courses at ISAE

- Courses A9 (first half, start on 09/11), A10, A11 (starts in october) and A13 take place at ISAE school.

- If you are interested by one of these courses, please contact now

  Michel Fournié (Michel.Fournie@isae-supaero.fr)

  to get access and all the information.

Choice of courses - Reading Seminar and Semester 2

Semester 2: Choose 2 courses

- B1: Affine Surfaces, Homogeneous Vector Fields and Germs Tangent to the Identity (X. Buff)
- B2: Introduction to Homotopy Theory (J. Bellier-Millès and J. Nuiten)
- B3: Regularity Theory for Minimizing Harmonic Maps (P. Bousquet)
- B4: Regularization of Ill-posed Inverse Problems and Applications (P. Maréchal)
- B5: Branching Brownian motion and variants (P. Maillard and M. Pain)
- B6: Robust Optimization and Statistical Learning (F. Iutzeler)

Reading Seminar: Choose 1

- C1: The spectrum of the Laplacian on hyperbolic surfaces (J.-P. Otal and M. Wolff)
- C2: Scaling limits in statistical mechanics and Unique continuation for second order elliptic partial differential equations (M. A. Ferreira and G. Faye)
- C3: Entropy and Large Deviations (C. Pellegrini)

English (and French)

- **English class (mandatory!)**
  Scientific English - 12h
  Internship dissertation will be written in English
  Starts later (probably January)
  (contact: Claire Chaplier, claire.chaplier@univ-tlse3.fr)

- **French class for beginners**
  On Mondays at 3:45 p.m. in room U6-200
  Starts on September 22
  If you are interested, just go to the first lecture
  (contact: Céline Dulac, celine.dulac@univ-tlse3.fr)

Internships

- At least (and usually) 4 months. Typically from March 01 to June 30, with defense early July.
- You have to find an advisor with a subject. It is an opportunity to try the subject you like the most before going to the Ph.D.:
- The courses can help you to know what is your favorite subject (remember that you will see new subjects in December)
- In November, researchers from the institute and outside will propose some internships
- You can discuss with the researchers and find a subject by any other mean.
- It is good if you have your internship by the end of January.
- We help as much as we can but we do not provide the internship.
- Internships have to be funded, but you do not have to worry now about that.

After the M2RI

Ph.D Thesis

- At the university, in research institutes (ONERA,...) or in private companies.
- Grades for the courses are very important (it is not enough to pass the exams).
- You have to find an advisor and a subject.
- A funding is mandatory (and not always easy to find). It is highly recommended to apply to several positions.
- Some applications have very early deadlines
- There can be more opportunities in applied mathematics (CIFRE funding).

Others: teaching, positions in private companies, etc.

After the Ph.D.

Academic research

- Temporary positions: Post-doc, ATER,...
- Research positions: CNRS, INRIA,...
- Teaching and research positions, typically at the university.

Teaching

- With the "agrégation": high school or "classes préparatoires" (you can pass the "agrégation" before or after the Ph.D.)
- At the university: PRAG

Positions in private companies (Research and Developpement,...)

First week

- A1: Monday – 1:30 p.m. – 3A-G11 + Wednesday – 3:45 p.m. – 3A-G11
- A2: Friday 10 a.m. – 3A-G35
- A3: Tuesday – 10 a.m. – 3A-G11
- A4: Tuesday – 2:00 p.m. – 3A-G11
- A5: Wednesday – 8:45 a.m. – 3A-G11
- A6: Monday – 3:45 p.m. – 3A-G11
- A7: Wednesday – 1:30 p.m. – 3A-G49
- A8: Thursday – 1:30p.m. – 3A-G11
- A9:

- - - - -

- A10:
- A11:
- A12:
- A13: Thursday – 2:00 p.m. – ISAE
- A14: Thursday – 2:00 p.m. – 3A-G25