

Magali Jay

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I study dynamical systems using geometric, analytic, and combinatorial tools. The main dynamical systems I study, *tiling billiards*, are inspired by the development of metamaterials which refract light with a negative index, and linked to the possi. Specifically I study *interval exchange transformations* (IETs) with or without flips and *linear involutions* in connection with the Teichmüller flow in the *moduli of quadratic differentials*. I also study *excursions of the geodesic flow on non-compact hyperbolic surfaces*, as well as *pseudo-anosov flows* on 3-dimensional hyperbolic surfaces.

EMPLOYMENT

Max-Planck-Institute	Leipzig
Mentored by Samantha Fairchild, in the group <i>Geometry, Groups and Dynamics</i> of Anna Wienhard	2024 –2026

EDUCATION

Aix-Marseille Université	Marseille
Math PhD, supervised by Pascal Hubert and Olga Paris-Romaskevich	2021–2024

Université Grenoble Alpes	Grenoble
Master <i>Groups and geometries</i> - with Honors	2020–2021

– Internship (5 months) supervised by Erwan Lanneau, Institut Fourier, Grenoble

École Normale Supérieure de Paris-Saclay	Cachan
Agrégation de mathématiques, option D (computer science) - awarded	2019–2020

École Normale Supérieure de Rennes	Rennes
Math département - double degree in computer science - with Honors	2017–2019

– Internship (2 months) supervised by Tobias Hartnick, Justus-Liebig-Universität, Gießen, Germany 2019

– Optional teaching internship (2 weeks) at High School Évariste Galois in Sartrouville, France May 2019

– Internship (6 weeks) supervised by Laurent Bougrain and Radu Ranta at INRIA and CRAN, Nancy 2018

– *Polynoms iterations and Julia's set*, work in group with Clémentine Laurens, supervised by Franck Loray 2018

Classes Préparatoires aux Grandes Écoles	Lycée Saint-Louis, Paris
MPSI - MP* - MP*	2014–2017

TRAINING COURSES

- **Doctoral school's courses**, of 24 hours each
Overview of Paul Erdős' math - Differential geometry and Gauss-Bonnet's theorem
- **Doctoral school's training courses** 2021-2023
Developing students' reflexivity (4h) - Teaching in flipped classrooms (8h) - Assessing your students' learning (8h) - The effects of gender stereotypes in academic and professional environments (1h) - Science didactics (4h) - Using cognitive science to facilitate student learning (12h)
- **MOOC** : *Research ethics (10h), Integrity in scientific professions (10h)*

ORGANIZATION AND ACADEMIC SERVICE

- **Co-organizer of a 2 weekly talks seminar** *Geometry, Groups and Dynamics* March-July 2026
- **Co-organizer** of the summer school *Dynamics and geometry in dimension 1, 2 and 3* at CIRM, 2-6 June 2025
About 45 participants have attended this summer school. Our goal was to bring together the dynamical and geometrical community from France and Germany. There were three mini-courses, participants' talks and some time dedicated to group working.
- **Reviewer** for the series *Panoramas et Synthèse* of the *Société mathématiques de France* 2025
- **PhD students' representative** on the doctoral school board 2021-2024
- **Co-founder and co-organizer of the PhD day** May 2022, January 2023 and February 2024
- **Co-organizer of the PhD seminar** on campus Saint-Charles 2022-2023

PUBLICATIONS

Journal Articles

1. Deviations for generalized tiling billiards in cyclic polygons, *International Mathematics Research Notices*, 2025. <https://academic.oup.com/imrn/article/2025/20/rnaf314/8287262> (open access)
2. Relation with a fixed interval exchange transformation, *Geometriae Dedicata*, 2023. <https://link.springer.com/article/10.1007/s10711-023-00868-x>, <https://arxiv.org/abs/2204.02456>

Preprint

3. Wind-tree tiling billiards and their trapping strips, 2026. <https://arxiv.org/abs/2603.25654>

Work available in my PhD thesis

4. Multiple interval exchange transformations with flips and tiling billiards

RESEARCH PROJECTS

- | | |
|---|--|
| Invited Researcher
One week invitation to work with Samantha Fairchild | TU/e Eindhoven, Netherland
May 2025 |
| Invited Researcher
Two weeks invitation to work with Krzizstof Frączek | Torun
January 2025 |
| Women in Groups Geometry and Dynamics
Selected to take part in the project <i>An illustrated guide to Anosov flows in dimension 3</i> weekly online meetings during the year to prepare a research retreat in July 2025 | Banff
2024-2025 |
| Invited Researcher
One week invitation to discuss with Corinna Ulcigrai and her group | Zürich
May 2024 |

TEACHING

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|---|------------------------------|
| Master course at Leipzig University
<i>Introduction to translation surfaces - created and given with Kai Fu</i> | 2026
(24h) |
| Teaching contract at Aix-Marseille University
<i>Preparation to Agrégation, option C (Algebra and Formal Calculation) - Modelling on SAGE</i> | 2021-2024
(30h) 2021-2024 |
| <i>3rd year - Math in English</i> | (16h) 2023-2024 |
| <i>3rd year of Computer science - Practical courses and training on Databases</i> | (18h) 2023-2024 |
| <i>2nd year of Math, Physics, Chemistry and Computer science (MPCI) - Tutoring on Databases</i> | (16h) 2022-2023 |
| <i>1st year of Computer science - Practical training How computers work</i> | (18h) 2022-2023 |
| <i>2nd year MPCI - Tutoring on Analysis and Algebra</i> | (34h) 2021-2022 |

INVITED CONFERENCES TALKS

- **Workshop Groups, dynamics and surfaces**, Paris Septembre 2025
- **Translation, dilation, affine and other structures on surfaces**, Toulouse April 2025
- **Workshop on geometric infinite surfaces**, Leipzig September 2024
- **Surfaces, MANifolds and Related Topics (SMART)**, Luxembourg March 2024
- **Weinachtsworkshop**, Karlsruhe December 2023
- **Young researchers in geometry and dynamics**, GDR Platon, Grenoble November 2023
- **Aussois' Winter School**, Aussois December 2022
- **Winter school on billiards**, Autrans January 2022

SEMINAR TALKS

- **Jussieu**, Geometry and Topology Seminar April 2026
- **Nancy**, Differential Geometry Seminar March 2026
- **Tours**, Geometry Seminar March 2026
- **Brest**, Probability Seminar February 2026
- **Lille**, Geometry and Dynamics Seminar January 2026
- **Orsay**, Séminaire de Géométrie, Topologie et Dynamique December 2025
- **DinAmicI**, Online Dynamical Systems Seminar December 2025
- **Strasbourg**, Géométrie Seminar Octobre 2025
- **Saarebrücken**, Algebra and Number Theory Seminar Octobre 2025
- **Eindhoven**, Geometry and Discrete Algebra Seminar May 2025
- **Paris-Est Créteil**, Geometry Seminar May 2025
- **Dijon**, Geometry, Algebra, Dynamic and Topology Seminar March 2025
- **Paris 13**, Dynamical System Seminar March 2025
- **En ligne**, Online francophone Groups and Geometry Seminar February 2025
- **Leipzig**, Joined Seminar of Jena and Leipzig January 2025
- **Toruń**, Dynamical System and Ergodic Theory Seminar January 2025
- **Toulouse**, Geometry and Topology Seminar June 2024
- **Zürich**, Dynamical System and Ergodic Theory Seminar Mai 2024
- **Rennes**, Dynamics Seminar Avril 2024
- **Leipzig**, Geometry, Groups and Dynamics Seminar Décembre 2023
- **Grenoble**, Topology Seminar Avril 2023
- **Marseille**, Rauzy Seminar Février 2023

CONTRIBUTIONS IN CONFERENCES

- **School on flat surfaces and interactions**, Le Teich - *Speaker* March 2024
- **Maths and art: creating together** at CIRM, *Animation of a workshop for High-school students* November 2023
- **Renormalization and Visualization for packing, Billiard and Surfaces** at CIRM - *Poster* July 2023
- **Geometry and dynamic Spring School** of GDR Platon, Lille - *Speaker* March 2023
- **Young researchers in geometry and dynamics**, GDR Platon, Orsay - *5 min lightning talk* November 2022
- **Combinatorics, Dynamics and Geometry on Moduli Spaces** at CIRM - *Poster* September 2022
- **Young researchers in geometry and dynamics**, GDR Platon, CIRM - *Poster* November 2021

OTHER ATTENDED CONFERENCES AND SCHOOLS

- **IHP Semester *Illustrating Mathematics***, CIRM and IHP January and February 2026
- **Winter school in Dynamics and Geometry in Aussois** December 2025
- **Summer school: Dynamics and Geometry in dimension 1, 2 and 3**, Marseille June 2025
- **Real World Applications of Geometry and Algebra**, Eindhoven May 2025
- **Reserch School: Geometric Structures and discrete group actions**, CIRM April 2025
- **Geometry at infinity**, Leipzig April 2025
- **Sagedays**, computer programming workshop, Le Teich January 2024
- **Renormalization and Visualization in Geometry, Dynamics and Number Theory**, at CIRM December 2023
- **Workshop Renormalization, Computation and Vizualization** at CIRM September 2023
- **Big Mapping Class Group and Diffeomorphism Groups** at CIRM October 2022
- **Winter school in Dynamics and Geometry in Aussois** December 2021

OUTREACH

- **Co-organizer of events**
 - II Day, talks and pie contest in Marseille* March 2023
 - French Young Mathematicians Tournament (TFJM2), in Rennes* April 2018
 - Meeting of young mathematician girl (RJM), first edition in Rennes* 2017
- **Targeting girls in particular**
 - Week Les Cigales at CIRM: Supervision of a group (two sessions)* April and November 2022
 - Week Les Cigales at CIRM: Talk How does a kaleidoscope work?* April 2022
 - Days Girls and math: Speed-dating* Mai 2020 and April 2022
- **Geometrists' gaze**, a project combining art and mathematics in schools
 - Workshop on the theme of light and colors (2h) in a middle school's class* 2023
 - Talk and workshop How many types of freize patterns exist? for public from 10 to 16 years old* 2022 and 2023
 - Workshops on the theme of kaleidoscope (2h) in classes of middle and high schools* 2022 and 2023
- **Other interventions for middle and high school students**
 - Talk The dimension of colors, for high-school student (in german)* March 2026
 - Talk Dansons avec les nombres on complex numbers, for middle school students* May 2023
 - Running a stand at the Mathematic fair in Rognac (France)* May 2023
 - Presentation of my PhD work to a high school class* Decembre 2022
 - Workshops on the theme of mirrors for classes of primary and middle schools* Science festival 2022 and 2023
 - Day for high school students at CIRM: running a stand* 2021 and 2022
- **For the general public**
 - Recording for the Palais de la Découverte about intuition in mathematics (work in progress)* 2026
 - Le théorème de la baguette magique et le problème d'illumination, article written for the magazine Tangente* 2025
 - Long Night of Science in Leipzig* June 2025
 - WECAM at MMI, Lyon: Creation of outreach activities on the theme of cooking* January 2023
 - Science festival in Marseille: Running the CIRM's stand* October 2022 and 2023
 - Mathematical culture and games fair, in Paris: Running the stand Imaginary* June 2022

LANGUAGES

- **Languages:** French (native) - English (B2/C1) - German (B2)
- **Programing languages:** Python, Sage, C, CamL, LaTeX

HOBBIES

- **Music :** violin, accordion, choir singing
- **Reading, Dance, Hiking**