ANNUAL REPORT 2018

FMJH

Fondation Mathématique Jacques Hadamard

Contents

A WORD FROM THE DIRECTOR

Welcome to Fondation Mathématique Jacques Hadamard!

I became director of the foundation in 2015, and its ambitious goal: raise mathematics to its highest level, has continuously inspired me since that time on. This goal became tangible during the great mathematics event of the International Congress of Mathematicians in Rio de Janeiro last August: there I was able to celebrate the Fields medal awarded to P. Scholze, who had given our Hadamard lectures in 2017. The achievements of FMJH, which include the cross-faculty Master's and PhD programs, are of the same standard. The FMJH team has devoted much effort to protecting these cross-faculty courses from the consequences of the Paris-Saclay project splitting into two poles.

Today, FMJH has reached a form of maturity, having changed greatly since its founding. In particular, it has expanded in order to host the majority of mathematicians involved in the Paris-Saclay campus. Its legal status was changed in July 2018, giving birth to a new legal entity. During this transition, FMJH has benefitted from constant support from Université Paris-Saclay, of which I am truly grateful. New calls have been launched which enlarge the scope of FMJH to take future vocations into account. These include things like the Votre Région fait des Maths call, whose aim it is to help strengthen associations spreading a mathematical culture in our region, as well as a focus on the future careers of math PhD holders.

FMJH and the LabEx LMH involve a large number of women and men, including an administrative team, program committees, jurys, policy officers, and councillors. This family has expanded alongside the increase in scope of FMJH. One founding value has remained unchanged: hospitality. Welcoming and taking care of scholarship holders still makes up the largest part of our team's daily work.

I hope you will enjoy a virtual visit of FMJH upon reading these pages, and let me warmly encourage you to visit us in person in our wonderful new building, unveiled by President Macron on October 25th, 2017.

Pierre Pansu

A Foundation and a LabEx

History

The Fondation Mathématique Jacques Hadamard (FMJH) is a unique institution in France. It was founded in 2010 after a decision by the Prime Minister following a preliminary announcement by President Sarkozy. Its funding is part of the *Plan Campus* section of the *Programme d'Investissement d'Avenir*. It is funded by interest on an endowment of 40 million euros.

Foster the emergence of mathematical talents

FMJH's role is to help the mathematical community of Paris-Saclay attain excellence. In doing so, it also aids its member institutions in determining their mathematics policies.

FMJH's missions also include:
- Launching shared activities for the Paris-Saclay campus. In particular, organizing undergraduate, graduate, and postdoctoral education.
- Backing and enhancing interactions between mathematicians with companies and with other scientific fields, as well as supporting emerging multidisciplinary themes.
- Strengthening international cooperation in mathematics.
- Attracting young talent and connecting it to the French mathematical community.

Founded by the CNRS, École polytechnique, ENS Cachan, IHÉS, and Université Paris-Sud in January 2011, FMJH was under the aegis of the *Fondation de Coopération Scientifique Campus Paris-Saclay* until 2017. The legal status of FMJH then changed in July 2018: it became a *fondation partenariale* in July 2018, with a new founding member: Université Paris-Saclay. As a consequence, it became a legal entity and a board of trustees *(conseil d'administration)* was established in August 2018.

FMJH today

Today, FMJH is the common link between 11 math labs, spread across the 5 founding members and 7 associate ones which joined between 2013 and 2017: AgroParisTech, CentraleSupélec, ENSIIE, ENSTA ParisTech, INRA, UEVE, and UVSQ.

In addition to the interest made on the endowment, FMJH receives financial contributions from its founding and associate members. Furthermore, a sponsoring program called PGMO, initiated by EDF, brings in private funds. Since 2016, further companies have joined the program: Thales-LAS, Orange, and Criteo. More will likely join in the future.

Strengthen the interfaces of mathematics

FMJH's director works in close connection with the member labs. A team of deputy directors and policy officers forms the executive committee. A scientific council supervises scientific choices and suggests new activities. The steering committee implements the major budgetary decisions taken by the board of trustees.

LMH

LabExes are structures that have been formed under the *Programme d'Investissement d'Avenir* since 2011. In general, a LabEx is a group of laboratories sharing a common research project and a potential for excellence which receives extra funding over an 8-year period. The LabEx Mathématique Hadamard (LMH) was established for the period 2012-2019 with a fund of 10 million euros. In February 2019, it was extended to include the period 2020-2024.

Its partner institutions are FMJH's founding and associate members, Institut Mines Télécom, CEA, and Inria, two further labs, and the Jacques Hadamard Mathematics Library. Its scientific policy, in close coordination with FMJH, focuses on the interface between mathematics and other fields: biology, computer science, engineering science, and theoretical physics. LMH is especially focused on PhD-level training at the Paris-Saclay campus. The director of FMJH is concurrently in charge of LMH.

List of FMJH's members

	Acronym	Title	UMR	Partner
FMJH	CMAP	Centre de Mathématiques Appliquées	UMR 7641	École Polytechnique – CNRS
	CMLA	Centre de Mathématiques et de leurs Applications	UMR 8536	ENS PS – CNRS
	CMLS	Centre de Mathématiques Laurent Schwartz	UMR 7640	École Polytechnique – CNRS
	FM	Fédération de Mathématiques	FR 3487	CentraleSupélec – CNRS
	LAG	Laboratoire Alexander Grothendieck	ERL 9216	IHES – CNRS
	LMO	Laboratoire de Mathématiques d'Orsay	UMR 8628	Université Paris-Sud – CNRS
	LMV	Laboratoire de Mathématiques de Versailles	UMR 8100	UVSQ – CNRS
	LaMME	Laboratoire de Mathématiques et Modélisation d'Evry	UMR 8071	UEVE – ENSIIE – CNRS
	MIA-Paris	Mathématiques et Informatique Appliquées		AgroParisTech – INRA
	MaIAGE	Mathématiques et Informatique Appliquées : du Génôme à l'Environnement		INRA
	UMA	Unité de Mathématiques Appliquées		ENSTA
LMH	BJH	Bibliothèque Jacques Hadamard	UMS 1786	Université Paris-Sud – CNRS
	IPhT	Institut de Physique Théorique	UMR 3681	CEA – CNRS
	LTCI	Laboratoire Traitement et Communication de l'Information		Institut Mines Télécom

FMJH's and LMH's most visible achievements

Sponsoring program

The Programme Gaspard Monge in Optimization (PGMO) sponsoring program was jointly founded by EDF and FMJH in February 2012. In 2017, it period was extended and its scientific scope broadened to now include interactions between optimization and data science. New sponsors have joined the program over time: Thales-LAS (2016), Orange (2017) and Criteo (2018).

In 2016, PGMO was awarded the AEF prize for the best joint initiative between academia and industry in the Research and Innovation category. PGMO's call is a world-wide one. Its annual event, PGMO-Days, is the main meeting point of the European optimization community. Its activities also include a regular seminar, PhD prizes, and advanced courses which attract a broad audience (students from universities and engineering schools, and academic and industrial research faculty).

PGMO's call is split into 4 sub-calls. First, a research program on fairly exploratory issues (joint call with LMH and IdEx Paris-Saclay's Initiative de Recherche Stratégique iCODE):
- Gaspard Monge Research Program in Optimization, and three research initiatives dealing with more focused themes:

- Research Initiative in Optimization for Energy (EDF, created in 2012),
- Research initiative in Data Sciences for Industry (EDF and Thales, created in 2016),
- Research Initiative around Recommendation Methods (Criteo, created in 2018).

Education

FMJH and LMH have acted as the underlying support for organizing the overhaul of mathematics education at Université Paris-Saclay, founded in January 2015. Below are the details for the Master's and PhD programs.

Master's program

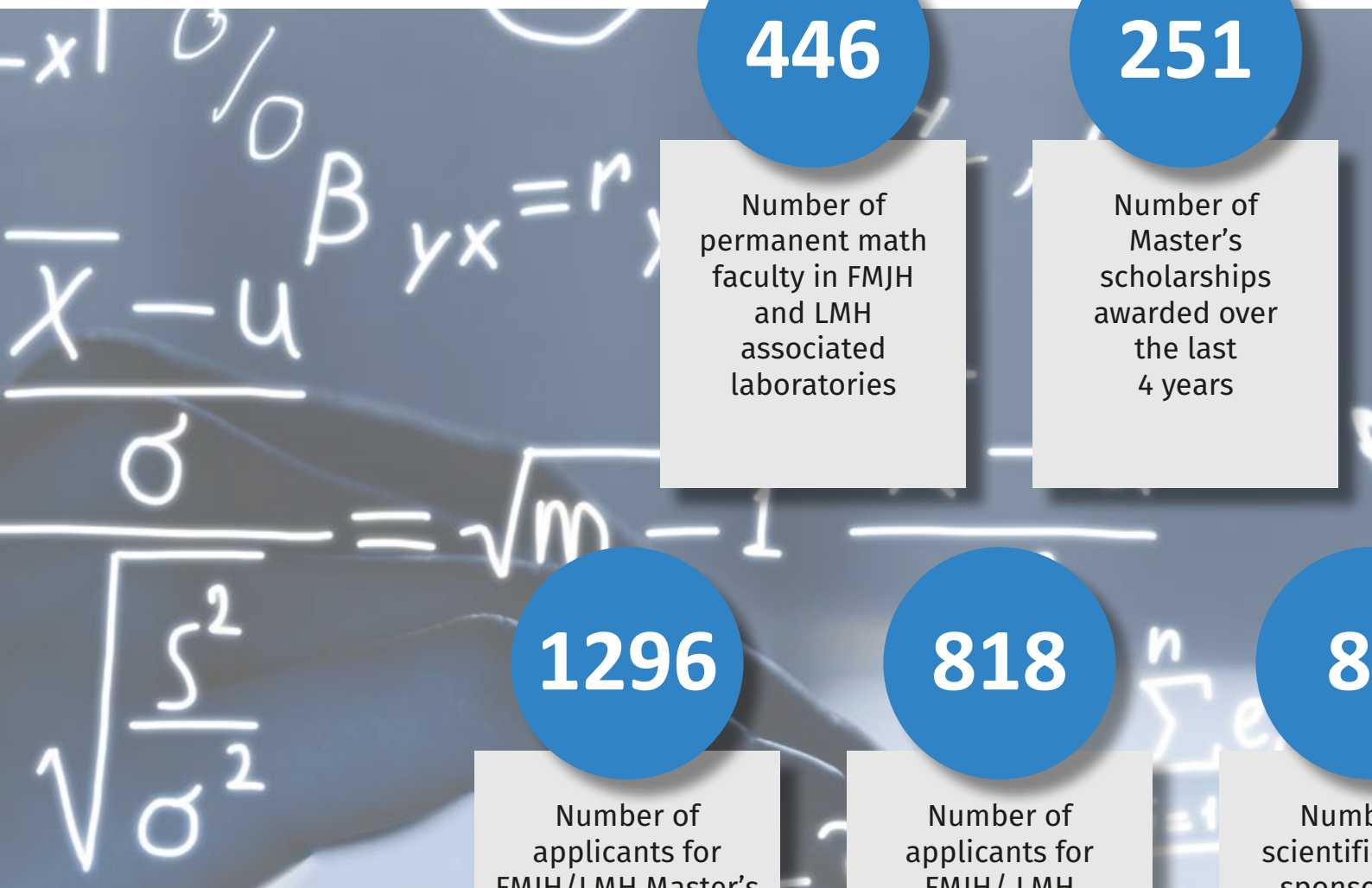
The Mathématiques et Applications de Paris-Saclay Master's program is the result of a thorough reorganization of Master's level education in the southern Paris region. In 2015, existing course

tracks were streamlined and new ones created for promising themes: Mathematics and Life Sciences, Optimization, and Data Science. This program is one of the 48 Master's programs at Université Paris-Saclay. It involves 15 research labs and awards more than 400 degrees per year. FMJH supports it via a scholarships call and a central secretarial office. Furthermore, the annual Journées de rentrée du master is an important event in FMJH's calendar. Over 3 days, general information, short courses, lectures, interaction with alumni, and direct contact with FMJH's team, are provided to scholarship holders and other Master's students.

PhD program

The Ecole Doctorale de Mathématiques Hadamard PhD program is one of the 20 offered at Université Paris-Saclay. It involves the same list of labs as the Master's program, plus Ecole Normale Supérieure, Paris. It covers a broad range of subjects from mainstream mathematics to industrial applications, as well as interfacing with other sciences. Its 300 enrolled students make it one of the largest math PhD programs in the world. LMH provides mobility options, course funding, and PhD fellowships. The great flexibility of LMH means that it can optimize available funding and maintain a high achievement level of recipients.

Key figures



446

Number of permanent math faculty in FMJH and LMH associated laboratories

251

Number of Master's scholarships awarded over the last 4 years

1296

Number of applicants for FMJH/LMH Master's scholarships over the last 4 years

818

Number of applicants for FMJH/ LMH postdoc fellowships over the last 4 years

8

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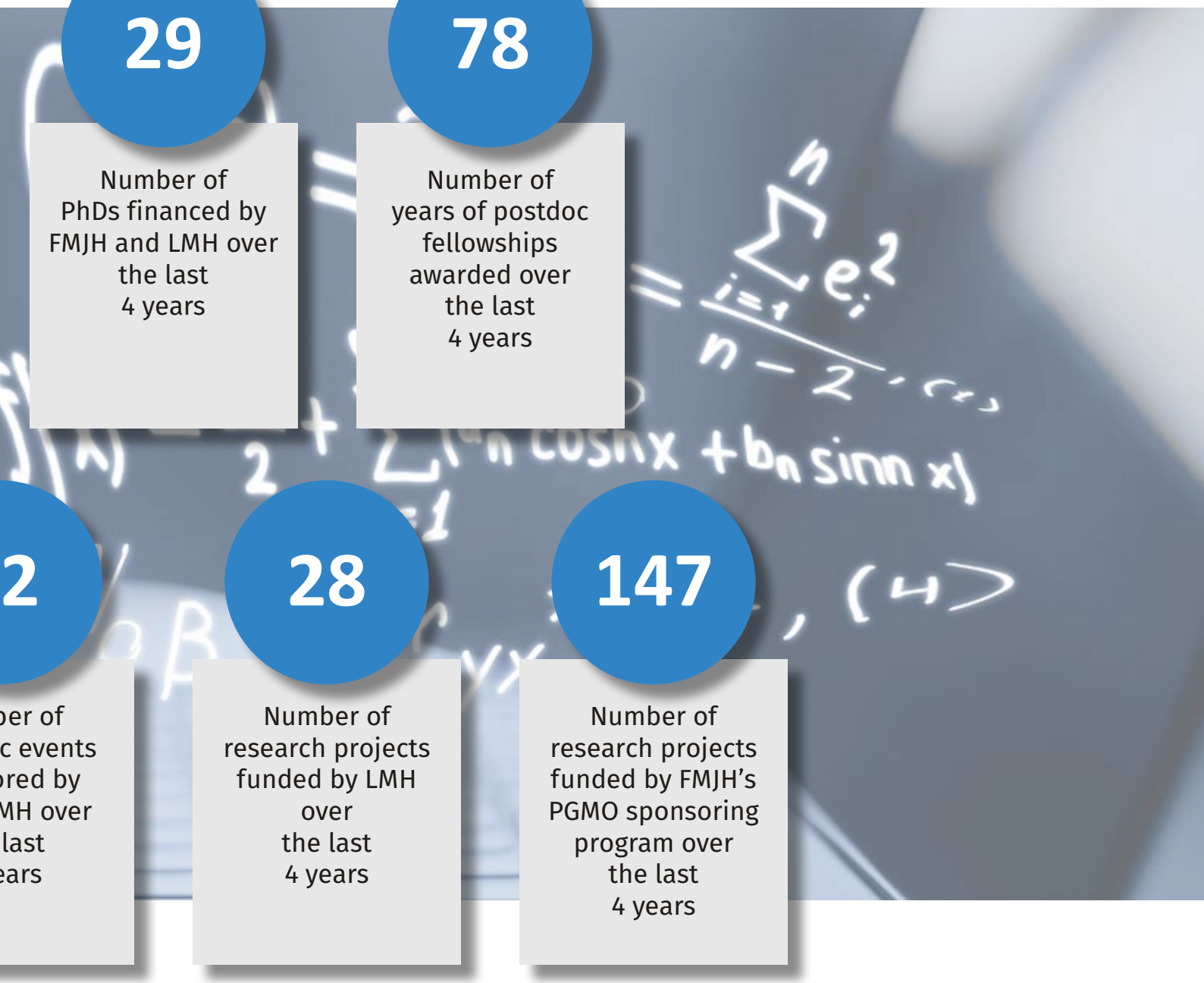

29

Number of PhDs financed by FMJH and LMH over the last 4 years

78

Number of years of postdoc fellowships awarded over the last 4 years

2

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28

Number of research projects funded by LMH over the last 4 years

147

Number of research projects funded by FMJH's PGMO sponsoring program over the last 4 years

Highlights

Hadamard lectures

Hadamard lectures are designed to bring to an audience of young researchers the basics of specific highly active areas of mathematics. The speakers are selected by FMJH's scientific council. The hadamard lectures are now established firmly in the calendar as a prestigious event..

The lectures are given at IHES. Since 2016, videos have been made available online afterwards..

2015

"Regularity Structures" *by Martin HAIRER*

Abstract : One of the main challenges of modern mathematical physics is to understand the behaviour of systems at or near criticality. In a number of cases, one can argue heuristically that this behaviour should be described by a nonlinear stochastic partial differential equation. Some examples of systems of interest are models of phase coexistence near the critical temperature, one-dimensional interface growth models, and models of absorption of a diffusing particle by random impurities. Unfortunately, the equations arising in all of these contexts are mathematically ill-posed to the extent that they defeat classical stochastic PDE techniques. Recently, the theory of regularity structures has allowed us to give a rigorous mathematical interpretation to such equations and to build the mathematical objects conjectured to describe the above-mentioned systems near criticality. It also comes with a robust solution theory allowing to prove various approximation results by solutions to classical PDEs, possibly with diverging coefficients. The aim of these lectures is to give an overview of the main results and concepts of the theory. Whenever practical, we will give at least sketches of proofs that are as self-contained as possible.
Martin Hairer agreed to give the 2015 Hadamard lectures early in 2014, well before he was awarded a Fields medal.

2016

"The energy critical wave equation" *by Carlos KENIG*

Abstract: The theory of nonlinear dispersive equations has witnessed a tremendous development in the last 35 years. Early works studied the behavior of special solutions such as traveling waves and solitons. Then, there was a systematic study of the well-posedness theory (in the Hadamard sense) extensively using tools from harmonic analysis. This yielded many optimal results on the short-time well-posedness and small data global well-posedness of many classical problems. The last 25 years have seen a lot of interest in the study, for nonlinear dispersive equations, of the long-time behavior of solutions, for large initial data. Issues like blow-up, global existence, scattering and long-time asymptotic behavior have come to the forefront, especially in critical problems.
In these lectures I will concentrate on the energy critical nonlinear wave equation, in the focusing case. The dynamics in the defocusing case were studied extensively in the period 1990-2000, culminating in the result that all large data in the energy space yield global solutions which scatter. The focusing case is very different since one can have finite time blow-up, even for solutions which remain bounded in the energy norm, and solutions which exist and remain bounded in the energy norm for all time, but do not scatter, for instance traveling wave solutions, and other fascinating nonlinear phenomena.
I will explain progress in the last 10 years in the program of obtaining a complete understanding of the dynamics of solutions which remain bounded in the energy space. This has recently led to a proof of soliton resolution in the non-radial case, along a well-chosen sequence of times. This will be one of the highlights of the lectures. It is hoped that the results obtained for this equation will be a model for what to strive for in the study of other critical nonlinear dispersive equations.

Carlos Kenig's audience included numerous PhD students and even Master's students. Since these lectures took place, Carlos Kenig was elected president of the International Mathematical Union.

2017

"On the local Langlands conjectures for reductive groups over p-adic fields"

by Peter SCHOLZE

Abstract: Consider a reductive group G over a p-adic field F. The local Langlands conjecture relates the irreducible smooth representations of G(F) with the set of (local) L-parameters, which are maps from the Weil group of F to the L-group of G; refinements of the conjecture relate the fibres of this map with the automorphism group of the L-parameter. Based on ideas from V. Lafforgue's work in the global function field case, I outlined a strategy for attaching (semisimple) L-parameters to irreducible smooth representations of G(F) in my 2014 Berkeley course. At the same time and place, L. Fargues formulated a conjecture relating the local Langlands conjecture with a geometric Langlands conjecture on the Fargues-Fontaine curve.
The goal of this course will be to discuss some of the developments since then. On the foundational side, this concerns basics on the etale cohomology of diamonds including smooth and proper base change and Poincaré duality, leading up to a good notion of "constructible" sheaves on the stack of G-bundles on the Fargues-Fontaine curve. On the applied side, this concerns the construction of (semisimple) L-parameters, the conjecture of Harris (as modified by Viehmann) on the cohomology of non-basic Rapoport-Zink spaces, and the conjecture of Kottwitz on the cohomology of basic Rapoport-Zink spaces.
The picture was taken during the opening ceremony of ICM 2018 in Rio de Janeiro, just after P. Scholze was awarded a Fields medal.

2018

"Time-Frequency Localization and Applications"

by Ingrid DAUBECHIES

Abstract: In this 250th anniversary year of the birth of Joseph Fourier, it behoves us to talk of frequency and spectral analysis!
The lectures shall revisit a number of different techniques that have been developed and applied in the last 30 years, to carry out what engineers and applied mathematicians commonly call time-frequency analysis; in different settings, this approach also goes by the name micro-local analysis. The goal is to decompose signals, functions and operators in ways that preserve, isolate or emphasize local features in both time (or space) and frequency (or momentum). Decompositions of this type can be viewed as analogous to standard music notation, which tells the musician which notes (= frequency information) to play and when (= localization in time).
Tools used for time-frequency localization include, for instance, the so-called short-time Fourier transform as well as wavelets and curvelets; both tools have applications that range widely, and that include, to name a few, semiclassical approximations and estimates in quantum mechanics, image compression, new tools for art conservators, and filters used for gravitational wave detection. We will also discuss the important role of sparsity, a central concept not only in signal analysis (compressed sensing) but also in inverse problems and large-scale computation.

In February 2018, the schedule of Ingrid Daubechies' lectures was affected by weather conditions. Nevertheless, an eclectic audience was able to attend them: analysts experts and students in PDEs probabilists, statisticians, etc. In 2019, Ingrid Daubechies was awarded a L'Oreal prize.

Scholarships and fellowships

FMJH and LMH award a large number of Master's scholarships, and PhD and postdoc fellowships. Postdoc fellowships come in two flavors: standard 2-year contracts, or *lecteurs Hadamard* with 3-year contracts and a teaching requirement.

Let us hear a few recipients speak for themselves about the experience.

Philip Thompson

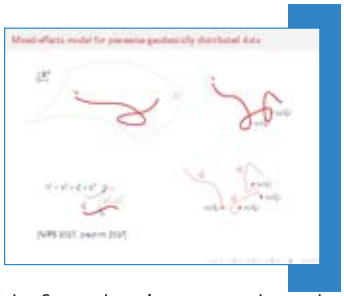
(LMH postdoctoral fellow)

When the result was announced, it felt great to be selected for a post-doc scholarship from such a prestigious institution as the FMJH and to be able to work with the internationally famous group of statisticians at CREST-ENSAE. After about 1 year has passed as a post-doc, I honestly feel I made the right decision. Working with Prof. Arnak Dalalyan and being part of the statistical and machine learning community at CREST (and more broadly in Saclay and Paris) has been a remarkable experience. Arnak has a deep understanding of research problems and his supervision has been very helpful to me. Besides the research work itself, the research environment and connections of CREST is very good. It has allowed me to be exposed to a wide range of research within France and abroad. I believe this 2-year post-doc experience with FMJH will have a significant impact on my professional career.
Philip Thompson

Juliette Chevallier

(PhD fellow of LMH's Math and Life Sciences program)

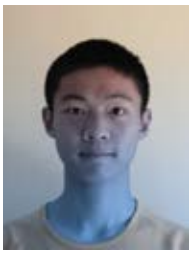
In September 2016, I began a PhD under Stéphanie Allassonnière's supervision. My lab is Centre de Mathématiques Appliquées (CMAP). I elaborate new models or improve existing ones for the statistical analysis of longitudinal data. Being financed by LMH gives me total freedom and allows me to attend conferences easily. For instance, I have been able to attend NeurIPS in California, a summer school in Copenhagen, and a conference in Barcelona. At CMAP, I enjoy ideal working conditions, both material and human. My mathematical knowledge has expanded (especially in differential geometry and stochastic optimization). My research has enabled me to discover the world of academic research and its interactions with the medical world (I collaborate with Georges Pompidou European Hospital on the treatment of metastatic kidney cancer).



Juliette Chevallier

Zhangchi Chen

(PhD student in Orsay, former Master's scholarship holder, in charge of tutoring 3 Master's students)



Indeed, FMJH has supported me strongly enough to live and work without financial pressure. With my scholarship I could also afford travelling abroad once per year. I find myself lucky and hope more students could benefit from it in the future.

Concerning tutoring the M2 students, I mainly focused on explaining and tracking the essentials of their M2 program: choosing enough courses, transmitting credits obtained from another school, applying for OFII/CAF/Carte Vitale, looking for supervisors for their M2 internships. I shared my experience, especially in the courses I have taken in Algebraic Geometry, Number Theory, Groups and Geometry, Complex Analysis and Harmonic Analysis. I also provided suggestions in looking for supervisors and communicating with different professors. Each student has a strong academic background, enough for them to succeed in M2. Once I had told them the right things to do and answered their questions,

they would accomplish their missions very quickly. When their demands went beyond my abilities, i.e., when a student wanted to get an internship in applied mathematics or in algebraic topology, I would tell M. Pascal Massart and he would contact an expert to guide the student individually.
Zhangchi Chen

Jordan Emme

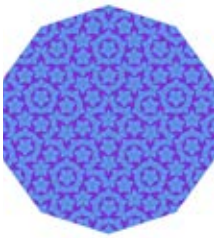
(FMJH Lecteur Hadamard since 2017)

I was lucky enough to become a "Lecteur Hadamard" in September 2017, which has been a tremendous opportunity for me. Indeed, this position comes with a number of advantages that really make it stand out, especially given the state of job offers in the academic world nowadays.

First of all, the fact that this postdoc can take place in any of the 13 laboratories of the FMJH+LMH has allowed for a lot of freedom in the conception of my research project.

Secondly, and possibly most importantly, is the fact that this position is three years long. This is something very rare in France, and it allows for more scientific independance and the time to tackle long-term projects that a standard one-year position otherwise would not. Not having to worry about postdoc applications every year is also that much more time that can be spent doing actual research.

Furthermore, this position comes with a light amount of teaching (which amounts to sixty-four hours yearly, a third of the standard teaching requirements in France). This is, to me, a great way to get more experience as a lecturer, without being overwhelmed by the sheer amount of preparation that a full teaching service would require.



It is worth noting that the position of "Lecteur Hadamard" comes with an annual grant of a thousand euros in order to cover, for instance, conference or workshop expenses, encouraging even further scientific autonomy.

Finally, the laboratories associated with the FMJH are ideally located, in a very scientifically active and stimulating environment near Paris, making it very practical to attend a great number of seminars, and fairly easy to meet many specialists.

All in all, I can say, at the risk of repeating myself, that this postdoc is a fantastic opportunity for a young researcher, and that one can only hope that this sort of practice could be generalized in order to help new PhDs start their careers.
Jordan Emme

Valeriia Starichkova

(FMJH Master's scholarship holder in 2017 and in 2018)

I did the bachelor program in mathematics at Moscow's "Higher School of Economics", after which I applied for the "Mathematics and applications" Master's program of Paris Saclay. I entered the Master's 1 program called Voie Jacques Hadamard that was financed by FMJH. During the first year I had basic courses in algebra, probability, geometry (algebraic and differential), statistics, and number theory, that were very clear and well organized. Maybe these courses inspired me to continue studying pure mathematics and entering the "Analysis, Arithmetics, Geometry" (AAG) Master's 2 program this year. Since FMJH's support was prolonged for this second year, I had the possibility of continuing my studies. The AAG program proposes interesting courses of a very good level and on various topics in the first semester, and a project in pure mathematics in the second. During the first semester I have already learned quite a lot, and I hope to continue in the same spirit.
Valeriia Starichkova

Economic impact: Connecting the academic world with industry

The foundation pushes for high-quality research and training in mathematics for industry also.

On the training side, it actively contributes to the organization of the yearly job fair of France's mathematical community.

On the research side, its runs a corporate scheme dedicated to funding public research with industrial applications. This scheme was created in partnership with EDF in 2012 and was awarded the AEF grand prize for joint initiatives between the academic world and industry in 2016. Current patrons are EDF (2012-), Thales (2016-), Orange (2017-), and Criteo (in 2018 only).

This corporate scheme is named "The Gaspard Monge program for optimization, operations research and their interactions with data science" (PGMO in short). Its objective is to support public research projects focused on solving industrial problems in the fields of energy and complex systems. These projects are encouraged in order to kick-off future partnerships between academic and industrial researchers. Several calls for projects are issued each year, depending on the type of mathematical methods (optimization, machine learning, etc.) and fields of application targeted. We provide below two examples of the results of projects funded through this program.

PGMO project #1:

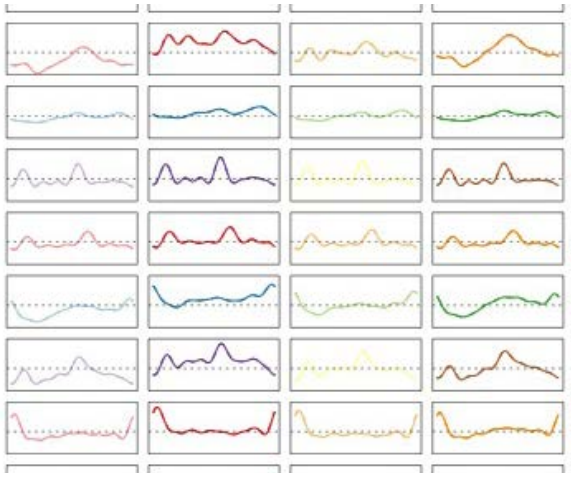
Model-based functional co-clustering for the analysis and prediction of electric power consumption
Project leaders: Charles Bouveyron (Université Côte d'Azur) and Julien Jacques (Université Lumière – Lyon 2)
In collaboration with: Laurent Bozzi (EDF)

As a consequence of recent policies for smart meter development, electricity operators are nowadays able to collect data on electricity consumption widely and with a high frequency. This is in particular the case in France where EDF will soon be able to remotely record the consumption of its 27 millions customers every 30 minutes.

In order to simultaneously extract from the data customer and daily consumption profiles, a new co-clustering methodology has been developed and published in [1]. This methodology consists in a co-clustering algorithm for functional datasets, which simultaneously clusters the rows and columns of a data matrix whose entries are curves.

Using the most recent implementation of the R package funLBM [2], a dataset provided by EDF was analyzed. The latter was made up of 1481 households in France for which the electricity consumption had been monitored every 30 minutes over a period of almost two years (July 2010 – March 2012). The output of the analysis is the identification of 36 typical daily consumption profiles (9 clusters of customers x 4 clusters of daily consumption, see figure below). This result can be used to aid an exploratory analysis of the data, but also in a predictive manner by developing predictive tools specific to each type of daily consumption profile. Potentially, such profiles can be used to offer different prices to different customers. Advice to customers on how to reduce their consumption can also be provided based on these profiles

[1] C. Bouveyron, L. Bozzi, J. Jacques and F.-X. Jollois (2018). The Functional Latent Block Model for the Co-Clustering of Electricity Consumption Curves, *Journal of the Royal Statistical Society,* Series C, **67** [4], 897-915.
[2] C. Bouveyron and J. Jacques (2018). funLBM: Model-Based Co-Clustering of Functional Data, R package version 1.0.



Average consumption curves for each profile group

PGMO project #2:

Classification of times series, with applications to estimated aircraft paths

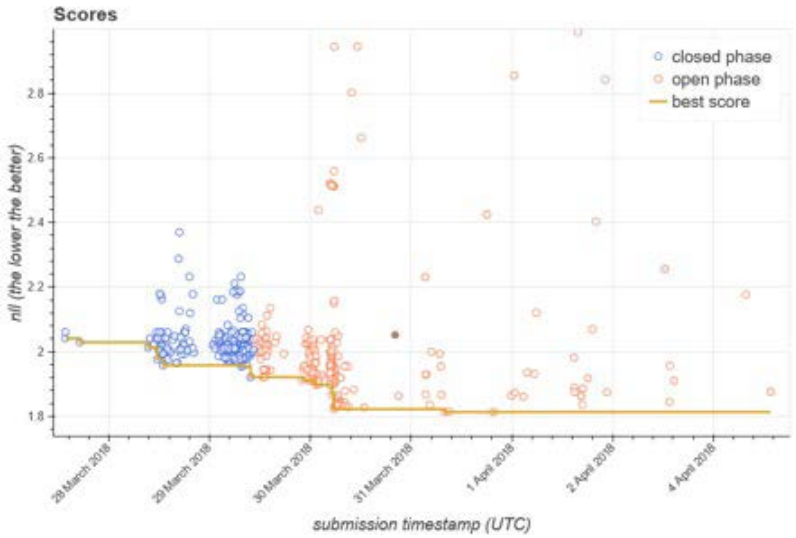
Project leader: Silvère Bonnabel (Mines ParisTech)
In collaboration with: Frédéric Barbaresco (Thales)

To provide air traffic controllers with efficient decision support tools, one should be able to automatically detect a number of features regarding an aircraft, solely based on radar measurements, that is, without the need of any cooperation from the aircraft. In particular, it is desirable to establish the aircraft category (helicopter, fighter, airliner, drone), its size, the type and number of engines. In turn, this information may prove useful to determine whether the aircraft is civilian or military, if its behavior is aggressive or not, and to assess what it is capable of.

The PGMO project funded an internship on this subject. A first type of classifier was devised by the intern Sami Jouaber, who was then a student at Ecole des Mines de Paris. He used deep learning techniques (convolutional neural networks) to extract relevant features out of the aircrafts' trajectories. When tested on real data, the algorithm achieved 90% accuracy in terms of type of aircraft assessment, 75% in terms of type of motor, and 70% in terms of size of the aircraft (Wake Turbulence Category).

After completing his internship, Sami Jouaber started a PhD jointly at Mines ParisTech and Thales AOW in the context of "Thèse Cifre Défense" funding. Over the next three years, he will continue leveraging the most advanced Artificial Intelligence techniques for radar tracking, based at Thales and Mines ParisTech.

Furthermore, the aircraft classification problem was submitted to around 80 students as a data challenge in the context of a machine learning course held at Ecole des Mines ParisTech in 2018. To devise, train, and test the algorithms, the students used the RAMP platform developed notably by Balazs Kegl and Alexandre Gramfort in the context of the Paris-Saclay ecosystem. In the first phase of the challenge (closed phase), students were in competition with each other. In the second phase (open phase), they had access to algorithms devised by others, and used them in order to obtain the best solution possible. The figure below displays the results with respect to times, and illustrates the large improvements obtained in the open (collaboration) phase.



Scores (negative log likelihoods, nll) obtained by the competing students over time, in two phases: closed phase (blue points), then open phase (orange points); the solid yellow line indicates the minimum achieved over time.

Forum Emploi Maths

Forum Emploi Maths is the end-of-year event of FMJH. More than 1000 students in mathematics participate in this national day taking place at the City of Science and Industry in Paris. There, they can check out 40 training stands for higher education institutions and 40 stands for companies which are eager to recruit mathematicians.

The Forum, organized by AMIES and the learned societies SMAI and SFdS, is above all a meeting place. Its program includes exchanges, thematic round tables, and presentations of business activities. Since 2016, FMJH participates in the organization of this event. It is in particular in charge of attracting companies, from start-ups all the way up to large groups. On the opening day, the whole FMJH team, together with volunteer students, attends in mass. FMJH is also present at the Forum Emploi Math as a higher education institution offering Master's scholarships, PhDs, and postdoc fellowships. FMJH's stand is a place where students can find guidance in navigating the jungle of Master's and PhD curricula, and get advice for postdoctoral careers.

Events

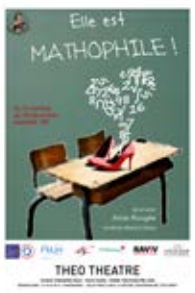
This page highlights some of the events funded either by FMJH or LMH in 2018. Both have permanent calls, processed by juries: program committees for LMH, a jury in charge of events for FMJH, and a specific jury for the outreach call *Votre Région fait des Maths*.

Outreach

FMJH's call *Votre Région fait des Maths* brings a small level of financial support to local outreach activities, run either by its member labs or by associations. Here is a sample of these.

Congrès MATh.en.JEANS, Orsay, the annual gathering of high school math clubs +

Chant de balles, a juggling show explaining the combinatorics of the coding system jugglers use to record their feats.



Comédie des Ondes, and its theater show "*Elle est mathophile*"

PAESTEL has run two math summer camps: Mat'les Vacances (maths and sports in the Alps) and Mat'les Etoiles (maths and astronomy in Ardèche)

International cooperation

FMJH, often with other French partners, maintains ongoing cooperation with several countries.

In Brazil, CNRS and *Instituto de Matemática Pura e Aplicada* launched the Réseau Franco-Brésilien de Mathématiques in 2000. Since that date, FMJH,

FSMP, and LabEx Bezout have joined the consortium. FMJH provides infrastructure (website, etc.) for this network chaired by C. Favre (CMLS) and J. Palis (IMPA). In 2018, the network funded 33 joint research projects.

In China, FMJH, with *Fondation Sciences Mathématiques de Paris* (FSMP) and Institut Fourier, Grenoble, cooperates with 3 chinese institutions: Beijing International Center for Mathematical Research of Peking University, Chern Institute of Mathematics in Nankai, and USTC in Hefei. This year's main activity was the Sino-French conference in Algebraic and Complex Geometry in Lyon

In Romania, our partner is the Simion Stoilow Mathematics Institute of the Romanian Academy. This year's activity was a Franco-Romanian meeting held in Bordeaux.

In Russia, FMJH contributes to Chaire Lamé, established by the French Embassy and the Tschebychev Laboratory in Saint-Petersburg.

In Tunisia, our partner is the *Modélisation Mathématique et Calcul Scientifique* Master's program, based in Tunis. In 2018, 4 Paris-Saclay faculty members gave courses there.

A selection of scientific events funded in 2018

- **Journées de statistique held at EDF-Labs (FMJH+LMH)**
- **Colloquium: Deux complices en statistique (LMH)**
- **Kolmogorov Days in Evry (FMJH)**
- **Junior Conference on Data Science and Engineering in Orsay (LMH)**
- **Colloquium: Groupes, géométrie et analyse, IHES (LMH)**
- **Séminaire Itzykson: Computational and information-theoretic phase problems (LMH)**

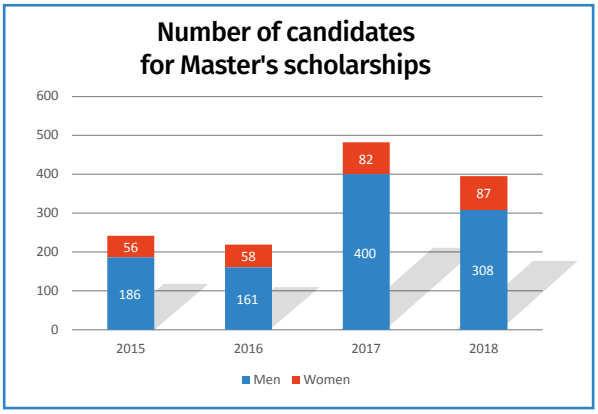
Figures

Scholarships and fellowships

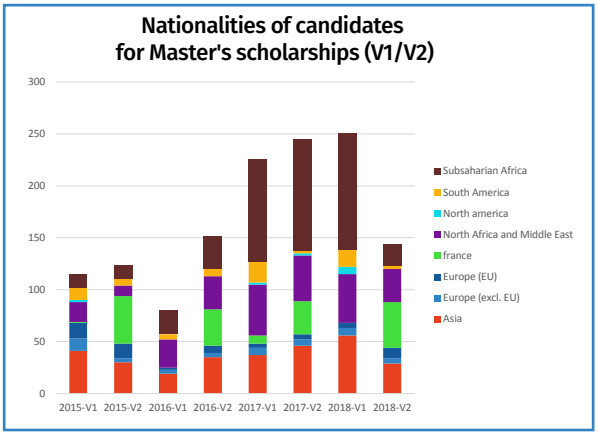
This section gives an overview of the calls for Master's scholarships, PhD and postdoc fellowships organized and funded by FMJH and LMH.

Master's Scholarships

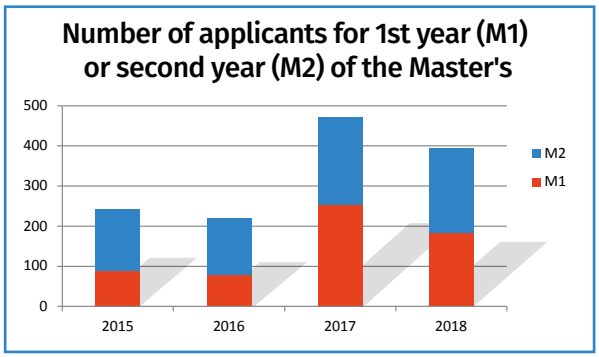
The number of applicants for Master's scholarships has increased.



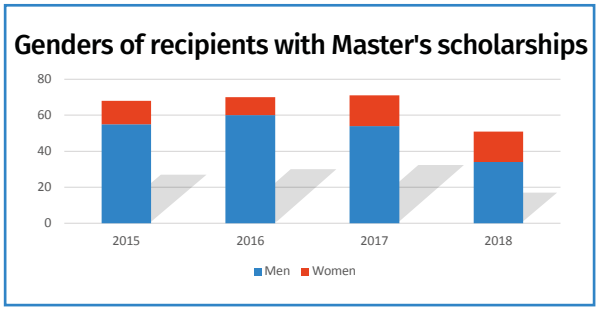
There are two calls each year, with deadlines at the end of January (1st wave "V1") and April (2nd wave "V2"). Non-EU candidates are encouraged to apply in January, in order to have enough time to obtain visas. While French candidates are only examined in May. This is reflected in the following figures.



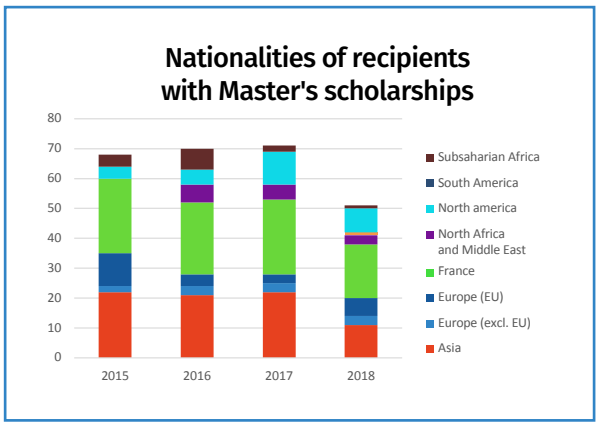
Scholarships allow for either enrollment in the first year (M1) or second year (M2) of the Master's. We note that the number of applicants at the M1 level has increased over recent years (a trend already observed between 2011 and 2015). Students who benefit from an M1 scholarship and who successfully pass through to the second year are automatically awarded an M2 scholarship.



Women represent 21% of applicants and 22% of recipients over the last four years.



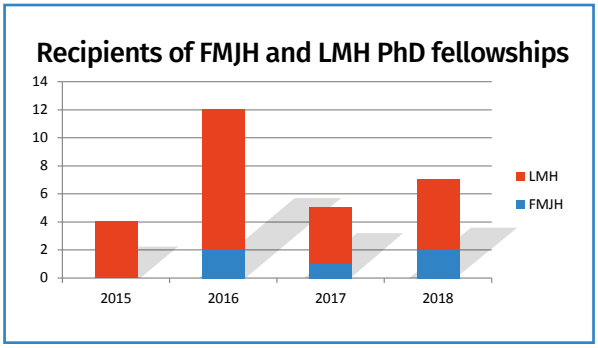
One third of recipients are French. South America and Asia also correspond to large numbers of Master's recipients, which reflects a history of scientific cooperation between Paris-Saclay, Brazil and China.



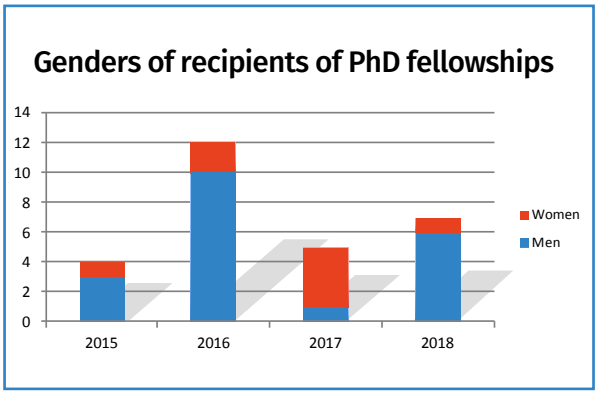
PhD Fellowships

Each year, up to around 100 candidates apply for PhD fellowships managed by the Ecole Doctorale de Mathématiques Hadamard (EDMH). EDMH has many sources of funding, including FMJH and LMH.

The number of PhD fellowships awarded by LMH peaked in 2016 since initially this should have been the final year in which labexes could launch PhDs. Since then, the rules have been relaxed.

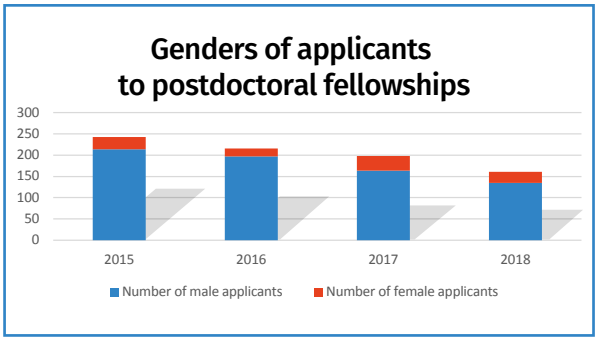


Women represent less than 20% of applicants, but close to 30% of recipients over the past four years.

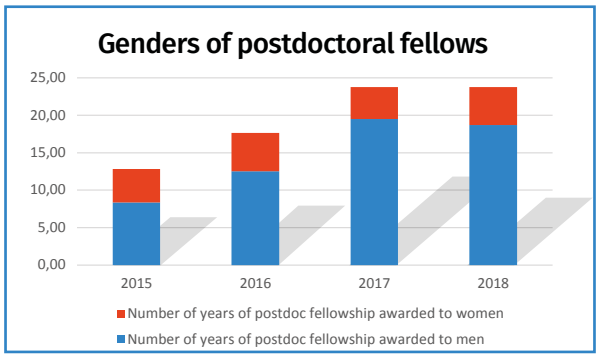


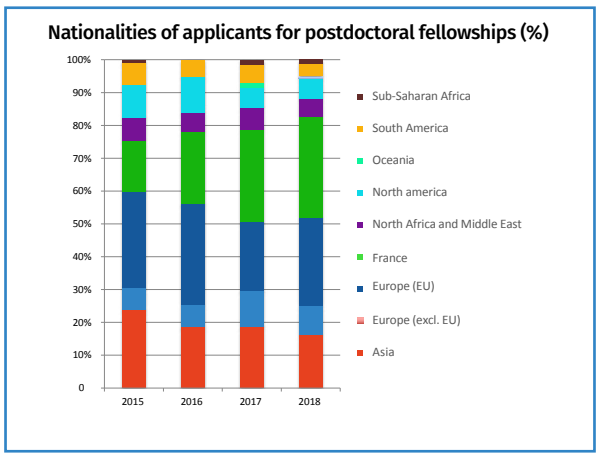
Postdoc Fellowships

The number of candidates for FMJH and LMH postdoc fellowships has slightly decreased over the last 4 years.

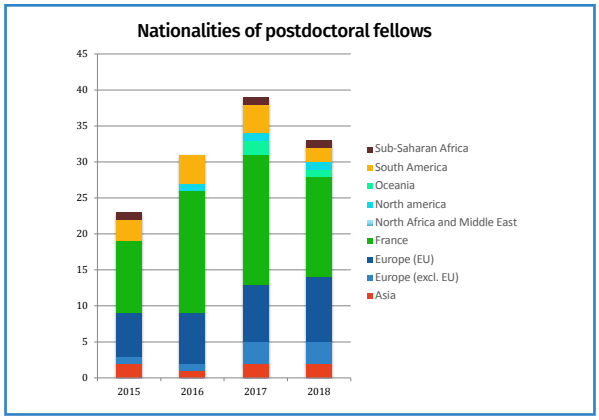


Women represent 13% of applicants but 25% of recipients over the past four years.





The next graphic counts the number of postdocs currently paid using funds originally coming from FMJH or LMH for at least part of the year. French citizens represent 47% of fellows but only 23% of candidates. Indeed, they are overrepresented in the group of *lecteurs Hadamard* (3 year positions with a teaching load) due to the special language prerequisites of this call. For similar reasons, the success rate is higher for Europeans and Africans than for other nationalities.



Research projects

List of research projects funded by LMH between 2015 and 2018

Each of LMH's four scientific programs runs a permanent call for research projects. In addition, since 2016, it is LMH's job to select the most theoretical projects submitted for the PGMO call.

Program	Date	Laboratory	Principal Investigator	Title
Math. Ingénierie	2015	LMV	Ch. Chalons, A. Larat	Study of numerical schemes preserving high order and asymptotics
Math. Ingénierie	2015	CMLA/LRI	Ch. Denis, M. Baboulin	Estimating the numerical quality and performance of linear algebra algorithms with mixed precision
Math. Ingénierie	2016	CMAP	L. Rizzi	Geometric Optimal Control
Math. Ingénierie	2016	CMAP	A. Kroener	Optimal control of partial differential equations using parameterizing manifolds, model reduction, and dynamic programming
Math STIC	2016	LIX*	C. Doerr	Parameter Optimization via Drift Analysis
Math STIC	2016	CMAP	X. Allamigeon	Tropical methods for the analysis of performances of temporised systems, application to sizing a call center at EDF
Math STIC	2016	CMLA	V. Perchet	Bandits with Structure and Sparsity
Math STIC	2016	LTCI	O. Fercocq	From monotone operators to smoothed duality gap
Math STIC	2016	LRI	C. Gicquel	Stochastic Optimization for Planning Remanufacturing Activities in Reverse Supply Chains
Math. Ingénierie	2017	CMAP	A. Kroener	Optimal control of partial differential equations
Math STIC	2017	CMAP	E. Le Pennec	Cloud dataset augmentation through texture synthesis
Math STIC	2017	CMAP	D. Brockhoff	Algorithms for Expensive Simulation-Based Optimization Problems
Math. Ingénierie	2017	LIX*	C. D'Ambrosio	Shortest Path Problem variants for the Hydro Unit Commitment Problem
Math STIC	2017	LIX*	C. Doerr	Self-Adjusting Parameter Choices in Heuristic Optimization

Math. Ingénierie	2017	LMO	F. Santambrogio	Variational and PDE methods in Mean Field Games
Math STIC	2017	LTCI	S. Clémençon	Anomaly Detection based on Functional Physical Data for Predictive Maintenance Of Aircraft Fleet
Math STIC	2017	LRI	D. Quadri	Guiding electrical vehicles
Math STIC	2017	LRI	C. Gicquel	Energetic efficiency in production planning: models and combinatorial optimization algorithms
Math STIC	2017	DAVID*	J.-M. Fourneau	Optimization and stochastic comparison
Math STIC	2017	IBISC*	Nguyen Kim Thang	On-line algorithms with random order
Math. Ingénierie	2018	CMAP	L. Chesnel	New concepts for imaging in complex media
Math. Ingénierie	2018	CMAP	S. Hadikhanloo	Optimal control of conservation equations
Math STIC	2018	LTCI	R. Gower	Scalable stochastic variance reduced gradient methods
Math STIC	2018	LTCI	F. Roueff	Extracting generic descriptors synthetizing information contained in electrical consumption profiles via functional principal component analysis
Math STIC	2018	LMO	J. Cugliari - J.M. Poggi	Generating Specialized Biased Experts for Electricity and Pollution Forecasting using Online Mixture
Math STIC	2018	SAMOVAR*	J. Neto	Spectral bounds for graph partitioning
Math STIC	2018	LIX*	C. Doerr	Analysis of Evolutionary Algorithms: Beyond Expected Optimization Times
Math. Ingénierie	2018	FM Centrale	L. Goudenège	Numerical simulation of long-life insurance products (with University of Udine)

LIX : Laboratoire d'Informatique de l'Ecole Polytechnique, UMR 7161
DAVID : Laboratoire d'Informatique de l'UVSQ, EA 7431
IBISC : Informatique, Bio-informatique et Systèmes Complexes, UEVE, EA 4526
SAMOVAR : Services répartis, Architectures, MOdélisation, Validation, Administration des Réseaux, Télécom Sud-Paris, UMR 5157

PGMO projects

List of research projects funded by PGMO between 2015 and 2018

FMJH's sponsoring program, *Programme Gaspard Monge*, runs a yearly call for research projects. It is divided into 4 sub-calls: PRMO for exploratory projects, and IROE, IRSDI and IRMER for projects focused on energy, data and recommendation methods, respectively. The average level of funding is 12,500 euros.

Year	Call	Partner	Principal Investigator	Title
2015	IROE	Ecole des Mines de Nantes	BELDICEANU Nicolas	Short term unit rescheduling with typical modification patterns
2015	IROE	Ecole Polytechnique	D'AMBROSIO Claudia	Decomposition and feasibility restoration for Cascaded Reservoir Management
2015	IROE	EISTI	THERA Michel	Optimization & stability of stochastic unit-commitment problems (OptStab)
2015	IROE	ENPC	DE LARA Michel	Logiciels pour l'Optimisation des Réseaux Intelligents (LORI)
2015	IROE	ENPC	PAGNONCELLI Bernardo / DE LARA Michel	Centralized versus Decentralized Energy Management in a Stochastic Setting (LASON 2)
2015	IROE	ENSTA PARISTECH	COSTA Marie-Christine	Conception d'un câblage robuste pour un parc éolien. Protection de solutions optimales de problèmes d'optimisation combinatoire
2015	IROE	ENSTA PARISTECH	LE CADRE Hélène	MiG Méthodes Intelligentes pour la Grid
2015	IROE	Inria	BROTCORNE Luce	Design and Pricing of Electricity Services in a Competitive Environment
2015	IROE	Inria	BUSIC Ana	Decentralized control for nenewable integration in smart grids
2015	IROE	Université de Lille 1 - Sciences et Technologies	TALBI El-Ghazali	Decentralized optimization and smart-grids
2015	IROE	Université Blaise Pascal	MAHEY Philippe	Décomposition proximale de programmes stochastiques pour la gestion long terme d'un réseau d'énergie multi zones
2015	IROE	Université d'Angers	GUERET Christelle	Optimisation de tournées de techniciens avec véhicules électriques
2015	IROE	Université PARIS 13	WOLFLER Roberto	Scheduling outages for nuclear refueling
2015	IROE	Université Paris Dauphine	FURINI Fabio	Effective algorithms for generic quadratic problems using QPLIB2014
2015	IROE	Université Paris Dauphine	MAHJOUB Ridha	Efficient exact algorithms for Graph Partitioning Problems 2nd year (EEAGPP2)
2015	IROE	Université Paris Diderot	GARNIER Josselin	Optimisation sous contraintes de fiabilité de systèmes complexes - Application à l'ancrage des supports d'éolienne flottante
2015	IROE	Université Paris Sud	GICQUEL Céline	Stochastic Optimization for Planning Remanufacturing Activities in Reverse Supply Chains

2015	IROE	Université Paul Sabatier	NOLL Dominikus	Robust optimization for control
2015	IROE	Université Pierre et Marie Curie	ANGELOPOULOS Spyros	Search and Surveillance Games: Theory, Algorithms and Applications
2015	IROE	Université Pierre et Marie Curie	COMBETTES Patrick	Sparse variational classification by proximal splitting
2015	IROE	Université Pierre et Marie Curie	PASCUAL Fanny	How Randomness Helps in Scheduling Problems
2015	IROE	UVSQ	TSEVEENDORJ Ider	Covering Balls Techniques for nonconvex optimization (COBALT)
2015	PRMO	Centre de Recherche Inria Saclay - Ile de France	RIZZI Luca / SIGALOTTI Mario	Geometric Optimal Control
2015	PRMO	CNRS Ile de France Ouest et Nord (DR5)	TOMALA Tristan	Stochastic Revision Games (SRG)
2015	PRMO	CNRS Languedoc-Roussillon	POSS Michael	Combinatorial robust optimization with budgeted uncertainty
2015	PRMO	CNRS Nord Pas-De-Calais et Picardie	NACE Dritan	Generalized framework for robust approximated approach to chance-constrained optimization problems
2015	PRMO	Conservatoire National des Arts et Métiers	LAMBERT Amélie	Global solution of mixed-integer polynomial optimization problems through quadratic reformulation
2015	PRMO	Ecole Centrale de Lille	GELAREH Shahin / SEMET Frédéric	BENMIP:A Generic Bender Decomposition-based (Mixed) Integer Programming Solver
2015	PRMO	ENPC	PENNANEN Teemu / CHANCELIER Jean-Philippe	Paris-London network on stochastics and optimization in renewable energy (PALON)
2015	PRMO	ENPC	LECLERE Vincent	Solar Forecasting with Epi-Splines
2015	PRMO	Inria	KRÖNER Axel	Optimal control of partial differential equations using parameterizing manifolds, model reduction, and dynamic programming
2015	PRMO	Inria Saclay Ile de France	ALLAMIGEON Xavier	Tropical Methods in Optimisation
2015	PRMO	Université d'Avignon et des Pays du Vaucluse	FIGUEIREDO Rosa	Signed graph optimization applied to community detection and related problems
2015	PRMO	Université d'Avignon et des Pays du Vaucluse	HAYEL Yezekael	Strategic design optimization problem under stochastic user equilibrium constraints
2015	PRMO	Université de Bretagne Occidentale (UBO)	BETTIOL Piernicola	Stochastic Control under State Constraints
2016	IROE	Robert Gordon University	John McCALL	Simulation-Optimization applied to Engineering Asset Management
2016	IROE	Wias (Weierstraß-Institut Für Angewandte Analysis Und Stochastik Leibniz-Institut Im Forschungsverbund Berlin E. V.)	Rene HENRION	Optimisation dans l'incertain pour les problèmes de Unit Commitment

2016	IROE	Inria (Institut National De Recherche En Informatique Et En Automatique)	François VANDERBECK	Synergies entre approches de décomposition de Dantzig-Wolfe et décompostiion de Benders, et application au problème du placement des arrêts nucléaires avec prise en compte de l'incertitude sur la demande - Post-Doc
2016	IROE	Ecole Polytechnique	Josselin GARNIER	Optimisation sous contraintes de fiabilité de systèmes complexes - Application à l'ancrage des supports d'éolienne flottante
2016	IROE	Dipartimento Di Informatica, Università Di Pisa	Antonio FRANGIONI	Advanced Modeling Tools for Decomposition Methods Applied to Energy Optimization Problems
2016	IROE	Cnrs Dr 13 (Languedoc-Roussillon)	Didier AUSSEL	Multi-leader-follower approach for energy pricing problems: competitive interactions producers/ aggregators and producers/smart grid operators
2016	IROE	Ecole Des Mines De Nantes	Nicolas BELDICEANU	Making time-series constraints more robust and more widely accessible and using them for short term unit rescheduling
2016	IROE	École Nationale Des Ponts Et Chaussées	Michel DE LARA	OGRE (optimization, Games and renewable energy)
2016	IROE	École Nationale Des Ponts Et Chaussées	Axel PARMENTIER	Resource constrained shortest path algorithms for EDF short-term thermal production planning problem.
2016	IROE	Ecole Polytechnique	Claudia D'AMBROSIO	Shortest Path Problem variants for the Hydro Unit Commitment Problem
2016	IROE	Inria Saclay - Ile-De-France	Anne AUGER	NumBER - Numerical Black-box Optimization for Energy Applications - Post-Doc
2016	IROE	Université D'Avignon Et Des Pays De Vaucluse	Yezekael HAYEL	Smart Cities with Efficient Coupled Energy-Transport Management
2016	PRMO	Université Grenoble Alpes	Anatoli IOUDITSKI	Statistical inverse problems by convex optimization
2016	PRMO	Université De Bretagne Occidentale (Ubo)	Piernicola BETTIOL	Stochastic Control under State Constraints and Maximum Principle
2016	PRMO	Université Paul Sabatier	Dominikus NOLL	Robust optimization for control
2016	PRMO	Institut D'Economie Industrielle Recherche Fondamentale - Idei-R	Francisco José SILVA ALVAREZ/ Jérôme BOLTE	PASTOR -- Perturbation analysis for deterministic and stochastic optimal control problems
2016	PRMO	Université Paris Dauphine	Fabio FURINI	Effective algorithms for generic quadratic problems using QPLIB2014
2016	PRMO	Université Paris Dauphine	Ridha MAHJOUB	Efficient exact algorithms for Graph Partitioning Problems 3nd year (EEAGPP3)
2016	PRMO	ENS CACHAN	Vianney PERCHET pour Patrick COMBETTES	Sparse variational classification by proximal splitting
2016	PRMO	Cnrs Dr 02 Paris B	Sylvain SORIN	COGLED– Convergence of gradient-like and evolutionary dynamics

2016	PRMO	Université Grenoble Alpes	Jerome MALICK	advanced nonsmooth optimization methods for stochastic programming
2016	PRMO	Cnrs Dr 14 Midi Pyrénées	Sandra Ulrich NGUEVEU	Optimizing energy allocation using lot sizing models (OPAL)
2016	PRMO	Ecole Polytechnique	Leo LIBERTI	Fast relaxations of the optimal power flow problem
2016	PRMO	Inria (Institut National De Recherche En Informatique Et En Automatique)	Jean-Baptiste CAILLAU	"Metric approximation of minimizing trajectories and applications"
2016	PRMO	Université Paris 13 - Paris Nord	Roland GRAPPE	Partitionnement connexe équicoloré des Smartgrids
2016	PRMO	Université Paris Dauphine	Guillaume VIGERAL	LMG Limit Game
2016	PRMO	Universite Paris Diderot (Paris Vii)	Antoine LEMENANT	Connexions Optimales, Calcul et Approximations (COCA)
2016	PRMO	Université Paris-Dauphine	Daniela TONON	Variational and PDE methods in Mean Field Games (VarPDEMFG)
2016	PRMO	Université Pierre Et Marie Curie (Upmc) Paris 6	Bruno ESCOFFIER	Stability versus Optimality in Dynamic Environment Agorithmics
2016	PRMO	Université Pierre Et Marie Curie (Upmc) Paris 6	Viet Hung NGUYEN	Exact and approximation algorithms for fair assignment/matching problems
2016	PRMO	University of Portsmouth Higher Education Corporation	Shahin GELAREH	BENMIP:A Generic Bender Decomposition-based (Mixed) Integer Programming Solver
2016	IRSDI	Ens Cachan	Vianney PERCHET	TeCoLeRe- Temporal Correlations in Learning and Retargetting
2016	IRSDI	Université Paul Sabatier	Jean-Michel LOUBES	Database for road traffic description
2016	IRSDI	Université Paris-Sud	Jairo CUGLIARI et Jean-Michel POGGI	Disaggregated Electricity Forecasting using Clustering of Individual Consumers
2016	IRSDI	Université Paris Descartes (paris V)	Charles BOUVEYRON	Model-Based Functional Co-Clustering for the Analysis and the Prediction of Electric Power Consumption
2016	IRSDI	Université D'Avignon Et Des Pays De Vaucluse	Serigne GUEYE	Estimation du trafic aérien mondial
2016	IRSDI	Université Paris Descartes	Themis PALPANAS	SEPREMA: Very Large Time Series Analysis for Predictive Maintenance
2016	IRSDI	Institut National De Recherche En Informatique Et En Automatique (Inria Rocquencourt	Mireille BOSSY	Projet TER : séries Temporelles et régime mÉtéorologique Régionalisé
2016	IRSDI	Institut Mines Télécom - Télécom Paristech	Albert BIFET	ERDF Linky Electricity Forecasts Using Machine Learning in Real Time
2016	IRSDI	CNRS Délégation Paris-Villejuif	Eric MATZNER-LOBER	Projet de prévision des localisations des incidents sur le réseau de moyenne tension de distribution d'électricité à Paris

2017	IROE	VITO / EnergyVille - public research center	LE CADRE Hélène	COSMIC - COordination Schemes for local and global Market InteraCtions
2017	IROE	EISTI - École internationale des sciences du traitement de l'information	THERA Michel	(OptStab) Optimization & stability of stochastic bilevel problems
2017	IROE	University of Vienna	PFLUG Georg	Incorporating Model Error in the Management of Electricity Portfolios
2017	IROE	Technische Universität Bergakademie Freiberg (Technical University Bergakademie Freiberg)	DEMPE Stephan	Numerical analysis of bilevel and multi-leader-follower games:application to best response estimation in electicity market model
2017	IROE	Université de Bordeaux	VANDERBECK François	Benders decomposition in synergy with Dantzig-Wolfe and application to long term electricity production planning under uncertainties
2017	IROE	Corporation de l'École Polytechnique de Montréal	ANJOS Miguel	Challenging mixed integer nonlinear programming problems for the maintenance planning for hydropower plants
2017	IROE	IMT Atlantique	BELDICEANU Nicolas	Data-base of linear cuts for short term unit rescheduling
2017	IROE	Université LILLE 1 - Sciences et Technologies	TALBI El-Ghazali	From single to multiple domestic consumers in smart grid management
2017	IROE	Ecole Polytechnique	D'Ambrosio Claudia	Shortest Path Problem variants for the Hydro Unit Commitment Problem
2017	IROE	ENSTA Paris-Tech	COSTA Marie-Christine	Conception d'un câblage robuste pour un parc éolien.
2017	PRMO	CNRS (13 languedoc-Roussillon)	POSS Michael	Extensions of classical robust combinatorial optimization
2017	PRMO	UPMC	ESCOFFIER Bruno	Stability versus Optimality in Optimization over Time
2017	PRMO	University of Birmingham, United Kingdom	KOCVARA Michal	Multi-level Methods in Constrained Optimization
2017	PRMO	Cnrs Dr 14 Midi Pyrénées	NGUEVEU Sandra Ulrich	Optimizing energy allocation using lot sizing models (OPAL)
2017	PRMO	Université Toulouse 1 Capitole - SIRET: 19311382600013	GADAT Sébastien	Combining Optimization and Stochastic Algorithms for large scale Learning. (COSAL)
2017	PRMO	Université Paul Sabatier	NOLL Dominikus	Robust optimization for control
2017	PRMO	CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE (CNRS) DELEGATION REGIONALE NORD PAS-DE-CALAIS ET PICARDIE	NACE Dritan	Robust network design subject to uncertain link capacities

2017	PRMO	Université de Perpignan Via Domitia	ADJE Assalé	Feasible and Optimal Semi-Definite Programs for Piecewise Affine Systems Verification
2017	PRMO	Univ. Pierre and Marie Curie	SAFEY EL DIN Mohab	Global Algebraic Shooting Method in Optimal Control and Applications
2017	PRMO	Université d'Avignon et des Pays du Vaucluse	FIGUEIREDO Rosa	Exploiting Antagonistic Relations in Signed Networks under the Structural Balance Hypothesis.
2017	PRMO	TELECOM SUD PARIS	CASTEL-TALEB Hind	Bornes et Bid Prices dans le But d'Economiser Energie (BOBIBEE)
2017	PRMO	Université Paris-Dauphine	BAZGAN Cristina	Most Critical Elements for Multiobjective Optimization Problems
2017	PRMO	Institut National Polytechnique de Toulouse	COTS Olivier	Algebro-geometric techniques with applications to global optimal control for Magnetic Resonance Imaging (MRI)
2017	PRMO	Paris Dauphine	FURINI Fabio	Rich Graph Coloring Problems with applications to resource allocation
2017	PRMO	Université Libre de Bruxelles (ULB)	FORTZ Bernard	Robust Energy Offering under Market Equilibrium Constraints
2017	PRMO	Université Grenoble-Alpes	MERTIKOPOULOS Panayotis	Optimization and analysis of heavily congested networks (HEAVY.NET)
2017	PRMO	Université Pierre et Marie Curie - Paris 6 (UPMC)	NGUYEN Viet Hung	New approaches for solving Max-Cut and related problems in sparse graphs
2017	PRMO	Université de lorraine	Gelareh Shahin	BENMIP: A Generic Bender Decomposition-based (Mixed) Integer Programming Solver
2017	PRMO	Université Pierre et Marie Curie - Paris 6	ANGELOPOULOS Spyros	Bijective and stochastic dominance in online computation
2017	IRSDI	Université de Rennes 1	Malinowski Simon	Études de l'apport des modèles hybrides dans le cadre de la prévision d'indicateurs de séries temporelles - HYPTSER
2017	IRSDI	Université de Technologie de Troyes	Antoine GRALL	From Monitoring Data to Predictive Maintenance for a Guaranteed Service Level on a Fleet
2017	IRSDI	Université de Lyon, Lyon 2	Julien JACQUES	Exploring and summarizing large scale functional data for prediction purpose with statistical learning tools
2017	IRSDI	ARMINES	Silvère BONNABEL	Classification de séries temporelles appliquée aux trajectoires estimées d'aéronefs
2017	IRSDI	Institut Mines Télécom - Télécom ParisTech	Albert BIFET	EDF Machine Learning in Real Time: Competition and Challenges
2017	IRSDI	Université Lyon 2	Julien VELCIN	DyNoFlu (Dynamique de l'information et nouveauté dans les flux de textes)
2017	IRSDI	INSTITUT NATIONAL DE RECHERCHE EN INFORMATIQUE ET EN AUTOMATIQUE	François DUFOUR	Optimisation de stratégies de maintenance par les processus markoviens déterministes par morceaux

2018	PRMO	Université Paris-Dauphine	TONON Daniela	Variational and PDE methods in Mean Field Games (VarPDEMFG)
2018	PRMO	Université de Limoges	NALDI Simone	Optimisation hyperbolique : algorithmes et implantations
2018	PRMO	Université Grenoble Alpes	MERTIKOPOULOS Panayotis	Optimization and analysis of heavily congested networks (HEAVY.NET)
2018	PRMO	Sorbonne Université	TSIGARIDAS Elias	ALgebraic Methods in gAmes and optimization
2018	PRMO	Sorbonne Université	SAFEY EL DIN Mohab	Global Algebraic Shooting Method in Optimal Control and Applications
2018	PRMO	Université d'Avignon et des Pays du Vaucluse	FIGUEIREDO Rosa	Exploiting Antagonistic Relations in Signed Networks under the Structural Balance Hypothesis
2018	PRMO	CNRS - Délégation Occitanie Est	POSS Michael	Extensions of classical robust combinatorial optimization
2018	PRMO	Université Libre de Bruxelles (ULB)	FORTZ Bernard	Robust Energy Offering under Market Equilibrium Constraints
2018	PRMO	Université Paris-Dauphine	VIOSSAT Yannick	Optimization of a new kind of cancer therapy
2018	PRMO	Université de Bretagne Occidentale	QUINCAMPOIX Marc	Optimal Control for Stochastic Differential Equations
2018	PRMO	Sorbonne Université	BAMPIS Evripidis	BeCOOL : Beyond COmpetitive Analysis and On-line Learning
2018	PRMO	CNRS Nord Pas de Calais et Picardie - DR18	JOUGLET Antoine	Prise en compte du routage, des ressources consommables et de la limitation des stocks dans l'optimisation de la chaîne logistique
2018	PRMO	Université Paris-Dauphine	MAHJOUB Ridha	Multi-objective Combinatorial Optimization: Mathematical Programming and Algorithmic Approaches
2018	PRMO	Université Paris Dauphine	ZILIOTTO Bruno	Regularization of zero-sum stochastic games without asymptotic value
2018	PRMO	CNRS Midi Pyrénées dr14	MAGRON Victor	Exact Polynomial optimization with Innovative Certified Schemes (EPICS)
2018	IROE	Università di Pisa, Dipartimento di Informatica	FRANGIONI Antonio	Multilevel Heterogeneous Distributed Decomposition for Energy Planning with SMS++
2018	IROE	Inria	BUSIC Ana	Distributed control of flexible loads
2018	IROE	Centre National de la Recherche Scientifique DR4	BLAVETTE Anne	Fully-decentralised optimizatioN based on Adaptive Multi-Agent SysTEms (NAMASTE)
2018	IROE	Université Paris Dauphine	LARAKI Rida	DAMPER: Designing contrActs and Matching Platforms for green EneRgy
2018	IROE	École Nationale Supérieure des Mines de Paris - Mines ParisTech	DE OLIVEIRA Welington	Models for planning energy investment under uncertainty

2018	IROE	EISTI	THERA Michel	VA-HEAT Tools from variational analysis for understanding heat network optimization
2018	IROE	Weierstraß-Institut für Angewandte Analysis und Stochastik Leibniz-Institut im Forschungsverbund Berlin e. V.	HENRION René	Accounting for uncertainty in distribution networks
2018	IROE	IMT Atlantique	BELDICEANU Nicolas	business constraints for short term unit rescheduling : sliding and conditional QRE
2018	IROE	CNRS	NGUEVEU Sandra Ulrich	Hybrid Optimization for Hydro Valleys
2018	IROE	Université de Lorraine	ADDIS Bernardetta	the Impact of optiMization in PRocESs Synthesis
2018	IROE	Université de Lorraine	JOZEFOWIEZ Nicolas	Algorithms for Vehicle routing problems with optimal Route constraints for Equity in Logistics (AVeREL)
2018	IRSDI	Institut National de Recherche en Informatique et en Automatique Bordeaux Sud-Ouest	DUFOUR Francois	Calcul de stratégies quasi-optimales de maintenance par les processus markoviens déterministes par morceaux
2018	IRSDI	Université Grenoble Alpes	GAUDOIN Olivier	Predictive maintenance strategy for systems submitted to multivariate degradation with dynamic covariates and imperfect maintenance
2018	IRSDI	UNIVERSITE COTE D'AZUR	BOUVEYRON Charles	Analyzing large datasets of multivariate functional data
2018	IRSDI	CentraleSupélec	HUDELOT Céline	Using deep learning and ontologies to estimate the interest of building renovations from street-view images
2018	IRSDI	UNIVERSITE PARIS DESCARTES	PALPANAS Themis	Signature-Based Disaggregation of Electricity Demand
2018	IRSDI	London School of Economics and Political Science	Qiwei Yao	Analysing and Forecasting Large Electricity Consumption Data
2018	IRSDI	CENTRALESUPELEC	VAZQUEZ Emmanuel	Bayesian Optimization On Trees. Application to Nuclear power reactor fuel assembly.
2018	IRMER	Floralis UGA Filiale	AMINI Massih-Reza	Sequential Optimization over Users Implicit Feedback in Large-scale Recommender Systems
2018	IRMER	INRIA Lille Nord Europe	VALKO Michal	Theoretically grounded efficient algorithms for high-dimensional and continuous reinforcement learning
2018	IRMER	Université de Versailles Saint-Quentin-en-Yvelines	MARINCA Dana	Modeling User Temporal Dynamics in Advertising Recommendation Systems

Outreach

List of outreach projects funded by FMJH and LMH between 2015 and 2018

FMJH and LMH run a permanent call for outreach projects. In addition, since 2017, an annual call named *Votre Région fait des Maths* selects outreach projects emanating from faculty members of Paris-Saclay or created for an audience in the southern Paris region. Its goal is to promote initiatives by providing a rather small but stable level of financial support.

	Date	Partner	Title	Organizer
FMJH	12/1/2015	Association Animath	TFJM2 complément	M. Andler
	11/1/2016	Association Animath	Préparation olympique Animath	M. Andler
	1/1/2017	Association Pi-day	Spectacle Pi-day 2017	G. Geoffroy
	5/1/2017	Association Animath	Tournoi Français de Jeunes Mathématiciens et Mathématiciennes	M. Lequesne
	10/1/2017	Association APMEP	Concours annuel de la régionale IdF	M. Kummer
	10/1/2017	LMO	Marathon des maths	F. Bourgeois
	10/1/2017	Association PAESTEL	Colonie Mat'les Vacances	L. Gerin
	10/1/2017	Compagnie Terraquée	Pièce de théâtre ciblée collège	F. Perrin
	10/1/2017	Association GICS	Interventions en lycées	A. Havet
	10/1/2017	Association Pi-day	Spectacle Pi-day 2018	J. Chevallier
	10/1/2017	LMO	Ateliers en écoles et collèges, exposition Imaginary	S. Lelièvre
	12/19/2017	UMA ENSTA	Exposition Rencontre diffractante	J. Pérez
	3/23/2018	Association MATh.en.JEANS	Congrès MATh.en.JEANS	P. Boutaud
	8/1/2018	Association PAESTEL	Stage d'été Mat'les étoiles	B. Rémy
	8/1/2018	Association Animath	Tournoi Français de Jeunes Mathématiciens et Mathématiciennes	F. Reuiller
	8/1/2018	LMO	Marathon d'Orsay de Mathématiques	F. Bourgeois
	8/1/2018	Association Femmes et Maths	Journées Filles et Maths et pièce de théâtre Dérivée	L. Broze
	8/1/2018	Compagnie des ondes	Spectacle théâtral Elle est mathophile	A. Rougée
	8/1/2018	Compagnie Terraquée	Spectacle theâtral Il est rond mon ballon	F. Perrin
	8/1/2018	Compagnie Chant de Balles	Jonglage musical	F. Hivert
	7/1/2018	Association PAESTEL	Stage d'été Mat'les Vacances 2018	L. Gerin
	10/24/2018	Société Mathématique de France	Concours SMF junior 2018	J. Buzzi

LMH	8/1/2016	Labex Milyon	Ecole d'été pour lycéens à Lyon	P. Mironescu
	4/2/2017	Association CIJM	Stand salon des jeux et de la culture mathématique	A. Lefebvre
	5/24/2018	Association CIJM	Stand salon des jeux et de la culture mathématique	P. Pansu

Scientific events

List of scientific events funded by FMJH and LMH between 2015 and 2018

FMJH and LMH run a permanent call, financed by FMJH and all 6 LMH programs. Only events held in France, organized by a faculty member from Paris-Saclay or located in Paris-Saclay, are eligible.

Program	Date	Laboratory	Title	Organizer
FMJH	6/27/2015	CMAP	Renc. Paris-Bath sur les structures branchantes, IHP	A. Véber
FMJH	6/10/2015	LMO	Topologie et géométrie hyperbolique - Bonahon	F. Paulin
FMJH	12/1/2015	IHP	Relativité et Géométrie - Lichnérowicz	J.-P. Bourguignon
FMJH	3/1/2016	FSMP	Chaire partagée Popa	C. Houdayer
FMJH	3/25/2016	LMO	Syst. Dynamiques et problèmes d'évolution, CIRM	G. Raugel
FMJH	5/1/2016	CMLS	Groupes fondamentaux en géométrie arithmétique	A. Cadoret
FMJH	6/1/2016	LMO	Dynamique, géométrie et th. des nombres - Margulis	F. Paulin
FMJH	6/8/2016	SMF	1er Congrès de la Société Mathématique de France, Tours	M. Peigné
FMJH	6/29/2016	CEA	String Maths, Collège de France	B. Duplantier
FMJH	7/1/2016	F&M	Journée Parité	C. Grandmont
FMJH	7/4/2016	LMO	Analyse Harmonique - Kahane	G. David
FMJH	9/1/2016	LMO	Points rationnels et géométrie algébrique	D. Harari
FMJH	12/8/2016	LMV	Géométrie algébrique - Cossart	M. Andler
FMJH	1/1/2017	LaMME	Advances in (numerical) calculus of variations - Brenier	L. Corrias
FMJH	1/1/2017	IHES	Cours et école d'été IHES	E. Ullmo
FMJH	5/23/2017	CMAP	Journée en l'honneur de J. Neveu	S. Méléard
FMJH	6/6/2017	IHES	Algebraic Analysis - Kashiwara	M. Kontsevich

FMJH	6/20/2017	CMLA	Journée pour expliquer l'œuvre d'Yves Meyer	J.-M. Morel
FMJH	9/1/2017	LMO	Analyse Harmonique - David	H. Pajot
FMJH	9/1/2017	LMO	StatMathAppli	P. Massart
FMJH	10/1/2017	SfdS	High Dimensional Statistics	J.-M. Poggi
FMJH	11/20/2017	Psud	Géométrie et Topologie à Bordeaux - Bavard	F. Paulin
FMJH	12/4/2017	Psud	Alg. Geometry and Number Theory - Colliot-Thélène	O. Wittenberg
FMJH	12/6/2017	IHES	Riemannian geometry - Berger	P. Pansu
FMJH	5/28/2018	Psud	Journées de statistique SFdS	C.Derquenne
FMJH	6/4/2018	SMF	2e Congrès de la SMF Lille	M. Maida
FMJH	9/26/2018	LaMME	Journées Kolmogorov à Evry	S. Menozzi
Math. Physique	6/1/2015	IHES	20e Rencontre Itzykson : Surfaces et géométries aléatoires	J. Bouttier
Math. Sci. Vivant	6/1/2015	LMO	Colloque statistique et algorithmique pour le grand séquençage	C. Giraud
EDMH	9/25/2015	LMO	Colloque Paroles aux jeunes chercheurs Nice	F. Paulin
Math. Physique	10/5/2015	LMO	Colloque Analyse asympt et théorie spectrale	K. Pankrashkin
Math. Ingénierie	11/1/2015	LMO	Colloque Écoulements à basse vitesse	F. Lagoutière
Math. Sci. Vivant	12/14/2015	IHES	Cellular and Molecular Biotechnology IHES	F. Kepes
Math. STIC	1/1/2016	IHES	Journée apprentissage	S. Arlot
Math. Ingénierie	2/4/2016	CMAP	Colloque New trends in integral equations	F. Alouges
Math. Physique	4/7/2016	IHES	5e Séminaire Itzykson : Feynman Integrals	S. Nonnenmacher & P. Vanhove
Math. Physique	4/11/2016	IPhT	Mini-school on the mathematics of string theory	R. Minasian
Math. Physique	4/14/2016	IHES	Journée Cartes	T. Budzinski
EDMH	4/17/2016	LMO	Journée Probabilités de demain	P. Maillard

Math. Physique	6/13/2016	IPhT	21e Rencontre Itzykson Quantum Many Body Systems	G. Biroli
Math. Sci. Vivant	7/1/2016	CMAP	Colloque EDP et proba. pour les SV, CIRM	C. Coron
Math. Sci. Vivant	7/17/2016	SPS	Ecole d'été Math-Bio du labex SPS	M.-L. Martin -Magniette
Math. STIC	9/1/2016	LTCI	Junior conference on data science	F. D'Alché-Buc
Math. Physique	9/12/2016	IPhT	Quantum integrable systems, Cargèse	J. Bouttier
Math. Physique	10/12/2016	IHES	6e Séminaire Itzykson : Physique Statistique Hors Equilibre	S. Nonnenmacher & N. Curien
EDMH	11/28/2016	Psud	Parole aux jeunes chercheurs Strasbourg	F. Paulin
Math. STIC	1/19/2017	IHES	Journée apprentissage	G. Charpiat
Math. Physique	2/2/2017	IPhT	Strings, Cosmology and Gravity Student Conf.	T. Poulain
Math. STIC	3/10/2017	CMAP	Journées ALEA	L. Gerin
Math. Physique	4/20/2017	IHES	7e Séminaire Itzykson : Résurgence et Quantification	S. Nonnenmacher & P. Vanhove
Math. Ingénierie	5/15/2017	LMO	Ecole CNRS PRECIS	L. Gouarin
Math. Sci. Vivant	5/16/2017	MIA-Agro	Journée Transcriptomique	M.-L. Martin -Magniette
EDMH	6/1/2017	IHES	Journée Probabilités de demain	P. Maillard
Math. Physique	6/1/2017	IPhT	22e Rencontre Itzykson: Manipulation des systèmes quantiques simples	M. Bauer
Math. STIC	6/1/2017	LTCI	Colloque Heavy tails and long-range dependance	F. Roueff
Math. STIC	6/19/2017	LMO	Structured regularization for high -dimensional data analysis	Y. de Castro
Math. Physique	7/17/2017	IPhT	Integrability in Gauge and String Theory	D. Serban
Math. Physique	7/24/2017	LPTMS	Exact Methods in Low Dimensional Statistical Physics	S. Ouvry
Math. Ingénierie	8/28/2017	ENSTA	Waves diffracted by Patrick Joly	S. Fliss
EDMH	9/6/2017	CNRS	GDR Platon à Rennes	F. Paulin

Math. STIC	9/14/2017	LRI	Junior Conference on Data Science	S. Cohen-Boulakia
Math. Physique	10/23/2017	LMO	Dynamics on random graphs and random maps	A. Singh
Math. Physique	11/21/2017	CMAP	Modél. et analyse des phénomènes dispersifs - Saut	A. de Bouard
Math. Physique	12/11/2017	IPhT	Géométrie spectrale, Aussois	S. Nonnen-macher
Math. Physique	1/22/2018	IHES	8e Séminaire Itzykson : Observables parafermioniques et physique statistique	S. Nonnen-macher & N. Curien
Math. Physique	3/14/2018	CPhT	Strings, Cosmology and Gravity Student Conference 2018	C. Cosnier -Horeau
Math. Sci. Vivant	3/19/2018	LRI-PSud	Ecole “Avancées en biologie des systèmes et de synthèse”	D. Zeliszewski
Math. Ingénierie	5/1/2018	UVSQ	Canum	C. Chalons
Math. Sci. Vivant	5/2/2018	CMAP	Colloque Stochastic analysis with applications in biology and finance	A. Véber
Actions transv.	5/14/2018	CMLS	Journées X-UPS	P. Harinck
Math. STIC	5/28/2018	Psud	Journées de statistique SFdS	C.Derquenne
Math. STIC	6/1/2018	Psud	Colloque Curves and surfaces, Arcachon	Q. Mérigot
Math. Physique	6/4/2018	IPhT	23e Rencontre Itzykson: Statistical Physics of Disordered and Complex Systems	H. Orland & G. Biroli
Actions transv.	6/7/2018	LMO	Journée de Géométrie	H. Auvray
Math. Sci. Vivant	6/12/2018	MIA-Agro	Journée Transcriptomique	M.-L. Martin -Magniette
Math. STIC	6/28/2018	IHES	Deux complices en statistique	S. Arlot
Math. Sci. Vivant	9/10/2018	CMAP	Colloque Populations	A. Véber
Math. STIC	9/13/2018	LRI-PSud	3rd Junior Conference on Data Science and Engineering	F. Saïs
Actions transv.	10/15/2018	IHES	Colloque Go-max	D. Shepelyansky
Math. Physique	11/21/2018	IHES	9e Séminaire Itzykson : Computational and information-theoretic phase problems	S. Nonnen-macher & N. Curien
Math. Physique	12/3/2018	IphT	Conformal Invariance and Harmonic Analysis	I. Kostov
Actions transv.	12/17/2018	IHES	Colloque Géométrie et analyse - Valette	I. Chatterji

Invitations

List of invitations funded by LMH between 2015 and 2018

Each of LMH's scientific programs runs a permanent call for medium to long-term invitations (of 1 to 3 months).

Program	Date	Laboratory	Length (months)	Guest	Host	Project
Math. Phys. Théorique	4/1/2015	UMA	3	S. Nazarov	A.-S. Ben Dhia	Asymptotics and the Unov-Mandelstam radiation conditions in cylindrical and periodic wave guides
Math. Phys. Théorique	5/1/2015	IphT	1	D. Waldram	M. Grana	Applications of exceptional generalized geometries
Math. Ingénierie	7/1/2015	LMO	2	B. Boghosian	F. Dubois	Extension of the lattice Boltzmann algorithm to the Kuramoto-Sivashinsky equations
Math. Phys. Théorique	10/1/2015	IphT	2	M. Malamud	K. Pankrashkin	Expansions in generalized eigenfunctions
Math. Ingénierie	3/1/2016	LMO	2	B. Boghosian	F. Dubois	Extension of the lattice Boltzmann algorithm to the Kuramoto-Sivashinsky equations
Math. Phys. Théorique	4/1/2016	LMO	3	M. Gualtieri	Ph. Boalch	Generalized complex geometry and heterotic flux compactifications
Math. Ingénierie	6/1/2016	CMLA	1	A. Grundland	R. Conte	Applications of the partially invariant solution method to Navier-Stokes equations
Math. Ingénierie	6/6/2016	CMLA	1	P. Musé	J.-M. Morel	Multi-image restoration problems
Math. Phys. Théorique	1/1/2017	LMV	1	R. Rodiac	A. Aftalion	2 components condensates
Math. Phys. Théorique	3/1/2018	LMO	1	V. Lotoreichik	K. Pankrashkin	Analysis of differential operators in domains

International cooperation

List of international cooperations funded by FMJH between 2015 and 2018

Some of these are in networks like the *Réseau franco-brésilien de recherche en mathématiques (RFBM)* and the *Sino-french research program in Mathematics (SFRPM)*. Cooperation sometimes take the form of courses given in foreign curricula, and support for Master's level internships at Paris-Saclay (Sub-Saharan Africa, Cuba, Romania, Tunisia). FMJH also supports the *Chaire Gabriel Lamé*, a prize established by the French Embassy in Saint Petersburg, Russia.

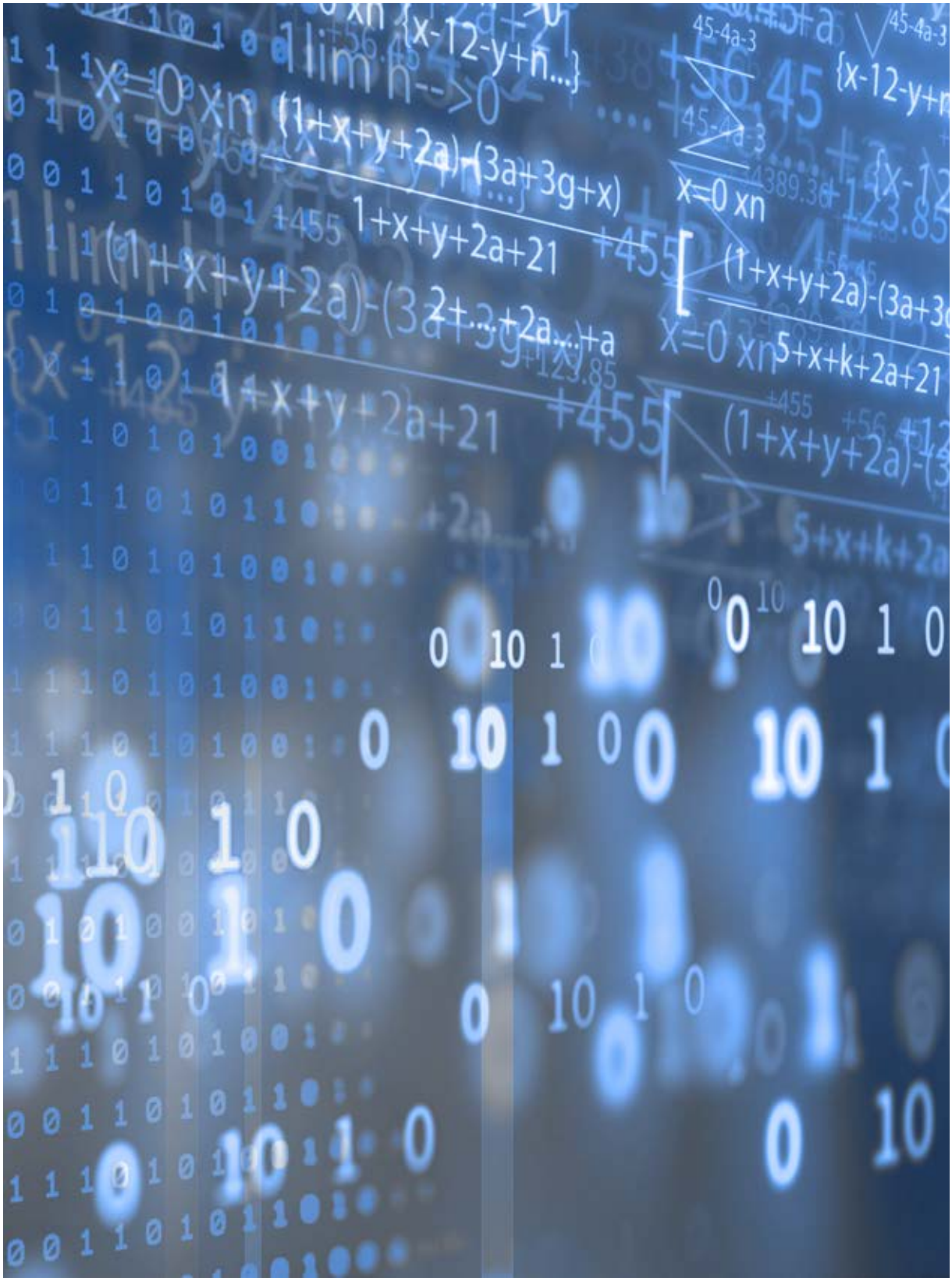
Date	Laboratory	Title	Organizer
3/1/2015	LMV	Mission à Cuba	O. Kavian
7/1/2015	IRMAR	Ecole d'été Sinaia Roumanie	R. Purice
4/1/2016	CMAP	Accueil du stagiaire M2 PSAV Kengne Sangue	S. Méléard
5/25/2016	Bordeaux	SFRPM Colloque Algebraic and arithmetic geometry	Q. Liu
7/1/2016	FMJH	Missions Ecole d'été Sinaia Roumanie	R. Purice
1/1/2017	FSMP	Contribution accord coopération avec Cuba	O. Kavian
3/6/2017	MIA-Agro	Ecole CIMPA La Havane	L. Bel
6/26/2017	LMO	SFRPM Colloque Dynamical Geometry Orsay	N. Pali
10/1/2017	IJF	SFRPM research in pair Lacave et Wang	C. Lacave
2/1/2018	FMJH	Mission Zuk Chaire Gabriel Lamé St Petersbourg	A. Zuk
4/23/2018	ICJ Lyon	SFRPM Colloque Géométrie Lyon	L. Fu
5/1/2018	CNRS	Contribution au RFBM année ICM	C. Favre
8/1/2018	UVSQ	Missions Chauvin Pouyanne à Birzeit, Palestine	B. Chauvin
8/27/2018	Bordeaux	Colloque Franco-Roumain de math. appliquées	M. Tucsnak
10/24/2018	LMO	4 cours de M2 en Tunisie	C. Zuily

Transversal activities

List of transversal activities funded by FMJH and LMH between 2015 and 2018

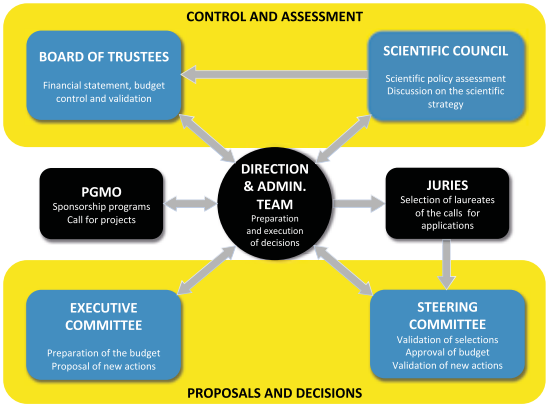
These are activities whose interest goes beyond FMJH's and LMH's programs.

	Date	Partner	Title	Organizer
FMJH	3/1/2015	ICM 2022	Aide au comité de candidature ICM 2022	F. Loeser
	10/1/2017	SMF	Numéro spécial gazette Yoccoz	V. Berthé
	10/1/2017	ICM 2022	Aide au comité de candidature ICM 2022	F. Loeser
	10/1/2017	F&M	BD Seximse Man contre le seximsme	I. Chatterji
LMH	7/13/2015	Psud	Heures de cours complémentaires Math-SV	C. Giraud
	12/1/2015	BJH	Bibliothèque : Livres et vacations	E. Kneller
	12/1/2015	BCX	Bibliothèque : Accueil des étudiants nomades de master	Richard/Boutevin
	12/1/2015	LMV	Bibliothèque : Concours BD IdM et exposition	N. Arnaud
	3/1/2016	PLS	Dossier interlabex Pour La Science Formes	P. Pansu
	3/1/2016	BCX	Bibliothèque : Expo Figures de Mathématiciens	M.-C. Thooris
	3/1/2016	BJH	Bibliothèque : Livres électroniques partagés	E. Kneller
	3/1/2016	CMAP	Bibliothèque : vacations pour étiquetage	A. De Bouard
	3/1/2016	CMLS	Bibliothèque : Ouvrages et vitrine de vulgarisation	B. Remy
	3/1/2016	LMV	Bibliothèque : Livres électroniques partagés	N. Arnaud
	7/12/2016	Psud	Heures de cours complémentaires Math-SV	C. Giraud
	7/12/2016	Psud	Heures de cours complémentaires Math-Ingénierie	M. Massot
	12/1/2016	PLS	Encart interlabex dans Pour La Science	P. Pansu
	2/1/2017	Psud	Compensation décharges pour pilotage LMH	P. Pansu
	2/1/2017	Psud	Immersion C. Coron laboratoire EGCE Gif	C. Coron
	7/10/2017	Psud	Heures de cours complémentaires Math-SV	C. Giraud
	7/10/2017	Psud	Heures de cours complémentaires Math-Ingé	M. Massot
	2/1/2018	Psud	Immersion A. Olivier laboratoire LIED Paris Diderot	A. Olivier
	5/1/2018	Psud	Compensation décharges pour pilotage LMH	P. Pansu
	7/9/2018	Psud	Heures de cours complémentaires Math-SV	C. Giraud
	7/9/2018	Psud	Heures de cours complémentaires Math-Ingénierie	P. Ciarlet
	7/9/2018	Psud	Heures de cours complémentaires Math-Physique	S. Nonnenmacher
	10/1/2018	Psud	Compensation décharges pour pilotage LMH	P. Pansu



Constituent bodies

FMJH is governed by a board of trustees, a scientific committee, a steering committee, and an executive committee.



Board of trustees

ROLE: the board of trustees makes necessary major budgetary decisions.

It is composed of 6 representatives of the founding institutions, 3 elected faculty members, and 5 external members. A representative of FMJH's staff and of the Recteur de l'Académie de Versailles are also invited to attend meetings (see «Other permanent guests» below).

Representatives of the founding institutions

Etienne Augé
Pascal Auscher
Keitaro Nakatani
Frank Pacard
Florent Staley
Emmanuel Ullmo (Vice President)

Elected representatives

Vincent Bansaye
Elisabeth Bouscaren
Agnès Desolneux

External members

Bertrand Braunschweig
Robert Bryant
Jean-Paul Chabard
Christoph Sorger (President)
Isabelle Terrasse

Other permanent guests

Isabelle Jasinowski
Fatou Ba Sene

Scientific council

ROLE : The scientific council supervises scientific choices and suggests new activities.

It has 20 members, at least 10 of which must not be affiliated with Paris-Saclay institutions. It meets once a year.

Members nominated by founding laboratories

François Alouges
Ekaterina Amerik
Patrick Bernard
François Golse
Jean-François Le Gall
Alain Trouvé
Pierre Vanhove

By CNRS
Luigi Ambrosio
Robert Bryant

By Inria
Peter Bühlmann

Elected members

Pauline Lafitte
Luc Robbiano
Hasnaa Zidani

Co-opted members

Irène Gijbels
Felix Otto
Ragni Piene
Andreas Schuppert
Günter M. Ziegler
Enrique Zuazua

Steering committee

ROLE : The steering committee implements the major budgetary decisions taken by the board of trustees. In addition to the directors, it includes 9 members nominated by founding institutions, 6 nominated by associate institutions (one for each laboratory), and 3 elected representatives.

LMH's steering committee includes in addition the LMH program's coordinators (and deputy coordinators) and 3 permanent invited guests.

The FMJH and LMH steering committees meet at midday on Fridays up to nine times a year.

Members nominated by labs

Emmanuel Ullmo – IHES
Elisabeth Gassiat - Université Paris Sud
Pascal Massart - Université Paris Sud
Frédéric Paulin - Université Paris Sud
Thomas Alazard - ENS Paris Saclay
Bertrand Rémy - Ecole Polytechnique
Sylvie Méléard - Ecole Polytechnique
Aline Lefebvre – CNRS
Liliane Bel – Agroparistech
Catherine Donati-Martin – UVSQ
Pauline Lafitte – CentraleSupélec
Pierre-Gilles Lemarié-Rieusset – UEVE
Eric Lunéville – ENSTA
Sophie Schbath – INRA

Elected representatives

Brigitte Chauvin
Christine Keribin
Sophie Schbath

Directors

Pierre Pansu
Vincent Giovangigli

Additional members of LMH's steering committee

LMH program coordinators and deputy coordinators

Mathematics and Biology: **Christophe Giraud, Stéphane Robin**

Mathematics and Theoretical Physics: **Stéphane Nonnenmacher, Nathanaël Enriquez**

Mathematics and Engineering: **Patrick Ciarlet, Pietro Congedo**

Mathematics and Information, and Communication Science and Technology: **Sylvain Arlot, Frédéric Chazal**

Permanent guests

Florent Staley - Université Paris-Saclay
Bertrand Eynard – Institut de Physique Théorique
Laurent Decreusefond – Laboratoire Traitement et Communication de l'Information

Executive committee

ROLE: This committee consists of policy officers and jury chairpersons who assist the directors.

Directors

Pierre Pansu
Vincent Giovangigli
Pascal Massart
Isabelle Jasinowski

Members

Thomas Alazard
Sylvain Arlot
Patrick Ciarlet
Sophie Donnet
Christophe Giraud
Stéphane Nonnenmacher
Frédéric Paulin
Bertrand Rémy
Gilles Stoltz

Directors and the administrative team

Pierre Pansu: Director

Vincent Giovangigli: Deputy director, in charge of LabEx Mathématique Hadamard

Pascal Massart: Deputy director, in charge of calls and educational issues

Isabelle Jasinowski: Operations director: budget, accounting, legal and social issues, assessments.

Clotilde D'Epenoux: Coordinator for LabEx Mathématique Hadamard (LMH) and Ecole Doctorale Mathématique Hadamard (EDMH). Clotilde is the coordinating secretary of EDMH, and the project manager of LMH and the mathematics department of Paris-Saclay. Clotilde is employed by Université Paris-Saclay and works closely with the FMJH team.

Alexandra Genesco: Project manager for Master's and postdocs. Alexandra is the coordinating secretary of the Mathématiques et Applications Master's and in charge of calls (Master's scholarships and postdoctoral fellowships) and coordinating the arrival of recipients. She follows FMJH's agreements with other parties.

Magali Le Chaponnier: Chief project manager for relationships with companies: Gaspard Monge sponsoring program, Forum Emploi Math, communication.

Policy Officers

Sophie Donnet: In charge of scientific documentation, coordinator of collective activities of the mathematical libraries of Paris-Saclay, and outreach.

Gilles Stoltz: In charge of relationships with companies, coordinates services provided to companies.

Chairpersons of juries

ROLE: These individuals chair juries which select applicants for scholarships, fellowships and funding.
Bertrand Rémy: Master's scholarships
Olivier Schiffman: Postdoc fellowships.
Luc Robbiano: Lecteurs Hadamard (3-year postdocs).
Sylvie Méléard: Events
Thomas Alazard: Scientific visibility of early-career mathematicians

Gaspard Monge sponsoring program's bodies

Programme Gaspard Monge is governed by an executive board, and advised by a scientific committee. A steering committee makes the major budgetary decisions. The monitoring committee discusses the evolution of the program.

Executive Board

Frédéric Bonnans: INRIA, Ecole Polytechnique
Pierre Carpentier: ENSTA ParisTech
Sandrine Charousset: EDF R&D
Sourour Elloumi: UMA, ENSTA Paris-Tech
Stéphane Gaubert: Coordinator, INRIA and Ecole Polytechnique
Eric Gourdin: Orange
Georges Hebrail: EDF R&D
Anthony Larue: Thales Optronique
Gilles Stoltz: CNRS, Université Paris-Sud
Emmanuel Vazquez: Centrale-Supélec

Scientific council

Grégoire Allaire: Ecole Polytechnique
Walid Ben Ameur: Télécom SudParis
Nadia Brauner: Université Grenoble Alpes
Luce Brotcorne: INRIA Lille
Jean-Baptiste Caillau: Université Côte d'Azur, CNRS/Inria
Antonin Chambolle: Chairman, Ecole Polytechnique
Johanne Cohen: CNRS, Université Paris-Sud
Claudia D'Ambrosio: CNRS, Ecole Polytechnique
Michel De Lara: ENPC
Antoine Girard: CNRS, Centrale-Supelec
Balàzs Kegl: CNRS, Ecole Polytechnique
Jérome Malick: CNRS, Université de Grenoble
Mathilde Mougeot: Université Paris Diderot
Vianney Perchet: Vice-chairman, Ecole Normale Supérieure Paris-Saclay
Patrice Perny: Université Pierre & Marie Curie
Alain Quilliot: UCA, CNRS
Frédéric Roupin: Université Paris 13
Joseph Salmon: Télécom Paris
Filippo Santambrogio: Université Paris-Sud
Pierre Senellart: Ecole Normale Supérieure Paris

Steering committee

Jean-Baptiste Bart: EDF R&D
Walid Benzarti: Thales
Frédéric Bonnans: INRIA, Ecole Polytechnique
Laurent Dumas: Laboratoire de Mathématiques de Versailles
Marie-Christine Costa: ENSTA Paris-Tech
Stéphane Gaubert: INRIA and Ecole Polytechnique
Bertrand Maury: Laboratoire de Mathématiques d'Orsay
Pierre Pansu: FMJH
Nancy Perrot: Orange (Invited member)

Monitoring committee

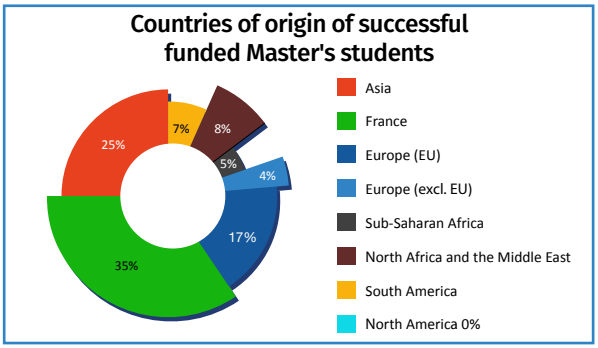
Jean-Baptiste Bart: EDF R&D
Walid Benzarti: Thales
Clément Calauzènes: Criteo
Pierre Pansu: FMJH
Henri Sanson: Orange

Future prospects

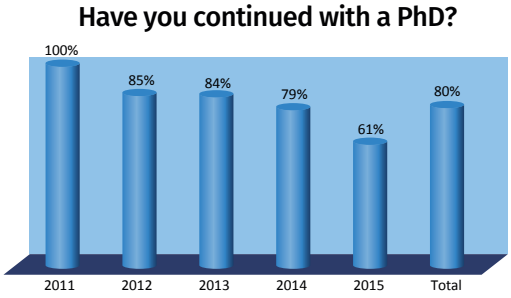
Career paths after FMJH and LMH

Careers of former Master's scholarship holders

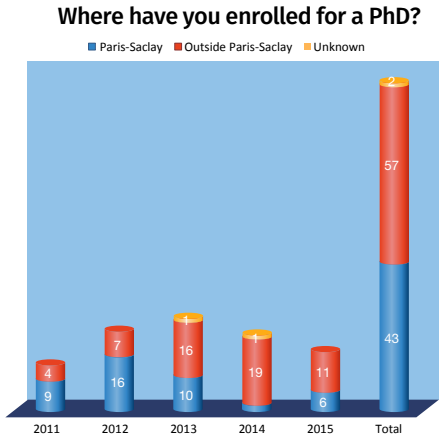
Between 2011 and 2015, FMJH and LMH offered 225 Master's scholarships in total. Of these, 198 obtained a Master's diploma before the summer of 2016, when a survey was performed. 128 students answered the survey. Here are the countries of origin of these students.



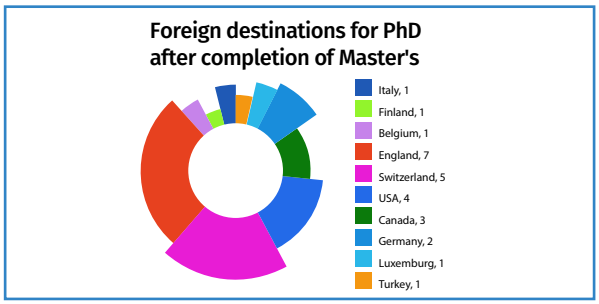
More than 80% of them continued on with a PhD afterwards.



Less than half of them continued at Paris-Saclay.

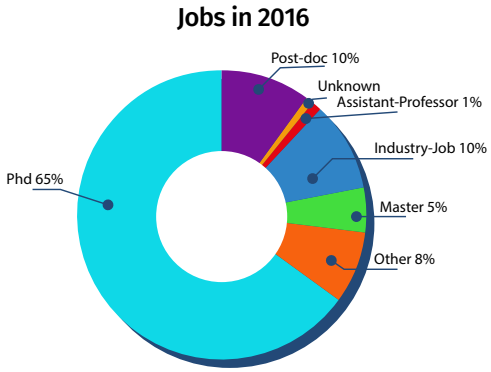


Indeed, in total 57 students enrolled in PhD programs outside Paris-Saclay, of which 31 were in France and 26 abroad. Of the latter, here are the destination countries.



We see that destinations differ strongly from origins. Clearly, FMJH's Master's scholarships contribute to a world-wide movement of students, with Paris-Saclay playing the role of a filter.

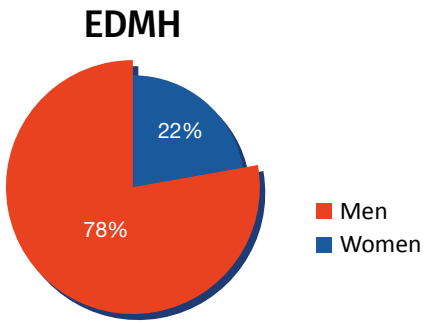
At the time of the survey (summer 2016), many recipients had already completed a PhD and some already had permanent jobs.



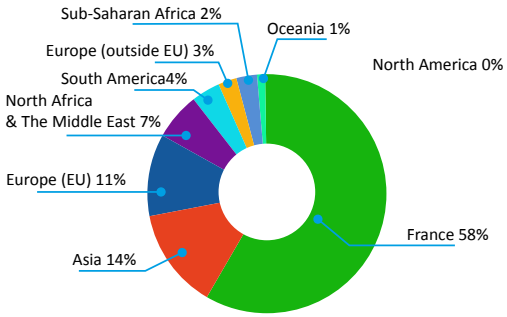
Careers of former PhD Students

The figures presented here concern the 234 mathematicians that have earned a PhD from the Ecole Doctorale Mathématique Hadamard (EDMH) since its creation in the fall of 2015. Hence the study is not limited to PhDs funded by FMJH and LMH, which was a fairly small number of 26.
In 2015, only 22 PhD defences took place within the newly created EDMH. In the following years, a constant flow of around 70 PhD defences per year was reached.

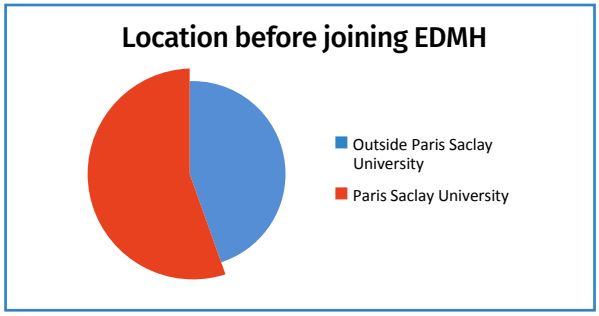
We begin with a description of this group of 234 young doctors. In it, women make up 22%, which is slightly less than the percentage seen in France as a whole (25%).



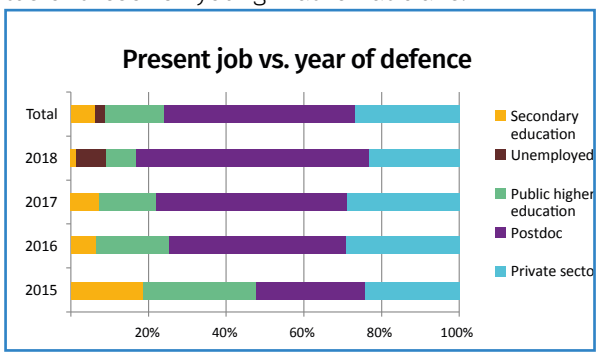
The range of nationalities is broad, with a substantial fraction of students coming from Asia.



55% obtained their final diploma before the PhD at one of Paris-Saclay's institutions.



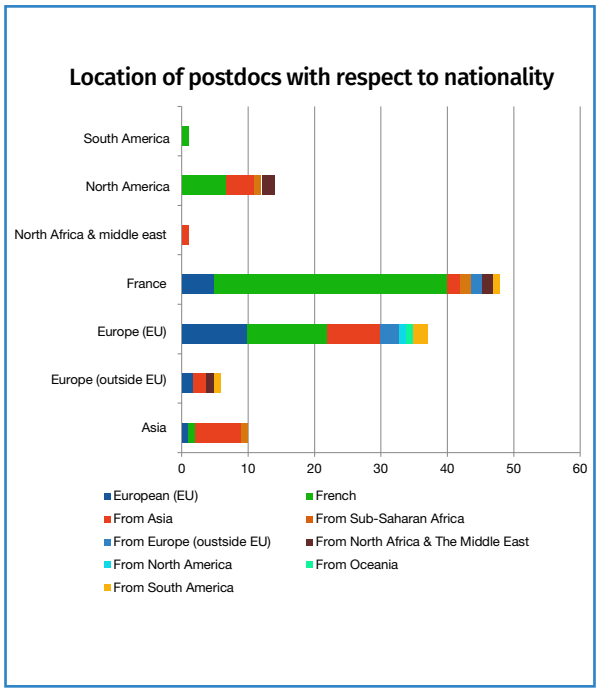
Next, here is information on the professional status of these 234 young mathematicians.



Note that each line corresponds to a different cohort. Nevertheless, we have checked that a graphic showing the job situation of the 2016 cohort only at 1, 2 and around 3 years after the defence is quite similar to this transversal graphic in terms of job evolution over time. We have also compared EDMH's data with national data collected by *Agence pour les Mathématiques en Interaction avec l'Entreprise et la Société*. These both lead to similar observations:

- 3 years after the defence, 25% of math PhDs still have a postdoc-type job.
- Non-academic jobs are permanent ones and usually obtained immediately after the defence. The percentage of non-academic jobs obtained after one or two years of postdoc is around 5%.

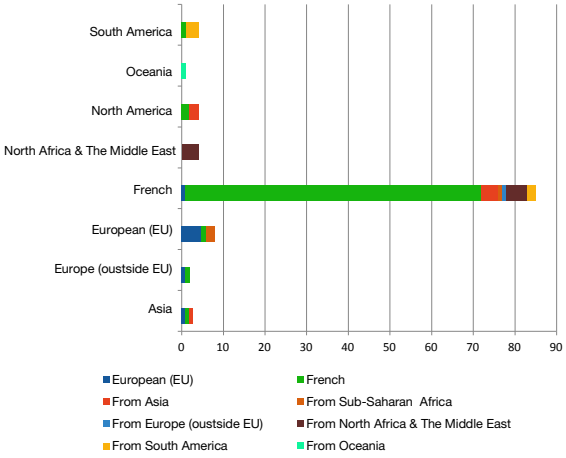
Here are data about the geographic location of PhD students following their defence. First we look at the postdocs only (half of the total population).



This indicates that Europe is by far the main destination. The huge North American market seems especially hard to access.

Next we focus on permanent positions.

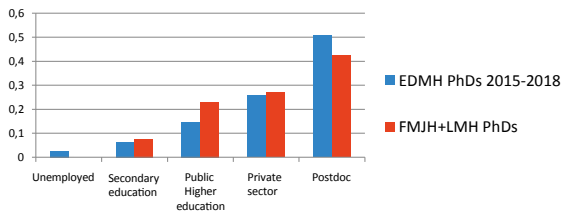
Location of permanent jobs with respect to nationality



We see that a vast majority of doctors from EDMH look for permanent positions in their home country. Among those who do not, the balance is in favour of foreign doctors settling in France (14) over French doctors settling abroad (6).

We conclude with a description of the professional situation of former FMJH and LMH PhD fellowship holders. Since 2011, FMJH and LMH have funded 53 PhD fellowships. Two fellows resigned after only a few months, one decided not to defend a PhD at the end of his contract, and 26 obtained a PhD. This small sample does not differ significantly from the wider EDMH population.

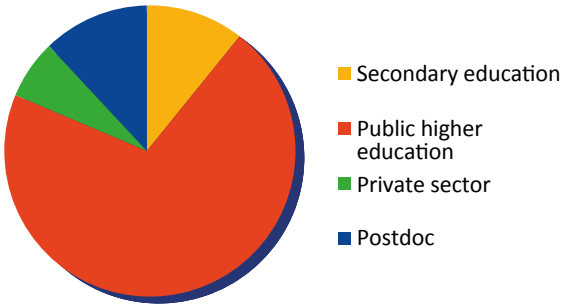
FMJH+LMH PhD fellows versus EDMH PhD students



Careers of former postdoc fellowship holders

Although offered 2-year contracts by FMJH or LMH, ordinary postdocs stayed 1.5 years on average. Although offered 3-year contracts by FMJH, lecteurs Hadamard stayed 1.8 years on average. This indicates that most of them find permanent positions even before the end of their contracts.
Since 2011, FMJH and LMH have funded 79 postdocs. Of these, 58 finished their contracts. Among these, 51 now have permanent positions, while 7 have continued with other postdoc fellowships. Here are the types of jobs they have obtained.

Jobs of former FMJH+LMH postdocs



Paths to future activities

Cohorts of young mathematicians trained at Paris-Saclay are now encountering a narrowing local academic job market. In contrast, job opportunities in a globalized world are plentiful, to some extent in the academic world, but of a much larger abundance in the private sector.

From our study of the job situations of EDMH doctors, and advice from FMJH's scientific council, we can draw two main conclusions.

First, at present, our Paris-Saclay doctors have rather limited access to the Northern American market, where the most prestigious postdocs can be found as well as permanent jobs. To improve this, we intend to focus on existing scientific connections between mathematicians on both sides of the Atlantic and allow doctoral and postdoctoral students to spend time on the opposite side in order to prepare a postdoc application there. Establishing links with Northern American institutions offering several month thematic programs (like at the Fields, MSRI, CRM, and PIMS research institutes) is also on the agenda.

Second, EDMH's record in terms of access to nonacademic jobs is already very good, but must be improved further. We believe that such jobs should be accessible to a vast majority of our doctors, independent of the subject of their theses. However, this requires some preparatory steps. These could start during Master's training, with opportunities for students to meet mathematicians working in the private sector. Forum Emploi Math is one way to do this, and we plan to create more such occasions. We also intend to take advantage of the new French regulation which allows PhDs to be interrupted for a semester or an academic year. FMJH is able to financially support PhD students who enroll in programs involving some training and short (paid) missions in companies. We are considering offering postdocs jointly with *Instituts de Recherche Technologiques*, places where young scientists are exposed to problems posed by companies.

A final word from our patron

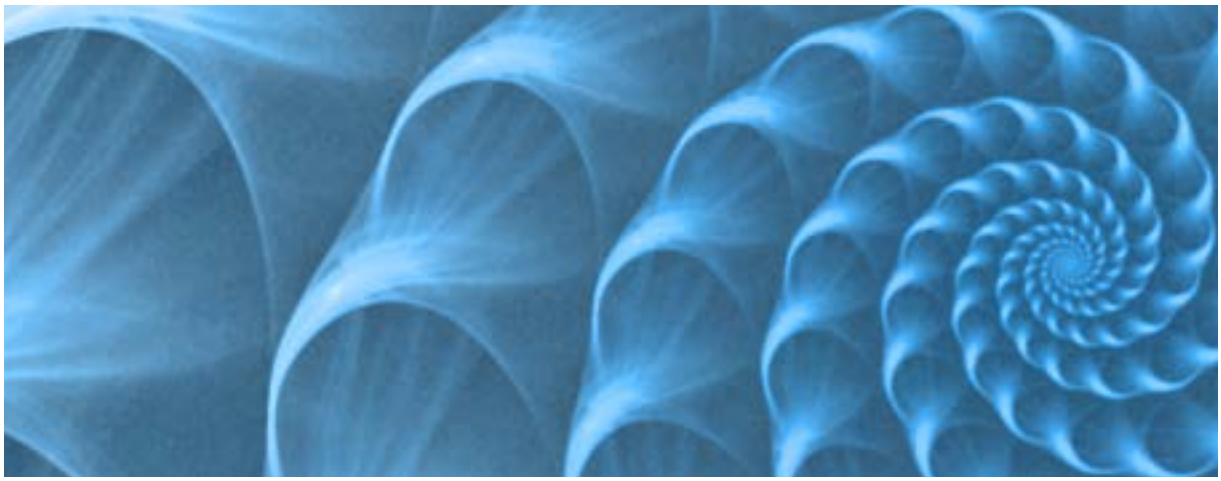
It gives me great pleasure to write a few concluding words for the Annual Report of the Fondation Mathématique Jacques Hadamard. Having been involved in its very early stages, it is very nice to now witness in my new role the development of the Fondation.

In the somewhat complex formal and administrative layers of French academic science, the FMJH provides an admirable showcase of how the French mathematical community – here, the mathematicians based in the south of Paris – can make intelligent use of financing opportunities when they arise.

One of the FMJH's main features is its flexibility, which enables it to provide pivotal support when that of the other French funding bodies is insufficient or absent. It is especially pleasing to see that – and this is a key strength and tradition of French mathematics -- priority is given to younger mathematicians. Funding top French and foreign students and postdocs from Master's level onwards is certainly money well « invested ». It provides a visible gateway to French mathematics for many brilliant people, and will have a long-lasting effect.

More generally, this Annual Report illustrates the sense of community that unites mathematicians from various institutions, and also how responsible and efficient our community can be when it is given the freedom and opportunity to foster mathematical education and research.

Wendelin Werner



Fondation Mathématique Jacques Hadamard thanks
Its founding and associated members.
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Its host, Institut de Mathématique d'Orsay.
The members of its bodies (105).
Its administrative staff (4).







Fondation mathématique
FMJH
Jacques Hadamard







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