

A HISTORY OF IHES

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Texts by Josselin Blicq &
Anne-Sandrine Paumier

Foreword by
Barry Mazur



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THE IHES COMMUNITY

IHES, THE INCREASINGLY FRENCH INSTITUTE

For the first half of its existence, the Institute chose to keep itself to itself in the face of decidedly cool reception from the University of Paris, which was wary of private enterprise. Léon Motchane's determination to preserve the independence of his scientific policy was another reason for this relative isolation. Motchane and later Nicolaas Kuiper obtained international funds, which meant that IHES chose not to advertise its links with French academia, as it wouldn't do for foreign governments to think of the Institute as being "too French". The Institute encountered some criticism as a result. It was deemed to be a "foreign import", benefiting the international scientific community greatly, and French scientists less so. In fact, between 1979 and 1988, long-term French visitors only accounted for 7.8% of the total: there were far fewer of them than American or even British and German visitors. Periodically, the Ministry of Research, which contributed 60% of the Institute's funds, would politely raise concerns about this.

Kuiper's three successors were keen to justify IHES as being "in the public interest". They strengthened ties with the French scientific ecosystem and organised events for the general public. The fact that all three directors were French and recruited from institutions in the Paris region facilitated the process. Stronger institutional links with France were first created, when the CNRS joined the IHES Board as an *ex officio* member in 1982. The number of seconded professors increased gradually, with Christophe Soulé, Dirk Kreimer, Jean-Benoît Bost joining IHES. Himself a CNRS Research Director, Bourguignon gave them new responsibilities and invited them to join the Scientific Council's meetings. They have taken part in the evaluation of invitations to researchers

ever since. They do not however take part in discussions concerning the recruitment of director or permanent professors posts, to avoid any potential conflicts of interest, should IHES offer a position to a CNRS researcher. In 2015, Emmanuel Ullmo officially created the Alexander Grothendieck Laboratory, a “certified research team” at IHES, thus further consolidating the relationship between the two institutions. This new agreement meant that CNRS researchers could be seconded for unlimited periods, officialising their status at IHES. In 2017, he also drew up an agreement with the French Alternative Energies and Atomic Energy Commission (CEA), a founding member of IHES. A part-time CEA researcher is invited to IHES each year under this agreement.

IHES is now also contributing to the creation of Paris-Saclay, the large university in the south western region of Paris. It was born of a political will to group three universities, Paris-Sud, Versailles and Évry, together with engineering and business schools and national research organisations. Although it is fully integrated in the surrounding academic network, the Institute remains completely independent as regards funding and scientific policy. Jean-Pierre Bourguignon, a former École Polytechnique professor, was an active contributor to the Université Paris-Saclay project, as is now Emmanuel Ullmo, a former Université Paris-Sud professor. One of its immediate effects was the creation in 2011 of the Jacques-Hadamard Mathematics Foundation, the founding members of which are Université Paris-Sud, Polytechnique, École Normale Supérieure de Cachan (now ENS Paris-Saclay), CNRS and IHES.

YOUNG RESEARCHERS AT IHES

Bourguignon very quickly started to implement a policy aimed explicitly at encouraging invitations to young researchers. He created the European Post-Doctoral Institute (EPDI) with the Isaac-Newton Institute in Cambridge and the Max-Planck-Institut in Bonn, with Sir Michael



Ceremony marking the new directorship in September 2013. From left to right: Jean-Pierre Bourguignon, Emmanuel Ullmo, Geneviève Fioraso and Philippe Lagayette.

Atiyah and Friedrich Hirzebruch as respective directors. Young doctors from all over the world undertook research in different partner institutions in this itinerant post-doctoral programme. Their numbers increased steadily as the project prospered. Nearly all the researchers on the EPDI programme subsequently obtained academic posts in prestigious institutions. The EPDI programme nonetheless ended in 2014, as the absence of a shared budget meant that costs weighed too heavily on some institutions’ finances.

“Postdocs” being admitted to IHES would, however, become an established feature. Invitation programmes were set up: CARMIN, launched in 2011 with the Institut Henri Poincaré, the Centre International de Rencontres Mathématiques de Marseille-Luminy (CIRM) and the Centre de Mathématiques Pures et Appliquées based in Nice. In fact, the number of postdocs increased significantly with the arrival of Emmanuel Ullmo. There are now specific calls for applications for these posts and compensation packages have been improved to attract the best candidates. The award of many research contracts, especially from the European Research Council and Simons Collaborations, has contributed to this shift. This is significant scientific departure from the Motchane years when only confirmed researchers were allocated an office, although young researchers were allowed to attend seminars and conferences.

In 2006, Jean-Pierre Bourguignon launched the first IHES summer school, injecting more activity into the Institute for the first two weeks of July, and raising its profile among young researchers. The first two summer schools took place in 2006 and in 2010 then resumed in 2014, becoming an annual event under Emmanuel Ullmo. Ullmo also set up the Cours de l’IHES, lectures given by permanent and invited professors, covering their latest research. More recently, IHES’ contribution to the Université Paris-Saclay doctoral school, as part of the Jacques-Hadamard Mathematics Foundation, means that PhD students can be based at IHES and permanent and CNRS professors

can supervise doctoral theses. Doctoral supervision by the Institute's scientists has increased significantly in the past decade.

REACHING OUT TO THE GENERAL PUBLIC

Before the end of the 1990s, IHES existed only for great scientists. The first event intended for a broader audience, which dates back to 1998, was an open day during which the people of Bures-sur-Yvette were able to visit the Institute. Its success encouraged the director to continue down this route and further popularisation projects took place at Bois-Marie. In 1998, Les Amis de l'IHES was created to that end. This association regularly organises public conferences, generally given by the Institute's professors. Its first chairman was Louis Michel, helped by Janine, David Ruelle's wife. He was followed by Marcel Berger, then by Jean-Marc Déshouillers and Valentin Poenaru (the current chairman), both of whom are heavily invested in the association's activities and have been since its creation.

Jean-François Dars and Anne Papillault, CNRS film-making engineers, were a regular presence at the Institute for several years from 2005. They took thousands of photographs during that period, chronicling both science activities and daily life at IHES. Alain Connes suggested they should be made into a book, and texts written by the researchers were added to the photos. *Les Déchiffreurs* was published in 2008, to coincide with the fiftieth anniversary of IHES. The book was a publishing hit and was translated into English and then into Japanese. It also led to an exhibition which travelled the world, partnered by the Alliance Française network and other partners, including in Vancouver and Hyderabad. "Les Déchiffreurs" was shown in Bangkok and at Expo 2010 Shanghai China, the book being translated into Chinese for the occasion. The last stages of the exhibition took place in France with "Le Tour de France des déchiffreurs" travelling to around 20 high schools and universities across the country, to promote both mathematics and IHES

to students. The director of the Fondation Cartier Pour l'Art Contemporain invited IHES to organise an exhibition, which was to become an important event in reaching out to the general public. "Mathematics, A Beautiful Elsewhere" was shown over a period of five months in 2011–2012. The theme of the exhibition reached a wider audience throughout the world with *Introduction aux mystères*, by Mikhaïl Gromov, published by Actes Sud in 2013.

Having conducted a successful first fundraising campaign, the Institute decided to step up its communication activities. In addition to the traditional annual report, IHES started publishing a new annual newsletter, *Bois-Marie*, in 2005. The development of the Internet also provided the Institute with new ways of raising its profile with the public. In the 2010s, it set up Facebook, LinkedIn and Twitter accounts and also started sending out electronic news bulletins. However, the IHES YouTube channel proved to be the most popular online medium. Since it was created in 2013, the channel has broadcast all IHES events, both scientific and public. At the end of 2018, it had generated more than 2.5 million views.

In addition to these communication activities, IHES professors contribute to many public events, often from their own initiative, as is the case with Alain Connes and Thibault Damour in particular. They include scientific news, such as the discovery of gravitational waves in 2016 and celebrations, for example the sixtieth anniversary of IHES. Damour, the physicist who was recruited by Marcel Berger in 1989, works on themes that are particularly suited to this sort of event, as he specialises in general relativity and Einstein's legacy. Damour has even written the script for a graphic novel, *Le Mystère du monde quantique*, illustrated by Mathieu Burniat. It was published by Dargaud in 2016 and has enjoyed a wide readership, it has also been translated into several languages.