N°5 • FEBRUARY 2009

Editorial



And so in 2008, the Institute turned fifty... and my wish is to see it continue its journey for the fifty years to come. Among the many expressions of friendship and gratitude offered during the events that marked this anniversary year, I wanted to share what Peter GODDARD, Director of the Institute for Advanced Study (IAS), said. He was quoting Robert J. OPPENHEIMER, a man who played an important part in the creation of IHÉS: "With the increasing magnitude, complexity, and busyness of scientific progress in all fields, and with the growth of educational systems which corresponds to a new development in the world's history, university chairs no longer necessarily offer that opportunity for seclusion, and for the most difficult and intensive intellectual effort... For this reason, places of retreat, which are in effect places for advance, have been brought into being... an opportunity for much more intensive concentration on study and research than is elsewhere possible... For these reasons, institutes for advanced study... will multiply throughout the western world..."

Both IHÉS and IAS are places where complete freedom is granted to researchers. They carry a vision which has proven to be so right decades later, a vision formulated by extraordinary men. Being the Director of one of these institutes is an honour and a challenge that I try to meet every day to live up to my predecessors.

With this historic year now ended, I particularly want to thank all those who make the Institute what it is: scientific and administrative staff, Board members, and people external to the Institute who help spread its influence, either in their official capacity or at an individual level.

Let me conclude with this thought from Léon MOTCHANE, a wonderful illustration of his vision of research: "Thought, under the pressure of time that flies, tends to the immediate... Difficulties can only be overcome by patient reflection. Day-to-day worries must not be allowed to conceal from us the continuity of life, which makes today's efforts responsible for tomorrow's outcomes".

Jean-Pierre BOURGUIGNON

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Institut des Hautes Études Scientifique

THURSDAY 27 MARCH 2008 : OFFICIAL LAUNCH CEREMONIES

The 50th Anniversary Campaign

HÉS officially launched the "50th Anniversary Campaign", its second fundraising campaign, in the splendid offices of JP Morgan France, place Vendôme in Paris, on the morning of Thursday 27 March. It was a very friendly event, taking place under the high patronage of campaign co-Chairmen Andrew GOULD, Schlumberger Ltd, and André LÉVY-LANG, Philippe LAGAYETTE, Chairman of the Institute's Board, and also host on this occasion, and in the presence of two major donors: Jean-Louis BEFFA, Saint-Gobain, and Augustin de ROMANET, Caisse des

Dépôts et Consignations.

were shared during the

debates, such as when

mathematics permanent

described the particularly

helpful working conditions

offered by the Institute to

its professors, especially

opportunity for everyone

to state again the reasons

which led them to being

such strong supporters of IHÉS in this international

fundraising campaign, a

venture, all the more so

because it benefits an institution with a focus on

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66 Saint-Gobain became involved because this is about mathematics and this is about IHÉS. With regard to mathematics, we're lucky enough to have centres of excellence in this discipline in France, including the foreign researchers based in our country. To my mind, IHÉS is a really remarkable organisation, both in terms of management and vision, and its high level recognised by its peers. Its growth, the choices it has made, for instance with the development of the mathematicsbiology activity seem to me to be highly interesting and relevant. It truly is a place of excellence.

Jean-Louis BEFFA, Chairman of the Board of Directors of Saint-Gobain

fundamental research, which is difficult to transcribe.

This six-year campaign, taking place between 2006 and 2011, emerged from its silent phase in 2006-2007, a particularly productive period during which partnerships of major importance to the Institute were agreed.

IHÉS is delighted with this launch, and the presence of loyal supporters, together with new players in French philanthropy, with whom the Institute hopes to develop long-term links.

Many thanks to all those who took part in this morning's event, providing momentum to the 50th Anniversary Campaign!



A. LÉVY-LANG, A. de ROMANET, P. LAGAYETTE, A. GOULD, J.-L. BEFFA

66 The difficulties experienced by organisations outside the mainstream of public financing is something that we're very familiar with at the Caisse des Dépôts et Consignations (CDC), and that's why I'm glad to carry on with the work that was started several years ago with the Institute.

The only question for our country is to locate not capital, but brains. CDC invests each year in improving the living conditions in research centres, and supporting IHÉS fits very naturally in that context.

Augustin de ROMANET, Managing Director of the Caisse des Dépôts et Consignations



Front row: L. LAFFORGUE, M. KONTSEVITCH, T. DAMOUR Back row: J. DE DEMANDOLX-DEDONS, H. BONELLI, E. MALINVAUD



6 I was at IHÉS for two months in the spring of 67, invited by Alexander GROTHENDIECK. This stay had a profound influence on my mathematical development. It is therefore with much gratitude that I take part in this prestigious institution's anniversary.

During the twenty or so years that followed, I was prevented from going abroad. Mathematicians from the West were becoming very rare in Moscow and mathematics from IHÉS only reached us via the usual impersonal routes: preprints, journals, especially the famous EGA and Publications Mathématiques de l'IHÉS. In this way. we were able to study the work of Pierre DELIGNE on Weil conjectures, mixed Hodge structures. I was very touched when I received a copy of a letter introducing Récoltes et Semailles from GROTHENDIECK in 1985. RUELLE's book on mathematical methods of statistical physics was translated in Moscow and became very influential. René THOM's catastrophes rekindled epistemological disputes in the world of the philosophy of science. I had translated and published his study on verb semantic. "



Y. MANIN

Yuri MANIN, Emeritus Professor at the Max-Planck-Institut für Mathematik, Bonn and Professor at Northwestern University, Evanston



|. TAYLOR

50th Anniversary Celebrations

he official launch of the international celebrations of the IHÉS 50th anniversary took place in the afternoon at the Institute in the Marilyn & James Simons Conference centre, in the presence of Valérie PÉCRESSE, French Minister for Higher Education and Research.

Cécile DEWITT-MORETTE (Emerita Professor at the University of Texas in Austin) started the ceremony by recalling historic moments in the Institute's creation and in particular the famous episode of the meeting between Léon MOTCHANE and Robert OPPENHEIMER. Presentations

66 I would like to pay homage to Léon MOTCHANE and the extraordinary intuition that led him to create IHÉS.

Valérie PÉCRESSE, Minister for Higher Education and Research

then followed from David RUELLE (honorary professor at IHÉS), Yuri MANIN (Max-Planck-Institut für Mathematik and Northwestern University), David MUMFORD (Brown University), Joseph TAYLOR (Princeton University) and Philippe LAGAYETTE (Chairman of the IHÉS Board of Directors). Valérie PÉCRESSE, honouring the Institute with her presence, made the closing speech. She was also able to congratulate Jacques TITS, who shared the 2008 Abel prize with John GRIGGS THOMPSON, as had been announced that very day.

The Unravelers Exhibition Inauguration

ollowing her speech, the Minister for Higher Education and Research inaugurated *The Unravelers*, the travelling exhibition taken from the beautiful book of photographic portraits by Jean-François DARS, Annick LESNE and Anne PAPILLAULT. The French version of the book is published by Éditions Belin, the English version by AK Peters and the Japanese version by Springer Japan. The exhibition, shown in French, English, Japanese and soon in Chinese, has travelled the world. In producing it, the Institute wanted to be able to talk easily with the general public about fundamental research, about the work of researchers, and maybe even to encourage some vocations among young people.



J.-F. DARS presenting the exhibition to V. PÉCRESSE





50th ANNIVERSARY SCIENTIFIC CYCLE

Mathematics Conference



W.WERNER

he mathematics conference took place in the Marilyn & James Simons Conference centre at IHÉS from 19 to 22 May.Twentythree presentations were made over four days that were devoted to a wide variety of mathematical topics.

The challenge in this event was for different generations of mathematicians to be heard; first to report back on the various subjects of research developed these past fifty years, at the Institute especially, then, handing over to much younger mathematicians, to present the themes currently emerging.

In this way, participants were able to attend presentations on "Théorèmes de Lefschetz sur les schémas arithmétiques", "Représentations supérieures des algèbres de Lie", "Calabi-Yau Motives", which belong to topics traditionally represented at IHÉS. Presentations were also made on "Entropie et localisation des fonctions propres", "Matrices aléatoires, probablités libres et émunération des cartes" and "Monge, Boltzmann, Ricci et le lieu de coupure", which are topics less frequently dealt with in Bures-sur-Yvette.

We thank all the speakers who came to celebrate fifty years of mathematics at IHÉS.



M. GROMOV



A. GUIONNET

Theoretical Physics Conference

rganised jointly by Thibault DAMOUR and Nikita NEKRASOV, theoretical physicists and permanent professors at IHÉS, this conference took place at the Institute from 16 to 20 June. Many people attended, and there were contributions from many speakers, whom we thank for having travelled from around the world to celebrate this 50th anniversary. They dealt with topics such as "Modular Properties of the Four-Gravitation Amplitude", "Supersymmetric QFT and Integrable Lattice Models", "Quantum Fields and Dyson-Schwinger Equations: Aspects of Locality".



concert, given by the Quatuor Arpeggione, provided an interlude to the conference. This quatuor, with three violinists and a cellist, was created in 1988 and was supported by Yehudi MENUHIN. Works by MOZART, CHOSTAKOVITCH and BEETHOVEN were played.

IHÉS hosted a conference on theoretical physics in June. It featured prominent theoretical physicists, from various countries.

Of course, the IHÉS homeland, France, was represented best, followed by the United States, the United Kingdom, the Netherlands, Germany, Belgium, Brazil, Ireland, Israel, Japan, Russia and Switzerland. The lectures and the scope of their subjects reflected the character of the theoretical physics research performed at the IHÉS over the last fifty years. Many lecturers were IHÉS



A. OKOUNKOV, N. NEKRASOV

professors or visitors. A few historical reviews were presented. Several talks were dedicated to the mysterious exceptional symmetries of the maximal supergravity and M-theory. A few presentations discussed time-dependence, both in statistical physics and string theory, notably the physics of the de Sitter space. There were several lectures on quantum field theory, its perturbative and non-perturbative dynamics in various spacetime dimensions.

Nikita NEKRASOV, Theoretical physicist, IHÉS

"











WEDNESDAY 24 SEPTEMBER: CONFERENCE AT THE MUSÉE DU QUAI BRANLY

The idea is not really to understand what the speakers are presenting, but to grasp what gives them food for thought. How can it be proven that there are exactly 3264 conics with a specific property? What is it that brings someone to study flexible polyhedra? How can trying all the possible combinations to work out what molecules can be assembled be imagined? And in the end, how does one go about having an idea?

Pierre MICHALAK, Inspector of mathematics education, Académie de Versailles

ommunicating with the general public, and with young people in particular, was one of the objectives of these celebrations, given that, although now fifty years old, the Institute remains little known by the general public. The Institute's mission is to encourage fundamental research. It was decided to introduce to the public, for their better understanding, the importance and scope of the work undertaken by scientists, the findings of whom it is particularly difficult to popularise. Another aim of this event was to address the next generation of researchers. For the past few years, science courses have been attracting fewer students, a source of concern for the scientific community at large. That is why more than 15 classes in science-oriented curricula in the Paris region were invited to attend this event, which took place in the wonderful surroundings of the musée du quai Branly, in the afternoon of Wednesday 24 September:

The "Meeting the Unravelers" conference, a reference to the book of the

On behalf of the 20 students and 5 teachers who attended the conference, I would like to thank you for having given them to opportunity to take part in the event. The students realised that mathematics was at the heart of many research areas, and even if the content of the lectures was quickly beyond them, they found it interesting.

Ghyslaine LE ROY, Mathematics coordinator, Lycée Bascan, Rambouillet

DAMOUR, Arndt BENECKE, Jean-Pierre BOURGUIGNON, Marie FARGE and Étienne GHYS) who agreed to play the part, by sharing their interest in particular topics with the public, science-minded or not, through their presentations; the public had come to listen to specialists in their field who do not often take part in this type of exercise.

This event was made possible thanks to different kinds of support from many partners, who, together, made it a real success. We offer thanks here to Fondation d'entreprise EDF DiversiTerre, the Animath network, Fondation d'entreprise EADS, the Pour la Science magazine, SCOR and the musée du quai Branly.

same name, with similar objectives to those of the event, had an audience of close to 500 people. For the public who had come to attend conferences on various subjects relating to mathematics, theoretical physics, biology and ethnomathematics, it was an afternoon of discovery and exploration. We would like to thank here all the speakers (Alain CONNES, Marc CHEMILLIER, Alessandra CARBONE, Thibault

FRANCO-JAPANESE SCIENTIFIC FORUM

Meeting with High School Students



his session's objective was to encourage exchanges between high school students and French and Japanese mathematicians, in order to promote science among young people and introduce them to scientific careers. Étienne GHYS and HIRONAKA made a Heisuke presentation to 70 high school students who listened to them for a few hours on the afternoon of 4 October at the University of Tokyo. This session was held at the same time as the conferences made as part

he conference was opened by

Motoyuki ONO, Chairman of the Japan Society for the

of the Takagi Lectures, which contributed to the excitement felt that day in the mathematics department of the University of Tokyo.

Perspectives in mathematical sciences



H. HIRONAKA

Takagi Lectures

he fifth Takagi Lectures, which were organised on 4 and 5 October by the Mathematical Society of Japan, featured speakers who all had links with the Institute: Nikita NEKRASOV, Maxim KONTSEVICH, Étienne GHYS and Jean-Pierre BOURGUIGNON.

"Maths & Industry" Symposium

lunchtime debate at the Keidanren headquarters on 10 October preceded the "Mathematics, as Key for Innovation in Industry" symposium. Hisanori ISOMURA, former Chairman of the Maison de la Culture du Japon à Paris was the moderator. It was important for IHÉS to organise an event relating to industry, as research issues are

" A few years back, as the Chief Scientist of my company, I looked at how well our scientific community was connected to the intellectual leaders of the various disciplines. In most cases, physics, chemistry, materials, geology and geophysics, computer science etc... we had meaningful relationships with some of the leaders of these disciplines, like Nobel Prize or other prestigious award winners. In mathematics, we had ... none with the so called pure mathematicians". This is how I got to know and appreciate IHÉS: this was a great opportunity for us to meet some of the most famous of them. It is clear that many questions mathematicians work on come from the physical world: quantum mechanics and general relativity and their ever-elusive combination are great sources of the best and most beautiful mathematics done. There is no reason why some of the most creative new patterns of ideas would not help solve some of industry's problems. But mathematicians must remain free to dream of these beautiful symphonies of ideas... 77

Philippe LACOUR-GAYET, Senior Scientific Advisor to the Chairman, Schlumberger Ltd.

closely linked to innovation. Academic researchers, research lab managers and company executives, as well as representatives from relevant |apanese ministries, came together to discuss the role of mathematics in industry and the links to be developed between academic researchers and private research labs. During the first part of the symposium, Tatsuaki OKAMATO, NTT, Philippe LACOUR-GAYET, Schlumberger Ltd. and Yasuyuki KATO, Nomura Securities answered this question: "Why does industry need input from mathematicians?" The conditions that need to be met for a fruitful collaboration to develop between mathematicians and people from industry were then reviewed by Masahiro ΥΑΜΑΜΟΤΟ. Tokyo University, Satoshi YAMAZAKI, Toyota and Jean-Pierre BOURGUIGNON, IHÉS. Both sessions were followed by round-table discussions which enabled exchanges of views between the audience and speakers.



R. Verdier, T. Yosano

Il these events were made possible thanks to the involvement of several Japanese scientists, the support from major academic institutions (Keio University, the University of Tokyo, the Mathematical Society of |apan), funding from several companies (Total, Dexia, BNP Paribas) and a number of organisations (Japan Society for the Promotion of Science, Fondation Franco-Japonaise Sasakawa, The Tokyo Club). We also thank the French Embassy in Japan, as well as Yusuke YASUDA and Toru YOSANO for their personal involvement.

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EVENTS IN THE UNITED STATES

Chicago



R. ZIMMER

50th HÉS celebrated its Anniversary in the prestigious University of Chicago on 11 April, at the invitation of Robert ZIMMER, its Chairman, a mathematician and former IHÉS visitor. With a warm welcome from Robert FEFFERMAN. the University's Dean of Physical Sciences, the ceremony opened with a conference during which participants heard a number of presentations. Bernard SAINT-DONAT. Chairman of Friends of IHES, also a former visitor at IHÉS right after the "Grothendieck years", provided an amusing and

interesting portrait of the people who at the time made the Institute what it was. Professors Spencer BLOCH and Stephen SMALE also made very well received presentations. The conference was followed by a dinner, which Jean-Baptiste MAIN de BOISSIÈRE, French Consul General in Chicago, honoured with his presence.

Princeton

he IHÉS 50th anniversary was marked by the Institute for Advanced Study on Saturday 8 November, with a series of events making the celebration a most pleasant one. After Peter GODDARD's much appreciated speech on the creation of IHÉS, Thibault DAMOUR, permanent professor at IHÉS, lectured on *"The Constants of Nature"*. Robert D MACPHERSON, professor at IAS, then presented *"Geometry in Bures and Princeton"*. These conferences were followed by a reception in Fuld Hall and a dinner.



n Thursday 13 November, professors Nikita NEKRASOV, Marc CHAPERON and Jean-Pierre BOURGUIGNON came to meet students at the Lycée Français in New York. They talked for an hour of research themes of particular interest to them, and of the reasons someone might decide to make a career out of research. We hope that these exchanges will have inspired future students. In the evening of the same day, Marc CHAPERON, mathematician, professor at Université Paris VII, former student of René THOM and one of his rare disciples, gave an original lecture called *"Art and Catastrophes, René THOM's Legacy"*, which was organised at the Maison Française of New York University.

A conference organised jointly with the Courant Institute of New York University was held on Friday 14 November. The conference took place in the Stern Building, and was attended by a large number of participants. The day ended with a reception in the Warren Beaver Hall of the

Courant Institute. We thank the speakers for their contribution, as well as Leslie GREENGARD and Jalal SHATAH of the Courant Institute for their welcome, and also the New York branch of CIC for its support.





P. GODDARD



R. MacPherson



Conference in the Stern Building at New York University

6 We can still claim that our two institutes are special, because of their distinguished history and achievements, because of the residential community they create, because of the excellence of their faculty, and because of the tranquility and true intellectual freedom that they offer to all who come to work at them.

It is vitally important for all of us that institutions like these, refuges from the maelstrom, continue to exist and prosper. The Institute for Advanced Study wishes the IHÉS happy birthday, with pride and admiration, and hopes that we shall both continue to exist in cooperation for many more half centuries.

Peter GODDARD, Director of the Institute for Advanced Study, Princeton, 14 November 2008



THE 50th ANNIVERSARY CAMPAIGN

66 The objective of the 50th anniversary campaign is to raise a minimum of 20 million euros between 2006 and 2011, with almost the entire amount to be capitalised, in order to consolidate the Institute's existing endowment funds and to provide it with long-term financial stability. As at 12 February 2009, 19,5 million euros have been raised from 87 organisations and 145 individuals in France and throughout the world. Two major donors recently joined the campaign's partners: one is creating the first ever permanent professor Chair entirely supported by private funds, and the other is endowing a permanent fund for the maintenance of the Institute's real estate... two of the campaign's strategic objectives.

"

Joanna JAMMES, Head of Development and Communication, IHÉS

IHES Rises to the Simons Foundation's Challenge

n October 2007, the Simons Foundation challenged the Institute: it would match, up to a maximum of 6 million euros, all donations to the 50th Anniversary Campaign from private sources. This challenge was met by the Institute early in 2009. Since I October 2007, IHÉS has collected over 6 million euros from major donors such as Société Générale, AXA and EDF but also from 39 Japanese companies that have contributed over 800 000 euros to the Japan Fund.

SIMONS FOUNDATION a very loyal supporter of

The Simons Foundation is

the Institute: Marilyn and James Simons were the major donors of the previous fundraising campaign: their support then had funded, amongst other projects, the building of a 130-seat amphitheatre at the Institute. Their commitment has not flagged in this new campaign, with the considerable boost they have provided, and we thank them most warmly. Half of the funds from this challenge-gift will be used to finance the deployment of the Institute's work in biology. Since late 2007, research is progressing on the electrophysiological geometry of the heart thanks to this funding. This activity was launched by Mikhail GROMOV (permanent professor at IHÉS) and is being carried out in collaboration with Alexander PANFILOV (University of Dundee). The rest of the funds will be allocated to the support of various projects, the AXA Chair, the Pierre Bonelli Chair and the Japan Fund among them. IHÉS also thanks Marilyn and James SIMONS for their support during the Institute's 50th anniversary celebrations in 2008; they had offered to finance a gala dinner for the Institute's benefit, which was to have taken place on 12 November: Unfortunately, the sudden decline of the financial markets, leading to a rapid worsening of the economic crisis, meant that the event had to be cancelled.

The AXA Chair for Mathematics at IHES



n October 2008, AXA, via the AXA Research Fund, created the "AXA Chair for Mathematics at IHÉS", the first ever permanent professor Chair

at IHÉS, entirely financed by private funds. The 3 million euro endowment of this Chair by AXA will be entirely capitalised, so that the financial proceeds can fund a permanent mathematician professor post at the Institute in perpetuity. The first holder of the "AXA Chair" is Maxim KONTSEVICH, whose exceptional career to date so impressed the AXA Research Fund. The amount allocated to this Chair will be complemented by a 2 million euro contribution, resulting from the Simons Foundation's matching gift, so that the chair is also able to support the other activities needed to ensure that the holder enjoys the best possible conditions to undertake their research (postdoctoral support, invitations to professors, seminars, visiting external institutes...)

Since the creation of IHÉS, the salaries of all of its permanent professors have been met from its operational budget. The Institute's wish is now to safeguard lastingly the work carried out by each of its permanent professors, which is why it is now seeking permanent endowments from private funds. AXA marks a new chapter in the Institute's history; we hope that other companies will choose this level of support for the research undertaken at IHÉS.

Funding for the IHÉS Real Estate

ugustin de ROMANET, Caisse des Dépôts et Consignations (CDC), made the announcement on 27 March 2008: his organisation would provide 2 million euros to support the Institute, as part of its new fundraising campaign. CDC wanted to address one of the Institute's recurring concerns, which is the maintenance of its real estate. This comprises both a housing residence with 50 units for



visiting scientists, but also administrative and scientific buildings on the Bois-Marie site. The Institute's objective is to find permanent financing, from the proceeds of a fund specifically set up for this expensive cost item. The CDC's strategic plan includes, among its priorities, supporting universities and the knowledge economy and also housing and urbanism projects, CDC wanted to support IHÉS activities by providing

permanent funding to the maintenance of its real estate.

CDC is one of the Institute's historic partners. The first links date back to 1962, with CDC granting the Institute the loan that enabled it to purchase the Bois-Marie site. It then became an institutional partner for several years and contributed to the Institute's first fundraising campaign "invest in the power of the intellect".

Launch of the Pierre Bonelli Chair

he ceremony was chaired by Philippe LAGAYETTE (Vice-President of JP Morgan for Europe, the Middle East and Africa), who was also host for the evening, and took place on Thursday 15 January 2009 in the offices of JP Morgan France, place Vendôme in Paris.

Around fifty guests came to listen to a number of presentations by Philippe LAGAYETTE (as Chairman of the IHÉS Board of Directors), Gilberte BEAUX (Pierre BONELLI's friend and colleague), Jean-Pierre BOURGUIGNON (IHÉS Director) and Harriet BONELLI (Pierre BONELLI's wife). Most of the Chair's donors were present, as well as many of Pierre BONELLI's friends: classmates (from nursery school through to Harvard Business School – not forgetting some of his friends from École Polytechnique), former colleagues and other friends, who all met in what was a very friendly event, where people were pleased to find old acquaintances or make new ones.

The pleasant atmosphere and affectionate words spoken during the event attest to the great sympathy felt for Pierre BONELLI and his larger-than-life personality.

IHÉS is pleased to have implemented this programme in memory of a man who worked very hard at its development, and warmly thanks the 60 donors who have contributed almost 400 000 euros, the amount required to finance three months of visits by researchers each year.



J.-P. BOURGUIGNON, H. BONELLI, P. LAGAYETTE, G. BEAUX



H. CONZE, J.-P. GOUIRAND, P. SEMTOB, A. FÉLIX



Support to Scientific Education and Research in Sub-Saharan Africa

Since 2005, IHÉS has been offering, with the support of the Schlumberger Foundation, the "Africa programme", for the benefit of scientific education and research in sub-Saharan Africa. Over the five years, eleven professors from various African countries have come to undertake their research activities at

the Institute, thanks to the "Africa Programme". This project also aims to encourage scientific training on the African continent. That is the reason why, each year, the programme also funds travel and subsistence costs for African researchers who attend scientific meetings organised in African countries. Dozens of researchers, and also young scientists taking PhDs have benefitted from this support. The programme will end in May 2009. IHÉS is pleased to have contributed to the development of scientific research in sub-Saharan Africa and warmly thanks the Schlumberger Foundation for having supported it in that aim, which it will pursue.

COPROMAPH 4. Benin

Launch of the Shimokawa Fellowship



Mr Shinogi, Mrs Shimokawa

n 2007, the Japan Fund received a major contribution from Nippon Information Industry (NII), the amount of which enabled the creation of a fellowship for the permanent funding, each year, of three months of visits by Japanese researchers at IHÉS. The programme was set up in memory of the late Mr SHIMOKAWA, founder of NII, and received the support of Mrs SHIMOKAWA.

NII, represented by Yoshiki SHINOGI, its Chairman and CEO, thus becomes one of the key contributors to the Japan Fund. The Shimokawa Fellowship is an integral part of the Japan Fund, the purpose of which is to collect the funds necessary to finance 24 months of visits by Japanese researchers to the Institute each year.

AWARDS

2008 Crafoord Prize

axim KONTSEVICH received the 2008 Crafoord Prize on 23 April in Stockholm, jointly with Edward WITTEN (Institute for Advanced Study, Princeton) "for their important contributions to mathematics inspired by modern theoretical physics": they have solved several major mathematical problems related to Quantum Field Theory and String Theory, thus influencing their future development.



M. Kontsevich

Keio University Honorary Doctorate



J.-P. BOURGUIGNON, Y. ANZAI

ean-Pierre BOURGUIGNON, IHÉS Director, became Honorary Doctor of Keio University on 8 October. His acceptance speech "Mathematics, a thriving science" was attended by many of the Institute's friends. It was the first time that the university chose to honour someone representing mathematics.

2008 Abel Prize

acques Tits, Emeritus Professor at the Collège de France was the 2008 Abel prize winner, together with the American professor John GRIGGS THOMPSON. They received the prize for their discoveries in algebra and in particular in modern group theory. Jacques TITS was Editor-in-Chief of *Les Publications Mathématiques de l'IHÉS* for a long time, occupying this position after Jean DIEUDONNÉ, and before Étienne GHYS.



J. and M.J.TITS

Jacques TITS's work has transformed the relation between group theory and geometry, with the introduction of concepts unmatched in their richness and simplicity. The four axioms of projective geometry enabled a skew field K to be built in dimensions larger or equal to 3 and to identify the space related to this geometry to be the projective $\mathbf{P}^n(K)$ space. The Tits theory of buildings represents a generalisation of that result, monumental in its impact and effectiveness. Closely related to the buildings, J.TITS introduced the BN-pair concept in group theory, intimately linked to Chevalley's proof of the Bruhat decomposition. These concepts and the many results demonstrated by *I.TITS* have become key tools in the classification of algebraic groups, the classification of finite simple groups and rigidity theorems such as the Mostow theorem for negatively curved spaces in Riemannian geometry. Whereas the theory's starting point was the search for a geometric realisation of exceptional groups, the elegance and simplicity of the axioms for the theory of buildings have become firmly established and successful, because of their validity without any modification - and effectiveness in more exotic situations, such as the case of hyperbolic geometries associated with p-adic groups, or that of Kac-Moody groups. The Abel Prize recognised a marvellous geometer, an absolute master in group theory and a man, whose culture, extreme courtesy, constant attention to others and discreet humour, make him a model of humanism. 77

Alain CONNES, Léon Motchane Professor, IHÉS

 JTITS's famous theorem comes to mind, on the dichotomy, for linear groups, between almost solvable groups and groups containing a free group.





NEWS IN BRIEF

The Unravelers

One thing led to another... "Come and visit IHÉS, a place where even the park's squirrels wear a Fields medal!" Lured by this vision (needless to say, a slightly fanciful one), we tiptoed quietly in one day, because we already knew quite a



few institutions, small and large ones, in various parts of France, that are devoted to research and are sometimes a little shy (it should never be forgotten that scientific controversy might nowadays at worst lead to a budget line being cut, rather than straight to the stake, as was the case only two or three centuries ago). We found it so comfortable in the land of chalk and blackboards that we took up quarters there, contemplating, listening, watching.

A book came out two years later. But that's another story, as KIPLING said."

Anne PAPILLAUT & Jean-François DARS

2008 Open Day

HÉS chose Science Week to open its doors to the public in the afternoon of Saturday 22 November: From 2pm to 6pm, some 300 people came to visit the Institute. The public could take part in various activities: watching videos of conferences given by Christophe SOULÉ and Alain CONNES as well as part of *Dimensions*, a film by Étienne GHYS, visiting *Skolem, Lumps, Bumps & Windy Figures*, a mathematical sculpture. The afternoon's highlight was the public meeting some of the Institute's researchers, among whom were Alain CONNES, Maxim KONTSEVICH, Arndt BENECKE, Annick LESNE, Nikita NEKRASOV, Christophe SOULÉ, Jean-Pierre BOURGUIGNON and professors like Cécile DEWITT-MORETTE, who were visiting the Institute at the time.

The afternoon ended on a musical note, with a performance by the Tutte Voci voice ensemble.

50th Anniversary Symbolic Object

Philippe STARCK created a distinctive object for the Institute's 50th anniversary: a dodecahedron symbolizing the fusion between mathematics and physics, as already understood by the ancient Greeks; the addition of a laser etching of the human brain is a reminder that, with interdisciplinarity very much in mind, the Institute has opened the door to such new disciplines as biology. The object also comprises at its heart an etching of the IHÉS logo, combining the mathematical symbols of the empty set and infinity, which symbolizes the Institute's place in the world of fundamental research.

The dodecahedron is a polyhedron with 12 faces, the most famous one being a regular dodecahedron with regular pentagons as faces. The fifth Platonic solid, it has long fascinated scientists. PLATO somewhat

enigmatically remarked of it: "... the god used it for arranging the constellations on the whole heaven". It has been seen as representing an additional fifth element: "ether" or "the universe", on top of the four elements of earth, wind, fire and water. It represents the perfect mediation of the infinite and the finite, the sphere and the cube. Philippe STARCK spoke of his part in the creation of this object during the filming of a video made for the Institute: he explained that, in talking to his friend Thibault DAMOUR, he



T. Damour

has come to understand "the music of intelligence", which this symbolic object could illustrate.



2008 Open Day, meeting scientists

L'étrange beauté des mathématiques

DAVID BUELLE DES MATHEMATIQUES

n his previous book, *Chance and Chaos*, David RUELLE had attempted to make readers familiar with the then emerging Chaos Theory, to which he had been a key contributor.

A member of the French Academy of Sciences and honorary professor at IHÉS, he now examines the progression of mathematical thought and the major new problems that it poses. Somewhat impertinently, he also provides a few glimpses of great mathematicians he has known, especially Alexander GROTHENDIECK.



EVENTS IN 2009 -FOCUS ON BALA IYER

From 12 to 16 January

"Aspects of Algebraic Geometry; the Mathematical Posterity of GROTHENDIECK" conference, IHÉS

15 January

Official launch of the Pierre Bonelli Chair, Place Vendôme, Paris

From 26 to 27 January

"Math and Industry Scoping Workshop", Paris

4 March

"String Theory at IHÉS" one day seminar.

April

"Mathématiques-Industrie" workshop, in partnership with learned societies, as part of the Schlumberger Chair

From 2 to 5 June

"Quantum fields, periods and polylogarithms II" working group organised by Dirk KREIMER, IHÉS

July

Marcel Grossmann conference in partnership with UNESCO, as part of the International Year of Astronomy, Paris

September

The Institute opens its doors to the public as part of the Heritage Days

December

"Maths A Venir 2009" conference, Paris

Date to be confirmed

Biology conference, as part of the 50th anniversary scientific cycle

Publication of Récoltes et Semailles by Alexander GROTHENDIECK (publication date not yet confirmed)



Alexander GROTHENDIECK's seminar on Algebraic Geometry (1960's)

6 My association with IHÉS goes as far back as the academic year 1989-1990. I recall the exciting meeting organised by Thibault DAMOUR on mathematical aspects of general relativity, the lectures by Sergiu KLAINERMAN on his results with Demetrios CHRISTODOULOU



on the global stability of Minkowski space and the intense discussions between the participants who attended this workshop.

During this first visit, I began working on problems related to Gravitational Radiation and became familiar with the powerful Multipolar Post Minkowskian (MPM) formalism that Luc BLANCHET and Thibault DAMOUR had initiated.

I returned to my position at the Raman Research Institute, Bangalore but continued to improve my working background on Gravitational Waves (GW) and on attempting to spread awareness of its importance among my younger colleagues. Starting in 1996, in collaboration with Luc BLANCHET and his students at DARC (and subsequently IAP), I began working on this problem.

One of the serious handicaps for researchers from countries like India was in finding a grant for international travel. In this matter many things helped me. In India, I have a position at a Research Institute with hardly any teaching responsibilities and the possibility of travel support if one is invited to a International meeting. So in the beginning I used every such opportunity to continue my academic contacts with collaborators abroad especially in Paris.

Visits to IHÉS facilitated this immensely. Even in this age of Internet and mobile phones there is no substitute for a few weeks where there is an intense discussion in front of the blackboard where the basic problem is formulated and the possible first cut solutions explored. There are so many warm and wonderful memories I have of IHÉS. I love for instance the humbling experience of seeing how lightly many distinguished visitors to IHÉS carry their fame. Something in the ambience of IHÉS instills a reverence for values that matter and evokes a sentiment of true humility. Though modern in its exterior there is indeed something austere about IHÉS and a rigour in its quest. I am grateful to Thibault and IHÉS for facilitating such a possibility for me and to my family for tolerating my long absences during the long walk towards the best templates for binary neutron stars and black holes in august company.

Bala IYER, physicist, Raman Research Institute, Bangalore, India

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