



CIMPA

Centre International  
de Mathématiques Pures et Appliquées

**2019 ANNUAL REPORT**

[www.cimpa.info](http://www.cimpa.info)

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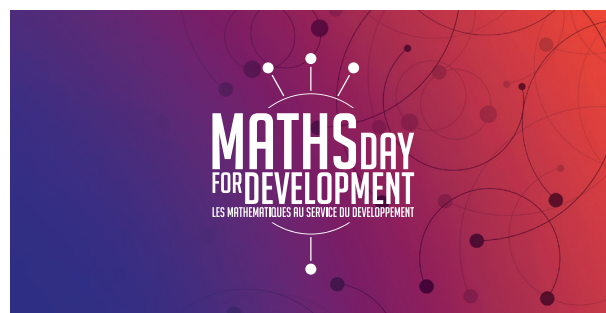


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# FOREWORD



It is a pleasure for me and Ludovic Rifford, the Director, to present CIMPA to you in this brochure. We are proud of CIMPA's history of contributing to the interest in and growth of mathematics in the developing world. Our CIMPA Schools, which are our main area of work, and our other activities are illustrated here, and have had a significant impact. Many mathematicians from Europe and from the developing countries support CIMPA, as do others who serve as co-organisers and lecturers and on our Scientific Council. We are grateful to them for their strong support and expertise. It is also a pleasure to acknowledge the support and major contribution of the French Government and the Scientific Community, as well as that of Spain, Norway and Switzerland.

Recognition of CIMPA's achievements, and the enthusiasm to contribute to its success, has led to other countries in Europe considering joining the organisation, which is a positive strategic goal for

"We are proud of CIMPA's history of contributing to the interest in and growth of mathematics in the developing world"

us. It is my pleasure to serve as President of CIMPA and to contribute to its excellent work, along with the Governing Board, Ludovic and others.

**Barry Green**  
PRESIDENT



This brochure, which serves as an annual report, presents the activities that were financed and co-financed by CIMPA in 2019. These were made possible by the continued funding by and involvement of CIMPA's four member countries (France, Spain, Norway and Switzer-

land) and UNESCO, as well as the links established by CIMPA over the years with continental mathematical societies and many partners throughout the world. In 2019, CIMPA undertook four types of activity in 35 countries: the CIMPA Schools – CIMPA's traditional activity – CIMPA Courses, which make it possible to provide funding for a series of one-off courses in the field in a very flexible manner, partnership schools held in association with mathematical societies in Africa, South America, Southeast Asia and West Asia, and the CIMPA Fellowships, which finance the participation of young mathematical researchers in short thematic programmes. This year, we also organised a day devoted to maths and development, held at UNESCO in Paris.

"In 2019, CIMPA undertook four types of activity in 35 countries"

All these activities owe a great deal to the work and energy of the members of the Board of Directors, the Scientific Council and the Steering Committee, the Scientific Managers and our invaluable administrative and technical team, whom I should like to thank very warmly. I hope you enjoy reading the brochure.

**Ludovic Rifford**  
EXECUTIVE DIRECTOR

# ABOUT US



The *Centre International de Mathématiques Pures et Appliquées* (CIMPA - International Centre for Pure and Applied Mathematics), founded in France in 1978, is a non-profit organisation that promotes research into Mathematics in developing countries. It is situated in Nice, is a **UNESCO Category 2** Centre and is part of the *Centre d'Accueil et de Rencontres Mathématiques Internationales* (CARMIN laboratory of excellence). It benefits from the financial support of France, Norway, Spain and Switzerland.

**CIMPA** co-organises and sponsors numerous activities in developing countries in all continents. Each activity is funded through a process of calls for proposals in one of the following categories:



CIMPA Schools



CIMPA Courses



CIMPA Fellowships

**CIMPA** also strongly supports activities developed in close collaboration with continental mathematical unions, such as Schools in Partnership, the purpose of which is to introduce undergraduate and Master students to research in Mathematics. For most of its activities, **CIMPA** works in partnership with other organisations with similar objectives, such as the **International Mathematical Union (IMU)**, the **European Mathematical Society (EMS)** and the **International Centre for Theoretical Physics (ICTP)**.



CIMPA School in Talca (Chile) - December, 2019



CIMPA School in Limbe (Cameroon) - July, 2019

# CIMPA, SINCE IT WAS FIRST CREATED

Founded in **1978** Located in **Nice** France

## ADMINISTRATION

**13**

members of the Executive Team

**13**

A Governing Board of 7 Individual Members and 6 Institutional Members

**12**

members of the Scientific Council

**22**

A Steering Committee of 7 Individual Members and 15 Institutional Members

**3**

employees

**219**

CIMPA members



A worldwide partner network of organisations and academic institutions

## ACTIVITIES

Each year, more than

**1000**

participants attend CIMPA Schools

Activities in more than

**100**

countries in the world

## COMMUNICATION



Present on 3 social networks



A Youtube channel  
**CIMPA Math**



A website  
**www.cimpa.info**

Budget about

**€ 500K**

per year

# INTERVIEW WITH LUDOVIC RIFFORD



## Ludovic Rifford

Born in 1974, Professor at the *Université Nice Sophia Antipolis* and Executive Director of CIMPA since 2016.

### What is your assessment of this year?

This year, 2019, has been eventful and truly exciting. In terms of our usual activities, 18 CIMPA Schools were held in Africa, Asia and Latin America, 30 CIMPA Courses were funded, 10 CIMPA Fellowships were awarded for participation in research programmes at the *Institut Henri Poincaré* and the *Centre de Recerca Matemàtica*, and 17 partner schools received financial support from CIMPA. Of the 21 CIMPA schools planned, three unfortunately had to be cancelled - the school in Haiti for security reasons, the school in Ecuador for budgetary reasons and the school in Tehran could not go ahead because of the sanctions against Iran. With regard to partnerships,

Mathematics), which brings together a number of European institutes whose purpose is to host and organise activities. We have renewed an important partnership with INRIA (the French national research institute for the digital sciences), with a view to increasing the potential funding that could be granted to CIMPA Schools and we have consolidated or initiated

cutive team and the governing board. In addition, an important event this year that kept us very busy was the organisation of a day devoted to maths and development, held at UNESCO in Paris.

### What are the successes that you would like to highlight?

The first thing that comes to mind is, of course, the day at UNESCO



Gashaw Aziz Mohammed-Saleh, Pierre Cartier and Ludovic Rifford in Erbil (Iraq) - February, 2019

"We have consolidated or initiated collaboration following numerous field trips by members of the executive team and the governing board"

we have joined the ERCOM group (European Research Centres on

collaboration following numerous field trips by members of the exe-

that I referred to just now. This day, which was entitled "Maths Day for Development" was organised in close collaboration with the staff of the French National Institute of Mathematical Sciences and their Interactions with the CNRS (French National Centre for Scientific Research) and the French National Commission for UNESCO (CNFU).

This enabled us to draw attention to several mathematicians from Africa, Asia and South America and discuss issues that link maths and development, at round tables. The day was, I believe, a great success and gave CIMPA a little more visibility. It was the result of a great deal of work, and I would like to take this opportunity to thank the teams from CIMPA, INSMI and CNFU warmly for making this day a great success. I would also like to thank the speakers, the members of our honorary committee and all the institutions that sponsored and supported us financially. I invite readers to visit the website of this day event for further information on all this, as well as some videos.

A second thing that comes to mind is the link between CIMPA and ERCOM, a committee of the European Mathematical Society. This will enable us to support the growth of CIMPA at the European level and develop new partnerships as part of our CIMPA Fellowships programme. This is already the case, because this year we financed several participants in an intensive research programme at the *Centre de Recerca Matemàtica in Barcelona*.

The most important aspect is, of course, the success of our activities in the field, whether this concerns the CIMPA Schools, CIMPA Courses or Schools in Partnership. We are always happy to fund all these activities and enable so many people, both students and colleagues, to contribute to the development of mathematics around the world.

**What are the immediate challenges?** CIMPA has high visibility and therefore receives many requests for funding. If we wish to be able to finance more activities, we clearly need to increase our budget. This can be achieved through requests for funding from foundations or non-state organisations - we are working on it, and it can also be achieved by new European countries becoming CIMPA investors. CIMPA initiated its expansion policy at the European level approximately ten years ago. Spain and Norway became members of CIM-

PA in 2010 and 2011 and Switzerland has been providing us with an annual grant since 2012. We are now working actively to bring in new countries.

In the field, I notice a growing demand from students for schools or

mathematical institutes in Africa and on the Indochina peninsula, for example. This is ongoing. I hope that CIMPA will be able to contribute to the development of these centres.

**You have been the Director of CIM-**



Ludovic Rifford and Barry Green at Chapman's Peak Lookout (South Africa) - November, 2018

courses on topics such as Big Data and Machine Learning; in short, all these very popular topics that are currently at the interface between computers and mathematics. We must be able to respond to these requests and, more generally, follow the evolution of mathematics and offer more schools that link mathematics and applications. The renewal of the agreement between CIMPA and INRIA falls within this framework by encouraging, to the greatest extent pos-

**PA for three years. What do you consider most significant from this experience?**

I have enjoyed working for CIMPA and feeling useful to the mathematical community, something I had never felt in this way before. I have greatly appreciated working with my colleagues in the Governing Board and all the members of the management team. Unfortunately, two of them passed away during my term of office - Ahmad El Soufi in December 2016 and Chris-

"I have enjoyed working for CIMPA and feeling useful to the mathematical community, something I had never felt in this way before"

sible, the preparation of school projects on topics that are at the interface between mathematics and other disciplines.

**What are the prospects for the future?**

The future prospects for the development of research into mathematics also include, I think, the development of regional mathe-

tian Mauduit in August 2019; they had done a lot for CIMPA. I also enjoyed working alongside Agnes, Héra and Roland in Nice, without whom CIMPA could not run smoothly.

# GOVERNING BOARD

The Governing Board is responsible for overseeing the administration of CIMPA. It approves the financial statements and ensures that they have been implemented in accordance with CIMPA's aims.

## INDIVIDUAL MEMBERS



**1 Barry Green**  
PRESIDENT  
Univ. of Stellenbosch, South Africa

**2 Annie Raoult**  
VICE-PRESIDENT  
Université Paris Descartes, France

**3 Ivan Area**  
SECRETARY  
Universidade de Vigo, Spain

**4 Marc Aubry**  
TREASURER  
Université Nice Sophia Antipolis,  
France

**5 Servet Martinez**  
Universidad de Chile, Chile

**6 Modeste N'Zi**  
Université Felix Houphouët Boigny,  
Ivory Coast

**7 Viet Dung Nguyen**  
Vietnam Academy of Science  
and Technology, Vietnam

## INSTITUTIONAL MEMBERS

- ▶ UNESCO
- ▶ Direction générale de la recherche et de l'innovation (DGRI), France
- ▶ Université Nice Sophia Antipolis (UNS), France
- ▶ Norwegian Ministry of Education and Research, Norway
- ▶ Ministeria de Economía y Competitividad (MINECO), Spain
- ▶ Institut des Sciences Mathématiques et de leurs Interactions (INSMI-CNRS), France

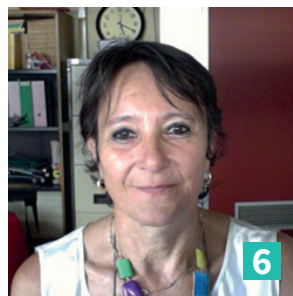


# SCIENTIFIC COUNCIL

The Scientific Council is comprised of 12 members.  
It makes recommendations on CIMPA's scientific activities.



Scientific Council in Paris (France) - October, 2019



**1** **Hans Munthe-Kass**  
PRESIDENT  
University of Bergen, Norway

**2** **Volker Bach**  
Tech. Univ. Braunschweig, Germany

**3** **Edy Tri Baskoro**  
Inst. Teknologi Bandung, Indonesia

**4** **Mohamed Boucetta**  
Université Cadi-Ayad, Morocco

**5** **Carlos Di Prisco**  
Univ. de Los Andes, Colombia

**6** **Laura Geatti**  
Università di Roma Tor Vergata, Italy

**7** **Henar Herrero Sanz**  
Univ. de Castilla-La Mancha, Spain

**8** **Mahouton Norbert Hounkonnou**  
Université d'Abomey-Calavi, Benin

**9** **Bertrand Maury**  
Université Paris-Sud, France

**10** **Helena Nussenzeig Lopes**  
Univ. Federal de Rio de Janeiro, Brazil

**11** **Sujatha Ramdorai**  
Univ. of British Columbia, Canada

**12** **Sara van de Geer**  
ETH Zurich, Switzerland

# EXECUTIVE TEAM

CIMPA's Executive Team consists of an Executive Director, a group of Scientific Officers and Administrative and Technical Staff. The Executive Director, who is responsible for the day-to-day running of CIMPA, benefits from the expertise of the Scientific Officers, who act as consultants for geographical areas and other important issues.

## INDIVIDUAL MEMBERS



1



2



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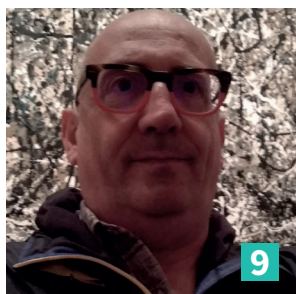
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8



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10



11



12



13

**1 Ludovic Rifford**  
EXECUTIVE DIRECTOR  
Université Nice Sophia Antipolis, France

**2 Yacine Chitour**  
Université Paris-Sud, France

**3 Sophie Dabo**  
Université de Lille, France

**4 Giulia Di Nunno**  
University of Oslo, Norway

**5 Fabrice Gamboa**  
Université Paul Sabatier, France

**6 Elisa Gorla**  
Université Neuchâtel, Switzerland

**7 Lidia Fernandez**  
Universidad de Granada, Spain

**8 Jorge Jimenez Urroz**  
Univ. Poltècnica de Catalunya, Spain

**9 Joan-C. Lario**  
Univ. Politècnica de Catalunya, Spain

**10 Jorge Mozo Fernandez**  
Universidad de Valladolid, Spain

**11 Stéphanie Nivoche**  
Université Nice Sophia Antipolis, France

**12 Vlady Ravelomanana**  
Université Paris 7, France

**13 Rosane Ushirobira**  
Inria, France

### STAFF

**Agnès Gomez**  
Executive Secretary

**Héla Lamiri**  
Communication Officer

**Roland Ruelle**  
IT Responsable

# STEERING COMMITTEE

The Steering Council draws up CIMPA's medium-and long-term scientific strategy. It offers policy guidance, suggests priorities and makes recommendations. Every year, it designs the programme for the CIMPA Schools and other activities, based on the recommendations of the Scientific Council.



Steering Committee in Nice (France) - January, 2019

## INDIVIDUAL MEMBERS



**Barry Green**  
PRESIDENT  
University of Stellenbosch,  
South Africa

**Ivan Area**  
Universidade de Vigo, Spain

**Marc Aubry**  
Université Nice Sophia Antipolis,  
France

**Servet Martinez**  
Universidad de Chile, Chile

**Modeste N'Zi**  
Univ. Félix Houphouët Boigny,  
Ivory Coast

**Viet Dung Nguyen**  
Vietnam Academy of Science and  
Technology, Vietnam

**Annie Raoult**  
Univ. Paris Descartes, France

## INSTITUTIONAL MEMBERS

- ▶ Académie des Sciences, France
- ▶ Comisión Nacional Española de Cooperación con la UNESCO, Spain
- ▶ Comité Español de Matemáticas (CEMAT), Spain
- ▶ Commission nationale française pour l'UNESCO, France
- ▶ Institut de la Recherche en Informatique et en Automatique (INRIA), France
- ▶ Institut des Sciences Mathématiques et de leurs Interactions (INSMI-CNRS), France
- ▶ Norwegian Mathematical Society, Norway
- ▶ Real Sociedad Matemática Española (RSME), Spain
- ▶ Sociedad de Estadística e Investigación Operativa (SEIO), Spain
- ▶ Sociedad Española de Matemática Aplicada (SEMA), Spain
- ▶ Societat Catalana de Matemàtiques (SCM), Spain
- ▶ Société de Mathématiques Appliquées et Industrielles (SMAI), France
- ▶ Société Française de Statistique (SFdS), France
- ▶ Société Mathématique de France (SMF), France
- ▶ Swiss Mathematical Society (SMS), Switzerland

# PARTNERS LIST

The primary partners of **CIMPA** are the institutional members of the Steering Council which develops the strategy and the scientific policy of **CIMPA**:

- ▶ Académie des Sciences (France)
- ▶ Comité Español de Matemáticas (CEMAT) (Spain)
- ▶ Comisión Española de Cooperación con la UNESCO (Spain)
- ▶ Commission nationale française pour l'UNESCO (France)
- ▶ Institut de la Recherche en Informatique et Automatique (Inria) (France)
- ▶ Institut des Sciences Mathématiques et de leurs Interactions (INSMI-CNRS) (France)
- ▶ Norwegian Mathematical Society (Norway)
- ▶ Real Sociedad Matemática Española (RSME) (Spain)
- ▶ Société de Mathématiques Appliquées et Industrielles (SMAI) (France)
- ▶ Société Française de Statistique (SFdS) (France)
- ▶ Société Mathématique de France (SMF) (France)
- ▶ Sociedad de Estadística e Investigación Operativa (SEIO) (Spain)
- ▶ Sociedad Española de Matemática Aplicada (SEMA) (Spain)
- ▶ Societat Catalana de Matemàtiques (SCM) (Spain)
- ▶ Swiss Mathematical Society (SMS) (Switzerland)

Being part of the French Laboratoire d'Excellence **CARMIN** (Centre d'Accueil et de Rencontres Mathématiques Internationales), **CIMPA** works in close collaboration with the three other **CARMIN**'s members:

- ▶ Institut Henri Poincaré (IHP) (France)
- ▶ Institut des Hautes Études Scientifiques (IHES) (France)
- ▶ Centre International de Rencontres Mathématiques (CIRM) (France)

The **CIMPA** has signed agreements of cooperation with several institutions:

- ▶ Académie Hassan II des Sciences et Techniques (Morocco)
- ▶ African Institute of Mathematical Sciences (AIMS)
- ▶ Centre de Recerca Matemàtica (Spain)
- ▶ Instituto Nacional de Matematica Pura e Aplicada (IMPA)
- ▶ Institut national de recherche en informatique et en automatique (Inria)
- ▶ Ministerio de Ciencia, Tecnología e Innovación Productiva de la República Argentina (MinCyT)
- ▶ University of Arba Minch (Ethiopia)
- ▶ Université Nice Sophia Antipolis (France)



ICIAM in Valencia (Spain) - July, 2019



Université Nice Sophia Antipolis (France)

Most of **CIMPA's** activities benefit from close ties established by **CIMPA** with the following international organisations:

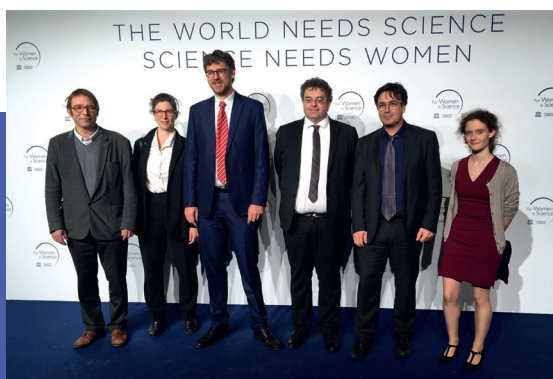
- ▶ Commission for Developing Countries (CDC) of the International Mathematical Union (IMU)
- ▶ Committee for Developing Countries (CDC) of the European Mathematical Society (EMS)
- ▶ International Center for Theoretical Physics (ICTP)
- ▶ Agence Universitaire de la Francophonie (AUF)

Close partners of **CIMPA** also include several continental mathematical unions, for example through the funding of Schools in Partnership:

- ▶ African Mathematical Union (AMU)
- ▶ Unión Matemática de América Latina y el Caribe (UMALCA)
- ▶ South East Asian Mathematical Society (SEAMS)
- ▶ Southern Africa Mathematical Sciences Association (SAMSA)
- ▶ West Asian Mathematical Schools (WAMS)

Other **CIMPA's** partners:

- ▶ Association pour la Promotion Scientifique de l'Afrique (APSA)
- ▶ Colloque Africain sur la Recherche en Informatique et Mathématiques Appliquées (CARI)
- ▶ Centro de Modelamiento Matemático (CMM)
- ▶ Comité National Français des Mathématiciens (CNFM)
- ▶ Deutsche Mathematiker Vereinigung (DMV)
- ▶ European Mathematical Society (EMS)
- ▶ Gesellschaft für Angewandte Mathematik und Mechanik (GAMM)
- ▶ International Mathematical Union (IMU)
- ▶ International Council for Industrial and Applied Mathematics (ICIAM)
- ▶ Institut de Recherche pour le Développement (IRD)
- ▶ Mathrice
- ▶ Soutien aux Activités de Recherche en Informatique et Mathématique en Afrique (SARIMA)
- ▶ UNESCO



The INSMI team during the 21st edition of the L'Oréal-UNESCO international awards for women in science - March, 2019



Annie Raoult (Vice-President of CIMPA) and Nouzha El Yacoubi (President of the African Mathematical Union) in Botswana - November, 2018

# MATHS DAY FOR DEVELOPMENT

FRIDAY, MARCH 15, 2019  
At UNESCO (PARIS)

UNDER THE SPONSORSHIP OF THE FRENCH ACADEMY OF SCIENCES



Maths Day for Development at Unesco (France) - March, 2019

## PARTNERS





Cédric Villani at Maths Day for Development - March, 2019

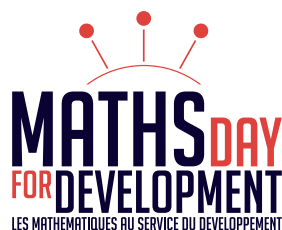
**The Centre international de mathématiques pures et appliquées (CIMPA), the French National Centre for Scientific Research (CNRS), and the French National Commission for UNESCO (CNFU), under the sponsorship of the Academy of Sciences, organised a special day on mathematics as a major issue for development. The event took place on Friday, March 15, 2019 at the UNESCO House in Paris.**

With more than 300 participants and more than a dozen speakers from every corner of the world, this one-day conference was an opportunity to raise awareness of the value of mathematics in our modern world and its importance for development.

Many topics were discussed, including

the role of mathematics in combating global warming and in the development of sustainable fisheries.

There were numerous features in the Press, including an interview with Mohamed Jaoua by *CNRS Le Journal*, an article published on the France 24 website, entitled «*Maths et développement économique : une équation gagnante ?*» (Mathematics and Economic Development: A Winning Equation?) and another on the website of the Moroccan newspaper *Le Matin*.



## IN FIGURES

More than  
**300**  
participants  
from all over the world

**13**  
panellists  
of 10 different nationalities

**2**  
round tables with  
5 panellists

**6**  
keynote speakers  
on various topics

**100%**  
satisfaction!

THE SLIDES AND VIDEO PRESENTATIONS ARE AVAILABLE ONLINE:



[mathdayfordevelopment.fr](http://mathdayfordevelopment.fr)



# APPOINTMENT OF THE NEXT EXECUTIVE DIRECTOR OF CIMPA



**Christophe Ritzenthaler**

was appointed the next Executive Director of CIMPA. He will take up his duties on September 1<sup>st</sup>, 2020. His term of office is 4 years.

Christophe Ritzenthaler completed his PhD, which was prepared under the supervision of Jean-François Mestre, at the *Université Paris VII* in 2003. After two years abroad as a post-doctoral researcher, he worked as assistant professor at the *Aix-Marseille Université*. In 2013, he took up a professorship at the *Université de Rennes 1*.

His research deals with effective aspects of arithmetic geometry and their application to cryptography and coding theory. For instance, he suggested several methods for computing Serre's obstruction for genus 3 curves

over finite fields. He has written more than thirty articles and ten packages for the computational algebra software Magma.

Christophe Ritzenthaler is heavily involved in promoting research and education. Over the past 5 years, he has organised 8 conferences and 5 summer schools. These include a CIMPA School in Uruguay and a School in Partnership in Turkey. He is also committed to addressing discrimination, in particular as advisor to the gender committee in his laboratory.



Governing Board in Nice (France) - September, 2019



# GIULIA DI NUNNO RECEIVES THE SU BUCHIN PRIZE

From the King of Spain at ICIAM 2019



## Giulia Di Nunno

**Professor of stochastic analysis at the University of Oslo and a member of the Executive Team of CIMPA since 2013**, was awarded the 2019 ICIAM Su Buchin Prize for her work on promoting mathematical research in African countries.

The prize was first created and awarded in 2007.

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## IN MEMORIAM:

The Passing of Christian Mauduit and Ahmad El Soufi



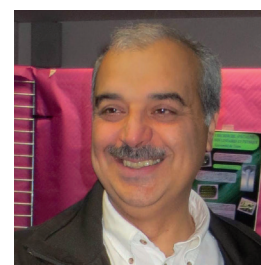
## Christian Mauduit

It was with great sadness that we learned this summer of the death of our friend and colleague Christian Mauduit.

He was a professor at *Aix-Marseille Université*, a researcher at the Marseille Institute of Mathematics (*AMU-Centrale-CNRS*), a member of the *Institut Universitaire de France*, and he was an invaluable member of the Executive Team of CIMPA for more than 10 years.

## Ahmad El Soufi

We would also like to pay tribute to our friend Ahmad El Soufi, who passed away in 2016. Ahmad El Soufi was a Professor at the *Université François Rabelais* in Tours and was a major player in CIMPA for many years, especially through his activities in Africa and the Middle East.



CIMPA is able to expand these activities through

# NEW PARTNERSHIPS

As part of the CIMPA Fellowships, CIMPA is now working in close collaboration with the *Center de Recerca Matemàtica* (CRM), Spain and the *Centre International de Rencontres Mathématiques* (CIRM), France.

From now on, the CIMPA Fellowships offer an opportunity for young mathematical researchers from developing countries to take part in short thematic programmes held in 3 partner research institutes.



Since 2018, many CIMPA Courses have been held at the University of Arba Minch, Ethiopia. To formalise this cooperation, Ludovic Rifford, Director of CIMPA, and Dr. Yechale Kebede, Vice-President for Academic Affairs at the University of Arba Minch, signed a Memorandum of Understanding (MoU) on April 10, 2019.



Signing of the Memorandum of Understanding (MoU) - April, 2019



# ACTIVITIES

# CIMPA SCHOOLS

In **2019**, CIMPA financed  
**18** CIMPA Schools in **15** countries  
 for a total cost of **€156,287**

CIMPA finances part of the cost of organising the School, as well as the travel and subsistence expenses for participants from neighbouring developing countries.

Historically, CIMPA's activity concerns the organisation of CIMPA Schools in developing countries. Each CIMPA School offers a series of research-level courses taught by specialists in a field of mathematics, with a duration of 8 to 15 days.

CIMPA Schools are aimed at doctoral students and teacher-researchers from developing countries.

- 1** **Montevideo, Uruguay**  
Elliptic Curves: Arithmetic and Computation
- 2** **Saida, Algeria**  
Analyse stochastique et applications
- 3** **Hanoi, Vietnam**  
Hyperplane Arrangements: Recent Advances and Open Problems
- 4** **Isfahan, Iran**  
Isfahan School and Conference on Representations of Algebra
- 5** **Dhaka, Bangladesh**  
Dynamical Systems and Applications to Biology
- 6** **Havana, Cuba**  
Mathematical Models in Biology and Related Applications of Partial Differential Equations



CIMPA School in Isfahan (Iran) - April, 2019

- 7** **Tabriz, Iran**  
Graphs, Algorithms and Randomness
- 8** **Kathmandu, Nepal**  
Summer School in Mathematical Biology
- 9** **Bogota, Colombia**  
Research School on Quantum Symmetries

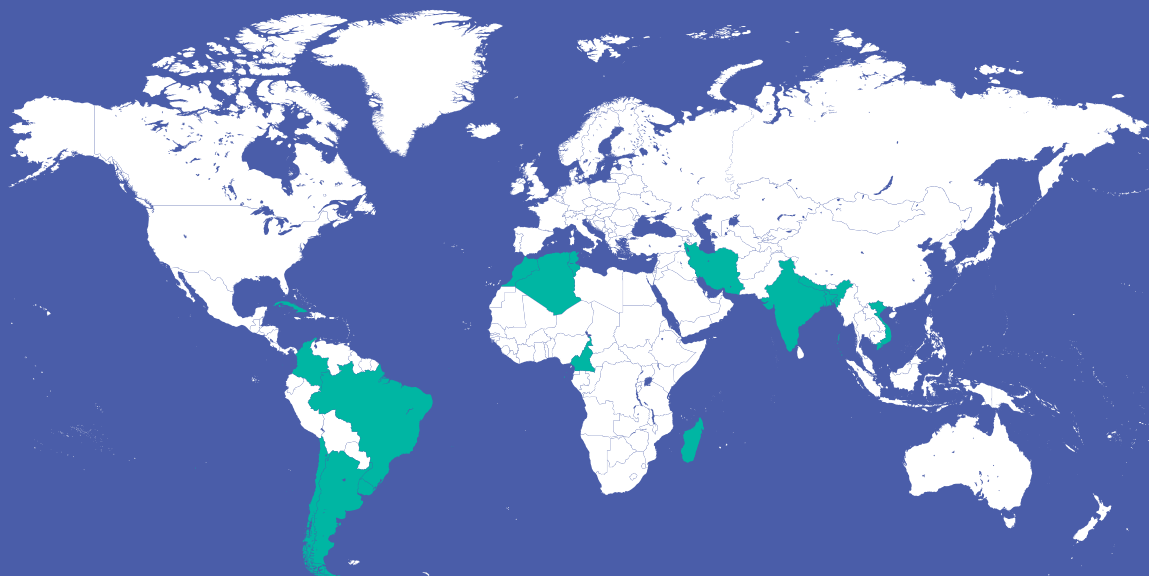


CIMPA School in Saida (Algeria) - March, 2019

- 10** **Tunis, Tunisia**  
Science des données pour l'ingénierie et la technologie
- 11** **Limbe, Cameroon**  
Algebraic Geometry, Number Theory and Applications in Cryptography and Robot Kinematics



CIMPA School in Dhaka (Bangladesh) - June, 2019



CIMPA School in Kathmandu (Nepal) - June, 2019



CIMPA School in Varanasi (India) - December, 2019

**12 Kenitra, Morocco**  
Modélisation, analyse mathématique et calcul scientifique dans la gestion des déchets ménagers

**13 Antananarivo, Madagascar**  
Approches algorithmiques et statistiques de l'apprentissage

**14 Cordoba, Argentina**  
Hopf Algebras and Tensor Categories

**15 Buenos Aires, Argentina**  
Algebraic and Geometrical Methods in String Theory

**16 Joao Pessoa, Brazil**  
Syzygies, from Theory to Applications

**17 Talca, Chile**  
Fourth Latin American School on Algebraic Geometry and its Applications

**18 Varanasi, India**  
Finsler Geometry and Applications



CIMPA School in Bogota (Colombia) - July, 2019

# CIMPA COURSES

In **2019**, CIMPA financed  
**30** CIMPA Courses in **16** countries  
for a total cost of **€25,409**

A CIMPA Course is a Master's-level or research-level mathematics course given by visiting professor-researchers, with a duration of 1 to 4 weeks.

The courses take place in higher education and research institutions in developing countries.

They are aimed at Master's and doctoral students, post-doctoral researchers and teacher-researchers.

CIMPA finances the involvement of the teacher-researchers by covering their travel expenses (with some exceptions, accommodation and the costs of meals are covered by the host institution).

- 1 Arba Minch University, Ethiopia**  
Commutative Algebra,  
by Michel Waldschmidt (Université Pierre et Marie Curie, France)
- 2 Arba Minch University, Ethiopia**  
Dynamical Systems,  
by Pierre Arnoux (Aix Marseille Université, France)
- 3 Arba Minch University, Ethiopia**  
Commutative Algebra,  
by Rahim Zaare-Nahandi (University of Tehran, Iran)
- 4 Université libanaise, Lebanon**  
Analytic Methods Applied to Geometry,  
by Barbara Nelli (University of L'Aquila, Italy)
- 5 Université Nazi Boni, Burkina Faso**  
Ten Lectures on Tilings,  
by Thomas Fernique (Université Paris 13, France)
- 6 Anand International College of Engineering, India**  
Orthogonal Polynomials: from one to several variables,  
by Iván Area (Universidad de Vigo, Spain)



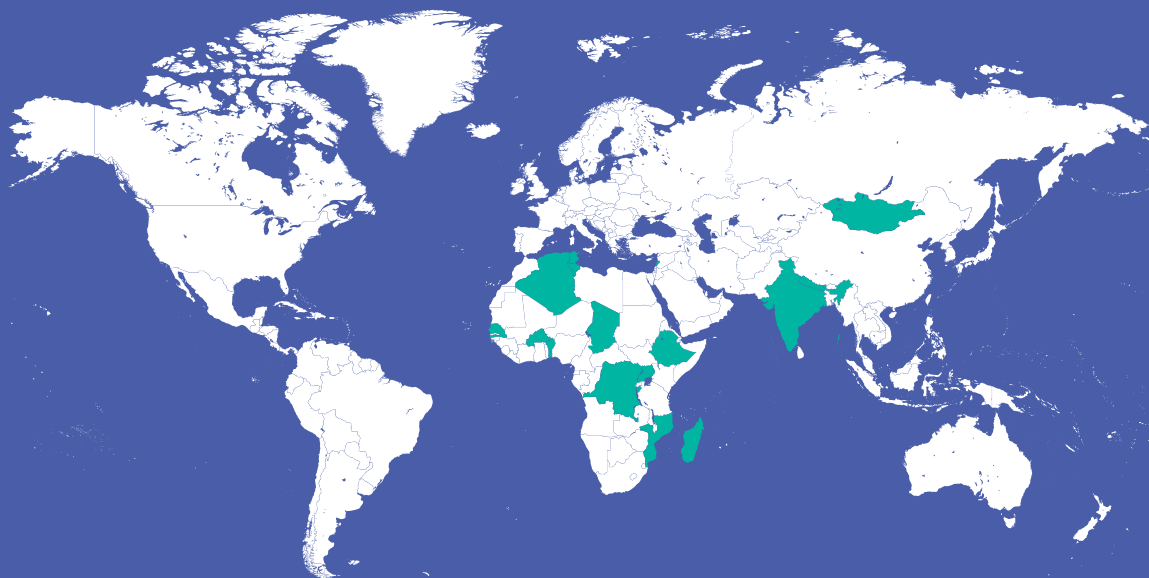
Jean-Pierre Gazeau in Burundi - December, 2019

- 7 Faculdade de Ciências Naturais e Matemática, Mozambique**  
Desenho de experimentos,  
by Javier Castro Cantalejo (Complutense Univ. of Madrid, Spain)



Patrick Tchepmo in Chad - November, 2019

- 8 Université de Béjaïa, Algeria**  
Introduction à la dynamique symbolique,  
by Nicolas Bédaride (Aix Marseille Université, France)
- 9 Université de Béjaïa, Algeria**  
Intro. aux systèmes Hamiltoniens et à la théorie des perturbations,  
by Abed Bounemoura (Université Paris Dauphine, France)
- 10 Université Marien Nguabi, Republic of the Congo**  
Algebraic Theory of Number,  
by Tony Ezome (Univ. des Sci. et Tech. de Masuku, Gabon)
- 11 Mbarara University, Uganda**  
Mathematics Methods of Astronomy,  
by Rosa María Ros Ferré (Barcelona NASE, Spain)
- 12 Mbarara University, Uganda**  
Mathematics Methods of Astronomy,  
by Ederlinda Vinuales Gavin (Barcelona NASE, Spain)
- 13 Arba Minch University, Ethiopia**  
Introduction to Systems and Control Theory I,  
by Ludovic Rifford (Univ. Nice Sophia Antipolis & CIMPA, France)
- 14 Arba Minch University, Ethiopia**  
Introduction to Systems and Control Theory II,  
by Francesca Chittaro (Université de Toulon, France)



**15 Faculté des Sciences Math., Phy. et Nat. de Tunis, Tunisia**  
Existence d'un équilibre général en dimension infinie,  
by Belmesnaoui Aqzzouz (University Mohammed V, Morocco)

**16 National University of Mongolia**  
Introduction to Number Theory and Galois Representations,  
by Christian Maire (FEMTO Inst., Univ. of Franche-Comté, France)

**17 Arba Minch University, Ethiopia**  
Algebraic Geometry,  
by Marcelo Maculan (Sorbonne Université, France)

**18 Université d'Antananarivo, Madagascar**  
Algorithmique et probabilités,  
by Cyril Nicaud (Université Paris-Est Marne-la-Vallée, France)



Lea Terracini in Nepal - July, 2019

**19 Université Assane SECK de Ziguinchor, Senegal**  
Équations de Monge-Ampère complexes dégénérées,  
by Ahmed Zeriahi (Institut Mathématique de Toulouse, France)

**20 Tribhuvan University, Nepal**  
Fourth Module of Galois Theory Course,  
by René Schoof (Univ. degli studi di Roma "Tor Vergata", Italy)

**21 Tribhuvan University, Nepal**  
Fifth Module of Galois Theory Course,  
by Lea Terracini (Università di Torino, Italy)

**22 Université d'Antananarivo, Madagascar**  
Graphes aléatoires et algorithmes randomisés,  
by Vlady Ravelomanana (Université Paris Diderot, France)

**23 Université d'Antananarivo, Madagascar**  
Fondements de la programmation impérative et fonctionnelle,  
by Flavien Breuvert (Université Paris 13, France)

**24 Université Nazi Boni, Burkina Faso**  
An Introduction to Algebraic Geometry,  
by Tony Ezome (Univ. des sciences et tech. de Masuku, Gabon)

**25 Addis Ababa University, Ethiopia**  
Theory of Distributions and PDE,  
by Jean-Pierre Puel (Université de Versailles, France)

**26 Université d'Abomey-Calavi, Benin**  
Apprentissage statistique et datamining,  
by Simplicie Dossou-Gbete (Univ. de Pau et des Pays de l'Adour, France)

**27 Université de N'Djaména, Chad**  
Modélisation déterministe,  
by Patrick Tchepmo (Arba Minch University, Ethiopia)

**28 Université Assane Seck de Ziguinchor, Senegal**  
Introduction à la géométrie algébrique,  
by Erwan Brugallé (Université de Nantes, France)

**29 Université du Burundi**  
Geometric Properties of Coherents States,  
by Jean-Pierre Gazeau (Université Paris Diderot, France)

**30 Arba Minch University, Ethiopia**  
Computational Optimization,  
by Tilahun Surafel (University of Zululand, South Africa)

# CIMPA FELLOWSHIPS

In **2019**, CIMPA financed the participation of **10** young mathematicians for a total cost of **€26,270**

The CIMPA Fellowships offer funding to enable young mathematical researchers from developing countries to take part in short thematic programmes in partner European research institutes, for 1 to 3 months. The CIMPA Fellowships cover all the participants' costs (travel, accommodation and meals).

## THE MATHEMATICS OF IMAGING

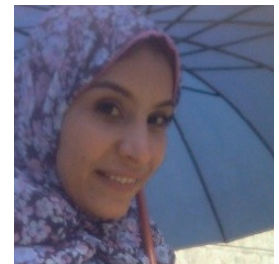
from January 7 to April 5, 2019



**Lorena Leon Arencibia**  
University of Havana, Cuba



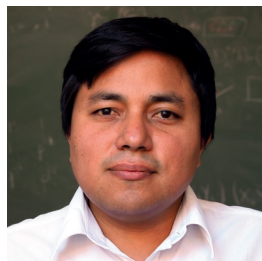
**Meryem Ameer**  
Faculté des Sciences  
et Techniques de Béni Mellal,  
Morocco



**Saida Saad Mohamed**  
Cairo University, Egypt

## REINVENTING RATIONAL POINTS

from April 15 to July 12, 2019



**Homero R. Gallegos Ruiz**  
Universidad Autónoma  
de Zacatecas, Mexico

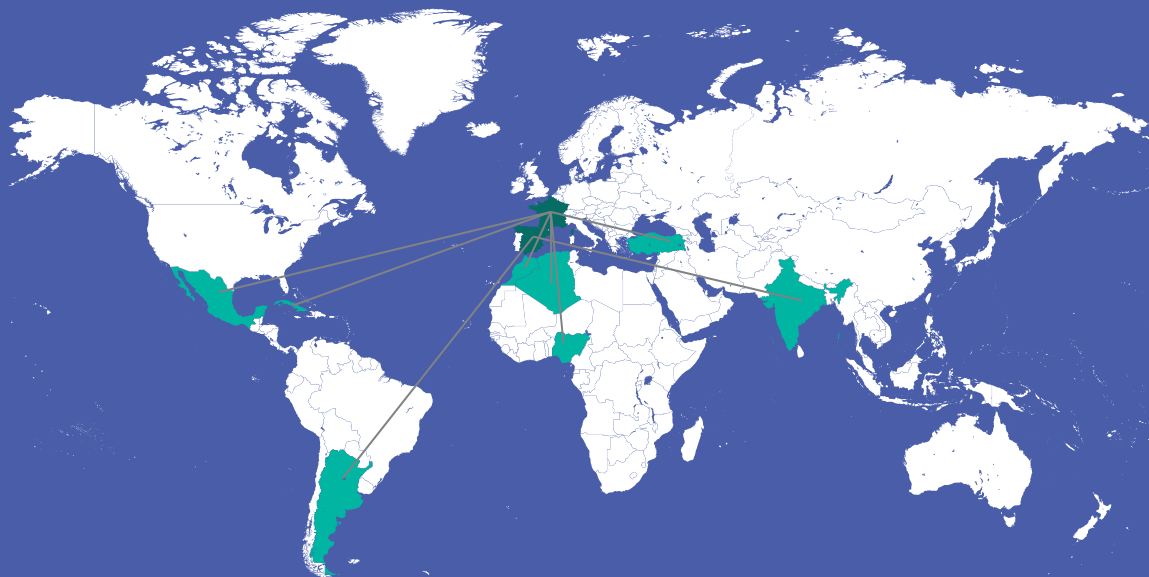


**Rabia Gulsah Uysal**  
Middle East Technical  
Universiyt, Turkey



**Marcelo Exequiel Paredes**  
University of Buenos Aires,  
Argentina





**September 9<sup>th</sup> to December 13<sup>th</sup>, 2019**

Scientific Committee:  
 Michael Ghil, ENS, Paris and UCLA, Los Angeles (co-chair)  
 Hervé Le Treut, IPSL, Paris (co-chair)  
 Mickaël D. Chekroun, UCLA, Los Angeles  
 Anne-Laure Dalbard, IJL, Sorbonne Université, Paris  
 Patrice Klein, Caltech and JPL, Pasadena  
 Valerio Lucarini, University of Reading, UK  
 Sabrina Speisich, ENS, Paris

**ihp Institut Henri Poincaré**  
 11 rue Pierre et Marie Curie  
 75231 Paris Cedex 13  
 France

**The mathematics of climate and the environment**  
 Thematic program with short courses, seminars and workshops

**IESC Pre-school in Corsica**  
 September 9<sup>th</sup> to 14<sup>th</sup>, 2019

**Nonlinear and stochastic methods in climate and geophysical fluid dynamics**  
 October 7<sup>th</sup> to 11<sup>th</sup>, 2019

**Big data, data assimilation, and uncertainty quantification**  
 November 12<sup>th</sup> to 15<sup>th</sup>, 2019

**Coupled climate-ecology-economy modeling and model hierarchies**  
 December 2<sup>nd</sup> to 6<sup>th</sup>, 2019

Program coordinated by the Centre Emile Borel (CEB) at IHP  
 Participation of postdocs and PhD students is strongly encouraged  
 Scientific program on: <http://www.geosciences.ens.fr/CIAMath-Paris2019/>  
 Registration is free however mandatory on: [www.ihp.fr](http://www.ihp.fr)  
 Deadline for financial support: March 9<sup>th</sup>, 2019  
 Contact: [CIAMathParis2019@ihp.fr](mailto:CIAMathParis2019@ihp.fr)  
 Charlotte Sahle-Eger: CEB organizational assistant  
 Sylvie Lhermitte: CEB Manager

# THE MATHEMATICS OF CLIMATE AND THE ENVIRONMENT

from September 9 to December 13, 2019



**Hanane Belhireche**  
 Université de Guelma, Algeria



**Adewale Folaranmi Lukman**  
 Landmark University, Nigeria

INTENSIVE RESEARCH PROGRAMME

**SAFAIS 2019**

The aim of the intensive research programme SAFAIS 2019 is to bring together leading experts in topical domains in Complex analysis, Functional analysis, and Approximation theory. It will be mainly focused on approximation, interpolation and sampling problems in spaces of analytic functions, and their various applications.

**SPACES OF ANALYTIC FUNCTIONS: APPROXIMATION, INTERPOLATION, SAMPLING**

[www.crm.cat/2019/IRP\\_SAFAIS](http://www.crm.cat/2019/IRP_SAFAIS)  
**October 21 - December 15, 2019**  
 CENTRE DE RECERCA MATEMÀTICA  
 BARCELONA

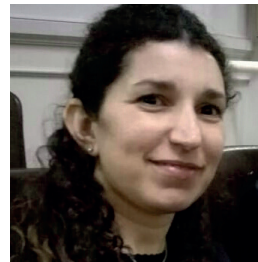
Logos: BEZOUT, The Research Council of Norway, NTNU, CRM, UP EM

# SPACES OF ANALYTIC FUNCTIONS: APPROXIMATION, INTERPOLATION, SAMPLING

from October 21 to December 15, 2019



**Muthukumar Perumal**  
 Indian Statistical Institute, India



**Maria Guadalupe Garcia**  
 National University of La Plata, Argentina

# SCHOOLS IN PARTNERSHIP

In **2019**, CIMPA financed  
**17** Schools in Partnerships  
in **17** countries  
for a total cost of **€65,263**

CIMPA support schools of mathematics at Master's level or students at the end of their undergraduate studies, in partnership with continental mathematical societies:

- ▶ **African Mathematical Schools**
- ▶ **Escuelas de Matemática de América Latina y del Caribe (EMALCA)**
- ▶ **SEAMS Schools of Mathematics (SEAMS)**
- ▶ **West Asian Mathematical Schools (WAMS)**

The Schools in Partnership take place in higher education and research institutions in Africa, South or Central America and West Asia, and have a duration of 1 to 3 weeks.

CIMPA's financial support covers the travel and subsistence expenses for participants from neighbouring developing countries.



## AFRICAN MATHEMATICAL SCHOOLS

- 1** Modélisation mathématique et innovations technologiques  
**Université de Lomé, Togo**
- 2** Bases mathématiques de l'intelligence artificielle  
**Université de Yaoundé I - CETIC, Cameroon**
- 3** Algebraic Topology and its Applications  
**Makerere University, Kampala, Uganda**
- 4** Équations aux dérivées partielles :  
analyse théorique, modélisation et mise en oeuvre numérique.  
**Institut National Polytechnique HB (INPHB) Yamoussoukro, Ivory Coast**
- 5** Mathématiques pour les réseaux  
**Institut Supérieur de Technologie d'Antsiranana, Madagascar**
- 6** Mathématiques au service des sciences de la gestion :  
finance, risk management, logistique et systèmes décisionnels  
**École Nationale de Commerce et de Gestion & École Supérieure de Technologie  
Université Ibn Zohr - Agadir, Morocco**



African Math. Schools in Cameroon - July, 2019



WAMS in Iran - September, 2019



EMALCA in Colombia - July, 2019



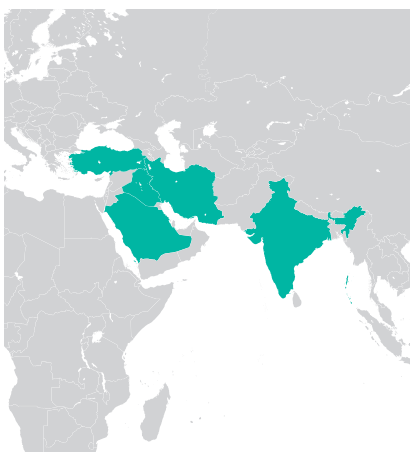
## ESCUELAS DE MATEMATICA DE AMERICA LATINA Y DEL CARIBE

- 1** Universidad Autónoma de San Luis Potosí and Universidad Autónoma de Zacatecas, México
- 2** Universidad del Cauca, Colombia
- 3** Universidad de Costa Rica, Costa Rica
- 4** Universidad Autónoma Tomás Frías, Bolivia
- 5** Universidad Nacional de la Patagonia San Juan Bosco, Argentina



## SOUTH EAST ASIAN MATHEMATICAL SCHOOLS

- 1** Optimization and Algorithms in Dynamic Environments  
**VAST-SEAMS School Hanoi, Vietnam**



## WEST ASIAN MATHEMATICAL SCHOOLS

- 1** Representation Theory  
**University of Sulaimani, Iraq**
- 2** Introductory Topics in Number Theory and Differential Geometry  
**King Khalid University, Saudi Arabia**
- 3** Recent Developments and Applications of Partial Differential Equations, from Theory to Simulation (RDAPDEs)  
**Indian Institute of Technology, India**
- 4** Applied Algebraic Geometry  
**Institute for Advanced Studies in Basic Sciences (IASBS), Iran**
- 5** Mathematics and their Interactions  
**Nesin Mathematics Village, Turkey**



African Math. Schools in Morocco  
December, 2019



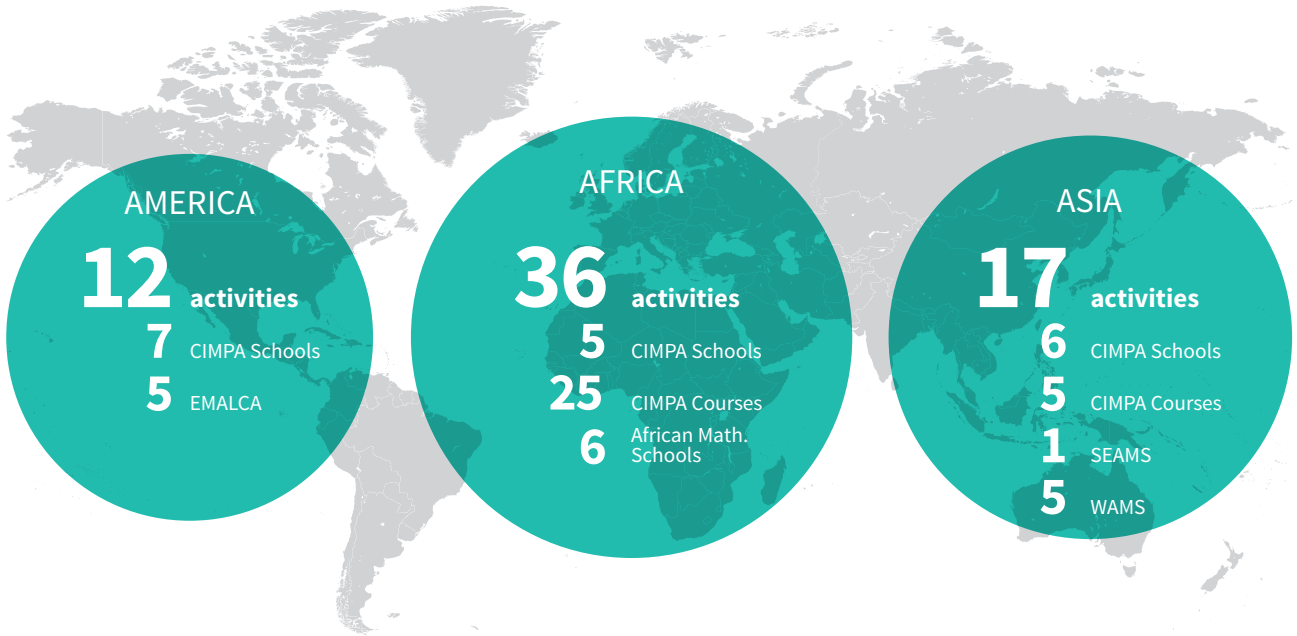
WAMS in Turkey - November, 2019



EMALCA in Costa Rica - August, 2019

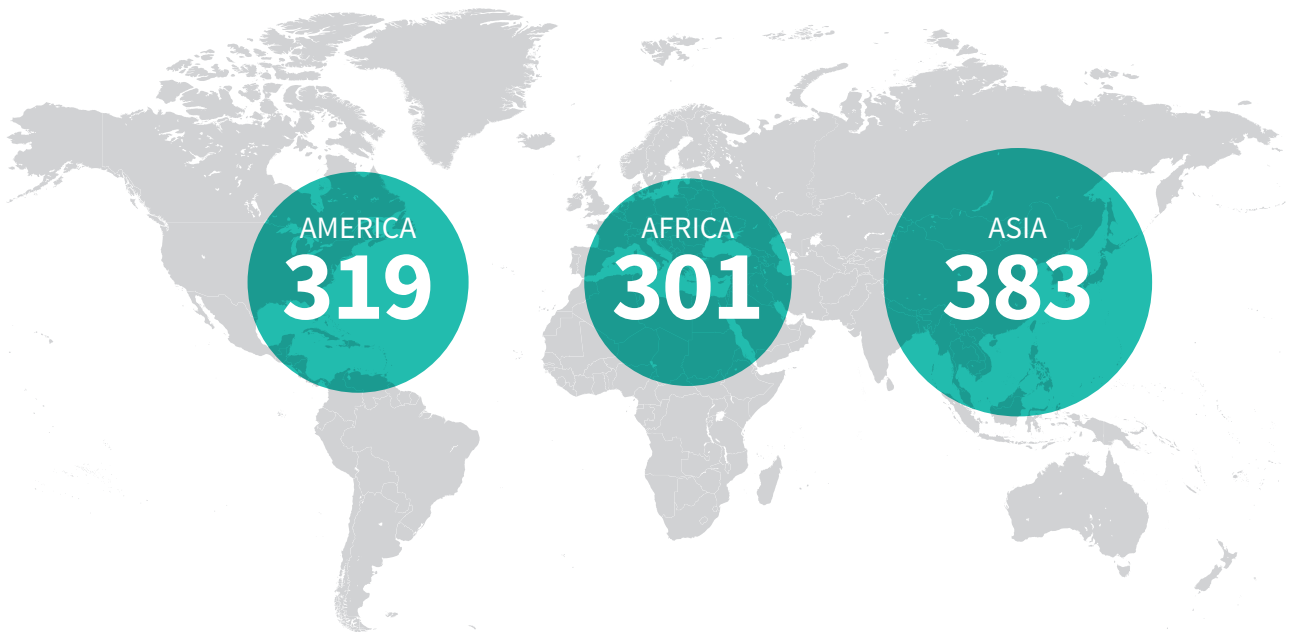
# STATISTICS

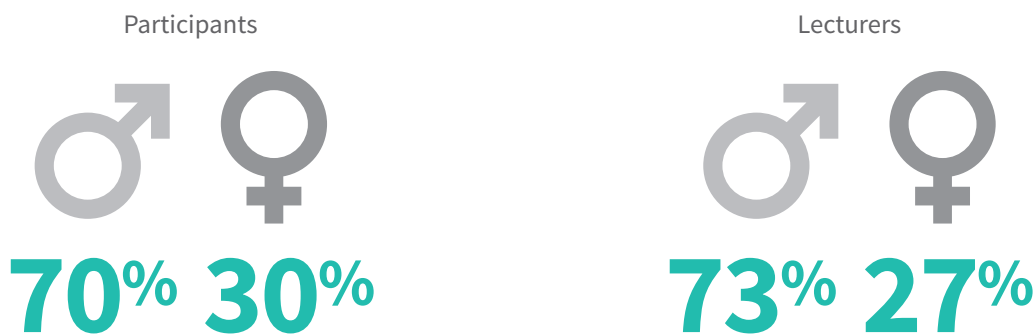
## CIMPA ACTIVITIES



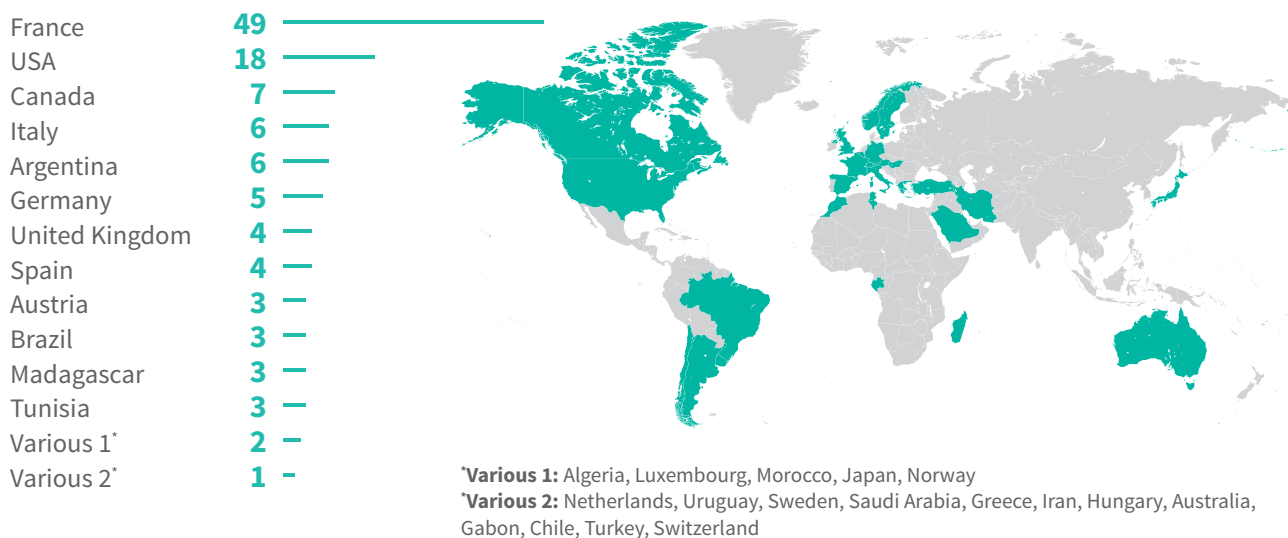
## CIMPA SCHOOLS

Number of participants by continent of origin



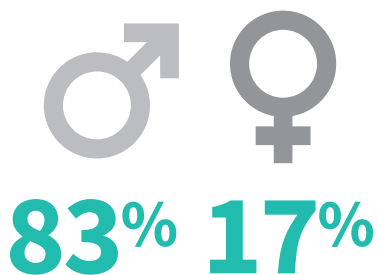


Number of lecturers by country of origin



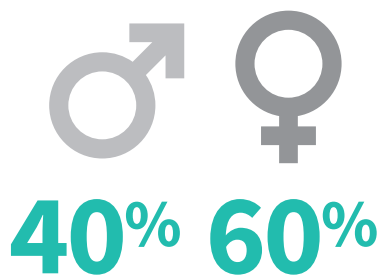
CIMPA COURSES

Lecturers



CIMPA FELLOWSHIPS

Laureates



# CIMPA SUBSIDIES AND ALLOCATION OF EXPENSES

The CIMPA receives subsidies from the following European and international institutions:

- ▶ Ministère de l'Enseignement Supérieur et de la Recherche (France)
- ▶ Université Nice Sophia Antipolis (France)
- ▶ Laboratoire d'Excellence CARMIN (France)
- ▶ Institut des Sciences Mathématiques et de leurs Interactions du CNRS (France)
- ▶ Ministère des Affaires Étrangères et Européennes (France)
- ▶ Ministerio de Ciencia, Innovación y Universidades (Spain)
- ▶ Ministry of Education and Research (Norway)
- ▶ Secrétariat d'État à la formation, à la recherche et à l'innovation (Switzerland)

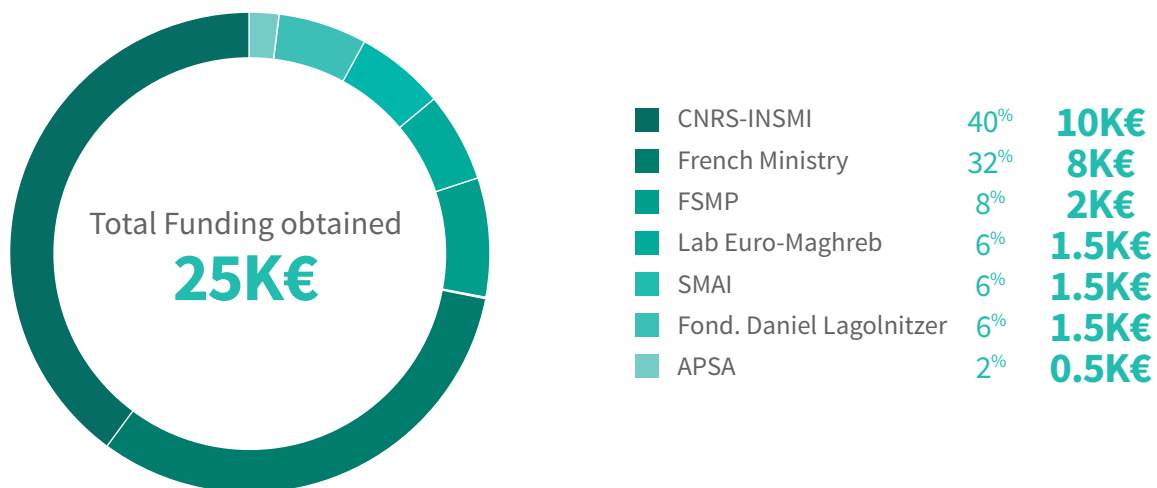


## 2019'S SUBSIDIES

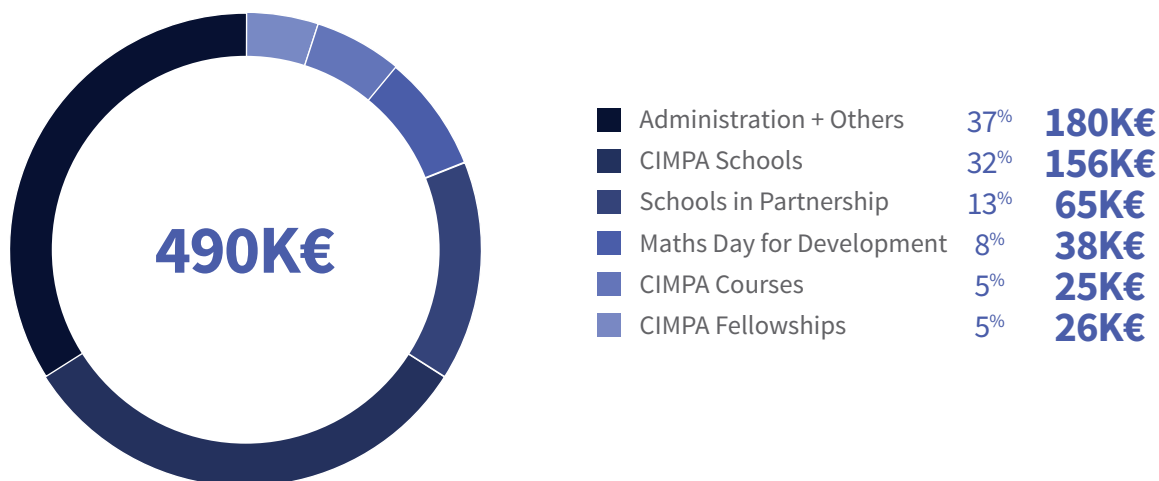


France Ministry	48%	<b>231K€</b>
Switzerland (Univ. of Neuchâtel and EPFL)	25%	<b>122K€</b>
Labex CARMIN	12%	<b>58K€</b>
Norway Ministry	6%	<b>30K€</b>
Spain Ministry	3%	<b>14K€</b>
Université Nice Sophia Antipolis	2.5%	<b>12K€</b>
Own ressources	2%	<b>10K€</b>
CNRS-INSMI	1.5%	<b>7K€</b>

## MATHS DAY FOR DEVELOPMENT EXCEPTIONAL SUBSIDIES

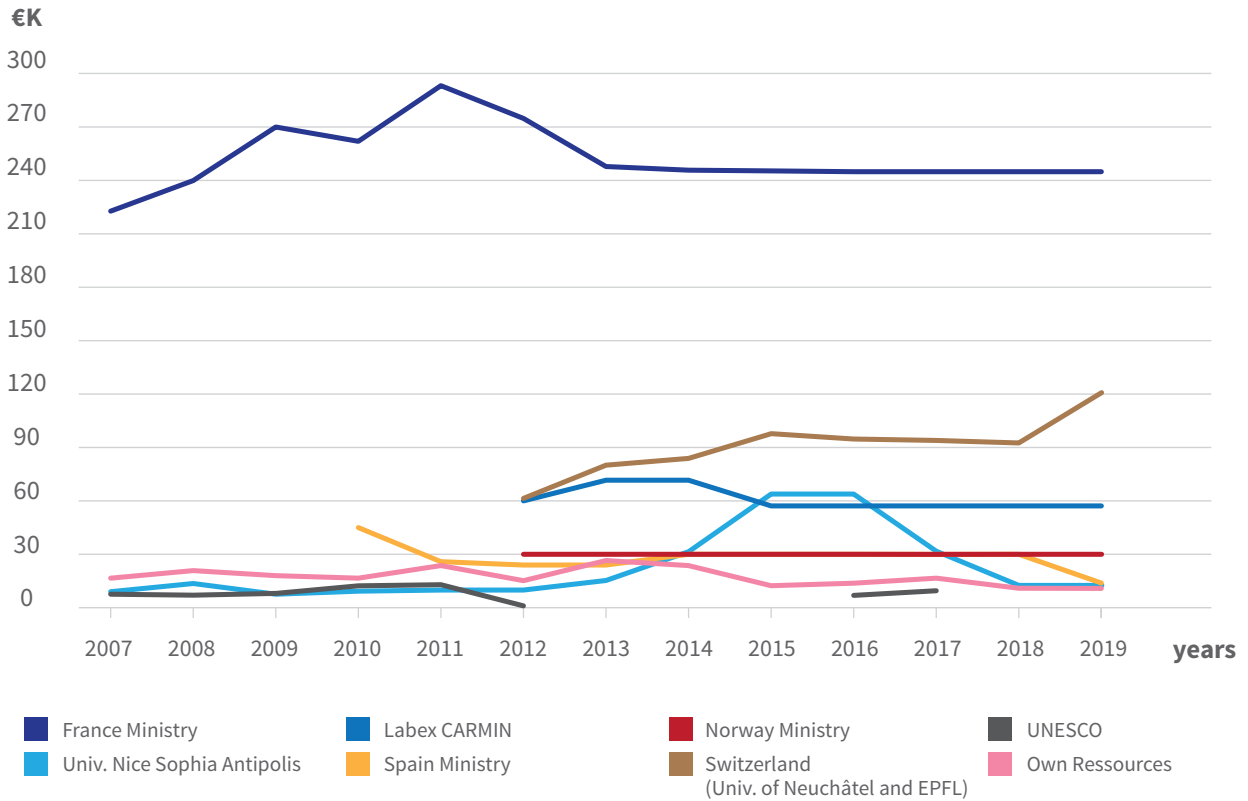


## 2019'S EXPENSES

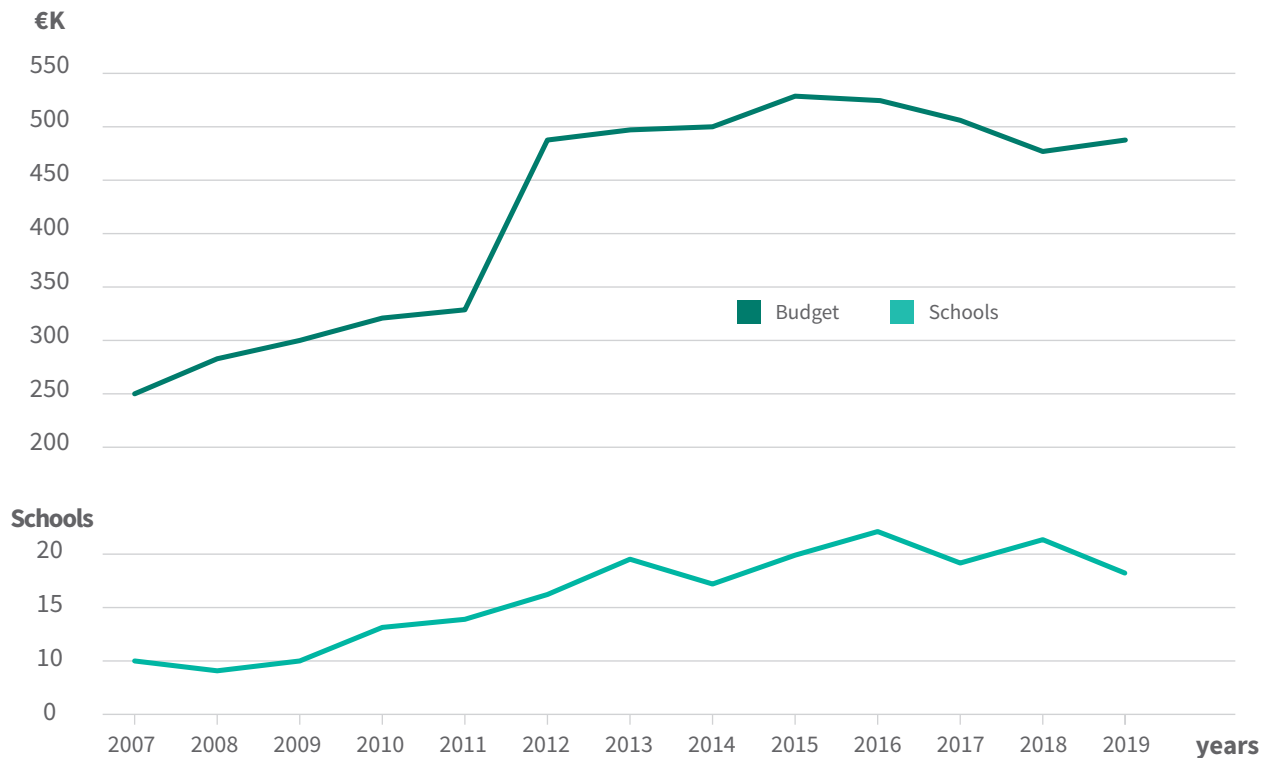


# EVOLUTION OVER THE YEARS

## EVOLUTION OF SUBSIDIES



## BUDGET EVOLUTION AND NUMBER OF CIMPA SCHOOLS





# NOTES

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# 2019 FINANCIAL STATEMENT

## INCOMES

	€
MENESR/DGRI	230 920,00
MENESR/DGRI - Maths Day for Development (March 15, 2019)	8 000,00
Ministerio de Ciencia e Innovacion (Spain)/FECYT	0,00
Université de Neuchâtel et EPFL (140 000 CHF)	121 985,22
Ministry of Education and Research (Norway)	30 000,00
CNRS-INSMI	7 000,00
CNRS-INSMI - Maths Day for Development (March 15, 2019)	10 000,00
Labo euro-maghrébin - Maths Day for Development (March 15, 2019)	1 500,00
SMAI - Maths Day for Development (March 15, 2019)	1 500,00
FSMP - Maths Day for Development (March 15, 2019)	2 000,00
Fondation Daniel Iagolnitzer - Maths Day for Development (March 15, 2019)	1 500,00
APSA - Maths Day for Development (March 15, 2019)	500,00
Labex CARMIN	57 639,00
MAEE-Iraq	6 000,00
Institut Français Brasil - support CIMPA School in Brazil	3 000,00
Université Nice Sophia-Antipolis	11 826,63
Membership fees, Donations, registration fees	10 116,66

**TOTAL INCOMES 503 487,51**

## EXPENSES

ACTIVITIES	€
<b>CIMPA SCHOOLS</b>	
Montevideo, Uruguay	8 187,24
Saida, Algeria	9 688,13
Pieton-Ville, Haiti - SCHOOL CANCELED	3 067,03
Hanoi, Vietnam	11 799,73
Isfahan, Iran	10 278,00
Dhaka, Bangladesh	3 338,98
Havana, Cuba	10 784,00
Tabriz, Iran	10 000,00
Kathmandu, Nepal	11 583,86
Bogotá, Colombia	8 000,67
Tunis, Tunisia	8 704,00
Tehran, Iran - SCHOOL CANCELED	0,00
Limbe, Cameroon	11 815,99
Kenitra, Morocco	9 917,00
Ibarra, Ecuador - SCHOOL CANCELED	0,00
Antananarivo, Madagascar	7 719,00
Cordoba, Argentina	4 162,51
Buenos Aires, Argentina	8 938,00
João Pessoa, Brazil	8 163,65
Talca, Chile	5 959,00
Varanasi, India	4 180,00
<b>TOTAL CIMPA SCHOOLS</b>	<b>156 286,79</b>

SCHOOLS IN PARTNERSHIP	
EMA	31 625,08
EMALCA	12 637,81
SEAMS	5 000,00
WAMS	16 000,00
<b>TOTAL SCHOOLS IN PARTNERSHIP</b>	<b>65 262,89</b>

CIMPA FELLOWSHIPS	
Trimestre IHP T1 "The Mathematics of Imaging" (3 laureates)	8 178,35
Trimestre IHP T2 "Reinventing Rational Points" (3 laureates)	8 966,71
Trimestre IHP T3 "Les mathématiques du climat et de l'environnement" (2 laureates)	6 888,82
Intensive Research Programme CRM (Barcelone) SAFAIS-2019"Spaces of Analytic Functions: Approximation, Interpolation, Sampling" (2 laureates)	2 236,00
<b>TOTAL CIMPA FELLOWSHIPS</b>	<b>26 269,88</b>

CIMPA COURSES	
Semester 1 (with the balance of the semester 2 of 2018)	19 584,09
Semester 2	5 824,93
<b>TOTAL CIMPA COURSES</b>	<b>25 409,02</b>

OTHER EXPENSES	
Math Day for Development 15/03/2019	37 677,80
Support IRAQ activities in Iraq through the French Embassy in Iraq	5 536,29
Travel expenses of members of the Executive Team and the Governing Board	24 018,54
Expenses for General Assembly/Governing Board/Scientific Council/Steering Committee meetings	14 650,61
<b>TOTAL OTHER EXPENSES</b>	<b>81 883,24</b>
<b>TOTAL ACTIVITIES</b>	<b>355 111,82</b>

ADMINISTRATIVE EXPENSES	€
Rent, Equipment, Office Supplies	8 980,53
Website, Communication Supports	9 159,69
Bank Fees, Taxes, Membership fees	16 213,11
Salaries, Payroll Taxes	100 250,88
<b>TOTAL ADMINISTRATIVE EXPENSES</b>	<b>134 604,21</b>

<b>TOTAL EXPENSES</b>	<b>489 716,03</b>
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<b>SURPLUS</b>	<b>13 771,48</b>
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<b>TOTAL GENERAL</b>	<b>503 487,51</b>
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Provisional budget as of December 31<sup>st</sup>, 2019



# CIMPA

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Campus Valrose, Bâtiment Dieudonné II

06108 NICE CEDEX 02 - France

+33 4 89 15 04 66 ✉ [admin@cimpa.info](mailto:admin@cimpa.info) 🌐 [www.cimpa.info](http://www.cimpa.info)

