

**Report of  
The AFRICAN MATHEMATICAL SCHOOL and  
The CRAG-6 International Conference organized at the University of  
Bamenda\***

*\* The following report presents the organization of the two events, the list of participants and the sponsors*

**Bamenda, 06 June 2016-17 June 2016**

**I- The African Mathematical School**

The African Mathematical School was co- organized in the University of Bamenda in Cameroon with the Pole of Research in Mathematics and their Application to Information Security PRMAIS ( www.prmasi.org ) from the 06 June to 17 June 2016. The title of the African Mathematical School was:

***1- Mathematics Applied to Cryptology and Information Security***

***2- Improve the Teaching of Mathematics with Computer Software and Technological Tools***

The school was organized under the patronage of the Vice-Chancellor of the University of Bamenda and under the scientific coordination of Dr. Fouotsa Emmanuel, permanent lecturer in the department of Mathematics.

**1. Number of Participants**

The African Mathematical School registered a total of 112 Participants with the complete details given in the following table.

Participants description	Number of Participants	Number of females	Countries/Town/universities of origin
Invited lecturer and researchers from Europe	07	02	France, Germany
Invited lecturer and researcher from Africa	06	01	Nigeria, Gabon, Tchad, Congo Brazaville, Senegal, Burkina Faso
Participants from Africa except Cameroon (Master and beginning PhD students)	08	02	Gabon, Tchad, Congo Brazaville, Senegal, Burkina Faso, Benin
Participants from the 6 State Universities in Cameroon excluded Bamenda	22	05	University of Dschang, Douala, Ngaoundere, Maroua, Buéa and Yaounde 1.
Participants from the University of Bamenda	69	08	University of Bamenda
<b>TOTAL</b>	<b>112</b>	18	

This number corresponds to students who effectively attended the different courses during the school.

Participants from outside Cameroon were welcomed at Douala International Airport by Dr. Fouotsa Emmanuel ( Scientific coordinator) on the 04 June 2016 and 11 June 2016 for other invited lecturers. They spent the night in Hotel Saffana in Douala and on board a Bus hired in the Company Guarranty Express Voyage, the participants travel to Bamenda on Sunday 05 June 2016. In Bamenda, All the participants out of Bamenda were lodged in three Hotels: Elissam Hotel, Blue Pearl Hotel and the Guest House of the University of Bamenda.

## **2. Scientific Activities**

### **2-1 Opening Ceremony**

The Vice-Chancellor of The University of Bamenda with all the academic and administrative staff of the University of Bamenda opened the African Mathematical School on the 06 June 2016 in the big hall PBB07 of the University of Bamenda. A key note speak on the role play by Cryptology was then given by Pierre-louis Cayrel, one of the invited Lecturer.

### **2.2. Lectures**

The lectures started at 11:00 AM on the same date and this continued for two weeks ( up to 17 June 2016) except the week-ends.

The seven lectures delivered during the school are:

L1: Code-Based Cryptography (8 hours) by Pierre-Louis Cayrel (*Université Saint-Etienne, France*)

L2: Lattices-Based Cryptography (8 hours) by Leo Ducas (*CWI Amsterdam*)

L3: Elliptic Curves Cryptography (7hours) by Sorina Ionica (*Univeristé de Picardie, France*)

L4: Randomness in Mathematical Cryptology (6 hours) by Damien Vergnaud (*ENS de Paris, France*)

L5: Postquantum Cryptography and Homomorphic encryption (8hours) by *Johannes Buchmann, TUD, Gemany*)

L6: PARI/GP, GeoGebra Practice and Modern Tools for Teaching Mathematics(8 hours) by Denis Simon (*Université de Caen, France*)

L7: Integrating Technology in the Teaching of Mathematics: Affordances and Tools (6 hours) by *Ayotola Aremu (University of Ibadan, Nigeria)*

Participants were attending lectures in the Computer center of the University of Bamenda. This was very useful for the practical for the lectures L2, L3, L6 and L7. A special session on the use of technological tools for the teaching of Mathematics was very appreciated by participants. This was done with materials brought by Pr. Denis Simon and other one manufactured in Bamenda upon its arrival. All the lectures were in English. Students were very attentive and were asking questions. Students also worked on projects given by some lecturers at the beginning of their lectures. Students also present their master thesis projects during the school in parallel to the CRAG-6 conference. Local transportation of participants was ensured by the University cars.

### **2-3 Closing ceremony and departure of participants**

The African Mathematical School ended on Friday 17 June during a ceremony conducted by the Vice-Chancellor of the University of Bamenda. This was a first international school/event organized in the University of Bamenda. The Authorities acknowledged the support from partners and thanked the invited lecturers. All the participants were happy to have attended this school on selected on topic and on time aspects of applications of Mathematics in daily life. This could draw the attention of the young University of Bamenda to develop academic programs in

Mathematics including Mathematical cryptology. Several contacts and collaborations will surely come from this school. Participants out of Cameroon spent one more night (17/06/2016) again in Bamenda and started the journey to the Douala Airport on the 18 June of 2016 at 05h00 AM, under the coordination of Dr. Fouotsa Emmanuel.

## **II- Other event organized in parallel with the African Mathematical School:**

### **II-1 The meeting of the PRMAIS ([www.prmasi.org](http://www.prmasi.org)) members.**

This was done in the presence of members from Senegal, Benin, Congo Brazaville, Gabon and Cameroon. Under the coordination of the Coordinator Dr. Tony Ezome and the Facilitator Marie-Françoise Roy, several points were discussed for a good functioning of the pole. This include the strategy for including new members from other countries to support development of Mathematics in Africa.

### **II-2 The CRAG-6 International Conference**

#### **II-2-1 Presentation**

During the last three days (15 June to 17 June 2016), was partially organized in PARALLEL to the African Mathematical School, The 6th Edition of the International Conference CRAG-6 ( Cryptography, Geometry and Algebra)

This conference was still organized under the Patronage of the Vice-Chancellor of the University of Bamenda.

The topics covered were:

- Algebra, Geometry, Coding Theory and Cryptology*
- Mathematical Finance*

The following researchers were mainly involved in the organisation

- Chair: Daniel Tieudjo, Université de Ngaoundéré, Cameroon  
Co-Chairs: Daniel Akume Akume, The University of Bamenda, Cameroon  
Celestin Lele, Université de Dschang, Cameroon  
Marcel Tonga, University of Yaoundé 1, Cameroon

Local Organizing Committee

- Kum Cletus Kwa, The University of Bamenda
- Emmanuel Fouotsa, The University of Bamenda

Invited Speakers:

- Damien Vergnaud (ENS Paris, France)
- Leonard Kwuida (Bern University of Sciences, Swiss)
- Olivier Menoukeu Pamen (University of Liverpool, UK)
- Louis-Aimé Fono (University of Douala, Cameroon)

### **II-2-2 Participants:**

Adding the number of participants of the African Mathematical School ( 112) , 39 other participants came for the international conference. They are from Cameroon, Nigeria, Sweden, UK, Swiss, France. The complete list of participants, together with their sponsor, is attached.

### **II-2-3 Communications:**

The participants of the conference and some students of the African Mathematical School presented their research results at the conference. In total we registered 4 Plenary talks of 50 minutes each and 37 communications of 25 minutes each. All in the domain related to Mathematical cryptology and Mathematical Finance. Some of the communications were done in parallel.

### **III- Sponsors**

The organization of the joint events African Mathematical School and CRAG-6 international conference was sponsored by the following organizations:

- 1- CIMPA-ICPAM funds for the African Mathematical School
- 2- CIMPA-ICPAM funds for "Support to Training and research"
- 3- PRMAIS (Pole of Research in Mathematics and their Application to Information security [www.prmasi.org](http://www.prmasi.org))
- 4- PRMAIS: Facilitations Funds
- 5- LIRIMA-MACISA ( INRIA)
- 6- DAAD
- 7- IMU
- 8- AMMSI
- 9- The University of Bamenda
- 10- Higher Teacher Training College of The University of Bamenda
- 11- Les Brasseries du Cameroun (soft drinks during the closing ceremony).

The Proceedings of the CRAG-6 Conference will be published by the African Journal of Pure and Applied Mathematics, IMHOTEP.

More information on the two events are available on the webpage: [www.httcambili.com/AMS](http://www.httcambili.com/AMS)