

# Report of the workshop

## Women in Mathematics Ouaga 2012

The African Mathematical Union (AMU) through its « Women in Mathematics Committee » (AMUCWMA) and the International Center for Pure and Applied Mathematics (CIMPA/ICPAM) took the initiative of the workshop Women in Mathematics, Ouaga 2012, following the one organized in Maputo (Mozambique) in 2008.

The workshop took place on 26 and 27 October 2012 at the University of Ouagadougou in Burkina Faso. More than seventy (70) people participated in the workshop, including at least forty (40) women, from the following countries : Benin, Burkina Faso, Congo Brazzaville, Congo Kinshasa, Ethiopia, France, Ghana, Ivory Coast, Kenya, Madagascar, Malawi, Mali, Morocco, Mozambique, Nigeria, Peru, Senegal, Tanzania, Zimbabwe.

Women participants from abroad were mainly university professors and PhD or master students. Most of them are working mathematicians, some are persons in charge of education. Among the Burkinabe participants there were also women who teach mathematics in secondary schools and students.

The activities of the workshop included:

- Lectures on the following topics:

- Mathematics, society and development, Fanja Rakotondrajao, University of Antananarivo,

- Popularization of Mathematics, Julien Cassaigne, University of Marseille.

- A study on gender and mathematics throughout the world, Nouzha El Yacoubi, University of Rabat,

- Scientific culture in the South: issues and perspectives for Africa, Stanislas Ouaro, University of Ouagadougou,

- Education and Gender in Burkina Faso, Edwige Zongo and Dieudonné Korsaga on behalf of the Minister for the Promotion of Women in Burkina Faso.

- Five (5) lectures of young participants on their research.

- Security issues in medical wireless sensor networks, Mwawi Nyirenda Kayuni, Security issues in wireless medical sensor networks, Royal Holloway, University of London

- A vector SIS malaria model in a patchy environment with age structure, Josephine Wairimu Kagunda, University of Nairobi

- Cryptographic Hash functions, Nafissatou Diarra, Université Cheikh Anta Diop de Dakar

- The challenges of teaching statistics in virtual environments through ODL, Nilsa Cherinda, Universidade Eduardo Mondlane

- Predicting breakthrough time for selected oil reservoirs in the Niger delta using fractal dimension in a Percolation Model, Chisara Peace Ogbogbo, University of Ghana

- A panel on the situation of african women mathematician.

Each of the five regions of Africa inside AMU was represented, by

- Ibtissam Medarhri, Ecole d'Ingénieurs Mahammedia-Rabat, Northern Africa Region
- Senelani Dorothy Hove-Musekwa, National University of Science and Technology, Zimbabwe, South Africa Region
- Fanja Rakotondrajao, University of Antananarivo, Madagascar, Eastern Africa Region
- Rebecca Walo, University of Kinshasa, Congo Kinshasa, Central Africa Region
- Marie-Françoise Ouedraogo, University of Ouagadougou, Western Africa Region

The panelists also included

- Marie-Françoise Roy, University of Rennes 1, France, European Women in Mathematics convenor, ICPAM/CIMPA representative
- Pétronille Kafando, professor of physics at University of Ouagadougou

Short presentations were followed by many contributions from the attendees. There is a general agreement that the situation of African women in mathematics remains critical. Their number is very small compared to the number of men and the proportion, in average 11 %, remains stable, while the proportion of women in the population is about 51 %.

The panel identified various factors hindering the promotion of women in mathematics, such as socio-cultural stereotypes and habits, lack of confidence of men in the capacities of women, weak number of women students in mathematics, lack of opportunities in Africa after mathematical studies and lack of role models.

Some ideas to improve the situation were proposed. They appear in the recommendations of the workshop, at the end of this text.

The workshop proposed to organize women mathematicians in Africa and launch a permanent framework aiming at creating an association of african women in mathematics, to consolidate the results of the present workshop and improve the situation of women mathematicians in Africa from the point of view of number, capacity, research activity and collaboration between them and with their male colleagues. This is the reason why it was proposed to create a UNESCO chair for « Women and Mathematics in Africa » based in Ouagadougou in Burkina Faso.

The workshop is in itself a success and has already had a positive impact since more than half of the non Burkinabe participants in the Bobo-Dioulasso ICPAM/CIMPA

school on « Discrete mathematics : combinatorial, dynamical, algorithmical aspects » are women.

Participants in the workshop thanked the organisers for the initiative, the quality of the lectures and the scientific program, and the level of the discussions. The atmosphere was friendly and animated. The material conditions were perfect.

Many thanks to all the sponsors for their financial or organizational support:

- African Mathematical Union (AMU)
- International Center for Pure and Applied Mathematics (ICPAM/CIMPA)
- International Mathematical Union (IMU)
- International Center of Theoretical Physics (ICTP)
- London Mathematical Society (LMS) and African Mathematics Millennium Science Initiative (AMMSI). LMS – AMMSI
- United Nation for Education and Science organisation (UNESCO)
- Embassy of France in Burkina Faso
- Department of secondary and tertiary education (MESS) from Burkina Faso
- Department of Women's Promotion (MPF) from Burkina Faso
- National Foundation for Education and Research (FONER)
- University of Ouagadougou, Burkina Faso
- University Ouaga2, Burkina Faso
- Polytechnic University of Bobo Dioulasso, Burkina Faso
- Institute of Sciences (IDS), Burkina Faso

## **Recommendations**

### **following the workshop Women in Mathematics, Ouaga 2012**

The recommendations of the workshop are the following.

#### **Women in Mathematics**

- organize a permanent framework to create an « African Association for Women in Mathematics », in contact with similar organizations in the world such as European Women in Mathematics, the Association for Women in Mathematics in the USA, the association Women in Mathematics in India, and African institutions such as AMU and the African Union,
- set national or regional coordinators, a mailing list and a website,
- write a booklet in several languages promoting African women in mathematics and disseminating they realizations, so that they can be used as role models,
- disseminate the information about the network among the African mathematical community, particularly at the occasion of a round-table organized during the next PACOM in Nigeria (2013),

- organize at least every two years a similar workshop in the various parts of Africa, at the occasion of other scientific events. In 2013, the workshop will take place in austral Africa, at the occasion of a CIMPA school in South Africa.

- set or reinforce active regional institutions in each part of Africa. In western Africa, propose a UNESCO chair « Women and Mathematics » in Ouagadougou in coordination with the existing initiatives (« gender » chair in Ouagadougou).

### **Young girls and mathematics**

- train all professors, men and women, starting from primary school professors, to gender awareness and equality among men and women, specially to avoid that young girls leave school early,

- pay a particular attention to the situation in secondary schools, which is a crucial step for keeping girls in the educational system,

- modify the methodology of teaching and promote active and participative techniques,

- disseminate the information on actions taken to encourage the young girls in secondary school to mathematics and generalize them to more countries. Such as: Miss Mathematics in Ivory Coast or Benin, or summer camps in mathematics in Zimbabwe,

- improve the image of mathematics by organizing popularization activities such as the mathematical week, the mathematical clubs, and pay attention to the participation of young girls,

- encourage young girls to participate in mathematics olympiads,

### **Men women equality**

- fight violence against young girls by enforcing existing laws and punishing professors and students involved in such violence,

- raise awareness of the importance of education to women among fathers and mothers and the whole family environment,

### **Conclusion**

- act in a coordinated way with all the users of mathematics and all the other scientist in an interdisciplinary framework, with active collaboration between secondary and higher education, and participation of all, men and women.

We wish that these recommendations will be considered favorably by AMU, UNESCO and CIMPA, in order to contribute efficiently to implement them.

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