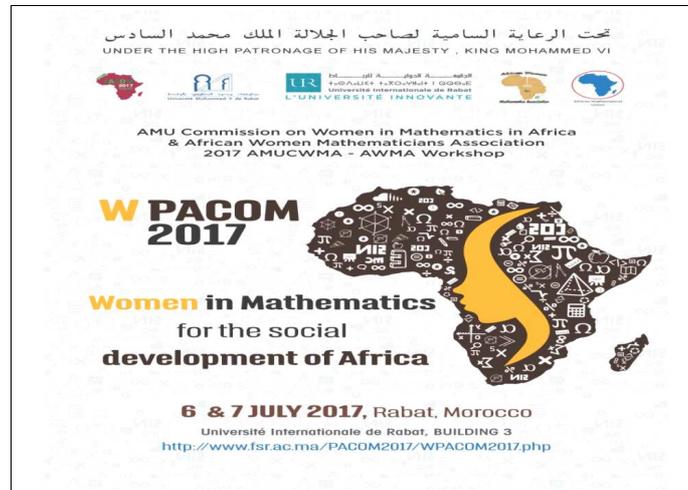


# Report of W-PACOM 2017 held at International University of Rabat, 6<sup>th</sup> to 7<sup>th</sup> JULY 2017



## Background Information

The African Mathematical Union Commission on Women in Mathematics in Africa (AMUCWMA) and the African Women in Mathematics Association (AWMA) organised the AMUCWMA - AWMA Workshop 2017 (W-PACOM 2017) held during the period 6th-7th July 2017 at the International university of Rabat (IUR). This Workshop was part of the 9th Pan African Congress of Mathematicians (PACOM 2017) held in Rabat, Morocco from 3 to 7 July 2017, as a Satellite Conference. The workshop was based on the theme was "Women in Mathematics for the social development of Africa".

This workshop follows a series of workshops, the first one was held at the University of Ouagadougou (Burkina Faso), 26th – 27th October 2012, the second one was held at the African Institute of Mathematical Sciences (AIMS), Cape Town, (South Africa), 17th – 19th of July 2013, and the third one was held in Naivasha, Kenya, 16th – 18th of July 2015.

The workshop had the following main components:

- scientific lectures by renowned mathematicians in their area of research
- Scientific presentations of the work of some participants
- a discussion on AWMA and the committee of Women in Mathematics (CWM) of the International Mathematician Union (IMU).

The workshop aimed to bring together African women mathematicians from the continent to advance the association's agenda, of promoting mathematics and women mathematicians in Africa. The workshop gives young women in science and mathematics the opportunity, as well as men, to meet role models other professional women who have successfully pursued scientific and mathematically-oriented careers. It was intended for;

- African women mathematicians
- Doctoral students;
- Faculty members ;
- All those who are interested in mathematics.

## Conference Proceedings

A number of guest lectures were identified and invited by the organizing committee.

The International organizing committee comprised of the following members:

- Prof. Marie Françoise Ouedraogo (University of Ouaga 1 JKZ, Burkina Faso)
- Prof. Dorothy Hove-Musekwa (National University of Science and Technology, Zimbabwe)

- Prof. Josephine Guidy-Wandja (University of Abidjan, Côte d'Ivoire)
- Prof. Sibusiso Moyo (Durban University of Technology)
- Prof. Yirgalem Tsegaye (Addis Ababa University, Ethiopia)
- Prof. Selmane Shehrazad (University of Science and Technology, Algeria)
- Prof. Sophie Dabo (University of Lille, France)
- Prof. Aissa Wade (AIMS, Senegal)

The Local Organising committee consisted of

- Prof. Nouzha El Yacoubi, AMU Vice President (North Africa)
- Prof. Nadir Maaroufi (International University of Rabat)  
Prof. Souad Bernoussi, Faculty of Sciences, Mohammed V University, Rabat
- Prof. Nouha El Khattabi, Faculty of Sciences, Mohammed V University, Rabat
- Prof. M'Feddal Hilali (International University of Rabat)
- Prof. El Hassan Zerouali (Mohammed V University Rabat, PACOM 2017 Convener)

The workshop attracted 54 participants from at least 11 African Countries within the continent: Algeria [3], Angola [1], Benin [2], Burkina Faso [1], Cameroon [2], France [4], Morocco [29], Nigeria [2], Portugal [1], Senegal [5], Spain [1], Tanzania [1], Tunisia [1], Zimbabwe [1].

The programme was as follows:

#### **Day 1: Thursday 06<sup>th</sup> July 2017**

The opening ceremony had more than 50 participants, with around 15 men among them, the opening ceremony of the W-PACOM 2017 was held at the International university of Rabat(UIR) on Thursday July 06. It started at 09 am. The dignitaries of the day were

- Mr. Abdelaziz Benjouad, Vice president of recherche and development of UIR
- Mr. Adewale Solarin, former president of AMU
- Mrs. Marie Françoise Ouedraogo, President of AWMA
- Mrs. Nouzha El Yacoubi, new elected president of AMU and Chair of PACOM 2017
- Mrs Christine Jouan Bruneau , President of "Femmes de demain"



The ceremony began with a speech of the vice-president of recherche and development, Mr. Abdelaziz Benjouag. He welcomed formally all the dignitaries and the participants coming from all over the continent, on behalf of the president of the university who was not able to come due to some others important meetings. He first talked about the creation of the International university of Rabat. He described the objectives of the UIR and its activities. He also congratulated the organizers of the W-Pacom and

encouraged members of AWMA to follow and achieve the goals of the association, as he said “The world needs science and science needs women.”

He was followed by Prof. Solarin Adewale, former president of the African Mathematical union., addressing very inspiring examples for the women’s association. He gave many examples where women were performing well in mathematics. As he said “based on my experience, women are more passionate when it comes to share knowledge and to teach mathematics. So we need to encourage women to choose and stay in mathematical sciences”. He motivated everyone to actively participate in the workshop and get benefited.

In her address, Prof. Nouzha El Yacoubi, who is the elected president of the AMU and the head of the local organizing committee of the W-Pacom welcomed the participants and congratulated all her team, for the great work they achieved for organizing such a wonderful conference. She gave, based on her experiences, examples and motivated women to pursue a career in mathematics. She said that since mathematics is one of the most challenging areas in sciences, women who choose this path must prove to their societies that they are able to achieve something.

Then, the president of AWMA, Prof. Marie Françoise Ouedraogo gave the history of the creation of AWMA starting by the first meeting in Ouagadougou in 2012, followed by two other meetings: one in South Africa and one in Kenya where women met and discussed about the main issues they are having in their academic and/or social life within mathematics. She congratulated Prof. El Yacoubi for her new presidency of the AMU and she said that “one can hope to see under her presidency, many changes that will bring new directions and innovations in benefit of women in mathematics in Africa since the president is now a woman.” She thanked the organizing committee of the W-Pacom and the sponsors.

At the end, Mme Christine Jouan Bruneau, member of the NGO called “Femmes de demain”, gave the aims of their association and how they are helping and supporting women in science in general. A concrete example is the UNESCO-L’Oréal Award that highlights and acknowledges work of women in sciences. She also thanked the UIR for providing all kinds of facilities to conduct such a workshop in the university.

The first presentation of the W-PACOM was made by Prof. Nadia Raissi, from the Mohammed V University of Rabat on the theme “Mathematical Modelling of fishery management”. She presented several models on fishery management to contribute to the Moroccan fishery regulations. This presentation was followed by Prof. Mercedes Siles Molina, from the University of Malaga on the theme: “Infinite dimensional evolution algebras”. She introduced the basic notions of genetic algebras and evolutive algebras and talked about the decomposability of such algebras. She also described the fragmentation process to decompose the evolutive algebras into its irreducible components.

The third lecture was given by Prof. Eunice Murheiti from the University of Dar es Salam on: “Optimal Control of Prey-Predator System with Harvesting in the presence of drought”. She insisted on the fact that the control strategies include creation of reserve areas with restriction of harvesting for controlling over-harvesting and construction of dams for drought effects mitigation.

These lectures were followed by contributions of Rasika Ettoussi from the Faculty of Sciences and Technologies, Beni Mellal on “Nonlocal Intuitionistic Fuzzy Differential Equation” and Amira Makhoul from Mohamed Seddik Ben Yahia University of Algeria on “Existence of solutions for second order maximal monotone semilinear differential inclusions with Mixed semicontinuous perturbation”.

The day ended with a discussion about AWMA and CWM. The discussion was led by Marie Françoise Ouedraogo, president of AWMA and Marie Françoise Roy, chair of IMU-CWM. It began with short presentations of the history of the two organizations and their objectives.

Marie Françoise Ouedraogo gave a brief history of the creation of AWMA and presented the different members of the standing committee (vice presidents, secretary, treasurer, etc...). She also explained the main objectives of the association and the different activities that have taken place so far. She also emphasized the reminding things to be done. Among others, we have

- to update the database of women with doctorate degree in Africa
- to make booklets with women mathematician in Africa as role model for young girls
- to organize scientific workshops, schools or conferences in specific areas of mathematic
- to have a meeting in a central African country

One also needs to encourage the creation of national associations as the ones existing in Ivory Coast, Senegal, Tunisia, Cameroon, Kenya, Nigeria.

Then, Marie Françoise Roy talked about IMU-CWM, the International Mathematical Union Committee for Women in Mathematics. She presented the committee's initiatives that she is leading since 3 years and highlighted all the various successful activities they conducted thus far

- encourage networks of women at the regional level (in Africa, in India, in Latino-America)
- support Schools and conferences in the developping world
- funding activities related to women in mathematics

She also presented the CWM flyers which contains a brief description of the objectives and activities of the committee. She distributed them to the participants and gave some announcements:

- CWM is organizing a satellite meeting of ICM2018 in Brazil: World meeting for women in Mathematics (WM)<sup>2</sup>.
- The proposal to ICSU (International Council of Scientific Unions) for the project "A Global approach to the Gender Gap in Mathematical and Natural Sciences : how to measure it, how to reduce it ?" has been successful. The award is of 300,000 Euros for the period 2017-2019. IMU was one of the two leading applicants. See <https://icsugendergapinscience.org/>.

After their presentation, the floor was open to questions that leads to the following discussions:

*Promote mathematics among girls:* Some participants shared their experiences with the audience and explained the progress they have done so far in their countries.

*The fundings issues of AWMA:* they are few people that are paying their annual fees to the association and this is far from enough to support the activities of AWMA. The treasurer, Fagueye Sylla, pointed out that the bank charges for the account of AWMA opened in Senegal is very large. She has just noticed this when she got the Bank statement before attending the PACOM 2017. She said that the bank fees are about 15 USD per month, which is very expensive since there is not enough money in the account. She said that she will approach another bank for example Ecobank to see whether she can get a reduction of the bank charges. If this is not possible, one will try to open the account in another country where bank fees are less expensive.

Others participants also expressed the need of the association to raise it own funds to support its activities. On needs to find a way to become financially independent in order to be able to make activities where many AWMA members would participate in the future.

*Collection of the fees payments to AWMA:* An efficient way to make people pay their fees to AWMA each year was also discussed. One proposal was to encourage the creation of national associations then the president of each local association, would be in charge of collecting the fees of each member in that country and send it to the treasurer. For example, if one fixed the fees of a local association to be 70 USD per member, the president of the local association will send 40 USD to AWMA and keep the 30 USD for the local association's activities.

*Database of Good Practices:* This is a way to collect all the good experiences that have been done in different countries in order to reach young learners and encourage them to study mathematics. This is one of the activities initiated by the ICSU project on gender gap in science.

**Day 2: Friday 07<sup>th</sup> July 2017**

The day began with the lecture of Prof. Aissa Wade, from Pennsylvania University USA and AIMS Senegal on the theme "On generalized Kahler geometry". She recalled that a generalized Kahler structure on a smooth even-dimensional manifold is at the intersection of symplectic geometry, Riemannian geometry and contact geometry. She illustrated this new theory with classical examples and explained their new method for constructing non-trivial generalized Kahler manifolds using trans-Sasakian manifolds and wrapped product metrics. This presentation was followed by the lecture of Marie Françoise Roy, University of Rennes, on the theme "Complexity of computing the topology of a real algebraic curve using amortized bounds for polynomials with algebraic coefficients". In this talk, she presented present an algorithm using no change of variable whose complexity coincides with the complexity of isolating the real zeroes of the discriminant of the equation of the curve. The tools of the proof combine classical quantitative algebraic and geometric results and recent algorithmic progress on amortized bounds for algebraic numbers. These lectures were followed by contributions of Dr Bouchra Ben Amma from Morocco on "Numerical solution of Intuitionistic Fuzzy Differential Equations by Runge-Kutta method of order four" and Dr Adegboye Zamurat from Kaduna Poly of Nigeria on "Scheme formulation techniques for direct integration of general nth order ODEs".

This workshop was a follow-up activity of AWMA and as mentioned during the discussion session, here is the programme of future activities of AWMA:

- continue to update the database of women with doctorate degree in Africa
- make booklets with women mathematicians as role model for young girls
- organize scientific workshops, school or conference in specific area of mathematics
- have a meeting in a central African country

The workshop W-PACOM 2017 ended with the closing ceremony.

W-PACOM 2017 should have included the second general assembly of AWMA. Unfortunately, due to lack of funding, we were not able to bring all the standing committee to Rabat. We postponed the GA to 2018 during a school we are planning to organize.

For the future editions of W-PACOM it would be better to hold the satellite meeting just before PACOM, and to include a panel discussion on women in mathematics inside PACOM so that it is possible to women to follow PACOM activities and better integrate the women to the mathematical african community. In Rabat, the dates of WPACOM were included inside the dates of PACOM and the location of WPACOM and PACOM where at some distance which made the contacts difficult. However a short report of W-PACOM was presented by Marie Françoise Ouedraogo during PACOM 2017 closing ceremony.

## **FUNDERS/SPONSORS**

Many thanks to all the sponsors for their financial support:

- African Mathematical Union (AMU)
- Committee for Women in Mathematics of International Mathematical Union (CWM for IMU)
- International university of Rabat (IUR)
- UNESCO
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