

*Promoting Mathematics in Africa
Through the African Mathematics
Millennium Science Initiative (AMMSI)*

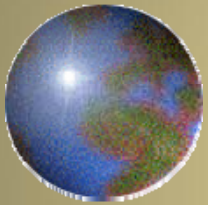
by

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*Regional and Interregional Cooperation to Strengthen Basic Sciences in
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1. BRIEF HISTORY OF AMMSI

1.1 Millennium Science Initiative (MSI)

- ***Formulated and fostered by the World Bank***
- ***Main Goal: Promote S&T spearheaded by scientists in the Developing countries***
- ***Administered by Science Initiative Group (SIG)***
- ***Activities in South America and Asia: Brazil, Chile, Mexico, Vietnam etc***

1.2 Science Initiative Group (SIG)

- **Based in Princeton USA**
- **Chairman of the Board – Professor Phillip Griffiths**
- **Executive Administrator – Arlen Hastings**
- **SIG serves as facilitator and catalyst for establishment of country or regional MSI projects**
- **Website for more information: <http://www.msi-sig.org/>**

1.3 World Bank/SIG Initiatives for Africa

- **Meeting in February 2000**
- **Formation of African MSI Task Force**
- **Efforts culminating in a meeting in Kampala, Uganda in January 2002**
- **Priority areas established by the Kampala meeting for initial stage of African MSI:**
 - ✓ **Instrumentation & Information Technology**
 - ✓ **Biotechnology**
 - ✓ **Mathematics**

1.4 Formation of AMMSI

- **Writing Group constituted in January 2003**
- **Writing Group Members:**
 - ✓ *Professor Wandera Ogana (Chairman), University of Nairobi, Kenya*
 - ✓ *Professor Edward Lungu, University Botswana, Botswana*
 - ✓ *Professor David Bekolle, University of Yaounde 1, Cameroon*
 - ✓ *Professor Sunday Iyahen, National Mathematics Centre, Nigeria*
 - ✓ *Professor Leif Abrahamson, Uppsala University, Sweden*
 - ✓ *Dr. Alan Anderson, USA*
- **Task: Prepare a 5-year proposal**

1.5 AMMSI Writing Group Proposal

- **5-Year proposal**
- **Balancing various activities subject to funding:**
 - ✓ *Teaching and Education*
 - ✓ *Research*
 - ✓ *Linkages and Networking*
 - ✓ *Outreach and Public Education*
 - ✓ *Role of ICT*
- **Forwarded to SIG in December 2003**
- **Submitted for funding consideration**

1.6 Commencement of Activities

- **Late 2004: The Mellon Foundation seed grant of USD 250,000 to be used for**
 - ✓ *Research/Visiting Staff Fellowships*
 - ✓ *Postgraduate Scholarships*
 - ✓ *Regional Scientific meetings*
- **Late 2004: Matching grant from IMU of USD 25,000**
- **Late 2004: Consultations on formation of Programme Committee**
- **Early 2005: Programme Committee constituted and work commences**

1.7 Initial AMMSI Programme Committee

- **Professor Wandera Ogana (Chairman)**

University of Nairobi, Kenya ; Programme Director and Regional Coordinator, Eastern Africa

- **Professor David Bekolle**

University of Yaounde 1, Cameroon; Regional Coordinator, Central Africa

- **Professor Professor Edward Lungu**

University Botswana, Botswana; Regional Coordinator, Southern Africa

- **Professor Samuel Ilori**

University of Ibadan, Nigeria; Regional Coordinator, Western Africa Zone 1

- **Professor Mary Teuw Niane**

Université Gaston Berger de Saint-Louis, Senegal; Regional Coordinator, Western Africa Zone 2

2. MISSION, GOALS AND PROPOSED ACTIVITIES

2.1 AMMSI Mission

To nurture the next generation of African mathematicians and mathematical leadership

2.2 Objectives of AMMSI

- 1) To strengthen the teaching and learning of mathematics and its applications (*Teaching and Education*).
- 2) To support research in mathematics and mathematics education, including interdisciplinary research in areas involving application of mathematics (*Research*).
- 3) To enhance capacity in mathematics and its applications through linkages, networks and regional/international collaboration (*Linkages and Networking*).
- 4) To raise general awareness in mathematics and articulate publicly the importance of mathematics to modern nations (*Outreach and Public Education*).
- 5) To enhance the use of information and communications technology in the teaching, learning and applications of mathematics (*Information and communications Technology [ICT]*).

2.3 Proposed Activities: Advanced mathematics training and education

(Objective 1)

- **Activities meant to be carried out through existing tertiary institutions**
- **Postgraduate training (M.Sc./Ph.D: Tutorial Fellows and Graduate Assistants)**
- **Postgraduate Scholarships**
- **Postdoctoral fellowships**
- **In-service training and short courses for university lecturers**
- **Visiting lectureship programmes**
- **Acquisition of textbooks, electronic access to journals**
- **Regional access to postgraduate courses**

2.4 Proposed Activities: Research in mathematics, mathematics education and applications of mathematics (Objective 2)

- **Basic and applied research, with special emphasis on multidisciplinary projects**
- **Planning and design of research projects**
- **Participation in international research projects involving application of mathematics**
- **Regional conference support**
- **Access to electronic communication and journals**
- **Local and international research mentoring**

2.4 Proposed Activities: Linkages and Networking (Objective 3)

- **It is necessary to leverage all available resources**
- **Organize events in collaboration with**
 - ✓ *African Mathematical Union*
 - ✓ *National/regional/international organizations and institutions*
- **Support organization/attendance of professional meetings**
- **Development of Databases and websites to act as “Clearinghouse of African Mathematics”**
- **Facilitate exchange of students and staff**

2.5 Proposed Activities: Outreach and Public Education (Objective 4)

- **AMMSI Prize for excellence in research and distinguished contribution to mathematics**
- **The African woman in mathematics**
- **University/government/private sector interaction**
- **Public lectures and exhibitions that provide non-technical exposition of mathematics**
- **Mathematics Olympiads (National, Regional, International)**

2.6 Information and Communication Technologies (ICT) (Objective 5)

- **ICT for university research: scientific literature, computing resources, fast internet access etc.**
- **ICT for university education: computer hardware and software, distance learning tools etc.**
- **ICT for schools: computers and other technologies etc.**

3. *ADMINISTRATIVE STRUCTURE*

3.1 AMMSI Network

Distributed network with 5 regional offices, each run by a Regional Coordinator:

▪ **Central Africa:**

Regional Office at University of Yaounde I, Cameroon

▪ **Eastern Africa:**

Regional Office (and also Programme Office) at University of Nairobi, Kenya

▪ **Southern Africa:**

Regional Office at University of Botswana, Botswana

▪ **Western Africa (Zone 1):**

Regional Office at University of Ilorin, Nigeria

▪ **Western Africa (Zone 2):**

Regional Office at University of Ougadougou, Burkina Faso

3.2 AMMSI Programme Office

- **Programme Office has overall coordination of AMMSI activities and is required to be located at one of the Regional Offices**
- **Programme Office is currently located in Nairobi, at the Eastern Africa regional office**
 - ✓ *Director - Prof. Wandera Ogana*
 - ✓ *Financial Services – African Academy of Sciences*

3.3 Programme Committee

The Programme Director and the Regional Coordinators constitute the **AMMSI Programme Committee** whose main functions are:

- To formulate and design the programme
- To write project proposals for funding
- To implement activities
- To liaise with collaborating institutions

3.4 Current Programme Committee

The current **AMMSI Programme Committee** members are:

▪ **Professor Wandera Ogana (Chairman)**

School of Mathematics, University of Nairobi, Kenya

▪ **Professor Bijtong Ndombol**

Faculty of Sciences, University of Yaounde 1, Cameroon

▪ **Professor Professor Edward Lungu**

Department of Mathematics, University Botswana, Botswana

▪ **Professor Samuel Ilori**

Department of Mathematics, University of Ibadan, Nigeria

▪ **Professor Hamidou Toure**

LAME, University of Ouagadougou, Burkina Faso

3.5 Selection and Evaluation Committee

The main functions are:

- **To select Fellowship candidates**
- **To select and evaluate research projects**
- **To evaluate the operations of AMMSI**

Current members are:

- **Professor Bernt Oksendal,**
University of Oslo, Norway (Facilitator)
- **Professor Augustin Banyaga**
Pennsylvania State University, USA
- **Professor Guy Martial Nkiet**
*Universite des Sciences et Technique de Masuku, Francville,
Gabon.*

4. ACTIVITIES TO DATE

4.1 Introduction

- **Funding from various sources for activities (since 2005)**
 - ✓ *The Mellon Foundation*
 - ✓ *International Mathematical Union (IMU)*
 - ✓ *The Nuffield Foundation*
 - ✓ *Leverhulme Trust*
 - ✓ *London Mathematical Society (LMS)*
- **AMMSI conducts its activities through individuals in existing institutions**
- **Memorandum of understanding to operate in collaboration with the African Academy of Sciences (March 2007)**

4.2 Research/Visiting Fellowships

4.2.1 Introduction

- **Maximum Fellowship amount initially USD 3,000 but increased to USD 5,000 in 2007**
- **Soft copy applications from 2006**
- **Online applications tried in 2007 - did not work well**
- **Applications mostly African mathematicians to visit African institutions, except for an awardee from USA who visited KIST, in Rwanda in 2008**
- **Suspended from 2009 due to end of the Mellon Foundation grant**

4.2.2 Total Fellowship Awards

Table below shows the total number of awards during 2005 - 2008

	CA	EA	SA	WA1	WA2	Total
Males (No.)	3	4	2	4	6	19
Males (%)	50	100	67	100	100	83
Females (No.)	3	0	1	0	0	4
Females (%)	50	0	33	0	0	17
Total (No.)	6	4	3	4	6	23

4.2.3 Fellowships – Areas of Activity

Actuarial Science	-	1
Applied Mathematics	-	6
Computer Science	-	1
Financial Mathematics	-	3
Mathematical Biology	-	6
Pure Mathematics	-	7

4.3 Postgraduate Scholarships

4.3.1 Introduction

- **For Ph.D, M.Sc and Postgraduate Diploma**
- **Maximum Scholarship amount initially USD 1,000 but increased to USD 2,000 in 2007**
- **Soft copy applications from 2006**
- **Online applications tried in 2007 - did not work well**
- **Although the Mellon Foundation grant ended, this activity continues, in a limited way, in 2009 due to support by the International Mathematical Union**
- **Announcement for 2009 to be made by end of September 2009, with awards in January/February 2010**

4.3.2 Total Scholarship Awards

Table below shows the total number of awards during 2005 - 2008

	CA	EA	SA	WA1	WA2	Total
Males (No.)	28	27	34	43	21	153
Males (%)	82	68	85	80	70	77
Females (No)	6	13	6	11	9	45
Females (%)	18	32	15	20	30	23
Total	34	40	40	54	30	198

4.3.3 Scholarship Awards – By Degree

	CE	EA	SO	WE1	WE2	Total
Ph.D (No.)	5	15	25	35	21	101
Ph.D (%)	15	38	62	65	70	51
M.Sc (No.)	14	25	14	16	3	72
M.Sc (%)	41	62	35	30	10	36
Other (No.)	15	0	1	3	6	25
Other (%)	44	0	3	5	20	13

“Other” refers to Diploma, DEA and Maîtrise

4.3.4 Gender Analysis by Degree

	CE	EA	SO	WE1	WE2	Total
Ph.D (M: No.)	4	12	22	28	16	82
Ph.D (M: %)	80	80	88	80	76	81
Ph.D (F: No.)	1	3	3	7	5	19
Ph.D (F: %)	20	20	12	20	24	19
M.Sc (M: No.)	12	15	11	12	2	52
M.Sc (M: %)	86	60	79	75	67	72
M.Sc (F: No.)	2	10	3	4	1	20
M.Sc (F: %)	14	40	21	25	33	28
Other (M: No.)	12	0	1	3	4	20
Other (M: %)	80	0	100	100	67	80
Other (F: No.)	3	0	0	0	2	5
Other (F: %)	20	0	0	0	33	20

4.4 AMMSI Regional Conferences

- **Conference in Porto Novo, Benin**
 - *10 – 17 August 2005*
 - *Representation Theory in Geometry and Physics*
 - *Organizer: Prof. Jean-Pierre Ezin*
- **Conference in Nairobi, Kenya**
 - *4 – 10 December 2006*
 - *General Eastern African mathematics conference*
 - *Organizer: Prof. Wandera Ogana*
- **SAMSA Conference in Windhoek, Namibia**
 - *26 November – 1 st December 2007*
 - *General Conference*
 - *Organizer: Prof. Edward Lungu*
- **Conference in Yaounde, Cameroon**
 - *1 – 16 January 2009*
 - *Topology and Geometry*
 - *Organizer: Prof. Bitjong Ndombol*

4.5 African Scientific Meetings

- **Mathematical Biology Workshop**

- *6 – 10 December 2006, Nairobi, Kenya*
- *Mini-Course in Mathematical Biology for postgraduate students from all over Africa*
- *Workshop presentations*
- *Lecturers and presenters from Africa, USA and Canada*
- *Roundtable deliberations on Mathematical Biology in Africa*

- **Symposium on the African Woman and Mathematics**

- *29 – 30 November 2008, Maputo, Mozambique*
- *Presentations by prominent African women mathematicians*
- *Presentations by female postgraduate students*
- *Roundtable deliberations on Mathematical Education and the African Woman*

4.6 Conference Support for Postgraduate Students

- **Funds provided by the London Mathematical Society**
- **Maximum of GBP 2,000 for each conference organized, or supported by, AMMSI**
- **Funds cover only travel expenses by postgraduate students to mathematics meetings held in Africa**
- **Request for support made by the meeting organizers through AMMSI**
- **Individuals to be supported are identified by the meeting organizers**
- **Support for 2 – 4 events every year, since 2005**
- **Over 40 Postgraduate students have benefited so far**

***5. MENTORING AFRICAN
RESEARCH IN
MATHEMATICS
(MARM)***

5.1 Focus

MARM focuses on:

- **Establishing longer-term mentoring relations between individual mathematicians and departments in African institutions**
- **Creating joint research partnerships, through mentorship, between mathematicians working in established research centres, their colleagues in sub-Saharan Africa, and postgraduate students of those colleagues.**

5.2 History

- **Initiated in 2005 by:**
 - Herb Clemens (of Commission on Development and Exchanges [CDE], of IMU, {**Now Developing Countries Strategy Group, DCSG**})
 - Wandera Ogana (AMMSI), while on sabbatical leave at The Ohio State University, USA
- **Proposal made and additional partners identified, notably, the London Mathematical Society (LMS)**
- **Funded by**
 - **The Nuffield Foundation (from 2005)**
 - **The Leverhulme Trust (from 2006)**
- **Initially mentors were only UK mathematicians**
- **Mentorship extended to mathematicians from elsewhere**

5.3 Selection Procedure

- **Call for expressions of interest by African departments, indicating areas in which they most need collaboration**
- **Call for expressions of interest by individual mathematicians outside Africa, indicating their areas of expertise**
- **Shortlisting and ranking of African institutions**
- **MARM Board finally matches selected institutions with potential mentors**
- **Contact between selected departments and mentors to work out their own plan and schedule of activities**
- **Limited funding availed for 2 years**

5.4 Current Status

- **For Round 1 in 2005, the following selected out of 11:**
 - Addis Ababa University, Ethiopia
 - University of Buea, Cameroon
 - KNUST, Ghana
- **For Round 2 in 2007, the following selected out of 12:**
 - Laboratory of Applied Mathematics and Computer Science, Ivory Coast
 - National University of Rwanda, Rwanda
 - Makerere University, Uganda
 - Bahir Dar University, Ethiopia
 - University of Ilorin, Nigeria
 - Kenyatta University, Kenya
- **For details of contact persons and activities to date, see: <http://www.lms.ac.uk/grants/MARM.html>**
- **Deadline for Round 3 over, selection process is ongoing**
- ***In future, expressions of interest accepted any time***

***6. WHAT HAVE WE
LEARNED?***

6.1 Impact: Determined from Reports

- **Making a difference to professional careers through Fellowships**
- **Making a difference to academic future through Scholarships**
- **Enabling staff and institutions in different continents to collaborate**
- **Providing opportunities for younger researchers to participate in conferences**
- **Many postgraduates appreciate the partial grants, even though small**
- **Enabled staff and postgraduate students to write and publish papers**

6.2 Room for Improvement

- **Funding constraints, hence:**
 - **Limited Fellowship and Scholarship amounts**
 - **Lack of diversification of activities**
 - **No major funding of research**
 - **Administration is by skeleton staff**
- **Implementation of online applications problematic in certain countries**
- **Transfer of funds to awardees – nightmare**
- **Slow submission of reports by awardees**
- **Communication problems with individuals and institutions**

7. SUPPORTING ORGANIZATIONS AND INSTITUTIONS

7.1 Financial Support

- **International Mathematical Union (IMU)**
- **Leverhulme Trust**
- **London Mathematical Society**
- **Mellon Foundation**
- **National Academy of Sciences, USA**
- **Nuffield Foundation**
- **US National Committee on Mathematics**

7.2 Facilities and Administrative Support

- **African Academy of Sciences (AAS)**
- **Science Initiative Group (SIG)**
- **Universite Gaston Berger, Senegal**
- **Universite de Ouagadougou, Burkina Faso**
- **University of Botswana, Botswana**
- **University of Ibadan, Nigeria**
- **University of Nairobi, Kenya**
- **University of Ngaoundere, Cameroon**
- **University of Yaounde I, Cameroon**

8. *CONCLUDING REMARKS*

8 Concluding Remarks

▪ **The original AMMSI Proposal contained many activities but funding constraint has compelled us to focus on:**

➤ **Fellowship and Scholarship grants**

➤ **Conferences**

➤ **Collaboration and linkages**

▪ **We are looking for new partners and additional funding sources to enable us:**

➤ **Strengthen the current activities**

➤ **Diversify to other equally important activities**

➤ **Introduce a strong element of research**

▪ *We, in AMMSI, are glad that activities of the initiative appear to have made some difference in the lives of African mathematicians, despite comparatively limited funds being available at our disposal*

For more information visit:

<http://www.ammsi.org>

THANK YOU

FOR

YOUR ATTENTION!!