

PROMOTING MATHEMATICS IN
AFRICA THROUGH THE AFRICAN
MATHEMATICS MILLENIUM SCIENCE
INITIATIVE (AMMSI)

by
W. Ogana

AMMSI PROGRAMME DIRECTOR

*School of Mathematics, University of Nairobi, P.O. Box 30197, GPO-00100, Nairobi,
Kenya.*

Email: wogana@uonbi.ac.ke

**Presented at the conference on Higher Education and Research in
Developing countries, during 12 – 13 February 2008, Oslo, Norway.**

1. BRIEF HISTORY

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 the African Mathematics Millennium Science Initiative (AMMSI)

- ❖ Writing Group constituted in January 2003 to prepare a draft proposal for the first 5 years of operation of AMMSI

Writing Group Members:

- ✓ Professor Wandera Ogana (Chairman), University of Nairobi, Kenya
- ✓ Professor Edward Lungu, University Botswana, Botswana
- ✓ Professor David Bekolle, University of Yaoundé 1, Cameroon
- ✓ Professor Sunday Iyehen, National Mathematics Centre, Nigeria
- ✓ Professor Leif Abrahamson, Uppsala University, Sweden
- ✓ Dr. Alan Anderson, USA

AMMSI Writing Group Proposal

- ❖ 5-Year proposal
- ❖ Balancing various activities subject to funding
- ❖ Forwarded to SIG in December 2003
- ❖ Submitted for funding consideration

1.5 AMMSI GOAL :

Nurture the next generation of African mathematicians and mathematical leadership.

2.

OBJECTIVES

AND

ACTIVITIES

2.1 The objectives of AMMSI

are:

- 1) To strengthen the teaching and learning of university 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).**

Contd.

- 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]**).

2.2 Advanced mathematics training and education in the African continent

- Activities meant to be carried out through existing tertiary institutions
- Postgraduate training (M.Sc./PhD; Tutorial Fellows/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

2.3 Research in mathematics and mathematics education, including interdisciplinary research in areas involving application of mathematics

- 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

Contd.

- ◉ Regional conference support
- ◉ Access to electronic communication and international journals
- ◉ Local and international research mentoring

2.4 Linkages and networking

- Necessary to leverage all available resources
- African Mathematical Union
- African Institute of Mathematical Sciences (www.aims.ac.za/)
- National/regional/international organisations
- Organization/attendance of professional meetings
- Databases and websites, “Clearinghouse of African Mathematics”
- Facilitate exchange of students and staff

2.5 Outreach and Public Education

- ✘ 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)

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

- Central Africa
- Eastern Africa
- Southern Africa
- Western Africa (Zone 1)
- Western Africa (Zone 2)

3.2 Programme Committee

Main functions are:

- To Formulate and design programme
- To Write project proposals for funding
- To Implement activities
- To Liaise with collaborating institutions

Current Members :

**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 Edward
Lungu, University
Botswana, Botswana
(Regional
Coordinator,
Southern Africa)**

**Professor Samwel
Ilori, University of
Ibadan, Nigeria
(Regional
Coordinator,
Western Africa Zone
1)**

**Professor Mary Niane,
Université Gaston
Berger de Saint-Louis,
Senegal
(Regional Coordinator,
Western Africa Zone 2)**

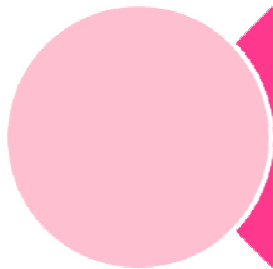
**Miss Petronilla Nduku
Masila,
(Administrator,
AMMSI Programme
Secretariat, Nairobi,
Kenya)**

3.3 Selection and Evaluation Committee

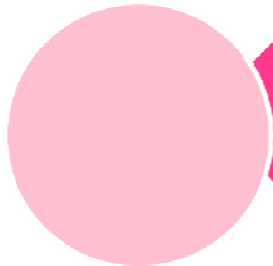
Main functions are:

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

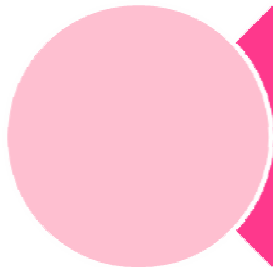
Current Members:



Professor Bernt Oksendal,
University of Oslo, Norway
(Facilitator)



Professor Augustin Banyaga,
Pennsylvania State
University, USA



Professor Hamidou Toure,
University of Ouagadougou,
Burkina Faso

3.4 *Advisory Board*

(Consultations to form
are ongoing)

4. ACTIVITIES

TO DATE

4.1 Introduction

- ❖ Funding from various sources for activities (since 2005)
- ❖ Agreement to operate as an autonomous programme of the African Academy of Sciences (March 2007)
- ❖ AMMSI conducts its activities through individuals in existing institutions
- ❖ Written research proposals in collaboration with others

4.2 Research/Visiting Fellowships

- ❖ Awarded 5 Fellowships each in 2005 and 2006
- ❖ Fellowship amount US \$ 3,000
- ❖ Amount increased to US \$ 5,000 in 2007
- ❖ Online applications implemented from 2007
- ❖ Experience on online applications
- ❖ 2007 Fellowships applications are being processed

4.3 Postgraduate Scholarships

- ❖ Awarded 54 and 57 partial scholarships during 2005 and 2006, respectively, with amounts ranging from US \$ 300 to US \$ 1,000
- ❖ Maximum scholarship amounts raised to US \$ 2,000 from 2007
- ❖ Online applications implemented from 2007
- ❖ Experience on online applications
- ❖ 2007 scholarships applications are being processed

4.4 Support of Scientific Meetings

- ❖ Conference in Porto Novo, Benin
 - 10 – 17 August 2005
 - Representation Theory in Geometry and Physics
- ❖ Conference and Workshop in Nairobi, Kenya
 - 4 – 10 December 2006
 - General Conference followed by Mathematical Biology Workshop
- ❖ SAMSA Conference in Windhoek, Namibia, November 2007
- ❖ In 2008 to support a conference in Central Africa

4.5 Conference Support to Postgraduate Students

- ❖ Funding by the London Mathematical Society
- ❖ Each funding supports 2 – 4 postgraduate students
- ❖ Postgraduate students supported to attend the following:
 - Conference in Benin, August 2005
 - GIRAGA meeting, Cameroon, September 2006
 - SAMSA Conference, Botswana, November 2006
 - Conference & Workshop, Kenya, December 2006

4.6 Mentoring African Research in Mathematics (MARM)

- ❖ Funded by
 - ✓ The Nuffield Foundation (from 2005)
 - ✓ Also by The Leverhulme Trust (from 2006)
- ❖ Initially collaboration was only with UK mathematicians
- ❖ Collaboration extended to other European mathematicians from 2006

Contd.

- ❖ Main objectives:
- ✓ Promote mentoring relationships between mathematicians in other continents and sub-Saharan African colleagues, together with their students.
- ✓ Promote collaboration in mathematical research and in mathematics education
- ✓ Create joint research projects and cultivate longer-term partnerships between institutions in Africa and those elsewhere

Contd.

❖ **First call for expressions of interest was in late 2005**

- ✓ 11 institutions responded
- ✓ Following selected and are participating:
 - Addis Ababa University, Ethiopia
 - University of Buea, Cameroon
 - Kwame Nkurumah University of Science & Technology, Ghana

Contd.

❖ **Second call for expressions of interest made in mid-2007**

- ✓ 12 institutions responded
- ✓ 11 short listed
- ✓ Final decision being made on 5-6 institutions to be supported

5. SUPPORTING ORGANIZATION S

5.1 Financial support

- Mellon Foundation
- Nuffield Foundation
- Leverhulme Trust
- US National Committee on Mathematics
- London Mathematical Society
- International Mathematical Union (IMU)

5.2 Office space, facilities, or general administrative support:

- Universite Gaston Berger, Senegal
- University of Botswana, Botswana
- University of Ibadan, Nigeria
- University of Nairobi, Kenya
- University of Ngaoundere, Cameroon
- Science Initiative Group (SIG)

5.3 Links and Partnerships

- African Academy of Sciences (AAS)
 - + Autonomous programme of AAS
 - + Administrative and financial services by AAS
 - + Access to African Union countries
 - + Joint projects by AAS and AMMSI
- Memorandum of collaboration with AESEDA
 - + Alliance for Earth Sciences, Engineering & Development in Africa
 - + Coordinated from Penn State University
- Committee member of 2iE

6. WHAT HAS
BEEN
LEARNT?

6.1 Positive

- 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 through MARM

Contd.

- Providing opportunities for younger researchers to participate in conferences
- Many postgraduate appreciate the partial grants, even though small
- Enabled staff and postgraduate students to write and publish papers
- Provided stimulus for further collaboration

6.2 Room for IMPROVEMENT

- Limited funds, hence small scholarship awards, and lack of diversification of activities
- No major funding of research
- Implementation of online applications problematic in certain countries
- Administrative structure in 5 regions

Contd.

- Lack of strong secretariat – funding constraints
- Incorporating Anglophone-Francophone interaction in administrative structure
- Transfer of funds to awardees -- nightmare
- Slow response by institutions and individuals to announcements
- Slow submission of reports by awardees
- Communication problems – poor

SUMMARY & CONCLUSIONS

- ❖ Science and Technology (S & T) provide the tools to address local challenges in agriculture, health, energy and other fields, consequently stimulating innovations that fuel development and economic growth.
- ❖ In recognition of the significant role mathematics plays in advancing S & T, there was formed a programme called the *African Mathematics Millennium Science Initiative (AMMSI)*.
- ❖ During the three years of its existence, AMMSI has awarded scholarships providing partial support to over 150 postgraduate students.

Contd.

- ❖ The main objectives of AMMSI include strengthening mathematics teaching, research and applications, and raising general awareness in the importance of mathematics for modern science and modern nations.
- ❖ In addition it has also awarded over ten Visiting/Research fellowships to enable staff members take leave from their home institutions and interact with students and staff in other universities.

Contd.

- ❖ AMMSI has also supported regional scientific meetings and promoted collaboration involving mathematicians from other continents, in order to stimulate training and research, and help build new multidisciplinary partnerships.
- ❖ There has been some positive experience for the AMMSI initiative but there is still room for improvement to enable AMMSI achieve most of its objectives

website :

<http://www.ammsi.org>

THANK YOU

END...