National Mathematical Centre, Shelda-Kwali, Abuja, Nigeria

Name of Director/Chief Executive: Prof. Promise MEBINE *FMAN, FCIRM*

Introduction

The National Mathematical Centre was established on January 1, 1988, by the Federal Government of Nigeria with Professor James Okoye Chukwuka Ezeilo (1930-2013) as its founding Director/Chief Executive. By the National Mathematical Centre Act 2004, which replaced its enabling decree 40 of December 12, 1989, the NMC is an Inter-University Centre with a broad mandate. Some of its functions include:

- Train and develop high-level personnel in mathematical sciences including mathematics, statistics, computer science and theoretical physics for Nigerian and African Institutions;

- Create a resource Centre to serve national and international communities as a focal point for advanced research and training in the mathematical sciences and its applications;

- Identify and encourage young talents in the mathematical sciences;

- Attract good mathematical scientists from all over the world into the service of Nigeria;

   And

- Encourage and support activities leading to the improvement of the teaching and learning of the mathematical sciences at all levels.

Vision, Mission and Philosophy

The NMC, therefore, occupies a position in the development of science, technology, engineering and mathematical sciences in Nigeria. The Centre's vision and mission statements are the following:

Vision
To be a world-class institution for training, learning and research in the mathematical sciences and their applications to development.

Mission
- To continually develop and deploy cutting-edge resources for training, learning and research in the mathematical sciences.
- To identify, motivate, inspire and train the next generation of experts in the mathematical sciences at all levels of education.
- To apply the mathematical sciences to solve societal problems and foster wealth creation.

As a result of its unique position in the nation's education system, NMC is pursuing the realization of its vision, mission and mandate with steadfast commitment and, in the process, progressively re-positioning Nigeria as a global leader in training and research activities in the Mathematical Sciences. The NMC's Vision, beliefs, principles and philosophy are are enshrined in the Core Vlaues and Norms:

Core Values
The core values of the Centre shall be premised on: Service, Intellectualism, Integrity, Optimism and Transparency.

Norms
The tradition of NMC shall be driven by the following standards of acceptable mentality and behaviour: Innovativeness ,Enthusiasm, Motivation, Equity and Probity

Key Achievements from August 2023 to August 2024

Advanced Training

1. International Workshop on Mathematical Sciences and Optimization (ICMSO 2023)
2. Jointly organised by the NMC, Association of Mathematical Science in Department of Mathematics & Department of Computer Science University of Lagos (28th -30th August 2023).
3. Foundation Postgraduate Course in Time Series Analysis and Applications(15th – 27th October, 2023)

4. Foundation Postgraduate Course in Dynamical Systems(5th – 17th November, 2023)
5. Foundation Postgraduate Course in Functional Analysis(3rd – 15th December, 2023).

6. Foundation Postgraduate Course in Multivariate Statistics and Advanced Research Methods (3rd – 15th December, 2023).
7. Maple and MapleSim Software Applications Workshop in Mathematics, Aeronautics, Robotics, Physics (9th-12th October 2023) organized by NMC and Tangier INT'L CO(TIC) the Representative of the MapleSoft Software, Canada.
8. Workshop on Research Oriented Course in Modern Aspects of Theoretical Physics and Applications to Physical Problems(6th – 17th November, 2023)
9. Research Oriented Course on Renewable Energy Physics and its Applications (3rd – 17th December, 2023)
10. Foundation Postgraduate Course on Current Trends in Mathematics Education (19th November – 1st December, 2023)
11. Workshop on Foundation Postgraduate Course in Research Methodology, Data Analysis and   Interpretation in Education(4th – 15th December, 2023)
12. Foundation Postgraduate in "Emerging Trend of Software Engineering and Programming (3rd - 15th March 2024)

Milestone:The Participants and Professors developed three computer applications , Two on finance and the third on How to overcome issue of identifying identical twins to enhance shortcomings in the National ' ID' scheme using new deep learning algorithm

OLYMPIAD COMPETITIONS

In line with its mandate to identify and encourage young talents in mathematical sciences, the Centre had annually organised talent hunts, National Competitions and Nigeria's participation in International Mathematics and Science Competitions to stimulate their enthusiasm for the physical sciences.

i. Yearly Intervention of special Mathematics Improvement and Olympiad competition for Junior Secondary school Girls students (SDGs Project):The state level of the competition had been conducted in the 37 states of the Federation and FCT.Remaining crowning of mathematics Queen
ii. Nigeria participated in Pan Africa Mathematics Olympiad in Rwanda won 2 gold medals in 2023 & 2 silver medals in 2024(virtually)

Advanced Research

1. International Conference on Mathematical Sciences and Optimization (ICMSO 2023) Jointly organized by the NMC, Association of Mathematical Science in the Department of Mathematics & Department Computer Science University of Lagos (1th -2th September 2023)
Theme: Digitized Economy: Challenges and the Imperatives of Mathematical Tools
Keynote and Plenary Speakers
i. Prof.Promise   Mebine,   the   Director/CE,National   Mathematical Centre(NMC),Abuja
ii. Prof. Benjamin O. Oyelami,Deputy Director,National Mathematical Centre(NMC),Abuja
iii. Prof. Guy Degla, Institut de Mathematiques et de Sciences Physiques (IMSP) at University of Abomey-Clavi (UAC).

iv. Prof. O. Mewomo, School of Mathematics, Statistics and Computer Science, University of KwaZulu-Natal, Durban, South Africa.

2. International seminar on Analysis and Visualization of spatial Data using R and STATA (19th April 2023), Speaker: Dr. Ajao Isaic Oluwaseyi, the PRO Professional Statistical Society of Nigeria.

3. International Conference and Advanced workshop on modelling and simulation of complex systems . held at Obafemi Awolowo University Ile-Ife, Nigeria on 27th - 31st May 2024.

4. International Conference/Workshop on Mathematical Sciences and Optimization (ICMSO 2024) Jointly organized by the NMC, Association of Mathematical Science in the Department of Mathematics & Department Computer Science University of Lagos (26th -31th August 2024), Theme : Applying Mathematical Research to 4th Industrial Revolution.

Internally Funded Research

Approved research activities under this category are as follows:

i. Design and Development of Teaching Strategy to train Secondary school Mathematics teachers for Effective use of technology in Multilingual Classroom practices

ii. Wind Energy Potentials in Nigeria

iii. Theoretical investigation of Nonlinear models of Gradient Elution Liquid Chromatography considering Power Law and Quadratic Solvent strength

iv. Mathematical Modelling and Simulation on Environmental pollution
v. Modelling and Simulation in Petroleum industry with emphasis on corrosion problems
vi. Development of Big Data Security Architecture to be use for Investigating and Detecting of terrorism activities in Nigeria

Collaborations

The Centre has embarked on aggressive drive seek strategic partnership and collaborations between NMC and National /International agencies, institution and industry.We have extended our tentacle to:

i. Siegener Sabithos Global Education (SSGE): collaboration to jointly organise international conference on climate change. This will be an annual event.
ii. Nigeria Meteorological Agency (NIMET): To develop models for enhancing weather forecasting in Nigeria for NIMET.
iii. Nigeria Electricity Regulatory Commission (NERC): To support the International Conference on climate change and Research to boost electricity generation in Nigeria and also adopt a climate friendly approach.

iv. Federal Ministry of Environment: a courtesy visit was made to Honourable Minister for Environment to garnish for support for the International Conference on climate change. A proposal on climate change and adaptation has been drafted following the request of the Honourable.

v. Economic Community of West African States (ECOWAS): We approached the ECOWAS to provide venue and feeding for the International Conference on Climate Change.

vi. National Council on Climate Change (NCCC) : The Centre and NCCC have been having series of meetings on areas that would be of mutual benefits.

vii. Digital Mathematics Network (DIMANET) Project: a collaboration between NMC and Austochien Limited. It provides an instructor-led training for secondary school Mathematics students;delivered via offline and online platforms. The online version is powered by DIMANET portal and mobile application.

Activities in Collaboration with COMSATS and other Centres of Excellence

1. NMC actively participated in COMSATS R&D Activities such as Coordinated the participation in the 6th, 7th and the 8th term ANSO-BIDI Schools for Innovation and Entrepreneurship, Sustainable Development and Leadership.

2. Prepared reports on the R&D activities of the Centre as contents in COMSATS' bi-monthly Newsletter and year report.

3. The Director/CE of NMC ,Professor Promise Mebine attended the COMSATS' Coordinating Council meeting held 25^{ft} -26th January, 2023 at Karachi, Pakistan.

Future Plan

i.   **Construct Robotics and AI Laboratories**

ii.   **Launch a project for Machine Learning and AI at Secondary School Level**

iii.   **Intensifying training programmes on endangered areas of Mathematics such Algebra, Analysis and Geometry. Other areas of enterpreneurship like Financial Mathematics, Robotics, Control Systems, Machine Leaning and other Data Science training**

Prayer:

I. The Centre intends to host International Conference on Climate Change, we need support and collaboration to jointly host it.

II. Request the COMSATS to Constitute the International Thematic Research Group to work on Mathematical Modeling and Simulation of Complex Systems and Applications