



International Conference and Advanced Workshop on Modelling and Simulation of Complex Systems (2025) (ICAWMSCS-2025)

CONCEPT NOTE

Theme:

Harnessing Mathematical Modelling and Simulation for African Development and Advancement

Conference and Workshop Overview:

The International Conference and Advanced Workshop on Modelling and Simulation of Complex Systems is an interdisciplinary program aimed at bringing together mathematicians, scientists, engineers, researcher, policymakers, and industry leaders to explore the transformative power of mathematical modelling in addressing Africa's most pressing challenges. This year, the conference will be hosted by the Postgraduate College of the University of Ibadan in collaboration with FirstSwWECh Limited between 21-25 July, 2025.

This gathering is not simply a conference. The uniqueness of this program is the hands on workshop. This year, the workshop, which is from 23-25 July, will provide introductory training in data science, artificial intelligence (AI)/machine learning (ML), statistics, biostatistics and epidemiology, as well as symmetry analysis in applied Mathematics (with application to ODEs and PDEs). It is recommended that workshop participants bring their laptops along. We envisage that this training is important in order to prevent Africa from falling behind in the AI revolution. The conference (21-22 July), which holds before the workshop, will provide a platform for sharing cutting-edge research, fostering collaborations, and promoting the application of mathematical modelling in driving sustainable development across the continent.

Further details are available at the conference website here: <https://icawmscs.net>



Objectives

We look forward to a conference with over 300+ participants. Our objectives for ICAWMSCS-2025 are:

1. Capacity building for students and early career researchers (especially through the workshop)
The program will serve to mentor young applied Mathematicians, Chemists, Physicists, Computer Scientists, Chemical Engineers, Mechanical Engineers, students and staff in academia and the industry, in the ECOWAS region and beyond, to include all African countries.
2. To introduce researchers in Africa to the tools of data science and AI/ML.
3. To showcase the latest advancements in mathematical modelling and their applications, particularly in Africa.
4. To encourage collaboration between academia, industry, and policymakers as well as stimulate collaboration between other researchers in other fields.
5. To increase the use of mathematical modelling as a tool for solving real-world problems in Africa.
6. To foster networks of experts and stakeholders committed to advancing mathematical modelling in Africa
7. To promote collaboration between African researchers/industrialists and their counterparts on other continents (Asia, Europe, South America, USA/North America)

Key Topics:

In order to ensure broad participation and relevance, the conference will focus on the following topics in mathematical modelling. Researchers in these areas or who are interested in these topics are strongly encouraged to apply.

1. *Machine Learning and AI in Mathematical modelling*
 - Integration of AI with traditional mathematical models.
 - Machine learning in Physics, Chemistry, Atmospheric Modeling
2. *Climate Change and Environmental modelling*
 - Predictive models for climate change impacts in Africa.
 - Modelling sustainable water resource management.
 - Air quality and pollution modelling.
3. *Epidemiology and Public Health*
 - Modelling infectious disease outbreaks (e.g., malaria, HIV/AIDS, COVID-19).
 - Vaccine distribution and healthcare resource optimization.
 - Predictive models for non-communicable diseases (e.g., diabetes, hypertension).



**INTERNATIONAL CONFERENCE AND ADVANCED WORKSHOP ON
MODELLING AND SIMULATION OF COMPLEX SYSTEMS**



UNIVERSITY OF IBADAN
THE POSTGRADUATE COLLEGE



4. *Agricultural and Food Security modelling*

- Crop yield prediction under changing climate conditions.
- Pest and disease modelling in agriculture.
- Optimization models for food supply chains.
- Modeling with National Statistics and Population Models

5. *Modeling in Oil and Gas*

- Reservoir simulation, Material balance equations, Decline curve analysis
- Wellbore dynamics, Drilling process modeling
- Enhanced oil recovery (EOR) studies
- Refinery: Refinery furnaces, Hydrogen network synthesis, Crude-oil scheduling and refinery planning, Petroleum extraction

6. *Energy and Renewable Resource modelling*

- modelling energy demand and supply in Africa.
- Optimization of renewable energy systems (solar, wind, hydro).
- Predictive models for energy transition and decarbonization.
- Resource modeling with National Statistics and Population Models

7. *Symmetry analysis in applied Mathematics*

- application to ODEs
- application to PDEs

8. *Operations research*

- Military Operations: Linear programming, Network analysis, Simulation modeling, Game theory, Queueing theory
- Urbanization and Infrastructure Development, Urban planning and smart city development, Infrastructure resilience modelling.
- Traffic flow and transportation network modelling.

9. *Financial and Economic modelling*

- Predictive models for economic growth and development.
- Risk assessment and management in financial systems.
- Modelling the impact of policy interventions on poverty reduction.



The conference will feature talks at plenary and parallel sessions by renowned experts in statistics and mathematical modelling as well as poster presentations together with time for networking and partnership building. The three-day workshop will focus on hands-on training sessions on modelling techniques, tools, and software (such as PYTHON and R).

Benefits of participation:

- Showcase your research and contribute to addressing Africa's challenges.
- Gain insights into the latest trends and applications of mathematical modelling.
- Network with leading experts and stakeholders from across Africa and beyond.
- Access training and capacity-building opportunities.
- Be part of a growing community of mathematical modelling enthusiasts.

Conference Fees:

In order to ensure broad participation, the **conference fees** will be structured as follows:

A. For those within the host country (Nigeria):

S/N	Category	Early Bird	Regular	Late
		14 March – 31 May	1 June – 30 June	1 July – 20 July
1	Academia	₦35,000	₦45,000	₦60,000
2	Student	₦15,000	₦20,000	₦25,000
3	Industry	₦70,000	₦80,000	₦95,000

B. For those within Africa but outside the host country: USD \$50

C. Participants from outside Africa: USD \$100

Registration fees cover meals (two coffee breaks and lunch on each day) as well as stationery (notebooks and pens). It does not cover accommodation nor transportation to the venue.

D. Workshop fees: ₦20,000 per workshop participant from within the host country
USD \$15 for all other workshop participants

The fees should be paid into the following account:

Account Name: Firstswwech Limited

Banker: First Bank of Nigeria

Account Number: 2040520647



Call to Action:

We invite researchers, practitioners, and students to submit abstracts, register, and join us at ICAWMSCS-2025 at the prestigious University of Ibadan. Together, we can harness the power of mathematical modelling and simulation to drive African Development and Advancement

Early Bird Registration Deadline: 31 May, 2025

Abstract Submission Deadline: 30 June, 2025

Submission of abstract and registration is at the conference website here: <https://ICAWMSCS.net>

Conference Dates: 21 – 22 July, 2025

Workshop Dates: 23 – 25 July, 2025

Venue: University of Ibadan, Ibadan, NIGERIA

Contact Information:

For inquiries, abstract submissions, and registration, please contact:

Email: info@icawmscs.net

Website: <https://icawmscs.net/>

Information for Partners and Sponsors:

We welcome partnerships and sponsorship from different organizations including those interested in advancing mathematical modelling in Africa. Please contact us for sponsorship opportunities. Some details are in Appendix A. This can give your organization greater visibility by, for example, having your logos on the conference materials and banner.

Let us make ICAWMSCS-2025 a landmark event in Africa's journey toward harnessing Mathematical Modelling and Simulation for African Development and Advancement



A. SPONSORSHIP PACKAGES

We believe that your organization shares our commitment to innovation, education, and collaboration, and we would be honored to have your support in making this event a success. Your sponsorship will not only contribute to the advancement of Mathematical Modelling in Africa but also provide your organization with unparalleled visibility and engagement opportunities.

We offer the following sponsorship tiers:

1. Diamond Sponsor (₦10M):

- Exclusive naming rights for the workshop.
- Prominent logo placement on all conference materials.
- Keynote speaking opportunity.
- Dedicated space for poster placement and distribution of organization fliers
- Conference and workshop fees for two personnel from your organization

2. Platinum Sponsor (₦5M):

- Premier logo placement on all conference materials.
- Speaking opportunity in a plenary session.
- Dedicated space for poster placement and distribution of organization fliers
- Conference and workshop fees for two personnel from your organization

3. Gold Sponsor (₦3M):

- Logo placement on all conference materials.
- Recognition during opening and closing ceremonies.
- Space for poster placement
- Conference and workshop fees for one personnel from your organization



4. Silver Sponsor (₦1.5M):

- Logo placement on select conference materials.
- Recognition during the conference.
- Space for poster placement
- Conference and workshop fees for one personnel from your organization

5. Bronze Sponsor (₦1M):

- Logo placement on the conference website and program.
- Recognition during the conference.
- Conference and workshop fees for one personnel from your organization

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Your sponsorship will enable us to deliver an exceptional experience for our attendees while showcasing your organization's leadership and commitment to advancing Scientific Development in Africa. We would be happy to discuss custom sponsorship opportunities tailored to your specific goals.