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University of Michigan
Science, Technology, Engineering, and Mathematics (STEM)-Africa Initiative

THIRD BIENNIAL CONFERENCE

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Effective U.S. Strategies for African STEM Collaborations, Capacity Building, and Diaspora Engagement



April 1-4, 2014
Rackham Amphitheatre · Michigan League

CONFERENCE STATEMENT

Over the past two decades, a global wave of market liberalization has produced an interconnected world economy, leading many governments to view science, technology, engineering, and mathematics (STEM) competencies as integral to economic growth and development. In Africa, this has meant a shift in regional development and higher education priorities towards enhancement of scientific research and technological training. This conference—the third in a series organized by the African Studies Center (ASC) at the University of Michigan—grows out of a larger collaboration joining the University of Michigan with several leading universities and partner institutions in Africa and the United States. We bring together academic and policy experts from Africa and the U.S. to consider ***Effective U.S. Strategies for African STEM Collaborations, Capacity Building, and Diaspora Engagement***.

Recent initiatives within African governments, at the African Union, African Development Bank, World Bank, New Partnership for Africa's Development (NEPAD), and other organizations demonstrate that Africa is embracing a new era in science and technology, and shifting the focus of its higher education institutions towards improving STEM capabilities. New STEM programs and centers include:

- RISE network of the Science Initiative Group
- African Centers of Excellence, World Bank

STEM-Africa Conference II · Kumasi, Ghana · May 2012





STEM-Africa Conference I · Ann Arbor, Michigan · May 2010

- Pan African University Institutes, African Union
- Next Einstein Initiative, African Institute for Mathematical Sciences (AIMS)
- *Poles d'Excellence Technologique Universitaires* (PETU), Economic Community of Central Africa States
- African Network of Science and Technology Institutes, UNESCO
- Square Kilometer Array (SKA) Station in South Africa
- Nelson Mandela Institutes

About the University of Michigan's Science, Technology, Engineering, and Mathematics (STEM) Africa Initiative

The University of Michigan's STEM-Africa Initiative is unique among peer institutions in the U.S. in its engagement of science as a trans-Atlantic affair. Through STEM-Africa, the ASC nurtures early-career scientists on the continent and advances research collaborations that extend scientific knowledge and yield solutions to global problems. This conference demonstrates that science thrives in Africa and opportunities for collaboration and engagement abound.

About the African Studies Center

ASC provides strategic guidance and coordination for Africa-related education, research and training activities on campus, and promotes opportunities for collaboration with African partners on the continent. The center serves as a conduit for U-M's many Africa initiatives in the sciences, arts, humanities, social sciences, engineering, and medicine.

STEM-AFRICA III COLLABORATIONS AND CAPACITY BUILDING

April 1-2 | Rackham Amphitheatre

TUESDAY, APRIL 1

8:30-10 AM

Welcome and Opening Keynote Address

MAKHTAR DIOP, Vice President for Africa Region, World Bank

Introduction by **KEN KOLLMAN**

Director, International Institute

Frederick G.L. Huetwell Professor, Political Science

University of Michigan

10-10:30 AM

COFFEE BREAK

10:30 AM-12 PM

STEM-Africa Round Table

The round table will consider: a) the science and technology capability needs for transforming African economies; b) necessary attendant policy orientations and resource allocations; and c) how the topic of STEM capacity as a joint endeavor can stimulate new forms of exchange and cooperation between Africa, U.S. institutions of higher education, and international development institutions, with an aim to strengthening what can be achieved in Africa

Moderator: **ANNE PETERSEN**, University of Michigan

MAKHTAR DIOP, Vice President for Africa Region, World Bank

JACQUES FAME NDONGO, Minister of Higher Education, Republic of Cameroon

MARY TEUW NIANE, Minister of Higher Education, Republic of Senegal

12-1:30 PM

LUNCH

1:30-3 PM

STEM Capacity Building

For the long term, we must provide resources to African institutions so that the products of the dreams of sustained capacity building replace current gaps in capacity that are filled by faculty, experts, and planners from other countries.

Moderator: **FRANK ANDERSON**, University of Michigan

TIMOTHY JOHNSON, University of Michigan

SENAIT FISSEHA, University of Michigan

“Increasing Capacity to Deliver Healthcare through Global Academic Partnership: The UM-Ethiopia Collaboration”

MARILYN PIFER, CRDF Global

“Improving STEM Capacity in Africa through Higher Education”

UPHIE CHINJE MELO, Local Material Promotion Society (MIPROMALO)

“Scientific Research and Innovation in Cameroon: Challenges in Capacity Building”

3-3:30 PM

COFFEE BREAK

3:30-5:30 PM

Emerging STEM Centers of Excellence in African Higher Education Institutions

Africa is increasingly embracing a new era of STEM development, reflected in the emergence of regional STEM Centers of Excellence. This panel will review Africa’s leading networks of Centers of Excellence: their particularities, experiences, and prospects, and their location within an African higher education system that is very diverse, yet bound together as the common producer of Africa’s scientific workforce.

Moderator: **NKEM KHUMBAH**, University of Michigan

ANDREAS BLOM, World Bank

“World Bank—African Centers of Excellence”

THIERRY ZOMAHOUN, Next Einstein Initiative Secretariat

“African Institutes for Mathematical Sciences (AIMS), the Emergence of Centers of Excellence, and the Transformation of Africa through the Power of Science, Youth, and Entrepreneurship.”

BEATRICE KHAMATI NJENGA, African Union

“African Union—Pan African University Institutes”

WOLE SOBOYEJO, African University of Science and Technology

“Nelson Mandela Institutes”

WEDNESDAY, APRIL 2

8:30-10 AM

Biomedical Sciences and Public Health

Health care and wellness are fundamental needs of people around the world. This panel will explore approaches and innovations in education and research for STEM and related areas to effectively address personnel training, building of infrastructure, and broader implementation of biomedical science advances.

Moderator: **JEROME NRIAGU**, University of Michigan

MATTHEW O. ABATAN, Pan African University

“The Pan African University: The West African Thematic Experience”

A. OVETA FULLER, University of Michigan

“Healing the Divide: Transforming Research and Education”

OLADELE A. OGUNSEITAN, University of California, Irvine

“Translational STEM: Unmet Needs in Global Health”

10-10:30 AM

COFFEE BREAK

10:30 AM-12 PM

Manufacturing, Design, and Innovation

A strong manufacturing base will be an essential component in the efforts of African nations to develop. The focus of this panel is to discuss the factors that will influence the establishment of a manufacturing industry in African countries and the best strategies for building viable manufacturing enterprises.

Moderator: **ELIJAH KANNATEY-ASIBU**, University of Michigan

MOSES MUSAAZI, Makerere University

“Simple Design, Sustainable Production in the African Context”

SAMUEL OWUSU-OFORI, North Carolina Agricultural & Technical State University

“Industrialization in a Sustainable Development Environment”

ANTHONY OKAFOR, Missouri University of Science and Technology

“Advanced Manufacturing Education and Research: A Roadmap for the Establishment of Sustainable Manufacturing Industries in Africa”

12-1:30 PM

LUNCH

1:30-3 PM

Environmental Research

This session brings to light the diversity of research related to environmental issues happening in Africa, from exploding lakes in Cameroon to land conservation management in Kenya, and the effect of climate change on the redistribution of infectious diseases. Furthermore, we will hear about the AfricaArray project, which supports and promotes applied and basic science relevant to the development and management of Africa's natural resources.

Moderators: **ALINE COTEL**, University of Michigan;
STEVE WRIGHT, University of Michigan

ANDREW A. NYBLADE, Pennsylvania State University
"AfricaArray: Geoscience Capacity Building in Africa"

JESSE T. NJOKA, University of Nairobi
"Environmental Research: Sustainability/Resilience Building towards Realization of Millennium Development Goals in the Horn of Africa"

GEORGE KLING, University of Michigan
"Defusing Certain Disaster in the Killer Lakes of Cameroon"

KWASI OBIRI-DANSO, Kwame Nkrumah University of Science & Technology
"Prevalence of Pathogenic Microorganisms and Hygienic Practices at Public Toilets in Selected Low-income Communities in Kumasi, Ghana"

3-3:30 PM

COFFEE BREAK

3:30-5:30 PM

Instrumentation and Infrastructure

This panel will review aspects of scientific instrumentation and infrastructure, and related challenges that affect Africa's ability to implement and own successful and transformative scientific research initiatives. Infrastructure also includes access to high speed internet, electronic journals, dissertations, and textbooks.

Moderators: **HERBERT WINFUL**, University of Michigan

NINA DUDNIK, Seeding Labs
"Leveraging the Resource Gap to Catalyze Research in the Developing World: Lab Equipment as Angel Investment"

KENNETH EVANS-LUTTERODT, Brookhaven National Lab
"Instrumentation and Big Science in Africa: a View from Inside Big Science in the U.S."

MOHAMED KAMEL, Elsevier Publishing

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STEM-AFRICA III DIASPORA ENGAGEMENT

April 3-4 | MICHIGAN LEAGUE

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THURSDAY, APRIL 3

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8:30-10 AM **Keynote Address**

PAUL ZELEZA, Vice President for Academic Affairs,
Quinnipiac University

Introduction by **KELLY ASKEW**

Director, African Studies Center

Associate Professor, Anthropology, Afroamerican, and African Studies
University of Michigan

Location: Rackham Amphitheatre

10-10:30 AM

BREAK and relocation to Koessler Room, Michigan League

10:30 AM-12 PM

**Exemplars of African STEM Diasporas in
U.S. Higher Education Institutions**

This panel will feature the work of select African scientific diasporas in U.S. institutions that are actively involved in scientific collaborations with African partners.

Moderator: **MARIE LYNN MIRANDA**, University of Michigan

SAM MUKASA, University of New Hampshire

JOHN CHIKWEM, Lincoln University

“Administration of a STEM Program in a Minority Institution”

KAMAL OUDRHIHI, NASA Mars Missions

12-1:30 PM

LUNCH

1:30-3 PM

Mathematical Sciences

Several concurrent initiatives are underway to bring African mathematical sciences onto the world stage. This panel will review some of the existing efforts for effectiveness of their various approaches, the roles by which external partner—especially U-M colleagues—may collaborate in this effort, and how African scientists are prioritizing these efforts in their own vision of the future of the mathematical sciences in Africa.

Moderator: **DAN BURNS**, University of Michigan

OVERTOUN JENDA, Auburn University

“A Model for International Research Network in STEM: Opportunities and Challenges for U.S.-Africa Research Collaboration”

AWONO (CHARLES) ONANA, University of Yaounde I

NKEM KHUMBAH, University of Michigan

“Transforming the Buea Conference”

ADEWALE SOLARIN, National Mathematical Center, Nigeria

“The Future of Mathematical Sciences in Africa”

3-3:30 PM

COFFEE BREAK

3:30-5:30 PM

Distance Education

Distance education is becoming increasingly important around the world. Many would argue that it offers the only economically viable way for many Africans to learn STEM subjects. This panel will discuss distance education and in particular its relevance for educating Africans in STEM disciplines.

Moderators: **BRIAN ARBIC**, University of Michigan

TED HANSS, University of Michigan

MARILENA DJATA CABRAL, African Virtual University

“The African Virtual University”

ISAAC KWAME DONTWI, Kwame Nkrumah University of Science and Technology

ELIJAH KANNATEY-ASIBU, University of Michigan

“Distance Education Programs at the University of Michigan – Potential for Collaboration with African Institutions”

GEORGE PHILANDER, Princeton University

“Global Warming: From a Nelson Mandela Perspective, an Opportunity for STEM Education”

FRIDAY, APRIL 4

8:30-10 AM

Africa STEM Associations and Networks

This panel will review the activities of select African STEM-diaspora organizations—highlighting challenges and opportunities.

Moderator: **CHINEDUM OKWUDIRE**, University of Michigan

LEE O. CHERRY, African Scientific Institute

“The African Scientific Institute: Its Efforts in the African Diaspora”

PETER JERANYAMA, Association of African Agricultural Professionals in the Diaspora, University of Massachusetts Amherst

“Leveraging Agricultural Knowledge, Innovation, and Resources through Collaboration with African Diaspora Networks for Africa’s Food Security”

10-10:30 AM

COFFEE BREAK

10:30 AM-12 PM

Science Diplomacy and African Diasporas

This panel will focus on how science diplomacy can address common challenges in Africa in general and in the horn of Africa in particular. It will also examine the role to be played by the African Academy of Sciences, NGOs (in Africa and in the U.S.) and the U.S.-based African diaspora in this effort to promote science and technology as a diplomatic tool with an inherent potential to transcend regional conflicts.

Moderator: **DALAL NAJIB**, U.S. National Academy of Sciences

BAHRU ZEWDE, Ethiopian Academy of Sciences

“Networking for Development: the Experience of the Ethiopian Academy of Sciences”

ARAYA ASFAW, Addis Ababa University

VAUGHAN TUREKIAN, American Association for the Advancement of Science

ANDREW MANU, Iowa State University

“Ambassadors in Agricultural Science: The Role of AAAPD and the African Diaspora”

12-1:30 PM

LUNCH

1:30-3 PM

Institutional Partners for Africa STEM Diaspora Engagement

Efforts to engage the scientific diasporas in African development are pervasive. This panel will review existing large-scale regional programs at select U.S. and African institutions that aim to facilitate such engagements, and consider the strengths and prospects of such programs, within the global context of Africa's increasing embrace of a new era in science and technology.

Moderators: **REBECCA HARDIN**, University of Michigan
KATHLEEN SIENKO, University of Michigan

STANLEY STRAUGHTER, Constituency for Africa

JONATHAN C. MBA, Association of African Universities (AAU)
"Promoting STEM in Africa with the Support of the Diaspora: The Role of AAU"

PEGGY OTI-BOATENG, UNESCO East Africa

3-3:30 PM

COFFEE BREAK

3:30-5:30 PM

Resources for Engaging U.S. Africa STEM Diaspora

This panel will focus on African continental financial, political, and institutional resources for STEM diasporas engagement.

Moderator: **OVETA FULLER**, University of Michigan

CORBIN MICHEL GUEDEGBE, African Development Bank
"Defining a Framework for Sustainable Engagement of U.S. STEM Diaspora for Africa: Implications for Home Countries, Host Country, and Other Partners"

BEATRICE KHAMATI NJENGA, African Union

JOHN BORIGHT, U.S. National Academy of Sciences



Conference organizer Nkem Khumbah (navy blazer, striped shirt), lecturer in U-M's department of mathematics, hands out certificates of participation to those who attended the Third Buea International Conference on the Mathematical Sciences. Photo by William Foreman.

LIST OF PARTICIPANTS

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Chair, Constituency for Africa

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BAHRU ZEWDE

Vice-President; Professor
Ethiopian Academy of Sciences



At the Third Buea International Conference on the Mathematical Sciences (Left to Right): Dan Burns, U-M math professor, speaks/ attends a session; Ndayong Laura, a graduate student in mathematics at the University of Buea, was an eager student in the summer school held concurrently with the conference. Photos by William Foreman.



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