



FIFTH BIENNIAL INTERNATIONAL CONFERENCE

RESEARCH, INNOVATION &
ARTIFICIAL INTELLIGENCE FOR
AFRICA'S TRANSFORMATION

📅 29 - 31 October 2025

📍 Host: **Makerere
University**





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 29 - 31 October 2025  Host: **Makerere University**

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KEYNOTE SPEAKERS



Prof. Tshilidzi Marwala
(Rector, United Nations University)



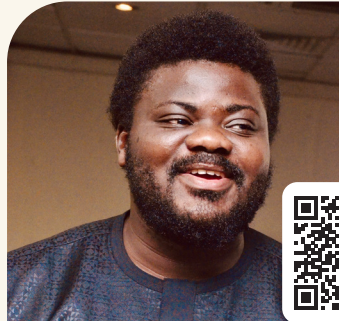
Prof. Patrick Okori
(Executive Director, Regional Universities Forum for Capacity Building in Agriculture-RUFORUM)



Prof. Vukosi Marivate
ABSA UP Chair of Data Science,
University of Pretoria



Adama Ibrahim
Vice-Chair, Science for Africa
Foundation



Darlington Akogo
Founder, CEO, minoHealth AI Labs



Samantha Carter
Senior AI Policy Manager,
J-PAL Global

OPENING CEREMONY

Speakers



Prof. Robert Wamala,
(Chair, Local Organising
Committee)



Prof. Barnabas Nawangwe
(VC, Makerere University)



Prof. Sizwe Mabizela
(VC, Rhodes University)



Dr. Lorna Magara
(Makerere University Council
Chair)



**Hon. Dr. Musenero Monica
Masanza** (Minister of Science,
Technology & Innovation, STI,
in the Office of the President of
Uganda)



Prof. John Owusu Gyapong (ARUA
Secretary-General)

Roundtable Discussion 1: *Advancing Responsible AI Ecosystems in African HEIs*

Speakers



Moderator:
Prof. Sizwe Mabizela
(VC, Rhodes University)



Prof. Bolanle Oboh
(DVC, University of Lagos)



Prof. Didas Muganga Kayihura
(VC, University of Rwanda)



Prof. Mosa Moshabela
(VC, University of Cape Town)



Prof. Sanjeev Kumar Sobhee (VC,
University of Mauritius)

Roundtable Discussion 2: **Collaboration of Networks (Promoting Collaborative Research and Innovation Networks in AI in Africa)**

Speakers



Moderator:
Prof. Kayode Oyeboade Adebawale
(VC, University of Ibadan)



Prof. Sharon Fonn
(Co-Dir., CARTA)



Prof. Anthony Egeru (Manager - Skilling,
Engagement for Community Development,
Regional Universities Forum for Capacity
Building in Agriculture - RUFORUM)



Mr. Jim Kaketch
(PASGR)



Prof. Margaret Jesang Hutchinson
(VC, University of Nairobi)



Dr. Rachid Serraj
(Director for Africa Initiative,
University Mohammed VI
Polytechnic)

Special Panel of the O. R. Tambo Research Chairs Initiative

Speakers



Moderator
Prof. Joyce Nakatumba-Nabende
(Makerere University)



Prof. Mengistu Tsidu
(University of Botswana)



Prof. Almeida Siteo
(Eduardo Mondlane University)



Prof. Hulda Swai
(Nelson Mandela Institute for
Science & Technology)



Prof. Firubu Saalia
(University of Ghana)

Roundtable Discussion 3: ***Collaboration of Networks (Engaging international collaborative networks for Research and Innovation)***

Speakers



Moderator
Prof. Ernest Aryeetey
(University of Ghana)



Prof. Jenny Dixon
(Sec. Gen., U21)



Prof. Jan Palmwosky
(Sec. Gen., The Guild)



Prof. Peter Lennie
(Exec. Dir., WUN)



Prof. Maashutha Samuel Tshehla
(DVC, Stellenbosch University)



Dr. Laurent Bochereau
(Minister-Counsellor Science,
Technology and Innovation
Delegation of the European Union
to the African Union)

Policy Roundtable and Wrap-Up

Speakers



Chair
Prof. Nana Aba Appiah Amfo
(VC, University of Ghana)



Dr Nomakwezi Mzilikazi
(DVC, Rhodes University)



Prof. Francis Peterson
(VC, University of Pretoria)



Prof. Sarah Ssali (DVC, Makerere University | Dir., ARUA CoE Notions of Identity)



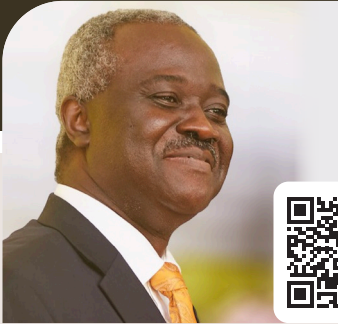
Prof. Francesco Petruccione
(Co-lead, Africa-Europe CoRE AI)



Prof. Oluyemisi Bamgbose
SAN (DVC, University of Ibadan)

Closing Ceremony

Speakers



Prof. John Owusu Gyapong
(ARUA Secretary-General)



Prof. Barnabas Nawangwe
(VC, Makerere University)



Prof. Sizwe Mabizela
(VC, Rhodes University)



PROGRAMME OUTLINE

DAY 1: 29 OCTOBER 2025

08.30 am	Registration
09:00 am	Cultural performance
09:05 am	Introductory Remarks / Introduction of Chair - Prof. Robert Wamala (<i>Chair, Conference LOC</i>)
09:10 am	Chairman's Remarks - Prof. Barnabas Nawangwe (<i>VC, Makerere University</i>)
09:20 am	Remarks by ARUA Board Chair – Prof. Sizwe Mabizela (<i>VC, Rhodes University</i>)
09:25 am	Remarks by Makerere University Council Chair - Dr. Lorna Magara
09:30 am	Short Address by Prof. Tshilidzi Marwala (<i>Rector, United Nations University</i>)
09:35 am	Cultural interlude
09:40 am	Opening of Conference – Hon. Dr. Musenero Monica Masanza (<i>Minister of Science, Technology & Innovation, Uganda</i>)
09:55 am	Address by Prof. John Gyapong (<i>ARUA Secretary General</i>) Topic: Research, Innovation and Artificial Intelligence for Africa's Transformation
10:05 am	Musical interlude
10:10 am	Signing of MoU between Makerere University & AstriaLearning to establish Makerere AI eCampus
10:15 am	Chairman's closing remarks – Prof. Barnabas Nwangwe (<i>VC, Makerere University</i>)
	Close of Conference opening: Photo Moment
10.20 am	Tea/Coffee Break
10:30 am	Roundtable Discussion 1: Advancing Responsible AI Ecosystems in African HEIs. Moderator: Prof. Sizwe Mabizela (<i>VC, Rhodes University</i>) Panellists: Prof. Bolanle Oboh (<i>DVC, University of Lagos</i>) Prof. Didas Muganga Kayihura (<i>VC, University of Rwanda</i>) Prof. Mosa Moshabela (<i>VC, University of Cape Town</i>) Prof. Sanjeev Kumar Sobhee (<i>VC, University of Mauritius</i>)
11:30 am	First Parallel Session Side Events Special Sessions Poster Presentations (Set 1)
01:00 pm	Lunch
02:00 pm	Second Keynote Address - Prof. Patrick Okori (<i>Executive Director, Regional Universities Forum for Capacity Building in Agriculture - RUFORUM</i>) Topic: Research, Innovation & Artificial Intelligence for Africa's Transformation: Harnessing the Developments in the Agricultural Sector for Sustainable Food Security



DAY 1: 29 OCTOBER 2025

03:00 pm **Second Parallel Sessions || Side Events || Special Sessions || Poster Presentations (Set 1)**

04:30 pm *Tea/ Coffee Break*

05:00 pm ARUA 10th Anniversary Celebration with Cocktail

DAY 2: 30 OCTOBER 2025

09:00 am Third **Keynote** Address - **Prof. Vukosi Marivate** (ABSA-UP Chair of Data Science, University of Pretoria)
Topic: Research, Innovation & Artificial Intelligence for Africa's Transformation: The Power of the Grassroots

09:30 am **Roundtable** Discussion 2: Collaboration of Networks (Promoting Collaborative Research and Innovation Networks in AI in Africa)

Moderator: Prof. Kayode Oyeboade Adebawale (VC, University of Ibadan)

Speakers: Prof. Sharon Fonn (Co-Director, Consortium for Advanced Research Training in Africa - CARTA)

Prof. Anthony Egeru (Manager - Skilling, Engagement for Community Development, Regional Universities Forum for Capacity Building in Agriculture - RUFORUM)

Mr. Jim Kaketch (Senior Programme Officer, Research and Policy Uptake, Partnership for African Social & Governance Research - PASGR)

Prof. Margaret Jesang Hutchinson (VC, University of Nairobi)

Dr. Rachid Serraj (Director for Africa Initiative, University Mohammed VI Polytechnic)

10:30 am *Tea/Coffee Break*



DAY 2: 30 OCTOBER 2025

11:00 am	Third Parallel Session Side Events Special Sessions AstriaLearning Demonstrations Poster Presentations (Set 2)
01:00 pm	<i>Lunch</i>
02:00 pm	Fourth Keynote Address - Adama Ibrahim (<i>Vice-Chair, Science for Africa Foundation</i>) <i>Topic: Research, Innovation & Artificial Intelligence for Africa's Transformation: developing the policy framework for Africa's transformation</i>
02:30 pm	Special Panel of the O. R. Tambo Research Chairs Initiative <i>Chair:</i> Prof. Joyce Nakatumba-Nabende (<i>Makerere University</i>) <i>Panellists:</i> Prof. Mengistu Tsidu (<i>University of Botswana</i>) Prof. Almeida Siteo (<i>Eduardo Mondlane University</i>) Prof. Hulda Swai (<i>Nelson Mandela Institute for Science & Technology</i>) Prof. Firubu Saalia (<i>University of Ghana</i>)
03:30 pm	<i>Tea/Coffee Break</i>
04:00 pm	Fourth Parallel Sessions Side Events Special Sessions Poster Presentations (Set 2)
06:15 pm	<i>Buses Depart for Conference Dinner</i>
07:00 pm	Conference Dinner - Dr. Lorna Magara (<i>Guest of Honour</i>)



DAY 3: 31 OCTOBER 2025

09:00 am	Fifth Keynote Address - Darlington Akogo (<i>Founder/CEO, minoHealth AI Labs</i>) <i>Topic: Research, Innovation & Artificial Intelligence for Africa's Transformation: harnessing the developments in the Health sector for improved health delivery</i> Sixth Keynote Address – Samantha Carter (<i>Senior AI Policy Manager, J-Pal</i>) <i>Topic: Research, Innovation & Artificial Intelligence for Africa's Transformation: Harnessing innovation and AI to address inequalities and poverty</i>
10:00 am	Roundtable Discussion 3: Collaboration of Networks (Engaging international collaborative networks for Research and Innovation) <i>Moderator:</i> Emeritus Prof. Ernest Aryeetey (<i>University of Ghana</i>) <i>Speakers:</i> Prof. Jenny Dixon (<i>Secretary General, Universitas 21 – U21</i>) Prof. Jan Palmwosky (<i>Secretary General, The Guild of European Research-Intensive Universities – The Guild</i>) Prof. Peter Lennie (<i>Executive Director, Worldwide Universities Network - WUN</i>) Prof. Maashutha Samuel Tshehla (<i>DVC, Stellenbosch University</i>) Dr. Laurent Bochereau (<i>Minister-Counsellor Science, Technology & Innovation Delegation of the European Union to the African Union</i>)
11:00 am	<i>Tea/Coffee Break</i>



DAY 3: 31 OCTOBER 2025

11:30 am	Parallel Sessions for CoEs - Workshops for Early-Career Researchers IREX Side Event Poster Presentations (Set 3) • <i>Unemployment and Skills Development</i> • <i>Inequality Research</i> • <i>Post-Conflict Societies</i> • <i>Notions of Identity</i> • <i>Urbanization and Habitable Cities</i>
01:00 pm	<i>Lunch</i>
02:00 pm	Parallel Sessions for CoEs - Workshops for Early-Career Researchers Poster Presentations (Set 3) • <i>Climate and Development</i> • <i>Water</i> • <i>Non-Communicable Diseases</i> • <i>Materials, Energy and Nanotechnology</i> • <i>Energy</i>
04:30 pm	Policy Roundtable and Wrap-Up Chair: Prof. Nana Aba Appiah Amfo (VC, University of Ghana) Panellists: Dr Nomakwezi Mzilikazi (DVC, Rhodes University) Prof. Francis Peterson (VC, University of Pretoria) Prof. Sarah Ssali (DVC, Makerere University Director, ARUA CoE Notions of Identity) Prof. Francesco Petruccione (Co-lead, Africa-Europe CoRE AI) Prof. Oluyemisi Bamgbose, SAN (DVC, University of Ibadan)
5:30 pm	Closing Ceremony and Evaluation Statements: Prof. John Gyapong (Secretary-General, ARUA) Prof. Barnabas Nawangwe (VC, Makerere University) Prof. Sizwe Mabizela (VC, Rhodes University & Chair, ARUA Board)
	<i>Light Refreshment</i>

SCHEDULE OF PARALLEL SESSIONS

Wednesday, 29th October 2025 (First Parallel Session)

Parallel Session 1.1: 11.30 AM EAT Theme: <i>Advancing Responsible AI Ecosystems in African HEIs I</i>	Parallel Session 1.2: 11.30 AM EAT Theme: <i>Application of AI in Research and Innovation in African Universities I</i>	Parallel Session 1.3: 11.30 AM EAT Theme: <i>Building AI Capacity and Talents in African Higher Education Institutions I</i>	Parallel Session 1.4: 11.30 AM EAT Theme: <i>Improving Infrastructure for Science and Technology in AI I</i>	Parallel Session 1.5: 11.30 AM EAT Theme: <i>Promoting Collaborative Research and Innovation Networks in AI in Africa I</i>	Special Session 1: 11:30 AM EAT Theme: <i>Artificial Intelligence: from Quantum Science to Sustainable Development</i>
Chair: Prof. Rhoda Wanyenze Venue: 4.0-1, Council Room	Chair: Prof. Damalie Nakanjako Venue: Main Hall Auditorium	Chair: John Bosco Insuju Venue: 4.05-1, Vice Chancellors Board Room	Chair: Prof. Tonny Oyana Venue: 2.01-1, Senior Common Room	Chair: Engineer Bainomugisha Venue: 3.01-1, Seminar 01	Venue: 3.01-1, Seminar 02 <i>Principal Organiser:</i> Patrick Weke (University of Nairobi)
Paula Saner <i>University of Cape Town</i> Responsible use of generative AI (genAI) tools in research practice	Taiwo E. Adeleke & M. S Umoren <i>University of Uyo</i> Optimizing Institutional Research Output: Ai-Driven Strategies for Organization and Relevance	Efua Irene N. Amenyah <i>Université Gaston Berger de Saint-Louis</i> Learning in higher education today. Role of Artificial Intelligence in strengthening knowledge construction	Roseanne Njiru et al. <i>University of Nairobi</i> Tech-savvy Care: Encouraging Male Participation in Non-Communicable Diseases (NCD) Caregiving in Families in Kenya	Akinmayowa Akin-Otiko & Ibukunoluwa Akinola <i>University of Lagos</i> Artificial Intelligence and Traditional Medicine: Expanding Database for Diagnosis and Curriculum	<i>Co-organisers:</i> Ranjula Bali Swain (Stockholm School of economics) Francesco Petruccione (Stellenbosch University) Tim Kamanu (University of Nairobi)

E. S. Boakye & F. K Awuah <i>Kwame Nkrumah University of Science & Technology</i> Inclusion of Students with Vision Impairment into STEM Education in African Universities: What Promise Has Artificial Intelligence?	Prince Dawson Tetteh et al. <i>Kwame Nkrumah University of Science & Technology</i> Advancing Responsible Artificial Intelligence Ecosystems in African Higher Education Institutions: A Roadmap for Inclusive Growth and Sustainable Development	Odinakachukwu Echeta et. al. <i>University of Lagos/ Kwame Nkrumah University of Science & Technology</i> Evaluating the Potential of Machine Learning for Improving Rainfall Measurements in Data-Scarce Regions	Lúcio Hilário Nhampimbe et al. <i>Eduardo Mondlane University (Associate Member)</i> Tropical Cyclone Trajectory Forecasting in Southwest Indian Ocean Based on Deep Learning	Wendy Githu <i>University of Nairobi</i> Using Telemedicine to Improve Ncd Care in Murang'a County, Kenya	· Zoran Bosnic (University of Ljubliana) · George Azzopardi (University of Groningen) <i>Format: 6 presentations of 10 minutes each and 5 minutes of discussion</i>
Titilayo Olubunmi Olaposi <i>Obafemi Awolowo University Ile Ife</i> Ethical Considerations in the Deployment of Artificial Intelligence: Lessons from Multiple Case Studies	Christopher Isike <i>University of Pretoria</i> The role of governance at University and State levels in fostering AI in Africa	Isaac Oluwatayo & Ayodeji Ojo <i>University of Venda/ University of Ibadan</i> The Changing Ecologies of Education and Skillsets for Youth Employability in Nigeria: Can Investment in Artificial Intelligence Bridge the Gap?	Hellen Maziku & Vincent Wilson <i>University of Dar es Salaam</i> Assessing Preparedness of Adopting Artificial Intelligence to Protect Critical Infrastructures in Developing Countries: A Case of Tanzania.	Deborah Oluwabiye & Kayode Eesuola <i>University of Lagos</i> Leveraging Artificial Intelligence for Integrating Indigenous Knowledge into Africa's Education Systems	
S. Wattai & M. Kawia <i>University of East London</i> Assessing the Usability and Effectiveness of HerbATLAS: A GeoAI Platform for Mapping, Preserving, and Promoting Knowledge of Medicinal Plants in East Africa	M. Nhangumbe & A. Nascetti <i>Eduardo Mondlane University/KTH, Sweden</i> Geo-foundation models and Sentinel data for flood mapping in Mozambique	Akinwale Babajide & Janet Okebiorun <i>University of Lagos</i> Artificial Intelligence (AI) Powered Personalized Learning for Facilitating Adult Education Programmes in Nigeria and Ghana: A Panacea for Bridging Skills Gaps Across Africa	Ayodeji Adegun <i>University of Ibadan</i> A Critical Review of Application of Ai in Sustainable Clean Water and Sanitation in Africa	Getachew Mengesha & Mesenbet Assefa <i>Addis Ababa University</i> Context-specific AI Legal framework for Ethiopia	

Wednesday, 29th October 2025 (Second Parallel Session)

Parallel Session 2.1: 3.00 PM EAT Theme: <i>Advancing Responsible AI Ecosystems in African HEIs II</i>	Parallel Session 2.2: 3.00 PM EAT Theme: <i>Application of AI in Research and Innovation in African Universities II</i>	Parallel Session 2.3: 3.00 PM EAT Theme: <i>Building AI Capacity and Talents in African Higher Education Institutions II</i>	Parallel Session 2.4: 3.00 PM EAT Theme: <i>Improving Infrastructure for Science and Technology in AI II</i>	Parallel Session 2.5: 3.00 PM EAT Theme: <i>Promoting Collaborative Research and Innovation Networks in AI in Africa II</i>	Special Session 2: 3:00 PM EAT Theme: <i>Afro-Feminism for AI: building community-driven solutions</i>
Chair: Prof. John Mango Magero Venue: 4.0-1, Council Room	Chair: Assoc. Prof. Dorothy Okello Venue: Main Hall Auditorium	Chair: Shahren Memon Venue: 4.05-1, Vice Chancellors Board Room	Chair: Prof. Enock Matovu Venue: 3.01-1, Seminar 01	Chair: Assoc. Prof. Isa Kabenge Venue: 2.01-1, Senior Common Room	Venue: 3.01-1, Seminar 02 <i>Principal organiser:</i> · Joyce Nabende (Makerere University)
Opeyemi Gbadegesin <i>University of Ibadan</i> Culturally Anchored Artificial intelligence (AI): Ethical Governance and Inclusive Innovation in African Universities	Peter Waweru Mwangi et al. <i>University of Nairobi</i> Leveraging the Power of AI to sustainably Solve Africa's NCD epidemic: - A 360-degree approach	Joseph Soluade & Julius Ehigie <i>University of Lagos</i> Developing AI Talent in African Higher Education: Strategies and Outcomes from the University of Lagos, Nigeria	Irene Esther Mutuzo et al. <i>Makerere University</i> Facilitating Conditions and Enabling Factors for Human Capital Management System Use in Ugandan Public Universities; Application of the Unified Theory of Acceptance and Use of Technology	Valentine Nlebedim et al. <i>University of Leeds & Egerton University</i> Lessons from the Leeds-Africa Hub in Data Science and AI	<i>Co-organisers:</i> · David Sumpter and Kajsa Hallberg Adu (Uppsala University) · Chika Yinka Banjo (University of Lagos) · Solomon Gizaw (Addis Ababa University) · Christine Musanase (University of Rwanda)

Emmanuel Nleonu et al. <i>Federal Polytechnic Nekede, Owerri, Imo State, Nigeria</i> <i>University of El Oued, Algeria</i> Photocatalytic and Adsorptive Properties of Li-doped Fe ₃ O ₄ Nanoparticles on Wastewater Containing Methylene Blue.	Obvious Mapiye et al <i>University of Stellenbosch/ University of Pretoria/ University of South Africa</i> Development of an Agri-Management Database System prototype for the sustainability of smallholder farmers in South Africa: A design thinking approach	Vicent Rutagangibwa & Comfort Musiimenta <i>University of Cape Town</i> Exploring the Adoption and Perceptions of Artificial Intelligence in Engineering Education Across African Higher Learning Institutions	Ogunbodede Adedoyin <i>University of Lagos</i> Artificial Intelligence and the Digital Economy for Transforming Africa's Workforce: A Case Study of Yale Foods Limited, Ibadan, Oyo State, Nigeria	Florence Nweke & Esther Ojo <i>University of Lagos</i> Exploring Acoustic and Behavioral Differences between Singing and Speaking in Yoruba Language: Implications for Music and Language.	<i>Format: Four 10-minute presentations from each participating university, 50-minute round table discussion</i>
Hussein Mbabali <i>Islamic University, Uganda</i> AI Research boost and impact on Ugandan Universities and Communities	R. R. Gangji & A. M Alimohamed <i>Muhimbili University of Health and Allied Sciences</i> A Systematic Review of The Transforming Triad of East African Healthcare Systems: Artificial Intelligence, Big Data, and Cloud Computing”	Bukola Amao-Taiwo et al. <i>University of Lagos, Obafemi Owolowo University, Ile Ife</i> The Future of AI in Gender-Responsive Entrepreneurship Education: A Case Study of Female Student Entrepreneurs at the University of Lagos	Olatunji Mukaila Iyiola et al. <i>University of Ibadan</i> Using Artificial Intelligence (AI) to Improve Institutional Structures in African Universities and Research Institutions for Co-Creation	Wilson Okaka et al. <i>Kyambogo University</i> Promoting Collaborative University Research Innovation Networks in Ai in Africa Through a Gender Equality Perspective Communication Strategy	
George M. Nyaory et al. <i>University of Nairobi</i> Machine Learning in 5G Network Slicing at Multi-Edge Computing (MEC) Servers for Efficient Resource Allocation	Dibin Varghese <i>Csi College for Legal Studies</i> Fostering Ai Research and Innovation Networks: Strategies for Collaboration and Impact	Kolawole Aramide et al. <i>University of Ibadan</i> Bridging the AI Skills Gap and Strategies for Developing AI Talent in African Universities: A Review	Joburg Mahuyu Midlands State University Investigating the attitudes and perceptions of African industries towards Artificial Intelligence (AI) adoption and collaboration with Higher Education Institutions (HEIs) in fostering research and innovation ecosystem	Solomon Caulker <i>United Methodist University Sierra Leone</i> Harnessing Artificial Intelligence and Innovation for Sustainable Development in Africa: Opportunities, Challenges, and Policy Imperatives.	

Thursday, 30th October 2025

(Third Parallel Session)

Parallel Session 3.1: 11.00 AM EAT Theme: <i>Application of AI in Research and Innovation in African Universities III</i>	Parallel Session 3.2: 11.00 AM EAT Theme: <i>Application of AI in Research and Innovation in African Universities IV</i>	Parallel Session 3.3: 11.00 AM EAT Theme: <i>Building AI Capacity and Talents in African Higher Education Institutions III</i>	Parallel Session 3.4: 11.00 AM EAT Theme: <i>Promoting Collaborative Research and Innovation Networks in AI in Africa III</i>	Parallel Session 3.5: 11.00 AM EAT Theme: <i>Research, Innovation & Artificial Intelligence for Africa's Transformation</i>	Special Session 3: 11.00 AM EAT Theme: <i>AI and Creative Economies</i>
Chair: Dr. Racheal Ddungu Venue: Main Hall Auditorium	Chair: Prof. Fredrick Muyodi Venue: 4.0-1, Council Room	Chair: Prof. Edward Bbaale Venue: 4.05-1, Vice Chancellors Board Room	Chair: Prof. Hellen Nambalirwa Venue: 2.01-1, Senior Common Room	Chair: Prof. Julius Kikooma Venue: 3.01-1, Seminar 01	Chair: Dr Anthony Tibaingana Venue: 3.01-1, Seminar 02 Jen Snowball et al. <i>Rhodes University</i>
Michael Daramola <i>University of Pretoria</i> Leveraging Artificial Intelligence (AI) for Effective Doctoral Studies and High-Quality Research in African Higher Education Institutions (HEIs)	Raymond Okwudiri Onuoha <i>University of Witwatersrand</i> GenAI for Education (GenAI4E) in Africa: Assessing Critical Imperatives for the Future of Work	Fatai Kayode Wahab & Tajudeen Idera Abdulmajeed <i>Kwara State University/University of Abuja</i> The Role of International Collaborations in Enhancing AI Capacity in African Higher Education Institutions: Case Study Approach	Cyprian Amutabi & Kevin Kotze <i>University of Cape Town</i> Innovation and Growth in South Africa: Do Patent Applications Matter?	Modou Gueye et al. <i>Université Cheikh Anta Diop/École Supérieure Polytechnique</i> Towards AI-Based Intelligent Orientation of First-Year Higher Education Students	Creative Economies in Africa, AI and Higher Education

Mekasha kassaye Gobaw <i>Addis Ababa University</i> Unlocking Perceptions and Redefining Traditional Roles Towards AI Implementation in Sub-Saharan African (SSA) Universities	Brenda Van Wyk <i>University of Pretoria</i> Utilizing Ai for Research Intelligence in the Global South Universities – A Scoping Review	Guttorm Alendal et al. <i>University of Bergen/ Makerere University/ Aalborg University/ University of Dar es Salaam</i> Innovative Learning: Data Science Education with Local Knowledge and Real-World Data.	Kimotho Ngunjiri & Ndirang Ngunjiri <i>University of Nairobi</i> Using AI and Big Data to Forecast Migration to Strengthen Long-Term Preparedness	Hamisi Mfaume et al. <i>University of Dar es Salaam</i> Addressing the Bottlenecks Faced by Postgraduate Students in Utilizing Artificial Intelligence in Academic Research Writing in Tanzania	Mohammed Aminu Sanda <i>University of Ghana</i> Enhancing AI-Oriented Creative Curriculum Towards Sustainable Creative Labour Creation in a Ghanaian Creative Economy
Oluwasegun Ogunsakin et al. <i>Ekiti State University, Ado-Ekiti, Tai Solarin University of Education/University of Ibadan</i> Demystifying the Power of Artificial Intelligence (AI) in Conflict Prevention and Peacebuilding in Nigeria	Rugare Chingarande <i>University of Stellenbosch</i> Customized Large Language Models for Biomedical Research: A unique opportunity for the global south	Guttorm Alendal et al. <i>University of Bergen/ Makerere University/ Aalborg University/ University of Dar es Salaam</i> Mathematics for Sustainability	Anthony Kamau & Ndirangu Ngunjiri <i>University of Nairobi</i> Accelerating Digitalization and Technological Innovation as Keys to Boosting Economic Growth in Africa	Olubusayo Adebusiuyi & Bimbola Oludipe <i>Obafemi Awolowo University Ile-Ife/ Olabisi Onabanjo University</i> Empowering Pre-service Teachers with AI-Powered digital Tools for Industry-Collaboration	Panel Discussion: <i>"Creativity, digital and new technologies in Uganda and beyond: a discussion panel"</i> · Rita Ngenzi (<i>Founding Director, Africa Creatives Alliance</i>) · Ivan Sewajje (<i>Head of Brand at Innovation Village and MOTIV</i>) · Amanda Gowa (<i>Community Development, Africa Creatives Alliance - ACA</i>)
Charles Roland Haruna et al. <i>University of Cape Coast</i> Facial Recognition Using Machine Learning: A Comparative Evaluation of Algorithms	Elohor Idolor et al. <i>University of Lagos/ University of Iowa</i> Enhancing Collaborative Learning through AI Breakout Learning Platform: Implications for Students Success in African Higher Education Institutions.	Daniel Clement et al. <i>University of Cape Coast</i> Utilizing Cloud-Based Technologies to Enhance the Availability and Reliability of the University of Cape Coast Students' Portal Service	Filagot Mengistu Walle et al. <i>Addis Ababa University/Philipps-Universität Marburg/ University of Helsinki</i> Climate-Smart Apiary Site Selection in East Africa: GIS-Based Analysis of Current and Future Climate Projections	Marlene Holmner et al. <i>University of Pretoria</i> Empowering Ethical Innovation: Designing a Responsible Computing Workshop for Emerging Economies	

Thursday, 30th October 2025

(Fourth Parallel Session)

Parallel Session 4.1: 4.00 PM EAT Theme: Application of AI in Research and Innovation in African Universities V	Parallel Session 4.2: 4.00 PM EAT Theme: Application of AI in Research and Innovation in African Universities VI	Parallel Session 4.3: 4.00 PM EAT Theme: Promoting Collaborative Research and Innovation Networks in AI in Africa IV	Parallel Session 4.4: 4.00 PM EAT Theme: Application of AI in Research and Innovation in African Universities VII	Parallel Session 4.5 4.00 PM EAT Theme: Investments in Artificial Intelligence for Africa's Development	Special Session 4: 4.00 PM EAT Theme: Investing in Artificial Intelligence for Advancements in Pharmaceutical Drug Formulation
Chair: Prof. Bruce Kirega Venue: Main Hall Auditorium	Chair: Dr. Cathy Mbidde Venue: 4.0-1, Council Room	Chair: Prof. David Guwatudde Venue: 4.05-1, Vice Chancellors Board Room	Chair: Dr Arthur Tugume Venue: 2.01-1, Senior Common Room	Chair: Mr. Samuel Mugabi Venue: 3.01-1, Seminar 01	Venue: 3.01-1, Seminar 02 Convener: Dr. Joy Ifunanya Odimegwu (University of Lagos)
Omonigho Umukoro <i>University of Lagos</i> AI as Muse or Mask: Theorizing the Fine Lines between Creative Authenticity and Impostor Syndrome in Academic Research	Dereje Bayisssa Demissie et al. <i>University of Stellenbosch</i> Mapping evidence on artificial intelligence (AI) technologies used in ultrasound-based monitoring progress of labour: A scoping review	Younous Ali Ahmat & Mamadou Simina Dramé <i>Université Cheikh Anta Diop</i> Assessment of wind energy resources in Chad, Central Africa, using 100-m wind data from ERA5 reanalysis	David Otieno & Sam Kariuki <i>Kenya Medical Research Institute</i> Field evaluation of breath biomarkers for malaria diagnosis in Western Kenya	Benjamin Anabaraonye & Gideon Nwafor Chukwuemeka <i>University of Nigeria, Nsukka/ Odumegwu Ojukwu University</i> The Role of Artificial Intelligence in Enhancing Eco-Theology in Nigeria	Speakers: · Pharm Wuraola Oyewusi (The University of Manchester) · Dr. Nkemehule Florence (University of Lagos) · Prof. Mag. Dr. Gerhard Ecker (University of Vienna)

Doreen Kainyu Kaura et al. <i>University of Western Cape</i> Utilising Technology as a Source of SRMNH Information: Challenges in Effective Communication Even in the Era of AI	Oluwaseyi Jessy Balogun et al. <i>University of Lagos</i> Diagnostic Optimal Machine Learning Algorithms for Chronic Pulmonary Aspergillosis	John Ugoji et al. <i>Federal College of Education, Enugu State, Nigeria</i> Fostering Artificial Intelligence Innovation through Collaborative Research Networks in Africa: Towards an Inclusive and Sustainable Knowledge Ecosystem	Kairo Kimende & Oliver Mbuthia <i>University of Nairobi</i> Bridging Healthcare Access for Non-Communicable Disease Patients Using Social Health Insurance (Kang'ata Care) in Murang'a County, Kenya	Philip Onyekachukwu Egbule <i>University of Delta, Delta State</i> Leveraging Indigenous Knowledge and Artificial Intelligence for Climate Resilience and Sustainable Agriculture in Africa: Exploring the Africa's Rain-Making Technology	- Pharm Ajala, Marvellous (Magami Open Science Initiative) - Dr. Charlotte Ndiribe (University of Lagos) - Prof. Fidele Ntie-Kang (University of Buea Center for Drug Discovery)
Doreen Kainyu Kaura et al. <i>University of Western Cape</i> Mapping existing noninvasive ultrasound technologies used in vaginal examinations during intrapartum: Is AI a solution for Africa?	John Oredo et al. <i>University of Nairobi</i> Determinants of Generative Artificial Intelligence (GenAI) Literacy Amongst Academics: The Role of Attitudes Toward GenAI	Tilman Gocht et al. <i>University of Tübingen/ African Institute for Mathematical Sciences (AIMS)</i> The Tübingen-AIMS Data Science & AI Program: A cooperative approach	Grace Otinwa et al. <i>University of Lagos</i> Fine-Tuning Foundational Language Models for Precision and Conciseness in AI-Driven Personalized Physical Activity Recommendations for Breast Cancer Patients	Mariah Muli <i>University of Nairobi</i> Leveraging Artificial Intelligence for Climate-Resilient Agriculture and Food Security in Africa: Addressing Data Gaps, Infrastructure Challenges and Policy Barriers	
Okonkwo Ifeanyi & Owoh Ikechukwu <i>University of Nigeria, Nsukka</i> Monitoring The Environmental Quality of Solar Energy-Powered Poultry Production System Using Artificial Intelligent (Ai)	H. Oripeloye & M. Oripeloye <i>Obafemi Awolowo University/Clemson University</i> Cultural Tradition Research in the Age of Artificial Intelligence (AI)	Behailu Getachew Wolde et al. <i>Mekelle University</i> Unified Intelligent Testing Framework for Code Review Design		Ernest Mulaya et al. <i>University of Dar es Salaam, Durham University, Oxford University, Universit'e de Lorraine</i> The helium gas budget in the East Africa Rift Valley	

Schedule of Poster Presentations

Set 1: Wednesday October 29, 2025	
Poster Title	Author(s)
1. Use of Face Recognition to Enhance the Security of Automated Teller Machine (ATM)	Hussen Asefa Musa & Million Meshesha <i>Addis Ababa University</i>
2. Artificial Intelligence (AI) in Education: Navigating Challenges and Seizing Opportunities for HEIs in Ethiopia	Amare Abawa Esubalew <i>Addis Ababa University</i>
3. Attitudes of Business Students towards Artificial Intelligence in the context of an underdeveloped country: Implications for Sustainable Educational Practices	Yohannes Workeaferahu Elifneh <i>Addis Ababa University</i>
4. Scaling Successful AI Initiatives Across African Higher Education	Dickson Marfo Fosu et al. <i>Kwame Nkrumah University of Science & Technology</i>
5. A Hybrid Deep Learning-Based Stochastic Bottom-up Framework for Enhancing Electricity Demand Prediction in Rural Electrification	Julius Adinkrah et al. <i>Kwame Nkrumah University of Science & Technology</i>
6. DeCGAN: A Diversity-enhanced CycleGAN for Unpaired Image-to-Image Translation	Matthew Cobbinah et al. <i>Kwame Nkrumah University of Science & Technology</i>
7. CNN-Based Accent Similarity Detection Using Masked Spectrogram Reconstruction	Amina Salifu et al. <i>Kwame Nkrumah University of Science & Technology</i>
8. Health-System Factors Associated with the Occurrence of Stillbirths among Women Delivering in Selected Hospitals of Marsabit County	Badane Wako & Fatuma Affey <i>Umma University</i>
9. Artificial Intelligence (AI) And Governance: The African Union's Strategy	Kambo Atse & Mireille Vanessa Demgne Tchuiam <i>Pan-African Think Do African Network of Young Researchers & University of Yaoundé II-Soa</i>

Set 2: Thursday October 30, 2025

Poster Title	Author(s)
10. Leveraging AI towards facilitating the attainment of the Sustainable Development Goals and ensuring inclusive growth across Southern Africa	Silas Mangwende & Agnes Nare <i>Women's University in Africa</i>
11. Genetic diversity and population structure of cowpea mutant collection using SSR and ISSR molecular markers	Badji-N'Poneh Ange Kabkia et al. <i>Université Cheikh Anta Diop</i>
12. AI for Africa, by Africa: Rethinking Governance, Data, and Development	Jonathan Shock & Chinasa Okolo <i>University of Cape Town & The Brookings Institute</i>
13. Protecting Intellectual Property and Personal Data in the Age of AI: Challenges for African Universities	Belinda Chepchumba Rop <i>University of Dar es Salaam</i>
14. Artificial Intelligence Techniques for Motion Artifact Cancellation in Radar-Based Vital Signs Monitoring: A Review	Josephine Kalekwa Stephen & Baraka Maiseli <i>University of Dar es Salaam</i>
15. To use or not use of ChatGPT in academia: Challenges and opportunities	Simon Ngalomba <i>University of Dar es Salaam</i>
16. Cultural Sensitivity as a Catalyst for AI Collaboration Success in West Africa	Theshaya Naidoo <i>University of KwaZulu-Natal</i>
17. Exploring the Effectiveness of Interactive Adaptive Learning Platform on Secondary School Students' Transformative Learning Outcome in Physics	Veronica Babajide et al. <i>University of Lagos</i>
18. Barriers To The Adoption Of Virtual Reality And Augmented Reality In Valuation Pedagogy	Al-Ameen Okonu <i>University of Lagos</i>
19. Leveraging Artificial Intelligence for Monitoring, Evaluation, and Learning (MEL) in Education in Emergencies: A Case Study of the AHEEN RDP Pathways Program	Immaculate Kimani & Barbara Moser-Mercer <i>University of Nairobi</i>

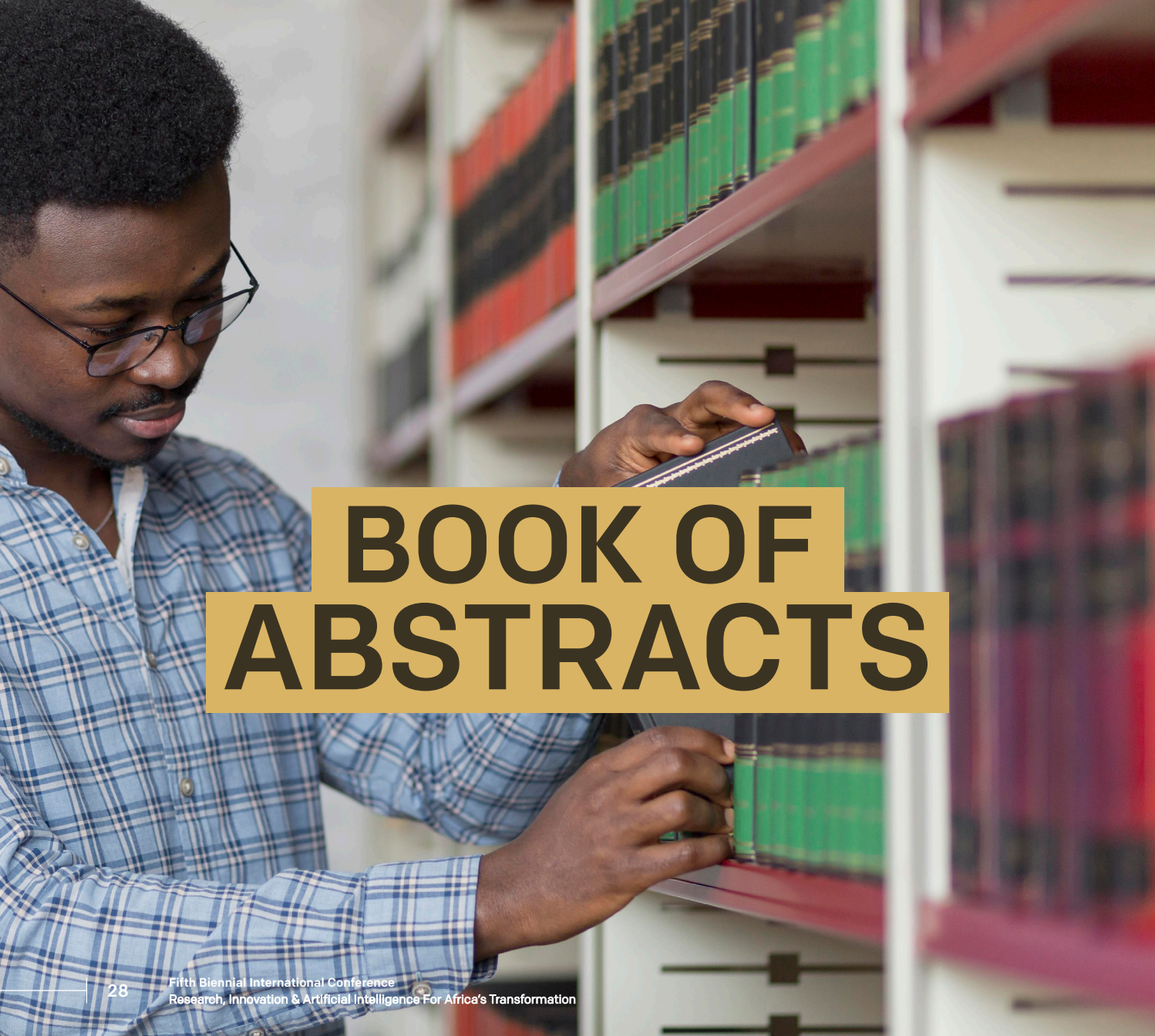
Set 3: Friday October 31, 2025

Poster Title	Author(s)
20. Ubuntu Meets AI: Decolonizing AI Ethics for a Just Tomorrow	Mitchel Ojaamong <i>University of Nairobi</i>
21. The Role of Kenya National ICT Policy 2020 in Research, Innovation, and AI for Africa's Transformation	Jacqueline Kamau & Henry Amadi <i>University of Nairobi</i>
22. AI-Driven Mental Health Screening and Support for Adolescents in Resource-Limited Settings: A School-Based Implementation Study	Dominic Ngalo et al. <i>University of Nairobi</i>
23. The Future of Legislation Using Multimodal Artificial Intelligence	Ndirangu Ngunjiri & Beatrice Mbiya <i>University of Nairobi</i>
24. Harnessing Artificial Intelligence For Conflict Prevention And Early Warning In Africa's Fragile States	Rosalyn Wanjiru Njoroge <i>University of Nairobi</i>
25. Navigating Disruptive Technologies in Academic Libraries: A Theoretical Framework for AI, information ethics, and Digital Competence	Lesego Makhafola et al. <i>University of Pretoria</i>



Schedule for ARUA CoE Early Career Researchers Workshop

Time	Workshop Sessions
Morning Sessions (11:30 AM EAT)	CoE Session 5.1: (Unemployment and Skills Development) Topic: <i>Research, Innovation & Artificial Intelligence for Africa's Transformation: Will Jobs Disappear, or More Jobs Created?</i> Venue: 3.01-1, Seminar 01 CoE Session 5.2: (Inequality Research) Topic: <i>AI for Good Sounds Great: Does it Work?</i> Venue: Main Hall Auditorium CoE Session 5.3: (Post-Conflict Societies) Topic: <i>Interdisciplinary Peace Research: Is the world ready for interdisciplinary research and teaching?</i> Venue: 4.05-1, Vice Chancellors Board Room CoE Session 5.4 (Notions of Identity) Topic: <i>Techno-colonialism? Decolonising AI for African Identity</i> Venue: 4.0-1, Council Room CoE Session 5.5 (Urbanization and Habitable Cities) Topic: <i>Leveraging AI for Sustainable Infrastructure Development in Africa</i> Venue: 3.01-1, Seminar 02
Afternoon Sessions (2:00 PM EAT)	CoE Session 6.1 (Climate and Development) Topic: <i>Opportunities and challenges for early career researchers in Africa on the use of AI and machine learning for climate change research</i> Venue: 3.01-1, Seminar 01 CoE Session 6.2 (Water) Topic: <i>Using AI and machine learning in water research</i> Venue: Main Hall Auditorium CoE Session 6.3 (Non-Communicable Diseases) Topic: <i>Research, Innovation and Artificial Intelligence for Africa's Transformation</i> Venue: 4.05-1, Vice Chancellors Board Room CoE Session 6.4 (Materials, Energy and Nanotechnology) Topic: <i>Advancing AI-Driven Materials Research and Innovation for Sustainable African Futures</i> Venue: 2.01-1, Senior Common Room CoE Session 6.5: (Energy) Topic: <i>Leveraging the power of Machine Learning and Artificial Intelligence in Renewable Energy Development</i> Venue: 3.01-1, Seminar 02

A man with dark skin and glasses, wearing a blue and white plaid shirt, is looking down at a book he is holding. He is in a library, with shelves of books visible in the background. The shelves are filled with books, some with green spines and others with red. The man is holding a book with a dark cover. The text "BOOK OF ABSTRACTS" is overlaid on the image in a large, bold, black font on a yellow background.

BOOK OF ABSTRACTS

Parallel Session 1.1

Responsible Use of Generative AI (Genai) Tools in Research Practice

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This paper examines the responsible use of generative artificial intelligence (genAI) tools in research practice, acknowledging their increasing prevalence and the ethical complexities they introduce. It highlights the spectrum of attitudes towards genAI, from outright refusal to enthusiastic adoption, and underscores the need for case-by-case deliberation on appropriate use. Emphasising the critical role of human accountability, the paper discusses ethical considerations including transparency, reproducibility, data security, and mitigation of bias. Particular focus is given to data analysis, contrasting quantitative applications where genAI may be beneficial, with qualitative contexts where its use poses significant risks. A values- and risk-based framework for responsible genAI use is proposed, anchored in established research integrity principles such as honesty, shared accountability, professional fairness, stewardship, respect, and epistemic justice, complemented by context-specific evaluation, impact assessment, and mitigation strategies. Examples of responsible and irresponsible genAI use in research illustrate practical challenges and consequences. The response of publishers to genAI integration is also explored, highlighting initiatives to support ethical AI adoption. Concluding, the paper asserts that while genAI tools are here to stay, their integration into research demands careful reflection, transparency, and accountability to uphold research integrity and foster responsible innovation in the scholarly community.



Inclusion of Students with Vision Impairment into STEM Education in African Universities: What Promise has Artificial Intelligence?

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Dr. Francis Kwadwo Awuah

Kwame Nkrumah University of Science and Technology

Science, Technology, Engineering, and Mathematics (STEM) education is vital for innovation and sustainable development. However, students with vision impairment (SVI) face significant barriers to inclusion in STEM, especially in African universities, where infrastructural and systemic challenges persist. Artificial Intelligence (AI) offers promising solutions to improve accessibility, engagement, and learning outcomes for SVI in STEM education. This study systematically reviews empirical research from 2019 to 2025 in leading AI education journals, focusing on AI's role in promoting inclusion for SVI in African and similar contexts. Using an innovative literature gathering method and the PQRS framework for data extraction, the review synthesizes evidence on AI applications aligned with Universal Design for Learning (UDL) principles. Findings show that AI-driven multimodal content, personalized adaptive learning, and alternative expressive technologies enhance accessibility and engagement for SVI, effectively supporting UDL. However, infrastructural deficits, limited educator expertise, and fragmented policies hinder sustainable AI adoption in African universities. The study highlights the urgent need for investments in digital infrastructure, AI literacy training, inclusive pedagogy, and coherent policy frameworks. This review confirms AI's potential to overcome accessibility barriers and advance inclusive STEM learning aligned with UDL principles.

Ethical Considerations in the Deployment of Artificial Intelligence: Lessons from Multiple Case Studies

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This study examines the ethical implications of AI deployment across ten case studies in sectors such as healthcare, finance, manufacturing, and customer service, using Principlism (autonomy, beneficence, non-maleficence, justice) and Virtue Ethics (compassion, transparency, fairness). Findings reveal that while AI enhances efficiency and productivity, it often prioritizes corporate gains over individual rights, leading to job displacement, privacy violations, and opaque decision-making. Principlism highlights systemic imbalances, particularly in autonomy and justice, while Virtue Ethics exposes deficits in corporate moral responsibility. Exemplary cases (e.g., IBM Watson Health, Nissan) demonstrate virtuous AI use, whereas controversial practices (e.g., Amazon's surveillance, biased recruitment AI) underscore ethical risks. The study advocates for a hybrid ethical framework, combining structured principles with virtue-driven governance, to guide responsible AI adoption, particularly in Africa. Recommendations include sector-specific guidelines, worker protections, and bias mitigation strategies to align AI advancements with societal well-being. This research contributes to ongoing debates on ethical AI governance, emphasizing the need for transparency, accountability, and equitable benefit distribution.

Assessing the Usability and Effectiveness of HerbATLAS: A GeoAI Platform for Mapping, Preserving, and Promoting Knowledge of Medicinal Plants in East Africa

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Mr. Mohammed Kawia

The preservation of traditional medicinal plant knowledge in East Africa is increasingly threatened by inadequate documentation and climate change. This study evaluates the usability and effectiveness of HerbATLAS, a GeoAI platform collaboratively developed in Tanzania, Kenya, and Uganda to safeguard indigenous knowledge and facilitate its dissemination. Stakeholders engaged with the platform during structured two-day sessions, followed by questionnaires completed by 45 participants, including community elders, youth representatives, herbalists, researchers, and policymakers. Usability was assessed across service quality, technical quality, information quality, and system quality. Results demonstrated consistently high approval, with mean satisfaction scores exceeding 4.3 across all user groups. HerbATLAS functions beyond a digital repository by supporting intergenerational knowledge transfer, improving accessibility to ecological knowledge, and providing a replicable framework for integrating local expertise into conservation strategies and policy development. During testing, the platform successfully documented over 200 plant records, confirming its capacity for knowledge preservation and dissemination. These findings validate HerbATLAS as both a technological innovation and a tool for cultural resilience, offering a model for evaluating GeoAI applications in ethnobotanical research and conservation.



Parallel Session 1.2

Optimizing Institutional Research Output: AI-Driven Strategies for Organization and Relevance

Dr. Taiwo Ebenezer Adeleke

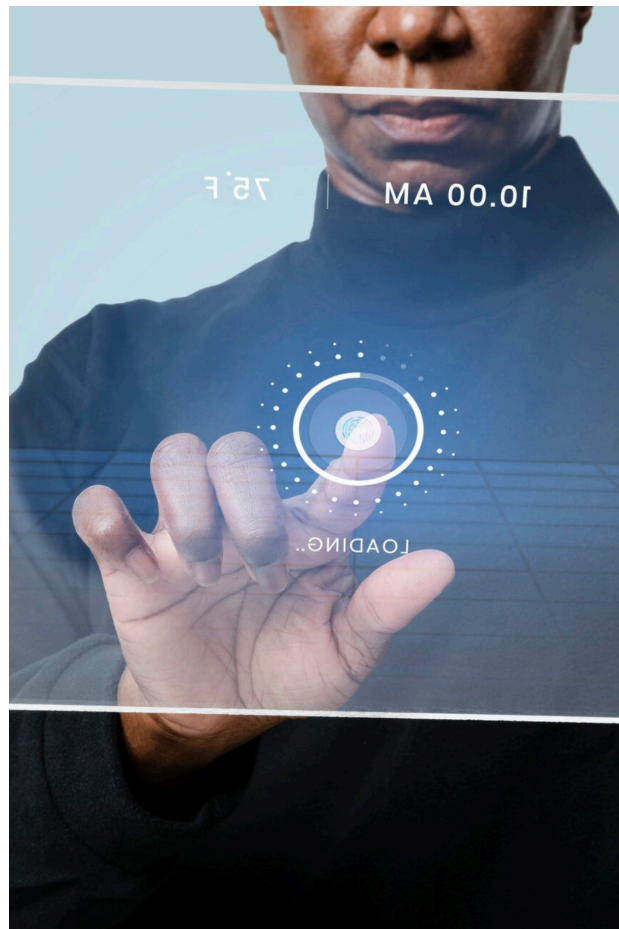
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Educational research is central to advancing development, improving practices, and shaping policies across academia, industry, and society. Despite the significant investments made by higher education students, much of their research remains underutilized, often confined to institutional archives with limited accessibility. This underutilization stems largely from weak organizational and management strategies. Effective dissemination and accessibility are crucial for ensuring research relevance to future scholars, practitioners, and policymakers. With rapid technological advancements, particularly in Artificial Intelligence (AI), institutions can adopt AI-driven approaches to enhance research management. This study explores AI's role in documentation, classification, evaluation, and implementation of research outputs. Through tools such as machine learning, natural language processing, and AI-powered recommendation systems, institutions can automate metadata generation, enable intelligent searches, and promote interdisciplinary collaboration. These innovations enhance visibility, usability, and knowledge discovery. However, challenges such as insufficient AI skills among staff, limited funding, resistance to adoption, and concerns over ethics and data security hinder widespread integration. Addressing these issues requires investment in AI training, infrastructure, and supportive policies. Overall,

AI can transform research repositories into dynamic knowledge hubs, boosting impact, promoting inclusivity, and fostering sustainable research ecosystems.



Advancing Responsible Artificial Intelligence Ecosystems in African Higher Education Institutions: A Roadmap for Inclusive Growth and Sustainable Development

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Artificial intelligence (AI) implementation within Africa's Higher Education Institutions (HEIs) brings about noteworthy possibilities to resolve problems the continent faces. However, this implementation encounters several obstacles. This study proposes an extensive framework for improving the responsible AI ecosystems within African Higher Education Institutions with a focus on creating new policies and implementing strategic measures compatible with regional development agendas, including Agenda 2063. The study calls attention to the essential role of policy frameworks in enabling AI adoption. The Digital Transformation Strategy for Africa (2020-2030) put forward by the African Union lays out the strategy to exploit digital technologies including AI at a continental level. Even though the implementation of the strategy at the national and institutional levels is uneven, it has potential benefits linked to it. The paper also emphasizes the importance of regulatory measures that concern ethics, including data privacy and bias in algorithms. It proposes the integration

of African cultural values such as Ubuntu principles so that they can be inclusive and equitable. According to the study, AI adoption is premised on crucial partnering among the key players...

The Role of Governance at University and State Levels in Fostering AI in Africa

Prof. Christopher Isike

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One of the lingering impacts of colonialism which continues to define Africa's marginality in global geopolitics which remain unresolved is the fundamental question of state formation. As imagined political communities, states are traditionally formed by people through a negotiation and social contract process that helps in the state-building and development process. In essence, why and how a state is formed impacts on its development trajectory both within and outside the state. This is because when people willingly or are forced by circumstances to form a political union, and they are involved in the process, they maintain a commitment to the state which also bestows it (the state) legitimacy which is critical in making the state work. Who formed states in Africa and why? What impact has the absence of Africans in the state formation process had on poor governance and underdevelopment in Africa? These questions are fundamental in understanding why Africa continues experience some of the most severe social and economic challenges worldwide despite its immense human and material resources. Addressing them will also help the continent to transform the state as the primary mode of organization and then put it in a position to transform its Higher Education Institutions.

Geo-foundation models and Sentinel data for flood mapping in Mozambique

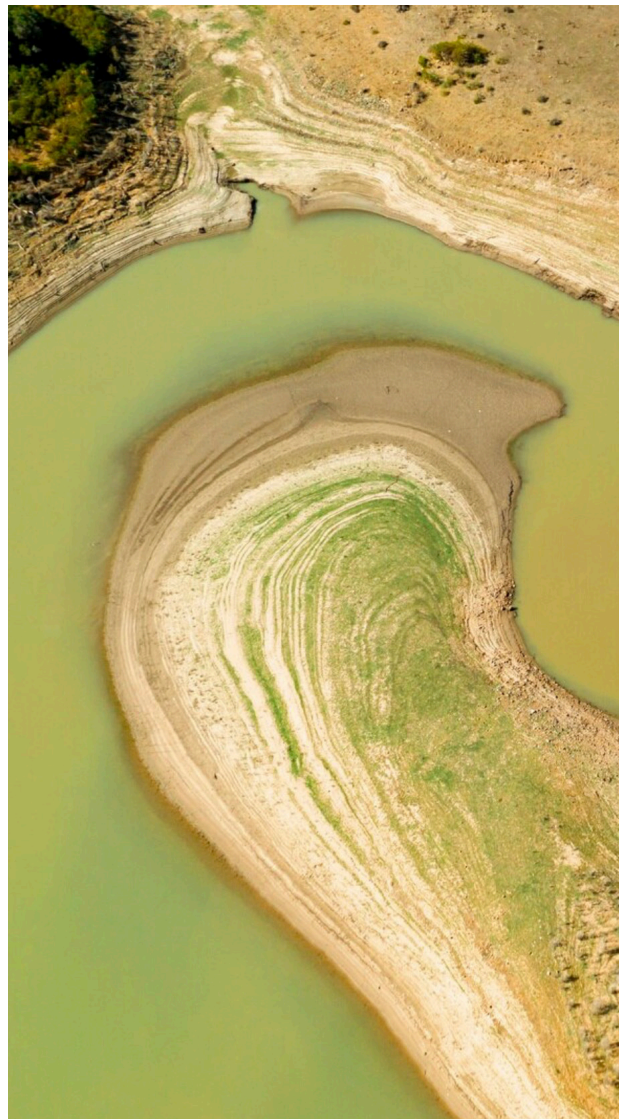
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Mozambique is one of the most flood-prone countries in Southern Africa, increasingly affected by tropical cyclones that cause severe damage, displacement, and agricultural losses. Cyclone Idai alone destroyed 93% of Beira, Mozambique's fourth-largest city. To address climate challenges, effective and sustainable flood mapping methods are essential, especially for countries in the Global South. Synthetic aperture radar (SAR) is widely used for flood mapping, with many machine learning (ML) and deep learning (DL) algorithms developed. However, these methods are often task-specific, require retraining, and depend heavily on annotated data, limiting their adaptability in multi-task or data-scarce settings. This study explores the use of Foundation Models (FMs), specifically the recently launched Geo-Foundation Model (GFM) Clay, for flood mapping. Using Sentinel-1 imagery from DrivenData Labs and Beira, we fine-tuned Clay and achieved high performance: IoU above 0.93 and F1 above 0.96 on the DrivenData dataset, surpassing the competition's best IoU of 0.8094. In Beira, results remained strong with IoU above 0.8 using VH polarization. These outcomes highlight Clay's robustness, adaptability, and potential for global application in flood mapping, making it a promising tool for climate resilience in vulnerable regions.



Parallel Session 1.3

Learning in Higher Education Today. Role of Artificial Intelligence in Strengthening Knowledge Construction

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In the past, teaching in lecture halls where university teachers are free to communicate their knowledge without worrying about mastering what they have learned. Learning in higher education today is totally different because it is a significant challenge for both learners and teachers. Following 1990, number of children entering school continued to increase, leading in turn to the massification in higher education. Since 2005, French-speaking Africa has undergone the Boulogne reforms, which repositioned the maps by replacing units of value (UV) by teaching units (UEs). This new reconfiguration allows for a level of mastery, or construction of knowledge by the learner. Today, with Artificial Intelligence (AI), it is a question of teaching differently, or learning differently. What place is given to AI in higher education today? Which of CM, TD and TP can it support? We will refer to theories relating to LMD system and teaching practices in higher education. Through a quantitative research approach including online questions on knowledge and use of AI. A sample of 292 adults' students answered survey. Data showed that large numbers of students know about and use tools including AI in teaching and learning activities in which they pursue in higher education institution (HEI).

Evaluating The Potential of Machine Learning for Improving Rainfall Measurements in Data-Scarce Regions

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Water Research Institute, Council for Scientific and Industrial Research, Accra, Ghana

Mr. Ishaya Ayock

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Prof. Ezechiel Longe

University of Lagos, Nigeria

Prof. Samuel Odaii

Accra Technical University, Accra, Ghana

Climate change has intensified flooding across Africa, heightening threats to lives and infrastructure. Effective flood mitigation depends on reliable precipitation data, yet precipitation measurements in Sub-Saharan Africa lack the spatial and temporal density needed for reliable early warnings. Satellite-derived Precipitation Products

(SPPs), offer the requisite high spatio-temporal coverage in these data-poor areas. However, they are associated with inherent errors, being indirect estimates. This study investigated whether machine learning (ML) models – Random Forest (SPP_RF), Gradient Boosting Machines (SPP_GBM) and Support Vector Machines (SPP_SVM) – can enhance extreme rainfall estimation in the Volta Basin, West Africa, using near-real-time (NRT) SPPs as inputs. The ML regression models were trained on daily rainfall data from 11 stations across the basin. The trained models were then used to predict rainfall at an independent location (L1), excluded from training. Predictions were evaluated against ground-truth gauge data at L1 and compared with raw NRT_SPP estimates. Results show that ML-derived estimates (SPP_GBM, SPP_RF) improved extreme-rainfall detection by 24% (Probability of Detection), 8.1% (False Alarm Ratio), 20% (Critical Success Index), 4.9% (Root Mean Square Error) and 1.1% (pBIAS). These findings demonstrate that ML can substantially improve rainfall estimation in observation-poor regions, aiding flood risk and water resources management.



The Changing Ecologies of Education and Skillsets for Youth Employability in Nigeria: Can Investment in Artificial Intelligence Bridge the Gap?

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Technology is transforming how individuals learn, work, and conduct business globally, and this transformation is driven by rapid digital innovations. Artificial intelligence (AI) is driving this transformation, revolutionizing traditional education and skill acquisition methods. This paper examines the evolving education and employment landscape in Nigeria, focusing on how AI investments can address critical skill gaps among young people, enhance employability, and improve the nation's integration into the global economy. Nigeria faces significant challenges in terms of youth employability arising from outdated curricula, inadequate educational infrastructure, and a disconnect between academic training and industry needs. The rise of digital jobs, which require competencies in data analytics and such likes, has aggravated these gaps. As industries increasingly adopt AI and digital technologies, some graduates struggle to meet evolving job market demands, exacerbating unemployment and underemployment. AI-driven education presents a viable solution to bridging the skill gaps required for emerging job opportunities. This paper discusses how AI can revolutionize Nigeria's education system through adaptive learning systems, AI-powered tutors, and other technologies. By embracing AI as a strategic driver of workforce development, Nigeria can bridge its education and skills gap, enhance economic competitiveness, and position its youths for success in the Fourth Industrial Revolution."

Artificial Intelligence (AI) Powered Personalized Learning for Facilitating Adult Education Programmes in Nigeria and Ghana: A Panacea for Bridging Skills Gaps Across Africa

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Dr. Janet Okebiorun

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Artificial Intelligence (AI) offers a transformative solution by enabling personalized, scalable, and adaptive learning experiences focused on the diverse needs of adult learners across Africa. The study used descriptive-survey research design. The populations of the study comprise all adult facilitators in the literacy centers in Nigeria and Ghana. The sample size comprised of randomly selected 400 facilitators in Adult literacy centers in both countries. The reliability of the instrument was established with split half method yielding a value of 0.75. Data were analyzed using descriptive and inferential statistics of frequency count, percentages and Pearson Correlation. Result revealed that more than 85% in both countries believe AI can address learner needs, bridge skill gaps, and improve teaching feedback. The result showed that AI adoption remains low overall, though Ghana shows slightly higher usage than Nigeria. The result also revealed in Nigeria, $r_{\text{calculated}}$ (0.41) is greater than $r_{\text{tabulated}}$ (0.138), showing a moderate positive and significant relationship between awareness/knowledge of AI and use of AI in teaching. In Ghana, $r_{\text{calculated}}$ (0.47) exceeds $r_{\text{tabulated}}$ (0.138), indicating a significant relationship. It was therefore recommended that all facilitators in Adult literacy Centres must be trained in the use of AI in teaching and learning processes.



Parallel Session 1.4

Tech-savvy Care: Encouraging Male Participation in Non-Communicable Diseases (NCD) Caregiving in Families in Kenya

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Dr. Peter Waweru

University of Nairobi

Prof. Charles Nzioka

University of Nairobi

Dr. Anne Kamau

University of Nairobi

Dr. Fred Bukachi

University of Nairobi

Non-communicable diseases (NCDs) account for nearly half of inpatient admissions and a third of annual deaths in Kenya, shifting the burden of long-term care to families. While caregiving has historically been feminized and treated as “women’s work,” men are increasingly taking on these roles. Yet their contributions remain invisible, economically disruptive, and socially unsupported. This paper asks how men’s caregiving experiences are shaped by cultural, economic, and psychosocial pressures, and whether artificial intelligence (AI) and digital health tools can create new entry points for their participation. The study draws on qualitative data from seven focus group discussions and five key informant interviews conducted in Vihiga, Makueni, and Murang’a counties. A reflexive thematic analysis, using both inductive and deductive coding, guided interpretation. Findings reveal that male caregivers navigate deep tensions: caregiving disrupts

breadwinning, exposes them to ridicule, and isolates them from support systems. Additionally, some men frame their involvement as responsibility or modernization, suggesting cracks in entrenched gender norms. The paper argues that AI—through telemedicine, digital training modules, supply-chain tracking, and virtual peer support—could ease burdens while reframing care as a technical, skill-based responsibility. Policy frameworks must embed these tools within gender-responsive approaches that recognize and legitimize men’s contributions.

Tropical Cyclone Trajectory Forecasting in Southwest Indian Ocean Based on Deep Learning

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Weather-related disasters, particularly Tropical Cyclones (TCs), have become increasingly frequent and devastating worldwide in recent years, causing significant loss of life and economic damage. Rapid and accurate forecasting of TC trajectories is therefore critical for effective prevention and mitigation. TC motion is governed by complex, nonlinear interactions between atmospheric and oceanic factors, including atmospheric circulation, steering flow, and the thermal structure of the underlying surface. These interactions make trajectory forecasting inherently

challenging for both dynamical and statistical models. In this study, we employ Deep Learning (DL), a subset of Artificial Intelligence (AI) and Machine Learning (ML), to develop predictive models for 6–72-hour TC trajectory forecasting over the South-West Indian Ocean (SWIO) basin. We analyzed TC movements in the SWIO from 1993 to 2023 using data from the International Best Track Archive for Climate Stewardship (IBTrACS). From this dataset, 11 variables most relevant to shifts in TC latitude and longitude were selected using feature importance rankings from a Random Forest Regressor (RFR), and these were used to train the DL models. Five recurrent neural network (RNN) architectures—Stacked-LSTM, BN-LSTM, SKIP-LSTM, Conv-GRU, and Encoder-Decoder—were developed and trained using the most recent 24 hours of TC characteristics to forecast the next 6–72 hours of TC trajectory forecasting over the South-West Indian Ocean (SWIO) basin...

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Assessing Preparedness of Adopting Artificial Intelligence to Protect Critical Infrastructures in Developing Countries: A Case of Tanzania.

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Cybersecurity vulnerabilities present significant threats to critical infrastructure sectors in developing nations, affecting economic stability, public safety, and national security. This study assesses the readiness of using Artificial Intelligence in addressing cybersecurity challenges of critical infrastructure sectors. This readiness is measured by security practices and incident response capabilities. A survey-based methodology was employed to gather data from 50 key stakeholders across various

critical infrastructure sectors. Findings indicate gaps in cybersecurity preparedness across critical infrastructure sectors. Fewer than 50% of organizations deliver structured and regular cybersecurity training, which increases employee vulnerability to cyber threats. Furthermore, a limited number of organizations possess fully operational incident response plans, and the execution of cybersecurity drills is inconsistent, thereby revealing weaknesses in proactive defense strategies. Artificial intelligence holds potential for threat detection and incident response; however, barriers including high costs, insufficient technical expertise, and ambiguous policies impede its implementation. The most frequently cited cybersecurity threats include phishing, ransomware, and data breaches, which are common concerns across multiple critical infrastructure sectors. This study serves as a foundation for a broader research initiative. Beyond identifying cybersecurity gaps, future work will involve expanding data collection and developing AI-driven threat prediction models to protect critical infrastructures.

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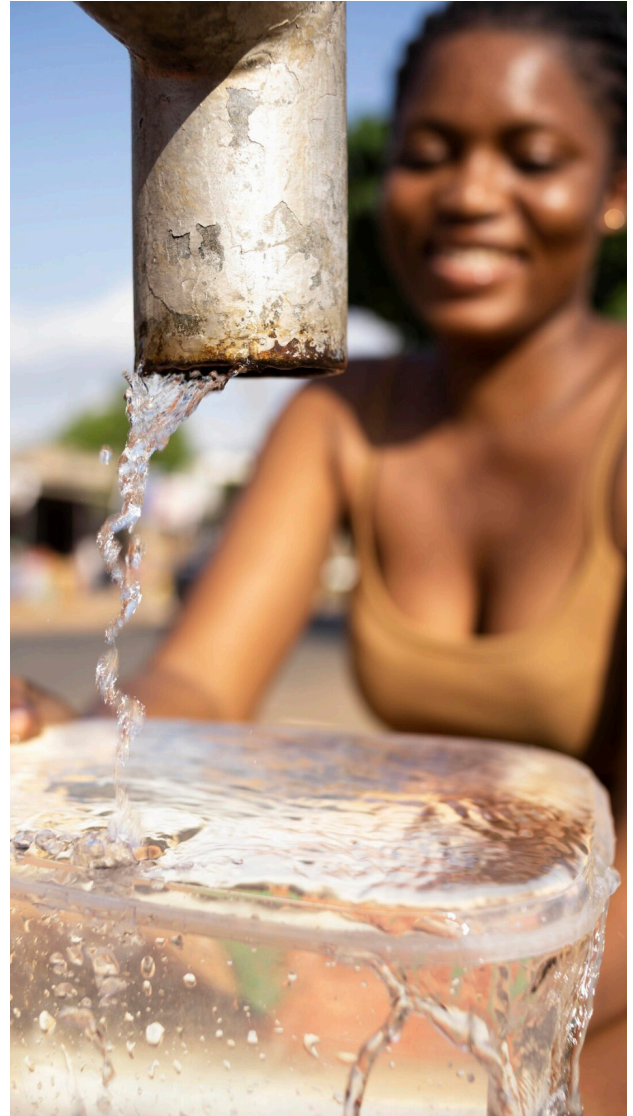
A Critical Review of Application of AI in Sustainable Clean Water and Sanitation in Africa

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Access to clean water and adequate sanitation remains a persistent challenge in Africa, affecting public health, economic growth, and environmental sustainability. This review examines the role of artificial intelligence (AI) in enhancing water and sanitation systems across the continent. It explores how AI technologies including machine learning, predictive modeling, and data analytics are

being applied to improve water quality monitoring, predict demand, manage sanitation infrastructure, and support real-time decision-making. AI-powered tools enable early detection of contamination, efficient resource allocation, and optimization of wastewater treatment processes, offering targeted solutions in both urban and rural settings. Despite its potential, AI adoption faces significant barriers in Africa. Challenges include limited digital infrastructure, high implementation costs, insufficient data availability, and a shortage of skilled professionals. Additionally, concerns about equity, data privacy, and inclusion must be addressed to avoid deepening existing inequalities. The review emphasizes the need for strategic collaboration among governments, technology providers, and development partners to create enabling environments for responsible AI use. Investments in local capacity and policy development are essential. AI, when effectively applied, can support Africa's efforts to achieve Sustainable Development Goal 6: clean water and sanitation for all.



Parallel Session 1.5

Artificial Intelligence and Traditional Medicine: Expanding Database for Diagnosis and Curriculum

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Traditional medicine is a significant part of the African culture and knowledge system. However, there is a lack of detailed diagnosis documentation which affects precision in the prescription of treatment in many cases. Artificial Intelligence (AI) presents a transformative opportunity for research and healthcare education in Africa. This bridges the gap between traditional medicine and modern diagnosis. Traditional medicine often uses generalised classification of illnesses such as fever in communicable diseases when references are made to more specific ailments such as malaria, typhoid, yellow fever, etc. In diagnoses, symptoms are discussed at length which leads to generic interpretation of symptoms and prescriptions. This research adopts the principle of Igba (òpò) òrò kò kún agbòn, aféfé ló nbá lo (two hundred words (a lot of words) do not fill a basket they only go with the wind) to explore how AI can improve the documentation and classification of diagnoses and treatments in Traditional Medicine. This research proposes the development of an AI-based system through interviews with practitioners. Gathered data will be analyzed and stored in a database for easy access and use. This will contribute to digital preservation and modernisation of Traditional Medicine by promoting the development of an AI-assisted documentation.

Using Telemedicine to Improve NCD Care In Murang'a County, Kenya

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Background: Non-communicable diseases (NCDs) are the leading cause of morbidity and mortality in Kenya, with hypertension as the most common condition. Despite effective therapies, awareness, treatment, and control rates remain low, especially in rural areas with limited access to specialists. In October 2024, Murang'a County launched a county-wide telemedicine programme to improve access, continuity, and quality of NCD care.

Methods: A longitudinal observational cohort study included 263 hypertensive patients enrolled in the programme. Baseline blood pressure (BP) readings were taken in December 2024, with follow-up in June 2025. Patients attended virtual consultations at 36 peripheral facilities linked to Muriranjias Level 4 Hospital. Nurses facilitated consultations, while hub clinicians managed diagnosis, medication, and counselling. The primary outcome was mean change in systolic and diastolic BP over six months.

Results: Baseline mean BP was 150/85 mmHg. After six months, mean BP decreased to 144/83 mmHg, reflecting reductions of -5.7 mmHg systolic ($p<0.01$) and -2.3 mmHg diastolic ($p<0.05$). Patients reported convenience, reduced costs, and better follow-up. Clinicians noted fewer unnecessary referrals and improved adherence.

Conclusion: Telemedicine is feasible and effective for hypertension management in rural Kenya. Modest yet meaningful BP reductions highlight its potential to lower cardiovascular risk and support Kenya's UHC goals."

Leveraging Artificial Intelligence for Integrating Indigenous Knowledge into Africa's Education Systems

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The marginalization of African indigenous knowledge in formal education has hindered cultural preservation and local innovation. This research explores how Artificial Intelligence (AI) can bridge traditional knowledge and modern education systems in Africa. Grounded in the Sankofa philosophy—learning from the past to inform the future—it examines AI-driven approaches like natural language processing (NLP) to document oral traditions, machine learning to analyze cultural data, and virtual platforms to teach indigenous knowledge. The study also highlights AI's role in preserving endangered languages and promoting inclusivity in education. Using a mixed-methods approach, including qualitative interviews with educators, AI experts, and cultural custodians, alongside case studies from Nigeria, the findings demonstrate AI's potential to foster cultural relevance in education while empowering students with global competitiveness. Challenges such as ethical concerns, technological barriers, and resistance to change are addressed, with proposed solutions for responsible implementation. This research contributes to Africa's transformation by advocating for the integration of indigenous knowledge into curricula through AI, supported by policy reforms and partnerships between governments, educators, and technologists. It envisions an education system that honors African heritage while preparing students for a global future.

Context-specific AI Legal Framework for Ethiopia

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Artificial intelligence (AI) technologies extensively employ data and algorithms to make programmed decisions. The legal soundness of machine decision-making has raised considerable concern. AI has been adopted in various sectors of the African economy, including agriculture, healthcare, finance, defense, and environmental protection. This study attempts to seek a response to the following questions: 1. What legal principles and issues need to be considered while adopting and developing AI in Ethiopia? 2. How can relevant AI legal frameworks be formulated? The study employed policy document analysis methods, with an emphasis on the principles and dimensions included in the document. Moreover, the study conducted a thorough review of related legislation, such as the Ethiopian Personal Data Protection Proclamation, to draw implications for the AI policy. Furthermore, an extensive review of the literature on the AI legal framework was conducted. An interview was held with three practicing legal experts to validate the dimensions and inclusiveness of the proposed framework. The study outcome is expected to provide legislators with a broader view when formulating AI legislation and serve as a basis for subsequent researchers in the domain as well.

Parallel Sessions 2:1

Culturally Anchored Artificial intelligence (AI): Ethical Governance and Inclusive Innovation in African Universities

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African nations pursuing Agenda 2063 and Sustainable Development Goals (SDGs) face challenges with AI adoption that often sidelines local ethical frameworks and cultural values, particularly Ubuntu principles of “communal welfare, restorative justice, and respect for indigenous knowledge.” This study explores how African Higher Education Institutions (HEIs) can cultivate responsible AI ecosystems by examining: how African cultural values can inform ethical AI frameworks; what systemic barriers impede inclusive governance; and how policy environments can enable equitable innovation. The research analyzes AI strategies from Nigeria, Rwanda and Uganda alongside university governance documents. Findings reveal inconsistency in balancing technological progress with cultural relevance, though Rwanda’s strategy incorporating Ubuntu principles and Makerere University’s integration of indigenous knowledge demonstrate successful approaches. The study recommends institutionalizing culturally grounded AI governance, embedding Ubuntu ethics into technical frameworks, formalizing community review boards, and advocating for data sovereignty laws. By anchoring governance in local values, African HEIs can transform AI from a tool of external imposition into a catalyst for inclusive, self-determined progress.

Photocatalytic and Adsorptive Properties of Li-doped Fe₃O₄ Nanoparticles on Wastewater Containing Methylene Blue

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Developing sustainable materials for pollutant treatment is crucial in developing countries. Li-doped Fe₃O₄ nanoparticles were synthesized for methylene blue (MB) removal via adsorption and photocatalysis. Characterization via XRD, FTIR, SEM, and UV-Vis confirmed structural and optical properties. Optimal adsorption (70%) and photocatalytic degradation (86%) efficiencies were achieved at 100 min contact time, 40 mg/L MB concentration, and 0.2 g/100 mL catalyst dose. Response surface methodology (RSM) with Box-Behnken design (BBD) optimized process variables: contact time (20–100 min), MB concentration (20–100 mg/L), and catalyst dose (0.1–0.5 g). Adsorption followed a quadratic model ($R^2 = 0.9992$, $p < 0.0001$), while photocatalysis fit a linear model ($R^2 = 0.9255$, $p < 0.0001$). At optimized adsorption conditions (0.5 g dose, 24 mg/L MB, 83 min), efficiency reached 73.18%; photocatalysis under identical conditions yielded 60.59%. Both processes aligned with the Langmuir-Hinshelwood model, indicating surface

reaction mechanisms. Li-doped Fe₃O₄ demonstrated synergistic adsorption-photocatalytic capabilities, proving effective for MB-contaminated wastewater treatment. The study highlights its potential as a sustainable material for pollutant remediation in developing regions.

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AI Research Boost and Impact on Ugandan Universities and Communities

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Artificial Intelligence (AI) is now increasingly becoming a force-changer in Ugandan higher education, bridging the gap between the traditional shortage of research and tangible impacts on communities. The previous methods of carrying out research had been marred by limited resources, outdated facilities, and weak linkages to industry and government, resulting in innovations that barely reached the communities in greatest need. This essay explains how Ugandan universities like for instance Makerere, Kyambogo, MUBS, IUIU, Gulu, Lira etc

are implementing AI and IoT to address real issues in health, agriculture, urban planning, energy, and education. Case studies demonstrate real-world impacts: Makerere University's AirQo sensors improved Kampala's air quality monitoring, MUST's computer-aided cervical cancer screening improved early detection, Busitema University's smart irrigation improved crop yields, and IUIU's artificial intelligence-supported maternal health systems improved predictive health in Mbale. Not only did these interventions improve livelihoods, disease burden reduction, and agricultural productivity but also university-community-industry partnerships. The report highlights challenges, including funding deficiencies and technical capacity limitations, and provides actionable recommendations for national scale-up of AI-based research. Impacts are

underscored to bring out the immense potential for AI to make Ugandan universities agents of social change with measurable, long-term impacts on communities in many regions.

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Machine Learning in 5G Network Slicing at Multi-Edge Computing (MEC) Servers for Efficient Resource Allocation

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Africa's digital transformation hinges on scalable, efficient telecom infrastructure. 5G network slicing, paired with Multi-Edge Computing (MEC), enables ultra-reliable, low latency communication, but resource allocation in MEC servers remains challenging due to dynamic demand, energy constraints, and security risks. This paper proposes a machine learning (ML) framework integrating deep reinforcement learning (DRL), federated learning (FL), and neural networks to optimize 5G network slicing in African contexts. We address resource allocation, energy efficiency, and privacy, with case studies in telemedicine, smart cities, and education demonstrating scalability. Simulations show 30% improved resource utilization, 25% reduced energy consumption, and 15–20ms latency. Aligned with Agenda 2063 and the Sustainable Development Goals (SDGs), our framework fosters industry academia partnerships and responsible AI ecosystems, addressing Africa's digital divide and advancing innovation.

Parallel Session 2.2

Leveraging the Power of AI to sustainably Solve Africa's NCD epidemic: - A 360-Degree Approach

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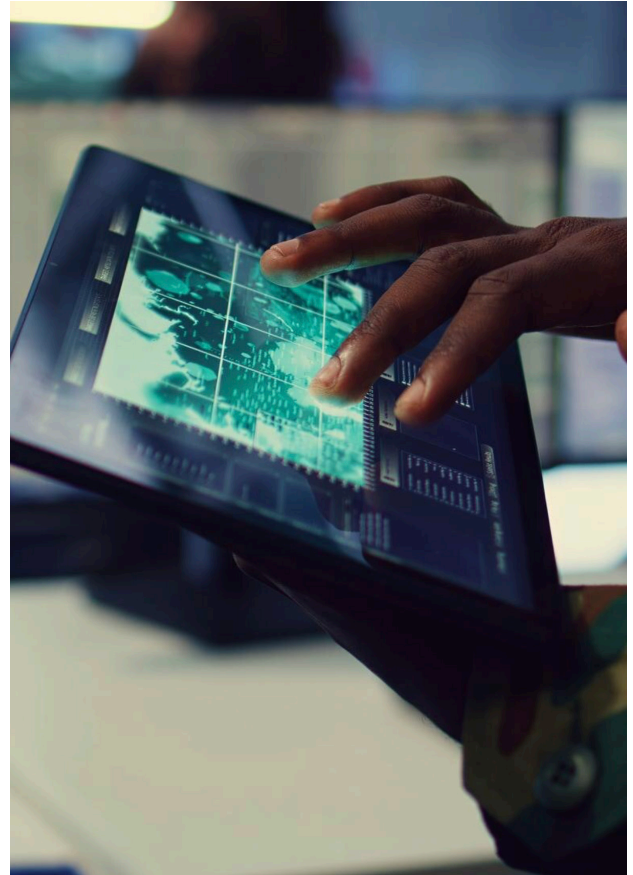
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Africa is undergoing an epidemiologic transition, with Non-Communicable Diseases (NCDs) becoming the primary cause of illness and death. However, this is happening alongside persistently high rates of infectious diseases like malaria, HIV, and pneumonia, often creating complex comorbidities. NCDs in African populations tend to appear earlier, be more severe, and involve multiple conditions, leading to worse outcomes and a higher societal burden. This dual health crisis is exacerbated by socioeconomic challenges, a youth-heavy demographic, and climate change. To address this, there is a critical need for locally appropriate, data-driven, and cost-effective care models. Artificial Intelligence (AI) offers a transformative potential to improve NCD care through diagnostics, telemedicine, patient education, and clinical decision support, which could enhance outcomes and reduce costs. However, effective AI deployment requires complete digitization of health records, robust IT infrastructure, and skilled human

resources. Significant challenges must be overcome, including data privacy concerns, algorithmic bias that could lead to inequitable care, and difficulties integrating AI with existing health systems and their workforce.



Development of an Agri-Management Database System prototype for the Sustainability of Smallholder Farmers in South Africa: A Design Thinking Approach

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The digital transformation of agriculture presents significant opportunities for smallholder farmers in South Africa and the wider region. However, issues such as low awareness, poor usability, and limited trust continue to constrain the adoption and scaling of digital technologies. To help address these barriers, this study used design thinking (DT) to co-create the AMDS, a mobile application (app) that aims to streamline farm recordkeeping and digitise extension services delivery. A sequential explanatory mixed-methods design was employed. Survey interviews with 101 smallholder cattle farmers in North West Province identified key constraints in extension delivery and market participation, while FGDs and KIs provided deeper contextual insights. Findings revealed key challenges including poor access to extension services (64%), persistent market inefficiencies (60%) and lack of farm data. The AMDS prototype demonstrated strong usability, with all six tasks completed by every participant. The average completion time was 4.9 minutes with few errors, and recordkeeping was consistently rated the most valuable feature. The study demonstrates the value of collaboratively developing context-specific digital innovations through DT and contributes to broader debates

on participatory research and development in smallholder digital agriculture. By aligning AMDS with farmers' realities, the system provides a practical pathway to their commercialization.

A Systematic Review of the Transforming Triad of East African Healthcare Systems: Artificial Intelligence, Big Data, and Cloud Computing

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Background: East African health systems face dual challenges of infectious disease burdens and rising non-communicable diseases within resource-constrained environments. Artificial Intelligence (AI), Big Data, and Cloud Computing offer transformative potential for healthcare delivery through enhanced diagnostics, optimized resource allocation, and improved care continuity.

Methods: We conducted a systematic review following PRISMA guidelines, searching PubMed, IEEE Xplore Web of Science, and Google Scholar for studies on AI, Big Data, and Cloud Computing applications in East-African healthcare systems. Risk of bias was assessed using the ROBIS tool, with narrative synthesis used to analyze findings.

Results: From 129 identified studies, 19 met inclusion criteria. Findings revealed promising pilot implementations demonstrating improved diagnostic accuracy and operational efficiency. However, no interventions achieved sustainable scale-up. Five key barriers emerged: inadequate infrastructure, limited workforce digital literacy, incomplete governance frameworks, poor system interoperability,

and unsustainable financing models dependent on donor funding.

Conclusion: A significant policy-practice gap exists between comprehensive national digital health strategies and ground-level implementation. While pilot projects show measurable benefits, systematic barriers prevent scaling to routine practice. Success requires coordinated investments across infrastructure, workforce development, governance, interoperability, and sustainable financing, supported by implementation science approaches rather than continued pilot-centric strategies."

Fostering AI Research and Innovation Networks : Strategies for Collaboration and Impact

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Artificial Intelligence (AI) holds immense potential for technological innovation, social development, and economic growth, but sustainable progress requires strong collaborative research networks. This paper explores strategies to enhance AI collaboration through successful models, such as the Deep Learning Indaba, which promotes knowledge exchange, and the Centre for AI Research (CAIR), which facilitates cross-border partnerships. Capacity building, mentorship, and inclusive ecosystems are emphasized as key to strengthening AI research and innovation. Effective networks demand deliberate efforts: fostering interdisciplinary collaboration among researchers, policymakers, and domain experts; creating open-access research repositories; establishing regional AI centres; and nurturing talent pipelines through mentorship and university courses. Despite these opportunities, challenges such as the digital divide, AI illiteracy among policymakers, and resource inequalities hinder progress. To overcome them,

investments in infrastructure, supportive policy reforms, and partnerships with international research centres are essential. Public-private partnerships (PPPs) play a central role: governments provide policy incentives, while private actors contribute funding and advanced technologies. Collaborations among universities, firms, and NGOs can translate research into real-world applications, particularly in healthcare, agriculture, and finance. Highlighting successful cases like Google's AI Research Centre and IBM Research, the paper argues that cooperative research networks are vital to unlock AI's transformative potential for growth.



Parallel Session 2.3

Developing AI Talent in African Higher Education: Strategies and Outcomes from the University of Lagos, Nigeria

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Artificial Intelligence (AI) presents a transformative potential for addressing Africa's persistent socio-economic challenges and driving inclusive growth. However, the continent's ability to harness this potential is constrained by shortage of skilled AI professionals, a gap rooted in the systemic inadequacies of its higher education systems. This paper examines the strategies, outcomes, and challenges of AI talent development at the University of Lagos as case study for solutions across African Higher Education Institutions (HEIs). Utilizing a mixed-methods approach—including document analysis, surveys of 117 students, and in-depth interviews with 15 stakeholders, the study provides an empirical evaluation of UNILAG's initiatives from 2018 to 2024. Findings reveal progress in curriculum-modernization, industry partnerships, and enrolment-growth, including a 300% increase in course offerings and a rise in female participation. However, these gains are substantially undermined by persistent infrastructure deficits, erratic funding, high rates of brain drain, and deeply entrenched gender disparities. The study concludes that while institutional leadership, as demonstrated by UNILAG, is crucial, a systemic and multi-stakeholder approach is imperative. It offers framework and recommendations for policymakers, university-administrators, and industry partners to collaboratively strengthen Africa's AI talent

pipeline, ensuring it serves as a catalyst for local innovation rather than perpetuating dependency on foreign technologies.

Exploring the Adoption and Perceptions of Artificial Intelligence in Engineering Education Across African Higher Learning Institutions

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This study offers one of the few empirical studies of artificial intelligence (AI) adoption within African engineering education, drawing on survey responses from 54 students and faculty across several African higher institutions of learning. Using a mixed-methods design, the research captured both quantitative measures of AI familiarity, usage patterns, and institutional support, as well as qualitative reflections on benefits, challenges, and expectations. Findings reveal near-universal exposure to AI tools, with most participants reporting moderate to high familiarity. Adoption is largely student-driven, while institutional guidance and training remain limited. The most requested forms of support include targeted training, improved access to AI tools, and capacity-building workshops. Key concerns centre on dependence on technology, data privacy and security, bias in algorithms, cost of implementation, and inadequate training. These insights highlight the need for context-sensitive AI policies and pedagogical strategies that address infrastructural constraints, build staff capacity, and safeguard equity in adoption. The study contributes timely

evidence to inform higher education policy, curriculum transformation, and sustainable AI integration in African engineering education.

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The Future of AI in Gender-Responsive Entrepreneurship Education: A Case Study of Female Student Entrepreneurs at the University of Lagos

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Artificial Intelligence (AI) technologies have the potential to mitigate inequities and promote gender equality, thereby contributing to the establishment of inclusive societies and the achievement of the Sustainable Development Goals. Nonetheless, AI may reinforce biases stemming from flawed datasets, algorithms, and fairness modelling if not deployed responsibly. This research examines the impact of artificial intelligence on enhancing entrepreneurship education for female student entrepreneurs at the University of Lagos, with a focus on significant obstacles to accessibility and inclusivity. This study uses a mixed-methods approach, incorporating a quantitative survey of female student entrepreneurs, analysis of their social media interactions, and case studies of AI-driven initiatives

promoting gender inclusivity. The objective is to identify the socio-cultural, economic, academic, and technological challenges that impede women's participation in AI-driven entrepreneurship while assessing the efficacy of adaptive learning technologies and AI-supported business incubation initiatives. The findings will inform policymakers and university administrators in developing gender-responsive AI strategies to foster inclusive entrepreneurial ecosystems, thereby ensuring equitable access to AI-enhanced education and resources for female entrepreneurs at the University of Lagos.

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Bridging the AI Skills Gap and Strategies for Developing AI Talent in African Universities: A Review

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The rapid evolution of Artificial Intelligence (AI) is profoundly reshaping industries, economies, and the global workforce. However, African universities face a significant challenge in producing graduates equipped with the essential AI competencies demanded by both local and international markets. As Africa strives to transition into a knowledge-driven economy, closing this AI skills gap is no longer a mere aspiration but a critical strategic necessity. This paper employs a narrative review methodology, synthesising insights from literature and case studies to critically examine current strategies, highlights successful initiatives, and identifies persistent deficiencies in AI education and

training within African higher education institutions. The review reveals key impediments such as limited faculty expertise in AI, minimal interdisciplinary integration, inadequate research funding, and poor alignment with industry needs. Conversely, promising solutions emerge, including the establishment of regional AI centers of excellence, the rise of Massive Open Online Courses (MOOCs) and bootcamps, the implementation of national AI strategies, and collaborative partnerships with international technology firms.



Parallel Session 2.4

Facilitating Conditions and Enabling Factors for Human Capital Management System Use in Ugandan Public Universities; Application of the Unified Theory of Acceptance and Use of Technology

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Institutions are progressively implementing Human Capital Management Systems (HCMSs) as a result of technology's growing value in HRM. In 2021, Uganda's Ministry of Public Service launched its HCMS. However, as of 2025, no public university in Uganda has fully embraced the system due to issues such as inadequate infrastructure, managerial support, and digital literacy. Furthermore, little is known about HCMS adoption in the African higher education context, with the available research focusing on limited theoretical frameworks. To find contextual enablers of HCMS use in Ugandan public universities and examine the relationship between facilitating conditions and HCMS use, this study adapted the Unified Theory of Acceptance and Use of Technology (UTAUT). Applying a mixed-methods sequential explanatory design, quantitative data

was gathered from 362 employees across three public universities and analyzed using PROCESS Macro. Age and experience were found to be insignificant moderators, while facilitating conditions had a significant impact on HCMS use. 16 of the 362 respondents were purposively sampled for interviews, and ATLAS.ti 7.5.18 used to analyze the qualitative data. According to the findings, HCMS enablers included organisational support, end-user knowledge, infrastructure, enforced policy, end-user involvement, time saved, performance improvement, system efficiency, user experience, and system ease.

Artificial Intelligence and the Digital Economy for Transforming Africa's Workforce: A Case Study of Yale Foods Limited, Ibadan, Oyo State, Nigeria

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This study examines the role of Artificial Intelligence (AI) and the digital economy in transforming Africa's workforce, using Yale Foods Limited, Oluyole Industrial estate, Ibadan, Oyo State Nigeria. A purposive sampling technique was adopted, focusing on the company's management team, which included the Human Resource Manager, Operations Manager, and Cluster Managers from the four clusters. Data was collected through a structured, closed-ended questionnaire administered to ten respondents. The analysis involved the use of frequency, percentage, and Mean Item Score (MIS) to rank respondents' opinions on AI-driven technologies in their operations. The findings reveal that Yale Foods Limited integrates AI technologies such

as Chatbots (MIS = 5.0), Predictive Analysis (MIS = 4.9), and AI Box (MIS = 4.9) to enhance workforce efficiency and operational performance. These AI-driven tools play a crucial role in mass productions of confectionaries, transaction processing, customer engagement, and decision-making. The study further highlights that the company's operational success relies heavily on the availability of the necessary AI resources and a well-trained workforce to implement digital strategies effectively. This research underscores the significance of AI in streamlining business processes and improving workforce efficiency in Africa's digital economy. The findings suggest that companies should invest in AI-driven solutions.

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Using Artificial Intelligence (AI) to Improve Institutional Structures in African Universities and Research Institutions for Co-Creation

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Co-creation works in an effective collaborative environment. It involves functional research collaborations among diverse research stakeholders which include researchers, policymakers, industries and communities. By this means the 'gown' can meaningfully and profitably serve the 'town'. Fulfilling this obligation is essentially part of the focus of the world university ranking organisations. But

as of 2025, none of the African universities is among the top 100 in world university rankings as the highest ranked university in Africa is in the 180th position. The focus of this study, therefore, was to investigate institutional structures limitations for co-creation in African universities and how AI could be integrated into the system to improve the structures for impactful co-creation. The research design used for the study was descriptive analysis. Assignment on co-development responded to by 136 participants in the 2020-2025 IREX-UASP from 11 African countries was analyzed to investigate the institutional limitations to co-creation in their universities. IT and AI experts were involved in the study to critically explore leveraging AI to enhance institutional structures in African universities for co-creation. Findings revealed 8 major constraints to co-creation in African universities; AI model was developed to enhance institutional structures; and recommendation was made for further research.

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Investigating the attitudes and perceptions of African industries towards Artificial Intelligence (AI) Adoption and Collaboration with Higher Education Institutions (HEIs) in Fostering Research and Innovation Ecosystem

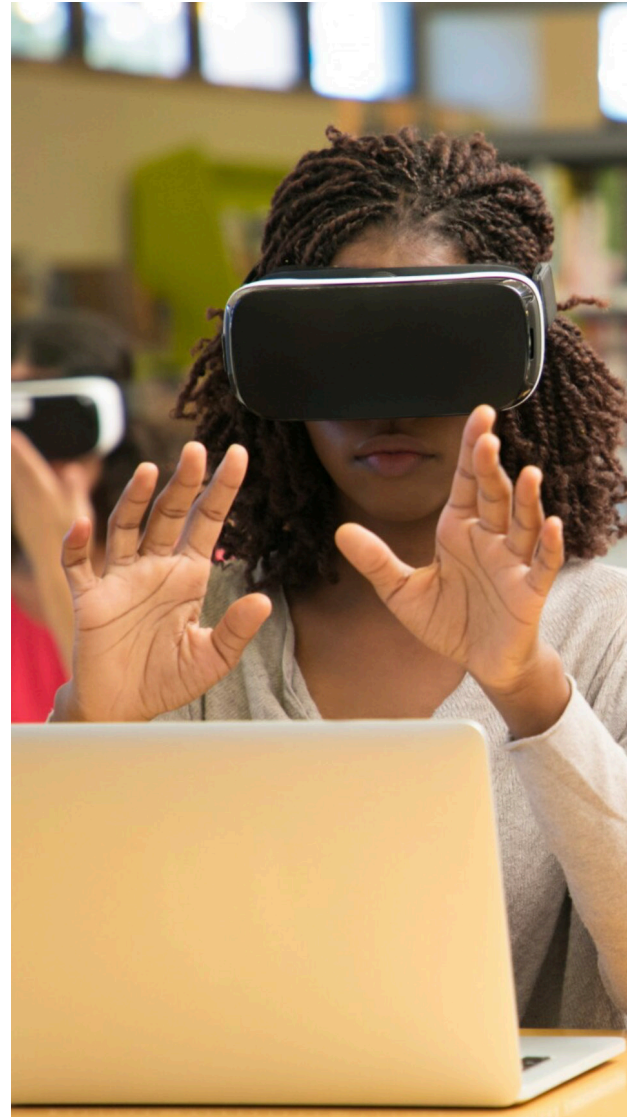
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This study examines the integration of Artificial Intelligence (AI) within collaborations between industry and Higher Education Institutions (HEIs) across Africa, with particular attention to Zimbabwe. Recognising the current underdevelopment of such partnerships, the research sought to explore African industries' perceptions of AI-driven collaboration, identify impeding challenges and burgeoning opportunities and assess AI's potential applications. The

population of the study encompassed African industries such as manufacturing, technology, healthcare, finance, and agriculture and HEIs in Africa and Zimbabwe. Through a desk review and qualitative approach involving in-depth interviews with 30 industry and HEI leaders in Zimbabwe, key challenges to AI advancement were identified, including limited access to information communication technology resources, high initial costs, skill shortages, and the persistent gap between industry and academia. Findings highlighted AI's capacity to significantly enhance research efficiency, data analysis, and automation. The study concludes that successful AI adoption and industry-HEI collaboration are contingent upon the formulation of targeted policies, strategic funding, and comprehensive capacity-building initiatives. Recommendations include establishing continent-wide AI consortia, standardizing data sharing, and for Zimbabwe, developing a national AI-HEI partnership framework that outlines mechanisms, incentives, and intellectual property guidelines for industry-HEI collaboration in AI research and adoption, alongside addressing misconceptions surrounding AI-induced job displacement.



Parallel Session 2.5

Lessons from the Leeds-Africa Hub in Data Science and AI

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The Leeds-Africa Hub in Data Science & AI is an ambitious collaborative effort to foster new and productive research connections between the University of Leeds and researchers across the African continent. In this paper we describe the motivation of the Hub, the background to its creation in 2023 and the activities organised during its initial phase. We give details of the collaborations that have already been established. We draw attention to the lessons we have learnt about inter-continental collaborations: challenges faced and how to best overcome these. We also

look at the opportunities arising in the future for further collaboration and progress in Data Science and AI.

Exploring Acoustic and Behavioral Differences between Singing and Speaking in Yoruba Language: Implications for Music and Language.

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Music and language are foundational elements of human society, expressed independently through instrumental sound and spoken word, and jointly through song. While extensive research across disciplines such as musicology, linguistics, psychology, anthropology, and neuroscience has explored the connections between singing and speaking, much of this work has centered on European languages, limiting its cultural reach. Recent findings by Ozaki et al. examined recordings from 55 languages and observed that songs and instrumental melodies tend to be slower, higher in pitch, and more tonally stable than speech. However, their participant pool—primarily researchers and professional musicians—may not reflect broader linguistic and musical communities. This study builds on and extends their work by focusing on Yorùbá, a tonal language deeply rooted in musical and ritual practice. Drawing from a sample of 15–34 Yorùbá-speaking adults, organized into three groups, participants engaged in four vocal tasks: singing a locally chosen song, reciting its lyrics collectively, participating in a conversational exchange, and performing the song solo with alternating lines. Using a within-participant design

and meta-analytic approach, the study compares acoustic features of singing and speech, with particular attention to pitch structure, group dynamics, and social bonding. By situating the analysis within Yorùbá cultural contexts—where music often serves as a communicative bridge in both sacred and communal life—this research contributes to a more inclusive understanding of vocal expression and its role in shaping human connection.

Promoting Collaborative University Research Innovation Networks in AI in Africa Through a Gender Equality Perspective Communication Strategy

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This paper presents the development and promotion of collaborative university research innovation networks in Artificial Intelligence (AI) across Africa, emphasizing a gender equality perspective within communication strategies. The specific objectives of the paper are to: analyze the current state of collaborative university AI research networks in Africa through a gender equality lens, identify challenges and barriers to women's participation in AI research collaborations, propose communication strategies that promote gender-inclusive AI research networks, and provide policy recommendations for integrating gender equality into AI research collaborations. The paper employed a systematic literature review, policy analysis, and lessons learned in addition to examining case

studies and best practices. It has emerged that recognizing the transformative potential of AI in addressing societal challenges underscores the importance of inclusive and equitable research collaborations. AI adoption and diffusion into the historical and contextual frameworks from global to local (Uganda) perspectives, identifies prevailing challenges, and methodologies and there is more urgent need for more policy analysis, and case studies to derive insights, culminating in actionable recommendations aimed at policymakers, academic institutions, and stakeholders committed to advancing gender equality in AI research.

Harnessing Artificial Intelligence and Innovation for Sustainable Development in Africa: Opportunities, Challenges, and Policy Imperatives.

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Artificial Intelligence (AI) and technological innovation are rapidly transforming global development paradigms, offering unprecedented opportunities for economic growth, social transformation, and environmental sustainability. In Africa, a continent with immense potential but persistent development challenges, the strategic adoption of AI and innovation could serve as a powerful catalyst for achieving the Sustainable Development Goals (SDGs). This paper explores the prospects, challenges, and policy imperatives of harnessing AI and innovation to drive sustainable development across Africa. It identifies key sectors such as agriculture, healthcare, education, financial inclusion, and governance where AI applications can have transformative impacts. The study also critically examines the structural, infrastructural, ethical, and policy-related barriers impeding the effective deployment of AI on the continent. Drawing on

global best practices and African case studies, the paper recommends a multi-stakeholder, inclusive, and ethically grounded policy framework that ensures technological advancement aligns with the socio-economic and cultural realities of African nations. The paper concludes that with strategic investments, capacity building, and coherent governance structures, AI and innovation can play a pivotal role in fostering resilient, inclusive, and sustainable development in Africa.



Parallel Session 3.1

Leveraging Artificial Intelligence (AI) for Effective Doctoral Studies and High-Quality Research in African Higher Education Institutions (HEIs)

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Education is indispensable to realize sustainable development goals and African Agenda 2063. However, rapid technological advancements in the last 5 years demand a relook at the development of the skills and ability of knowledge producers in African higher education institutions (HEIs) and workers of the future to solve emergent challenges. It is understood that knowledge and skills acquisition from advanced studies, such as doctoral studies, can develop knowledge and understanding that will stimulate curiosity to solve problems ravaging the society. In this same vein, capacity-building, in this context, that fosters sustainable development through the joint efforts by the governments, academia, industry and civil society is a catalyst to enabling African agenda 2063. Thus, doctoral studies in African higher education institutions (HEIs), that could pave the way for the realization of Africa's development agenda, require a transformation to be more innovative, inclusive, cooperative and responsible. Though doctoral studies require intensive training in research methodologies as surveys, statistical analyses and laboratory experiments, the use of artificial intelligence (AI) (e.g. generative AI, Machine Learning, decision trees, logic, etc.) which is a technique that enables computers to mimic human intelligence could transform and revitalize how this is done for better outcome.

Unlocking Perceptions and Redefining Traditional Roles Towards AI Implementation in Sub-Saharan African (SSA) Universities

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As we navigate a myriad of cultures in Africa, the emergence and expansion of AI and all ICT-related facilities, part of the Fourth Industrial Revolution, are likely to be met with various layers of resistance. Some of the more pronounced ones already wrecking the region with this regard and confirmed through data-driven research are the rising population, weak power and cyber infrastructure, poor digital literacy, and political violence. Added to the list are religious backlash, poor public perceptions, and minimal state commitment toward preparing for emerging innovations. This study examined the AI perceptions of university teachers, key stakeholders in higher education, and their acceptance of AI in their future teaching in a select SSA country: Ethiopia. Analysis of the quantitative survey data was made, and conclusions were drawn, in juxtaposition with the current discourse in the literature. Findings indicated that the current state of mindset of those stakeholders is not sufficient to shoulder the introduction and full implementation of AI in the region. What is more, those stakeholders expressed their dismay that the changes in their mindsets and the redefinitions of roles deeply inbuilt and culturally constructed would rather take longer to occur.

Demystifying the Power of Artificial Intelligence (AI) in Conflict Prevention and Peacebuilding in Nigeria

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This study examines the demystifying power of artificial intelligence (AI) in conflict prevention and peacebuilding in Nigeria. With the complex issues of identifying violence indicators and other contending national issues, AI can prevent escalation. The study adopted the qualitative research method. The Google Form survey was designed to collect data from participants. The study population includes stakeholders in the peacebuilding and community development sector, academics, government officials, and technology experts. Meanwhile, primary and secondary sources were adopted for the study, allowing for a proper understanding of the various research questions. The findings from the survey include that AI is an important frontier tool that can bring about conflict escalation and de-escalation in Nigeria. Findings from the study indicated that the development of machine learning and other advanced tools is arising worldwide, but applying rights will ensure the improvement of Nigeria's conflict prevention and peacebuilding programming. The application of AI-assist tools is prevalent due to a lack of sustainable funding and research, and a need for guides. The study concluded and recommended that AI is paramount in ceasing conflict and improving peacebuilding in Nigeria. Also, the Nigerian government should prioritize attention to research work in developing a viable AI system.

Facial Recognition Using Machine Learning: A Comparative Evaluation of Algorithms

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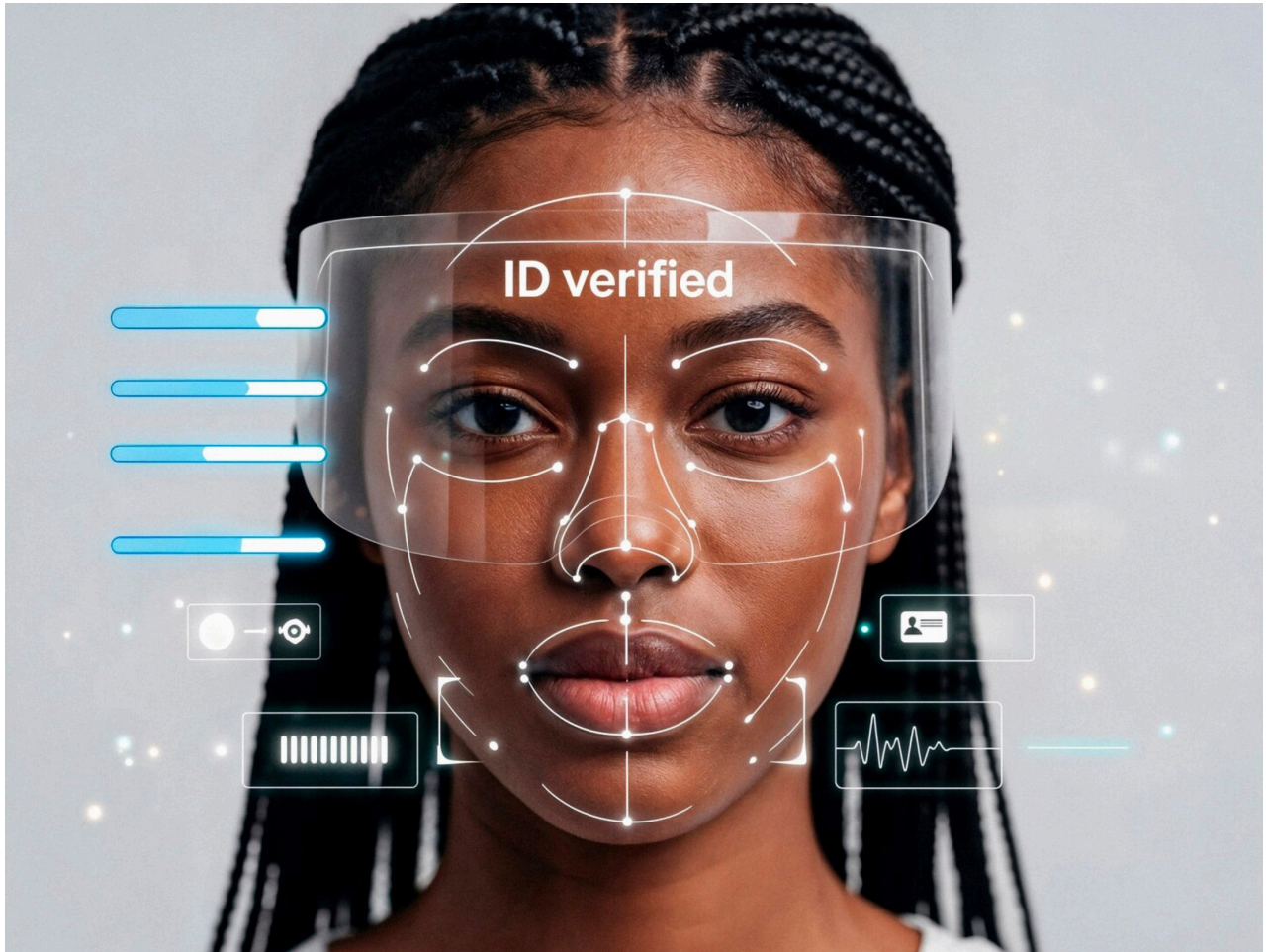
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Facial recognition technology has gained immense popularity over the years, driven by advancements in machine learning algorithms. This project presents a comprehensive comparison of three distinct machine learning algorithms—Support Vector Machine (SVM), Linear Regression, and K-means Clustering—within the context of facial recognition. The objective is to evaluate the effectiveness and accuracy of each algorithm when applied to the Labelled Faces in the Wild dataset from Scikit-learn. SVM, a dominant supervised learning algorithm, is known for its ability to handle high-dimensional data and deliver high accuracy in classification tasks. Linear Regression, on the other hand, is a regression algorithm that is known for its potential in identifying faces through a modified approach. K-means Clustering is also an unsupervised learning algorithm that is utilized to group similar facial

images in clusters. The methodology involves preprocessing through image resizing, feature extraction and dimensionality reduction through Principal Component Analysis (PCA). Performance metrics such as accuracy, precision, recall, and F1-score are employed to evaluate each algorithm's effectiveness. The findings of this research aim to evaluate the strengths and weaknesses of each algorithm, offering valuable insight into which algorithm is best suitable for facial recognition.



Parallel Session 3. 2

GenAI for Education (GenAI4E) in Africa: Assessing Critical Imperatives for the Future of Work

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This paper explores the critical imperatives for integrating Generative AI (GenAI) into African education to prepare its workforce for the evolving global digital economy. It assesses the current landscape of GenAI adoption, identifies crucial skill gaps, evaluates institutional readiness, and proposes a comprehensive policy framework. Drawing on Socio-technical Systems (STS) theory and case studies from across the continent, the paper details necessary shifts in curriculum design, teaching methodologies, and the evolving role of educators. It highlights the transformative potential of GenAI for inclusive growth, innovation, bridging the digital divide, and fostering Africa's leadership in global AI discourse, offering actionable recommendations for policymakers and educational stakeholders.

Utilizing Ai for Research Intelligence in the Global South Universities – A Scoping Review

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Globally, higher education remains a highly competitive environment, where striving towards good institutional reputation, as well as academic and research performance are paramount. As such, research intelligence (RI) is fast becoming an area of interest. RI refers to the strategic use of data, analytics, and insights to understand, evaluate,

and improve a university's research performance. Adding to this is how AI could be used as competitive advantage mechanism in managing research output and scholarly communication for competitive advantage, adding to understandings of academic maturation and institutional maturity. Measuring progress and success is a strategic and data-driven process. The question is firstly: what the status quo is of managing research output and scholarly communication optimally as intellectual capital that can be used to improve research impact. Furthermore, how can research management systems be utilized by universities to better align resources, foster innovation, and accelerate their progression toward research excellence and institutional maturity, with a focus on universities in the Global South. This paper reports on a scoping review study on the concept of RI, exploring how using the affordances of AI could assist universities in the Global South to manage and use institutional research output as knowledge capital towards competitive advantage.

Customized Large Language Models For Biomedical Research: A Unique Opportunity for the Global South

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Customized Large Language Models for Biomedical Research: A unique opportunity for the global south. The potential use of Large Language Models (LLMs) in biomedical research has gained enormous attention in the research community. The ethical challenges associated with these technologies have been exquisitely articulated. They include but are not limited to bias and bias amplification, privacy

violation, perpetuation of stereotypes, entrenchment of epistemic injustice, attribution and accountability. The spotlight has been on ChatGPT. However, there is a lacuna in the literature as regards customized LLMs. The nub of LLMs is the data used to train the models. Unlike ChatGPT and other general LLMs where the datasets used to train the models are unknown, customized LLMs as in-house technologies offer researchers a unique opportunity to work with developers to select the data sets used to train the model. The emergence of big regional data and data science hubs can spur the growth of customized LLMs trained on carefully curated data from the region. This paper presents the case for the adoption of customized LLMs by researchers in the global south, discusses the unique ethical challenges associated with such customized models and how these challenges can be addressed.

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Enhancing Collaborative Learning through AI Breakout Learning Platform: Implications for Students Success in African Higher Education Institutions.

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The educational landscape in Africa faces significant challenges, including inadequate infrastructure, insufficient funding, and disparities in access, particularly in developing economies. However, the integration of

technology, especially Artificial Intelligence (AI), offers potential solutions for enhancing educational quality and accessibility. This study investigates the role of the Breakout Learning Platform in promoting collaborative learning within African higher education institutions, focusing on student engagement and success. Grounded in theories such as Constructivism and the Community of Inquiry framework, the research emphasizes active participation among students. A quantitative design targeted 80 undergraduate students from institutions including the University of Iowa, University of Lagos and Supérieure de Commerce in Dakar, with a purposive sample of 20 top-scoring students from the University of Lagos's Faculty of Management Sciences. Data were collected through surveys, and analysis involved descriptive and inferential statistics. Findings indicated that the platform facilitated global interaction and collaboration among students, while also fostering innovative teaching practices. However, challenges such as technical issues, variability in engagement, and time zone constraints were noted. Recommendations include improving access to resources and enhancing student interaction to further benefit collaborative learning experiences, thereby promoting quality education in Africa.

Parallel Session 3.3

The Role of International Collaborations in Enhancing AI Capacity in African Higher Education Institutions: Case Study Approach

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This study employs a case study approach to investigate the role of international collaborations in enhancing artificial intelligence (AI) capacity within African higher education institutions. Recognising the increasing global demand for AI expertise, this research examines the impact of partnerships between African universities and institutions in other countries on AI education and research. Through in-depth analysis of selected collaborative projects, this study explores how these partnerships facilitate knowledge transfer, curriculum development, access to advanced resources and infrastructure, and the execution of joint research projects. Specific attention is given to the influence of these collaborations on faculty development, student training, and the establishment of sustainable AI research ecosystems within African universities. The case studies provide insights into the practical implementation of collaborations, highlighting both successes and challenges encountered. The findings reveal the substantial contribution of international partnerships in accelerating AI capacity building in Africa, while also identifying potential obstacles such as funding discrepancies, cultural differences, and the crucial need for equitable knowledge exchange. The study concludes by offering recommendations for promoting more effective and sustainable international collaborations to strengthen AI capabilities in African higher education.

Innovative Learning: Data Science Education with Local Knowledge and Real-World Data.

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This presentation outlines a project-based framework for teaching mathematics and data science using Python, Jupyter Notebooks, and cloud platforms like Google Colab. By leveraging real and locally relevant datasets—such as climate data from Norway and weather station data from Uganda—the approach fosters contextual learning, critical thinking, and interdisciplinary engagement. AI-assisted coding environments streamline development, allowing students to focus on validation and interpretation. The framework supports both education and research, with applications ranging from epidemiological modelling to

fractal generation. Recognizing the challenge of limited data access in many African contexts, the paper highlights publicly available socio-economic data sources such as ECStats, MyNBER, Statistics Norway (SSB), Uganda Bureau of Statistics (UBOS), and Tanzania's National Bureau of Statistics (NBS). These resources offer opportunities to expand the scope of data-driven learning and research. The framework aligns with the goals of the MATH4SDG project and demonstrates how open-source tools, AI integration, and local data can enhance mathematics education and support sustainable development.

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Mathematics for Sustainability

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The Mathematics for Sustainable Development (MATH4SDG) project, part of Norway's NORHED II programme, aims to strengthen mathematical literacy and research capacity in Tanzania and Uganda. Led by the University of Bergen in collaboration with Makerere University and the University of Dar es Salaam, the project supports 11 PhD students in mathematics education and applied mathematics, addressing challenges in teaching, curriculum development, and public health modelling. Outreach efforts include training over 600 secondary school teachers and engaging with schools to promote mathematics. The project emphasizes gender inclusion and

industry collaboration, aligning academic programs with societal needs. MATH4SDG is embedded within the CoRE-MATH Network of Excellence, co-led by Makerere University and Uppsala University, with UDSM as a core member and UiB as an active participant. The network spans 16 institutions across 12 countries, fostering international collaboration and sustainable PhD training. By integrating AI and data science into education and research, the initiative contributes to Africa's digital transformation and supports the UN Sustainable Development Goals, particularly SDG4 on Quality Education. The project's legacy lies in its capacity-building efforts, regional impact, and the foundation for long-term partnerships in mathematics for sustainability.

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Utilizing Cloud-Based Technologies to Enhance the Availability and Reliability of the University of Cape Coast Students' Portal Service

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Cloud computing has contributed significantly to the technological sector, causing a major revolution in the IT sector since its widespread adoption. This study examines the usage of cloud computing in moving an existing on-

premises student portal service to Microsoft Azure cloud services. Imagine the frustration of continually navigating inaccessible academic resources, delayed and inconsistent student portal services, and academic activities; this is the present condition at the University of Cape Coast. The current architecture struggles with efficiency (availability and reliability) and offers restricted development potential. Cloud computing can help to improve the portal's availability, reliability, and usability. The analysis highlights issues with the current system and evaluates the advantages of moving to the cloud. The emphasis is on enhancing performance (availability and reliability), limiting expansion potential, and improving the portal's service for students. To ensure a smooth transition, this research paper provides a step-by-step migration plan that keeps the site operational throughout. Finally, this study intends to provide specific recommendations for the university's transition to a cloud-based system. The findings can also be useful for other schools looking to improve their digital offerings by leveraging cloud technologies.



Parallel Session 3.4

Innovation and Growth in South Africa: Do Patent Applications Matter?

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There is indeed a consensus in the literature that innovations play a crucial role in defining the growth outcomes of economies globally. However, the impact of patent applications (as a proxy for innovation) on growth in African countries remains anecdotal. We, therefore, examined whether patent applications mattered in explaining growth in South Africa using time series data for the period 1990-2021. A Vector Error Correction Model was estimated, with our primary findings revealing that patents significantly propelled growth both in the short run and long run. Secondly, using the Granger causality test, we uncovered a unidirectional causation between the two variables running from patents to growth, further asserting that our evidence is *prima facie* at least in the context of developing economies. Thirdly, primary school enrollment complemented the above nexus, albeit to a lesser extent. These findings highlight that patenting can be a prime avenue for the sustained growth of developing countries that are still striving for a suitable engine of innovation-based growth. There is, thus, a compelling need for African governments to channel their efforts towards infrastructural development, particularly, the ICT sector. This will provide a platform for facilitating patent development and its seamless integration into the production process.

Using AI and Big Data to Forecast Migration to Strengthen Long-Term Preparedness

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Migration is one of the most important issues of the twenty-first century. More data is needed to better understand how and why people are moving so that focus interventions and urban development strategies can better support evidence-based migration policy. "Big data" is large, complicated data from a variety of sources and it is often touted as a means to closing the knowledge gaps that are present today. In July 2019 we took part in a workshop in London, Britain, of experts, from both academia and humanitarian non-governmental organisations (NGOs), and the United Nations (UN) to better understand the potential applications of big data in migration research and policy and ultimately, we identified six important topics related to big data in migration research and policy. This includes gaining access to and using data, data integration within data sources and information, practitioners understanding the environmental factors that shape migrations, improving migrant populations' access to health care, resolving ethical and security issues inherent to how big data is used, and reconciliation of political narratives. We also support more cross-disciplinary cooperation on how to maximize the use of big data in migration research while safeguarding vulnerable migrant groups and a careful assessment of the challenges implied by our growing use of big data. In that vein, this paper examines the potential of big data and artificial intelligence (AI) for migration forecasting

and explores their transformational potential, application strategies, results, and challenges. The final part offers a strong set of recommendations for improving mechanisms for managing international migration.

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Accelerating Digitalization and Technological Innovation as Keys to Boosting Economic Growth in Africa

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This paper addresses how relevant technological innovation and digitalization are to economic development in Africa. Particularly, because of some of the specific peculiarities of the African continent, the rapid population growth and underdeveloped infrastructure-digital technologies provide potential transformation. The report indicates how advances in digital banking, internet connectivity, and mobile technology raise productivity in several industries, all the while encouraging entrepreneurship. These case studies present some leading-edge and impactful digital projects and assess their impact on economic inclusiveness, service reach, and job creation. The study further discusses supportive legislation, investment in digital infrastructure, and human capital development to maximize the benefits of digitalization. It concludes by contending that the adoption of technology is necessary for sustained economic growth in Africa and, consequently, for increased active participation in the global economy.

Climate-Smart Apiary Site Selection in East Africa: GIS-Based Analysis of Current and Future Climate Projections

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Sustainability in East Africa is increasingly threatened by climate change, particularly in agriculture, which is highly climate-sensitive and central to food security, livelihoods, and national economies. As a response to these challenges, beekeeping has emerged as a cost-effective and sustainable strategy that enhances income, provides pollination services, and contributes to carbon sequestration. This study focuses on improving apiary site selection in Yabelo, Ethiopia, and Taita-Taveta County, Kenya, using fuzzy Multi-Criteria Decision-Making (MCDM) methods under both current and future climate conditions based on Shared Socioeconomic Pathways (SSP1-2.6 and

SSP5-8.5). Incorporating future climate scenarios allows for a more adaptive planning approach. Results show that, under current conditions, 40.2% of Yabelo is highly suitable for beekeeping, while 43.6% and 16.2% are moderately and less suitable, respectively. In Taita-Taveta, 54.9% is highly suitable, 34.0% moderately, and 11.2% less suitable. Under future climate scenarios, highly suitable areas decline in both regions, with increases in moderately and less suitable areas, indicating climate-induced shifts. Nonetheless, Taita-Taveta consistently demonstrates higher suitability than Yabelo. These findings highlight the importance of integrating climate projections into decision-making to enhance the long-term sustainability and resilience of beekeeping in East Africa.



Parallel Session 3.5

Towards AI-Based Intelligent Orientation of First-Year Higher Education Students

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Artificial intelligence (AI) is reshaping education and digital learning, but African countries lag in AI integration within the education sector. In Senegal, growing student enrollment and limited university capacity complicate the admission process. The national Campusen platform, while automated, often assigns students to unsuitable programs, contributing to high failure rates - 66.72% for first-year students at Cheikh Anta Diop University (UCAD) in 2021–2022. Its reliance on subjective criteria without data-driven optimization or recommendation features limits the effectiveness of the platform. This paper proposes an intelligent orientation system to improve program matching for high school graduates. Using data from nearly 4,000 students collected by the Senegalese Baccalaureate Office and UCAD, we design a two-stage decision model that evaluates both probability of academic success and likelihood of selection. Our Lasso-based optimization enhances admission ranking accuracy by 92.23% (MRR), while a Decision Tree classifier predicts first-year success with 82.61% accuracy. We further present DIORES, a web platform that implements this framework to provide

personalized recommendations. By aligning student profiles with suitable programs, the system aims to reduce failure rates and improve satisfaction, offering a data-driven alternative to traditional admission processes in Senegal.

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Addressing the Bottlenecks Faced by Postgraduate Students in Utilizing Artificial Intelligence in Academic Research Writing in Tanzania

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Artificial Intelligence (AI) offers promising prospects for advancing academic writing in higher education, but its adoption among postgraduate students in Africa, particularly in Tanzanian universities, is currently low. This study aimed to identify the challenges faced by postgraduate students in using AI for academic research writing and propose strategies to overcome these obstacles. The study employed a qualitative case study approach at a selected public university, involving 20 postgraduate students and 10 lecturers who were purposively selected. Data were collected through semi-structured interviews and analyzed thematically. The study revealed several challenges, including limited access to advanced AI tools, negative perceptions of AI among research supervisors, lack of AI knowledge and skills among students, and ethical

issues related to AI. Proposed solutions included increasing access to AI resources, instituting institutional policies to guide AI use, training students and lecturers on AI use, investing in technological infrastructure and AI resources, and integrating AI into the university curriculum. By implementing these measures, students can fully leverage the potential of AI in their research pursuits. Therefore, policymakers, academic institutions, and researchers should collaborate to overcome these challenges and promote the effective utilization of AI.

Empowering Pre-Service Teachers with AI-Powered Digital Tools for Industry-Collaboration

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Artificial Intelligence (AI) is reshaping education globally by enabling adaptive assessments, personalized learning, and innovative pedagogical design. In Sub-Saharan Africa, however, its integration into teacher education remains limited. This study examined how AI-powered digital tools and industry collaboration can empower pre-service teachers in Southwestern Nigeria across pedagogical, psychological, and career domains. An explanatory sequential mixed-methods design was employed. Quantitative data were collected from 150 final-year pre-service teachers across three higher education institutions, while qualitative insights were generated through focus groups ($n = 35$) and interviews with industry professionals ($n = 5$). Descriptive statistics, regression, and thematic analysis were used to interpret the data. Findings showed that 73% of participants reported low AI proficiency. STEM students (42% moderate/high) outperformed humanities

peers (19%), and males (54%) reported higher confidence than females (32%). Regression analysis revealed digital exposure as a significant predictor of AI proficiency, while personal motivation was not. Focus groups and industry interviews highlighted barriers including limited AI training, weak university–industry linkages, and gender-based differences in confidence. The study concludes that embedding AI literacy and structured industry collaboration in Nigerian teacher education is essential to address equity gaps and prepare graduates with AI-ready pedagogical and professional competencies.

Empowering Ethical Innovation: Designing a Responsible Computing Workshop for Emerging Economies

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This paper details a multi-method collaborative autoethnographic (CAE) research project that explored the state of AI and AI ethics at a university in an emerging African country. The project addresses the ethics and skills gap among African researchers and students caused by the rapid technological changes of the Fourth Industrial Revolution (4IR). The University of Pretoria initiated a

collaborative research project with other African universities to design and facilitate training workshops for academics and postgraduate students. The goal was to enhance the responsible and effective use of AI. The study's initial phase involved a scoping literature review to understand existing research on AI ethics, both globally and within African universities. Based on the gaps identified in the review, a series of workshops were created to provide practical and theoretical support for using AI responsibly in research. The workshops were designed using the scaffolded framework of the Zone of Proximal Development (ZPD) to equip researchers and students to test AI tools for teaching, learning, and research. Data from pre- and post-workshop surveys, along with reflexive data from the CAE process, were triangulated and analyzed. The findings indicate that the workshops were timely and effective, highlighting the need for more such interventions to foster the real-life experience of ethical AI use in academic settings.



Parallel Session 4.1

AI as Muse or Mask: Theorizing the Fine Lines between Creative Authenticity and Impostor Syndrome in Academic Research

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The increasing integration of artificial intelligence (AI) in academic research has transformed knowledge production, offering unprecedented access to data analysis, literature synthesis, and content generation. While AI tools enhance efficiency and cognitive expansion, their role in shaping researchers' sense of creative authenticity raises critical concerns. This paper explores the paradox of AI dependence in academia; does it serve as a muse that fosters intellectual originality, or does it function as a mask that fuels impostor syndrome? Drawing from psychological theories on creativity, self-efficacy, and cognitive offloading, this paper interrogates the boundaries between AI-assisted innovation and the erosion of scholarly confidence. Through a critical examination of AI's role in shaping research ideation, authorship, and validation, the paper theorizes how over-reliance on AI may obscure the researcher's sense of ownership and expertise. Additionally, it considers the ethical implications of AI-driven scholarship and its impact on the future of human agency in academic research. This paper contributes to the broader discourse on the evolving nature of academic integrity, authenticity, and self-perception in the AI era.

Utilizing Technology as a Source of SRMNH Information: Challenges in Effective Communication Even in the Era of AI

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Background: The use of technology to disseminate information on sexual, reproductive, maternal, and neonatal health (SRMNH) has expanded rapidly, offering new pathways for improving health outcomes. Yet, despite increased digital access, communication barriers persist, especially for marginalised populations.

Aim: This study aimed to explore the challenges of using technology as a source of SRMNH information, on effective communication in the era of Artificial Intelligence (AI).

Setting: The study was conducted through qualitative synthesis of data on technology-based SRMNH interventions, with particular attention to low- and middle-income countries (LMICs).

Methods: A qualitative descriptive phenomenology was employed to analyse data from two studies on culturally sensitive Information Communication (IC). Three themes emerged on IC, which include effective communication,

what women want, sources of information, and cultural sensitivity in communication.

Results: Key challenges identified include digital exclusion due to literacy and access, cultural and gender barriers, mistrust in digital sources, misinformation risks, and technological solutions in context-specific communication. While technological solutions offer scalability and personalisation, they often lack human sensitivity and contextual relevance.

Conclusion: Despite technological advancement, SRMNH information dissemination remains hindered by communication mismatches between digital systems and diverse user needs. Integrating human-centred design and local knowledge systems remains critical.”

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Mapping existing noninvasive ultrasound technologies used in vaginal examinations during intrapartum: Is AI a solution for Africa?

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Background: Technology like Ultrasound (US) has revolutionized the process of measuring cervical dilatation, cervical elasticity, station, and position of the foetal head to assess progress of labour. Ultrasound is deemed non-traumatic, accurate, and user-friendly offering an objective alternative to traditional digital vaginal examination (DVE).

Objective: This scoping review aimed to map existing noninvasive ultrasound technologies and devices used in vaginal examinations during intrapartum.

Methods: The scoping review followed Arksey, and O'Malley's five-step framework and the search strategy involves a brief initial search of Medline and CINAHL, followed by keywords from the titles and abstracts of articles found in Cochrane Review Library, PubMed, CINAHL, Medline, EMBASE, Scopus, and Web of Science. This study excluded non-English language and non-journal articles, published in peer-reviewed journals.

Result: Of a total 40 original articles, with total sample size of 7606 women in labour or deliveries included in this review, most studies on labour monitoring focus on ultrasound-based methods, including transabdominal, transperineal, 2D, 3D, and automated approaches, compared to traditional DVE.

Conclusion: The scoping review recommends integrating ultrasound-based digital tools into labour monitoring for improved diagnostic accuracy and patient comfort, investing in affordable digital tools, and prioritizing healthcare worker training on advanced technologies.”

Monitoring The Environmental Quality of Solar Energy-Powered Poultry Production System Using Artificial Intelligent (Ai)

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One of the major contributors to the global economy and regulator of the hunger index is poultry. In Sub-Saharan Africa, poultry production has not kept pace with the rising consumption rate. Monitoring environmental quality remains a major challenge confronting poultry farm management in Africa. To enhance operational efficiency and avert unpredictable data acquisition in poultry production systems, an Internet of Things (IoT) data logger for real-time data acquisition was developed at the University of Nigeria, Nsukka, for monitoring the micro-elements and environmental conditions of a Solar-powered Trombe wall poultry production facility. Results showed that the IoT device was able to monitor the real-time environmental conditions of the solar-powered poultry facility with average measured data ranged between 28 – 35oC temperature, and 56 – 82% relative humidity while the ambient conditions were between 20 – 33oC and 56 – 95% respectively when the solar radiation was between 0 – 993 W/m². In this paper, highlights of the role of Artificial Intelligence (AI) in poultry production systems is discussed. The paper described the operational methodology of the Tol data logger for environmental quality assurance in the poultry production system. AI applications in poultry production will enhance operational efficiency in poultry production systems.



Parallel Session 4.2

Mapping Evidence on Artificial Intelligence (AI) Technologies Used In Ultrasound-Based Monitoring Progress of Labour: A Scoping Review

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Background: Artificial intelligence is revolutionizing maternal care by providing birth monitoring solutions, improving women's comfort, privacy, and safety. Advanced algorithms can predict outcomes, detect preterm birth risks, and identify pregnancy complications. Further research is needed to fully integrate these technologies into clinical practice.

Objective: The study aimed to map the existing evidence on the use of Artificial Intelligence (AI) used in ultrasound-based monitoring progress of labour.

Methods: The study utilized Arksey and O'Malley's five-step framework and searched Medline and CINAHL, followed by articles from various databases, including peer-reviewed journals, and extracted, charted, synthesised, and summarized the data.

Result: This scoping review of 14 articles, involving 145,085 women in labour/delivery records, analyzed the use of

Artificial Intelligence (AI) in vaginal examinations and labour follow-up. Key areas explored included automated foetal head position assessment, segmentation of anatomical structures, dystocia prediction, and mode of delivery prediction. Challenges remained in validation, standardization, regulatory approval, and integration into clinical workflows.

Conclusion: This review suggests that integrating AI into vaginal examinations and labour monitoring can enhance safety, accuracy, and efficiency. The study suggests that further validation with larger datasets and live patient studies is recommended before widespread clinical implementation.

Diagnostic Optimal Machine Learning Algorithms for Chronic Pulmonary Aspergillosis

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Objective: Chronic pulmonary aspergillosis (CPA) often mimics pulmonary tuberculosis (PTB) and requires diagnosis through clinical symptoms, imaging, and serology. The Bordier ELISA assay (BEA), while considered the gold standard for fungal detection, is costly and inaccessible in resource-limited settings. The *Aspergillus* LDBio ICT IgG/IgM lateral flow assay (LFA) is less expensive but has lower accuracy, leading to frequent misdiagnosis.

Methods: We trained 11 supervised machine learning algorithms using patient symptoms, chest x-ray features, and LDBio IgG results to predict CPA. This multi-center cross-sectional study involved 386 PTB patients (55% female, 53.1% HIV positive, 35.8% post-TB, 64.2% retreatment). Of these, 25.1% had CPA; BEA was positive in 25.4%, and LDBio assay in 18.4%. Data was split 70:30 for training/testing with 10-fold cross-validation.

Results: Five algorithms (LR, ANN, rf, XGBoost, SVM) showed strong predictive performance for CPA (AUC ≥ 0.95 , accuracy ≥ 0.9 , sensitivity ≥ 0.75 , specificity ≥ 0.9). Key predictors included clinical symptoms, chest x-ray findings, and IgG evidence of fungal infection.

Conclusion: Machine learning algorithms effectively reduced CPA misdiagnosis among PTB patients, highlighting important predictive variables for further research.

Determinants of Generative Artificial Intelligence (GenAI) Literacy Amongst Academics: The Role of Attitudes Toward GenAI

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The rapid growth of Generative Artificial Intelligence (GenAI) presents new opportunities and challenges for higher education, influencing teaching, research, and academic practice. While much research has examined student use, less attention has been paid to academics, who play a dual role as adopters and gatekeepers of responsible integration. This study explores the determinants of GenAI literacy among academics, extending the Technology–Organization–Environment (TOE) framework by incorporating individual characteristics and attitudes. A structured questionnaire was administered to academics in [Country—dummy], and data were analyzed using descriptive statistics and Partial Least Squares Structural Equation Modeling (PLS-SEM). Descriptive findings show that 82.4% of respondents use GenAI tools, with ChatGPT most widely adopted (53.7%), and that adoption varies across disciplines, with social sciences leading. SEM results indicate that individual characteristics ($\beta = 0.646$, $p < 0.001$) and technological factors ($\beta = 0.240$, $p = 0.019$) significantly predict GenAI literacy, whereas organizational support,

environmental context, and attitudes are not significant. The model explained 60.7% of the variance in GenAI literacy (SRMR = 0.071), reflecting acceptable fit. The findings suggest GenAI literacy is currently shaped more by personal readiness and access to technology than by institutional or policy frameworks, emphasizing the need for universities and policymakers to

cultural perspectives and many more. However, despite its radicalization of institutional practices, AI lacks the wherewithal to handle the whole gamut of cultural tradition performance.

Cultural Tradition Research in the Age of Artificial Intelligence (AI)

Prof. Henri Oripeloye

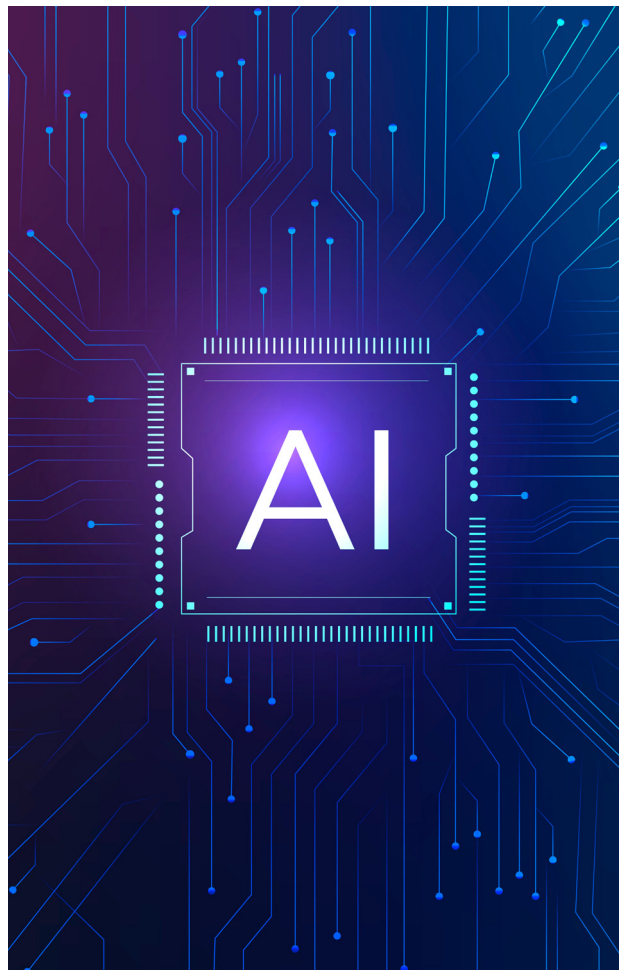
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Miss. Moyinoluwa Oripeloye

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Artificial Intelligence (AI) is revolutionizing research in all facets of human endeavours, it has provided novel ways of understanding human perceptions with its capacity to provide information on virtually all aspects of human condition. It has in some dramatic movements unsettled conventional research methods as technologies have reinvented contemporary approaches to research across the world; it has influenced research activities of the whole human society being an integral part of the post-human world cognition that has the capacity for generating, transmitting, performing and archiving vernacular culture (Trevor Blank, 2009). This presentation attempts a figuration of traditional oral culture in the age of AI research informatics with a view to interrogating its generative capacity in the field of cultural production. In oral culture, especially in performance, there is a rich and complex data that when harnessed will significantly improve the quantum of research on African cultural heritage. AI has the potential to provide a way of capturing, synthesizing, editing, sharing of cultural and sociological backgrounds by marking up



Parallel Session 4.3

Assessment of Wind Energy Resources in Chad, Central Africa, Using 100-M Wind Data from ERA5 Re-analysis

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This study provides a climatological assessment of wind resources in Chad using 100-m wind data from the ERA5 reanalysis. The results highlight spatio-temporal variations in wind potential, enabling the identification of climate zones suitable for wind farm development. Wind speeds range from 1.5 to 11 m/s, with increasing gradients from south to north. Maximum wind speeds are observed between autumn and spring, particularly from October to April, while minimum speeds, below 5 m/s, occur during the wet season. A distinct diurnal cycle is noted, with nighttime wind speeds averaging 26% higher than daytime speeds. Winds predominantly blow in favorable directions, primarily toward the northeast. The study indicates that almost the entire northern region of Chad (north of 15°N latitude) is particularly favorable for wind farm installations, except for areas around the Tibesti mountain range, where wind speeds remain low due to the presence of a permanent anticyclone. Three zones are identified as particularly promising: the region around Faya, the far northeastern part of the country, and the area around Amjarass. Additionally, longterm analysis reveals a slight decrease in 100-m wind speeds, possibly linked to the increased frequency of La Niña events over the past decade.

Fostering Artificial Intelligence Innovation through Collaborative Research Networks in Africa: Towards an Inclusive and Sustainable Knowledge Ecosystem

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Artificial Intelligence (AI) presents enormous opportunities for tackling Africa's most pressing development challenges. Whether in the field of healthcare provision, agricultural yields, or education systems, AI has the potential to bring revolutionary change. However, constraints in the form of scarce talent, fragmented research efforts, and infrastructure deficiencies continue to pose barriers to widespread adoption and innovation across the continent. This paper examines how AI innovation in Africa can be driven through research collaboration networks by bridging knowledge, resources, and capacity gaps. Through an examination of regional and cross-institutional collaborations, the paper demonstrates how collaboration facilitates the sharing of knowledge, pooling of resources, and co-development of context-specific AI solutions. The paper highlights exemplary case studies and emphasizes the imperative to create sustainable ecosystems that facilitate interdisciplinary research, ethical AI development,

and inclusive participation. The article further highlights the necessity for regional innovation centers, investment in digital infrastructure, and capacity-building programs to cultivate local AI talent. Finally, it contends that building collaborative networks is essential to placing Africa on the map as a contributor—not merely a consumer—of global AI innovation. By presenting actionable suggestions to stakeholders, the study provides a roadmap for accelerating AI-driven change in African societies.

The Tübingen-AIMS Data Science & AI Program: A Cooperative Approach

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African Institute for Mathematical Sciences (AIMS)

In 2022 we started a partnership between the African Institute for Mathematical Sciences (AIMS) and the Machine Learning Cluster of Excellence at the University of Tübingen. The activities include courses taught by scientists from Tübingen in the AIMS centers as part of the AIMS Master's degree programs as well as an AI fellowship program in which AIMS graduates carry out a research project in one of the research groups in Tübingen. Furthermore, a joint PhD program has just started recently and we are currently jointly setting up a Junior Research Chair at one of the AIMS centers in Africa. Overall, the ambition of our collaboration is to develop exchange activities at all academic career levels for the benefit of both institutions and, more importantly, for those who are participating in these exchange activities. This partnership underscores our shared vision of building the AI research capacity required to advance sustainable development in Africa.

Unified Intelligent Testing Framework for Code Review Design

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Software validation requires a structured approach to ensure compliance with international standards. This paper presents the Unified Intelligent Testing Framework, integrating combinatorial test generation, AI-driven defect classification, and behavior-driven development (BDD) validation within a systematic review process aligned with ISO/IEC 25010. The framework modularizes test datasets into combinatorial test data, structured quality metrics, and automated validation mechanisms. Key innovations include dynamic threshold calibration, predictive defect tracking, and cross-dataset correlation, ensuring enhanced validation efficiency. Experimental benchmarks demonstrate a 98% BDD pass rate, a 40% reduction in test generation time, and maintainability improvements, with 85% of classes meeting $WMC \leq 20$ standards. Comparative analysis highlights the framework's advantages in precision and scalability. Additionally, AI/ML-based risk assessment and real-time feedback loops facilitate continuous refinement. Future directions include reinforcement learning-based test optimization, ISO/IEC 25023 extensions for security and reliability metrics, and validation methodologies for microservices and cloud-native architectures. This framework offers a scalable, adaptive, and predictive software testing approach suited for evolving development environments.

Parallel Session 4.4

Field Evaluation of Breath Biomarkers for Malaria Diagnosis in Western Kenya

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Malaria is caused by a parasite called Plasmodium. The parasite is transmitted to humans by the bite of infected Anopheles mosquitoes. There is currently no ideal diagnostic technique for malaria, as all currently available options have limitations and they are all based on blood test. We used state-of-the-art mass spectrometric techniques to identify volatile organic compounds (VOCs) produced by cultured Plasmodium falciparum. Several of these compounds are known mosquito attractants, called terpenes. In a recent pilot study in Lilongwe, Malawi, we found that similar compounds, including terpenes, are present in the exhaled breath of children with uncomplicated falciparum malaria. Using just six breath biomarkers, we can classify children with or without malaria with over 82% accuracy. Based on our key proof-of-concept pilot study, we hypothesize that candidate biomarkers characterize the exhaled breath of malaria-infected children. To advance this approach, our immediate objectives are to determine the reproducible changes in breath composition in response to malaria infection, parasite loads, and parasite developmental stages. These compounds can then be explored as novel biomarkers of malaria infection and could then form the basis of future non-invasive malaria diagnostic devices.

Bridging Healthcare Access for Non-Communicable Disease Patients Using Social Health Insurance (Kang'ata Care) in Murang'a County, Kenya

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Murang'a County

Title: Bridging Healthcare Access for Non-Communicable Disease Patients Using Social Health Insurance (Kang'ata Care) in Murang'a County, Kenya. Author: Kairo Kimende

Introduction: Muranga County rolled out a social health insurance program dubbed 'Kanga'ata Care' between 2023 and 2025 to address health financing gaps that hinder access to healthcare among patients with non-communicable diseases (NCDs). The aim of the program is to eliminate out-of-pocket payments for beneficiaries who seek healthcare services at all levels in Muranga, and to provide a sustainable financing model for healthcare.

Methodology: A cross-sectional descriptive study design was utilized with a purposive sampling of respondents related to implementation of the program.

Results: 90,000 households benefited from the program since inception with a total of 360,000 individual beneficiaries. Health facilities in the county received Ksh 101 million as fee-for-service from NHIF. Demand for the program was high and other counties and institutions visited Murang'a to learn how they can roll-out similar programmes.

Conclusion: Publicly funded health insurance can cover bigger population portions and are accepted in most health facilities. The payments return the investment back to financing of healthcare. The impact of the model and sustainability need to be studied further.

Fine-Tuning Foundational Language Models for Precision and Conciseness in AI-Driven Personalized Physical Activity Recommendations for Breast Cancer Patients

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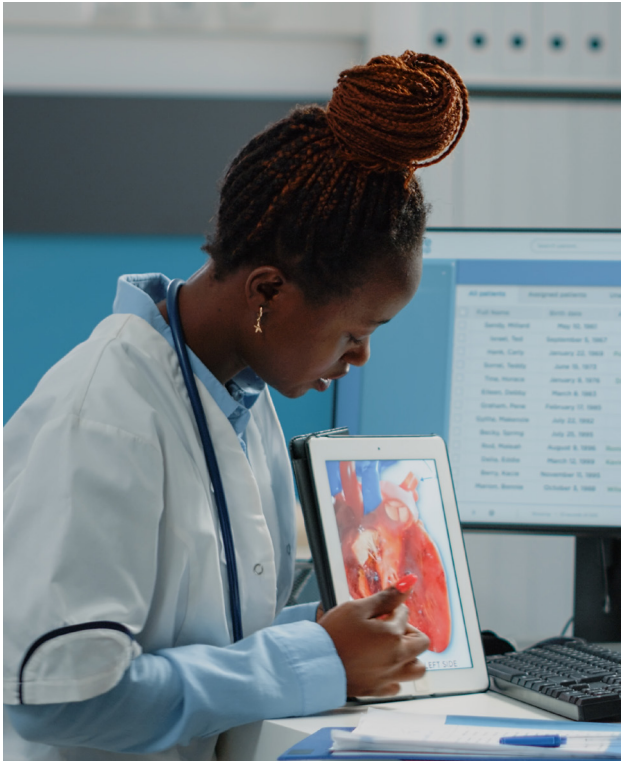
University of Lagos

Ms. Elijah Awotunde

University of Lagos

Breast cancer is a global health challenge, where rates of new cases and mortality are increasing, especially in low-income countries (LMIC). Breast cancer patients may benefit from physical exercise, yet they often receive limited individualised information about exercise. This study addresses this critical gap by conducting a pilot study to fine-tune a foundational model optimisation and validate an AI-powered system using the Bilingual Evaluation Understudy (BLEU) score and n-gram precision in generating personalised physical activity recommendations to improve the quality of life for breast cancer patients. It also seeks to advance an AI-driven personalised exercise programme by proposing a scalable solution to improve lifestyle interventions for breast cancer patients. A dataset

of 1,659 breast cancer patients, containing demographics, lifestyle and clinical characteristics, was analysed as part of the research design. The foundational language model was fine-tuned using the DeepSeek-R1 model on this dataset to generate personalised exercise recommendations. The BLEU score, n-gram precision, length ratio, and brevity penalty were used to assess the output quality and verbosity. Results showed constant n-gram precision throughout 1-gram to 4-gram levels (36.7%, 35.8%, 35.4%, and 35.0%, respectively) and an overall BLEU score of 0.357, indicating modest alignment with reference texts.



Parallel Session 4.5

The Role of Artificial Intelligence in Enhancing Eco-Theology in Nigeria

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Artificial Intelligence (AI) has become a global revolution in our 21st Century. Almost every sector in the developed countries of the world has utilized AI to deepen their technological efficiency as well as escalate progress and development which in turn entrenches their global relevance. AI holds the potential to bring about transformative advancements in environmental data monitoring, resource management optimization, food security and the advancement of eco-theology in Nigeria. Through systematic literature review and participant observation, this study identifies the role of AI in enhancing eco-theology for sustainable development in Nigeria. This study further identifies the great need to promote a better understanding of eco-theology and climate resilience through AI in Nigeria. It recommends eco-musicology, eco-poetry and eco-photography as innovative tools which can be used to enhance eco-theology with the aid of AI for sustainable development in Nigeria. It concludes with a clarion call for researchers, theologians and scholars to dig deeper in research towards maximizing the role of AI in enhancing eco-theology in Nigeria."

Leveraging Indigenous Knowledge and Artificial Intelligence for Climate Resilience and Sustainable Agriculture in Africa: Exploring the Africa's Rain-Making Technology

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Africa faces serious climate change challenges, with agriculture, its economic backbone threatened by rising temperatures, inconsistent rainfall, and frequent droughts. Historically, African communities have relied on Indigenous Knowledge Systems (IKS), particularly rain-making "technology", to forecast and induce rain. These practices, rooted in ecological observation, spirituality, and communal rituals, offer localized precision, ecological stewardship, and cultural legitimacy. However, climate variability has reduced their predictive reliability, while modernization and stigmatization have further eroded their transmission. At the same time, Artificial Intelligence (AI) offers powerful tools for climate adaptation, capable of analyzing large datasets, predicting droughts, and disseminating forecasts. Integrating IKS with AI presents a promising pathway for building climate resilience. Hybrid systems, such as Kenya's Nganyi rain-makers' collaboration with meteorological services and Zimbabwe's advisory calendars demonstrate improved accuracy, trust, and agricultural planning. AI can digitize indigenous indicators, support predictive modeling, and deliver culturally inclusive decision-support systems. Yet, challenges including data sovereignty, cultural sensitivity, and capacity gaps are identified. This paper argues that co-production of knowledge through equitable collaboration among scientists, indigenous custodians, and policymakers are essential. By merging ancestral wisdom with technological innovation, Africa can develop

climate adaptation strategies that are scientifically robust, sustainable and strengthening food security and preserving cultural heritage.

Leveraging Artificial Intelligence for Climate-Resilient Agriculture and Food Security in Africa: Addressing Data Gaps, Infrastructure Challenges and Policy Barriers

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Agriculture is vital to African economies, but climate change, low productivity and food insecurity remain major challenges. According to the FAO (2024), 20% of Africa's population faces hunger, with millions in Sub-Saharan countries experiencing food insecurity. Artificial Intelligence (AI) holds promise for enhancing agricultural resilience, optimizing resources and improving food security. However, AI adoption faces challenges such as data gaps, weak infrastructure and inadequate policy frameworks. This study explores these barriers and AI's role in fostering climate-resilient agriculture in Africa. Using qualitative research and secondary data from peer-reviewed articles, policy reports and agricultural databases, the research applied Dependency Theory and Liberal Institutionalism Theory to assess AI's integration into African agriculture. The study focused on three objectives: (1) evaluating AI adoption and its potential for enhancing climate resilience and food security; (2) identifying infrastructural and technological constraints and (3) assessing the policy landscape and its impact on smallholder farmers. Findings show AI applications like predictive analytics and precision farming improve yields and mitigate climate risks but are underutilized due to challenges such as poor data, limited infrastructure and high costs. The study recommends developing localized AI

models, increasing investment in digital infrastructure and fostering public-private partnerships to overcome these barriers."

The Helium Gas Budget in the East Africa Rift Valley

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Prof. Chris Ballentine

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Considerable high heat flow anomaly in the East Africa Rift Valley is required as a prerequisite to drive the release and circulation of radiogenic helium in the continental crust. Here we apply statistical analysis and machine learning to account for crustal helium mass balance with a particular case study of the Rukwa Rift. Our results demonstrate anomalously high heat flow $\sim 64\text{--}99\text{ mW/m}^2$ with a consistent trend of helium isotopic ratio and fluid chemistry. Mass balance calculation show that the whole crustal volume underlying the East Africa Helium Pool (EAHP) has a capability of producing radiogenic helium of about $\sim 9.9 \times 10^6\text{ mol/yr}$ ($\sim 22 \times 10^{-6}\text{ mol }^4\text{He/m}^2\text{ yr}$) while the total radiogenic helium flux ranges between $\sim 2.39 \times 10^6\text{ mol/yr}$ and $\sim 2.68 \times$

109 mol/yr. The Tanzania Craton contributes largely to radiogenic helium releasing up to 50% of the total capacity in the region. These results imply that the helium accumulation in the EAHP would have started as early as Paleoproterozoic (2.349 Ga). These results provide a qualitative and quantitative insight to assess both helium and geothermal potentiality in the region.





Conference Special Sessions

Special Session 1:

Artificial Intelligence: from Quantum Science to Sustainable Development

Principal Organiser: Patrick Weke, University of Nairobi (pweke@uonbi.ac.ke)

Co-organisers:

- Ranjula Bali Swain, Stockholm School of economics (Ranjula.Bali@hhs.se)
- Francesco Petruccione, Stellenbosch University (francesco.petruccione@nithecs.ac.za)
- Tim Kamanu, University of Nairobi (tkamanu@uonbi.ac.ke)
- Zoran Bosnic, University of Ljubljana (zoran.bosnic@fri.uni-lj.si)
- George Azzopardi, University of Groningen (g.azzopardi@rug.nl)

Format: 1,5 hours session: Six presentations of 10 minutes each and 5 minutes of discussion

Session Abstract:

Artificial Intelligence (AI) and Quantum Science are poised to drive transformative solutions for sustainable development across Africa. This special session, convened by the ARUA Cluster of Research Excellence in AI and aligned with the United Nations' designation of 2025 as the International Year of Quantum Science and Technology, will showcase pioneering research. Presentations and panel discussions will highlight how AI methodologies—such as machine learning, natural language processing, and optimization—are being harnessed for climate resilience, healthcare, agriculture, energy optimization, and economic inclusion, while also emphasizing responsible deployment that considers ethics, local contexts, and social equity. In

parallel, the session will explore the strategic importance of preparing a quantum-ready workforce and the potential of quantum computing and communication to revolutionize sectors like energy, healthcare, and finance. By bringing together researchers, educators, policymakers, and industry partners, the session aims to foster collaboration, build capacity, and strengthen Africa's role in both the global AI and quantum science landscapes. Ultimately, the event will provide a platform to explore how these emerging technologies can be leveraged for sustainable, resilient, and inclusive growth, ensuring that Africa is not only an active participant but a key contributor to shaping the future of science and technology.

Special Session 2:

Afro-Feminism for AI: building community-driven solutions

Principal organiser: Joyce Nabende, Makerere University (joyce.nabende@mak.ac.ug)

Co-organisers:

- David Sumpter and Kajsa Hallberg Adu, Uppsala University
- Chika Yinka Banjo, University of Lagos
- Solomon Gizaw, Addis Abeba University
- Christine Musanase, University of Rwanda

Format: 1,5-hour workshop with presentations, Four 10-minute presentations from each participating university, 50-minute round table discussion.

Session Abstract:

In this session, we will look critically at how AI is developed and deployed in Africa, building on the approach of Afro-feminism proposed by Sylvia Tamale. Many of the

AI approaches to, so-called, “African problems” are motivated more by technosolutionism than by the needs of the communities the researchers are meant to serve. For example, drones used in preventing poaching take a focus away from community participation in conservation; collection of data on African languages is motivated by multinational corporations desire to own language corpora; and studies of women’s health using smartphones, do not necessarily account for the fact that men often control the only phone in a household. In this session, we discuss these problematic cases, but also look at ways of solving these issues through approaches that respect differences and the community perspectives. For this session, we are looking for approaches and case studies that are bottom-up, that look at how to identify problems suited to AI (and those that are not) and discuss data collection tools and AI model development and deployment which respect and help communities.

Special Session 3: AI & Creative Economies

Creative Economies in Africa, AI and Higher Education

Prof. Jen Snowball (j.snowball@ru.acza)

Prof. Noel Pearse

Dr Fiona Drummond

Rhodes University

This paper explores the dynamic intersections between artificial intelligence (AI), the cultural and creative industries (CCIs), and higher education in the African context. As Africa’s AI market grows rapidly, so too does the urgency to understand its impact on CCIs, a sector poised for expansion. The paper analyses how AI and related technologies, such as generative tools, digital platforms, and NFTs, are

reshaping creative value chains across ideation, production, distribution, and consumption. While AI offers opportunities to democratise access and enhance productivity in creative work, it also raises critical issues around intellectual property, cultural authenticity, and deepening digital divides. Drawing on sectoral data and a case study of a South African Visual Special Effects (VFX) training programme, the paper illustrates how Higher Education Institutions (HEIs) can play a pivotal role in building inclusive, future-ready talent pipelines. The potential of micro-credentials is examined as a flexible model for equipping creatives with AI-relevant skills. Framing HEIs as intermediaries within a broader innovation ecosystem, the paper calls for interdisciplinary, industry-aligned strategies to support sustainable creative economies in Africa. It argues that inclusive and ethical integration of AI into CCIs depends on the responsiveness of both educational systems and policy frameworks.

Enhancing AI-Oriented Creative Curriculum Towards Sustainable Creative Labour Creation in a Ghanaian Creative Economy

Prof. Mohammed Aminu Sanda

University of Ghana
msanda@ug.edu.gh

This paper provides insight into the development dynamics of the Ghanaian creative industry relative to creative entrepreneurs’ lived experiences and the viability of the academic curriculum that guides their acquisition of creative knowledge and skills, and which is supposed to help accelerate the process of turning their creativities into business ventures. The purpose was to examine the potential of generative artificial intelligence (GenAI) in strengthening Ghana’s creative economy through curriculum innovation, entrepreneurial practice, and sustainable labor development. Using a participatory workshop with 17

creative entrepreneurs, the study identifies challenges in integrating AI into creative education and opportunities for enhancing value chains. Findings highlight three priorities: (i) government and investor support, (ii) policy frameworks for AI-enabled creative industries, and (iii) curriculum innovation linking education with industry. The paper concludes that deliberate integration of GenAI into creative curricula, policies, and governance can position Ghana's creative industries as drivers of economic growth and cultural transformation. The insights from these findings provide a future-oriented learning for enhancing GenAI-oriented creative curriculum, creative labor, value chains, and productivity towards sustainable entrepreneurship in the Ghanaian creative economy.

Panel Discussion:

Creativity, digital and new technologies in Uganda and beyond

Speakers:

- Rita Ngenzi (Founding Director, Africa Creatives Alliance)
- Ivan Sewajje (Head of Brand at Innovation Village and MOTIV)
- Amanda Gowa (Community Development, Africa Creatives Alliance - ACA)



Special Session 4: Investing in Artificial Intelligence for Advancements in Pharmaceutical Drug Formulation

Convener: Dr. Joy Ifunanya Odimegwu, University of Lagos (jodimegwu@unilag.edu.ng)

Speaker	Topic
Pharm Wuraola Oyewusi (The University of Manchester)	<i>What You Should Know About AI</i>
Dr. Nkemehule Florence (University of Lagos)	<i>Integration Of Artificial Intelligence And Computational Modeling To Drug Safety & Pharmaceutical Formulation In Africa</i>
Prof. Mag. Dr. Gerhard Ecker (University of Vienna)	<i>AI In Drug Discovery And Toxicity Prediction</i>
Pharm Ajala, Marvellous (Magami Open Science Initiative)	<i>Application Of Artificial Intelligence In The Virtual Screening Of Antimalarials</i>
Dr. Charlotte Ndiribe (University of Lagos)	<i>Expanding The Frontiers Of Artificial Intelligence In Ecology And Environment</i>
Prof. Fidele Ntie-Kang (University of Buea Center for Drug Discovery)	<i>AI-Driven Drug Discovery and Formulation Design</i>

Session Abstract:

The integration of Artificial Intelligence (AI) in pharmaceutical drug formulation is an emerging field poised to revolutionize the way new drugs are developed, optimized, and produced. AI technologies, including Machine Learning (ML), Deep Learning (DL), and Data Analytics, offer transformative potential in accelerating drug formulation processes, improving the precision of drug delivery systems, and enhancing overall product quality. This special session will explore the innovative applications of AI across various stages of pharmaceutical drug formulation, from drug discovery from nature, interrogating ecology and fundamental early-stage research to clinical trials, toxicity predictions, and some specific research on health conditions, all aiming towards optimizing active pharmaceutical ingredient (API) properties, excipients selection, stability studies, and the development of personalized drug delivery systems.

ARUA CoE Early Career Researcher Workshops



ARUA CoE: UNEMPLOYMENT AND SKILLS DEVELOPMENT

Workshop Theme: “**Research, Innovation & Artificial Intelligence for Africa’s Transformation: Will Jobs Disappear, or More Jobs Created? ”**

Time	Event/Topic	Responsible Person/ Institution	Presenter/ /Rapporteur
11.30-11.40	Why we are here! ““Research, Innovation & Artificial Intelligence for Africa’s Transformation: Will Jobs Disappear, or More Jobs be Created? ”	ARUA, Centre of Excellence for Unemployment and Skills Development in Africa (ARUA, CoE-USD) Secretariat Moderator: Prof. Kesh Govinder (Spoke Lead, University of Kwazulu Natal)	Presenter: Prof. Sunday Adebisi (Director ARUA, CoE-USD) Rapporteur: Early Career from Makarere
11.40 - 12.10	Sub Topic on the Workshop Theme (Spoke Lead from Kenya)	University of Nairobi, Kenya Moderator: Dr. Chika Yinka-Banjo	Presenter: Prof. Jackson Maalu and his Team Rapporteur: (Early Career,University of Makarere)
12.10-12.35	“Sub Topic on the Workshop Theme (Spoke Lead from Uganda) ”	University of Makarere Moderator: Prof. Sunday Adebisi	Presenter: To be determined by University of Makarere, Uganda Rapporteur:Katherine Idolor (Early Career,University of Lagos)

Time	Event/Topic	Responsible Person/ Institution	Presenter/ /Rapporteur
12.35 – 13.00	“Sub Topic on the Workshop Theme (Spoke Lead from Cape Town) ”	University of Capetown Moderator: Dr. Oladimeji Odetunde	Presenter: Prof. Abimbola Windapo (Spoke Lead, University of Cape Town) Rapporteur: Early Career, University of Nairobi, Kenya
Lunch 13:00 -14:00			
14.00-14.30	“Sub Topic on the Workshop Theme (Spoke Lead from Kwazulu-Natal) ”	University of Kwazulu Natal, South Africa Moderator: Dr. Priscilla Baffour (Spoke Lead, University of Ghana)	Presenter: Prof. Kesh Govinder Rapporteur: Dr Bukola Amao-Taiwo Early Career, University of Lagos)
14.30-15.00	“Sub Topic on the Workshop Theme (Spoke Lead from University of Ghana) ”	University of Ghana Moderator: Prof. Jackson Maalu (Spoke-Lead University of Nairobi)	Presenter: Dr. Pricilla Baffour Rapporteur: Early Career, University of Nairobi, Kenya
15.00-15.30	“Sub Topic on the Workshop Theme (Spoke Lead from University of Mauritius) ”	University of Mauritius Moderator: Prof. Abimbola Windapo (Spoke Lead, University of Cape Town)	Presenter: Dr. Viraiyan Teeroovengadam Rapporteur: Early Career, University of Makerere, Uganda
15.30 – 16.00	Discussion, Wrap Up and Focus for the future Development of the Collaboration under ARUA, CoE-USD on the Future of Jobs	ARUA, Centre of Excellence for Unemployment and Skills Development in Africa (ARUA CoE-USD)	Prof. Sunday Adebisi (Director, ARUA,CoE-USD)
14.00	Workshop Closing and Lunch		



ARUA CoE: Inequality Research

Title: “AI for Good Sounds Great: Does it Work?”

Lecturer/Tutor: Sarah Kopper

Abstract: As artificial intelligence (AI) is increasingly integrated into social programs across the world, there is an urgent need for rigorous evidence on its impact. Without such evidence, policymakers, innovators, and regulators risk deploying AI in ways that fail to maximize benefits—or even cause harm. This session will introduce participants to the use of randomized evaluations (RCTs) to rigorously assess AI interventions in development contexts. We will cover the basics of RCT design, the value of randomized evaluations for understanding causal impact, and how these methods can be adapted to the specific challenges and opportunities presented by AI applications. Drawing on early evidence and examples where available, the session will explore how randomized evaluations can help identify where AI improves social outcomes, and where it may fall short. This workshop aims to equip participants with a practical understanding of how to build rigorous evidence around AI’s real-world impact in Africa’s development landscape.



IPSS

Institute for Peace
& Security Studies
Addis Ababa University

ARUA CoE: Post-Conflict Societies

Topic: *Interdisciplinary Peace Research: Is the world ready for interdisciplinary research and teaching?”*

Organizer: Dr Mercy Fekadu Mulugeta, Director, ARUA CoE on Post Conflict Societies

Abstract

While the world seems to have reached a consensus on the value of interdisciplinary research, a multitude of challenges unravel as researchers attempt to engage in it. These range from overarching philosophical and epistemological differences that manifest through conceptual discrepancies, to methodological differences and practical difficulty in synthesizing data. Additionally, researchers pursuing interdisciplinary research also face social, institutional and cultural challenges. These include funding and awards systems that exclude people pursuing creative interdisciplinary problems, lack of institutional infrastructure that facilitate collaborative work across disciplines and various other challenges associated with ethics and impact.

In light of these challenges, the CoRE on Interdisciplinary Peace Research would like to explore the question “is the world research for interdisciplinary research and teaching?” Besides developing the tools to allow it to pioneer a programme on interdisciplinary peace and navigate interdisciplinary boundaries the CoRE is interested in understanding the research landscape in which its members are functioning. In this round table, we would like to explore the topic in ways relevant to the CoRE’s thematic focus and beyond by addressing the following thematic areas:

- Goal of interdisciplinary research, questions requiring interdisciplinary research,
- Research infrastructures facilitating collaboration among interdisciplinary teams, team building, leadership, power, funding and conflict resolution
- Methodological tensions, data integration, synthesis, ethics
- Dissemination, impact, sustainability



MAKERERE UNIVERSITY

ARUA CENTRE OF EXCELLENCE IN NOTIONS OF IDENTITY



Topic: Technocolonialism? Decolonising AI for African Identity

Abstract:

Artificial intelligence is presented as the current one-size-fits-all solution to everything, regardless of context and history. In Africa, AI is presented as a solution to limited development, serving as a strategy to leapfrog the continent into the modern era. The tendency is to posit technology and AI as value-neutral, culturally free and devoid of any biases.

Yet the critics of AI perceive it as a form of techno-colonialism, one that is designed to propagate African epistemicide, as well as maintain Africa as a market for Western finished goods. Focusing on Africa's past history and colonial legacy, such critiques perceive technology and AI as another form of neo-colonialism, albeit using technology. This session will 1) critically examine the Eurocentric nature of AI, 2) its implications on African knowledge systems and 3) how AI can be rethought to serve Africa. Specifically, workshop will engage scholars in how best to re-centre Africa in the AI agenda.

Workshop Delivery mode:

Participants will be required to watch the video Indigenous Epistemologies: Decolonising AI and Shaping Sustainable Futures | Husein Inusah (<https://www.youtube.com/watch?v=wwmld-gTmaM>) before the session. Participants will be asked to view and share any questions triggered by the video beforehand. The actual event will comprise of a free form discussion, where the moderator will engage the panellists and participants. In addition, we shall have breakout sessions and feedback plenary.

Key Themes:

1. Critical examination of AI
2. AI and African knowledge systems
3. AI and cultural/epistemic erasure of Identity
4. Re-centering the African in AI

Programme:

Time	Item	Role
11:30 – 11:40 AM	Welcome Remarks and Session Overview	Dr. Sarah N Ssali
	Overview of the ARUA CoE in Identities	
11:40 – 11:55 AM	Examining questions from the Video	Dr. Florence Ebila
11:55 – 12:00 PM	Break	
12:00 – 12:10 PM	Introduction of the Panellists	Dr. Kemi Kehinde
12:10 – 12:50 PM	Panel Discussion	
12:50 – 13:00 PM	Q & A	Ms. Salama Nakiranda
13:00 – 14:00 PM	Break	
14:00 – 14:00 PM	Introduction to Breakout Sessions	Prof. Edward Walakira
	Breakout Sessions	ARUA CoE NoI Team
14:00 – 15: 00 PM	Feedback from Breakout Sessions/ Plenary	Dr. Zaid Sekitto
Conclusion	Conclusion	Dr. Sarah N Ssali

ARUA CoE: Urbanization and Habitable Cities

TOPIC: Leveraging AI for Sustainable Urbanization And Habitable Cities in Africa

Objective: To explore the role of Artificial Intelligence (AI) in promoting sustainable urbanization and habitable cities in Africa, and to identify strategies for building AI capacity in African higher education institutions to address urbanization challenges.

Key Discussion Points:

1. AI Applications in Urban Planning and Management: How can AI be used to improve urban planning, transportation, and public services in African cities?
2. Addressing Urbanization Challenges: How can AI help address urbanization challenges such as housing, sanitation, and environmental sustainability in African cities?
3. Building AI Capacity in African Higher Education Institutions: What strategies can be implemented to build AI capacity in African higher education institutions to address urbanization challenges?
4. Collaborative Research and Innovation Networks: How can collaborative research and innovation networks be established to leverage AI for sustainable urbanization and habitable cities in Africa?

Expected Outcomes:

1. Identify Best Practices: Identify best practices in leveraging AI for sustainable urbanization and habitable cities in Africa.
2. Develop Strategies: Develop strategies for building AI capacity in African higher education institutions to address urbanization challenges.
3. Establish Collaborative Networks: Establish collaborative research and innovation networks to leverage AI for sustainable urbanization and habitable cities in Africa.

Target Audience:

- Researchers: Researchers in AI, urban planning, and urbanization.
- Policymakers: Policymakers in urban development and AI.
- Industry Experts: Industry experts in AI and urban development.
- Higher Education Institution Leaders: Leaders of African higher education institutions.

PROGRAMME

Theme: LEVERAGING AI FOR SUSTAINABLE URBANIZATION AND HABITABLE CITIES IN AFRICA.		
TIME	ACTIVITY	FACILITATOR
11:30 – 11:40am	Opening: Welcome & Introduction	Prof. Taibat Lawanson <i>Co-Director (IP), Centre for Housing and Sustainable Development</i>
11:40 – 12:30pm	Lead Speaker: “AI Applications in Urban Planning and Management”	Prof. David Toll <i>Prof. of Engineering, Department of Engineering, Durham University, UK &</i> Prof. Tom Goodfellow <i>Prof. of Urban Studies & International Development, University of Sheffield</i>
12:30 – 12:40pm	Interaction, Questions and Answers	
12:40pm – 13:00pm	Panel Session: - This panel will bring together experts to discuss leveraging AI for sustainable urbanization and habitable cities in Africa, focusing on three key areas by sharing their expertise and experiences on how AI can be harnessed to drive sustainable urbanization and create habitable cities in Africa. AI in Housing and Regeneration: Best practices in leveraging AI for sustainable construction, infrastructure planning, and management. Digital Built Environment: Harnessing AI to create more efficient, livable, and sustainable cities. Future of Spatial Data Infrastructure: The role of AI in enhancing geospatial analysis, urban planning, and data-driven decision-making.	Panelists: - Prof. Timothy Nubi <i>(Director, Centre for Housing and Sustainable Development)</i> - Prof. Martins Dada <i>(Construction Technology Expert, Department of Building, Cluster Lead, Digital Built Environment)</i> - Prof. Muyiwa Agunbiade <i>(Geospatial information, Urban analyst, Cluster Lead, Spatial Data Infrastructure)</i>



ARUA CoE: Climate and Development

Topic: Opportunities and challenges for early career researchers in Africa on the use of AI and machine learning for climate change research

About the Session:

Africa Research Universities Alliance - Climate and Development (ARUA-CD) Centre of Excellence, represented by University of Nairobi (Daniel Olago), University of Cape Town (Mark New), and University of Ghana (Benedicta Fosu-Mensah)

Convenor:

Dr. Timothy A. Downing (Research Fellow - University of Nairobi- Institute for Climate Change and Adaptation; Nairobi Hub Coordinator for ARUA-CD)

Program:

Activity	Speaker
<i>Introductory Remarks</i>	Timothy A. Downing
<i>Overview of AI needs for climate science and governance</i>	UNFCCC Secretariat
<i>Applications of AI in large evidence synthesis for climate action</i>	Nicholas Simpson (Chief Research Officer- University of Cape Town)

Activity	Speaker
<i>Use of AI in material discovery for carbon capture</i>	Jonathan Shock (Associate Prof., University of Cape Town)
<i>Towards Predicting Kenya's Long Rainy Season using Deep Learning Approach</i>	Herbert Misiani (PhD Student, University of Nairobi)
<i>Leveraging Artificial Intelligence and Climate Models to Enhance Agricultural Resilience: Insights from Maize Yield Prediction in Uganda's Lake Kyoga Basin</i>	Angella Kisakye (PhD Student, Makerere University)
Question and Answer	Workshop participants

Round Table Discussion:

- Discussion with all five speakers and workshop participants on the experience of AI and climate change research; challenges and opportunities and the way forward
- *Topics to discuss:* AI opportunities for early career researchers, use of AI in interdisciplinary spaces; research gaps in AI and climate change; Africa's niche in AI spaces, legal and ethical challenges, resources available for AI practitioners in Africa, and future prospects.
- *Closing Remarks:* Prof. Jonathan Shock

Special Session Output:

AI/ML Resource guide/toolkit for early career researchers in Africa

Session Abstract:

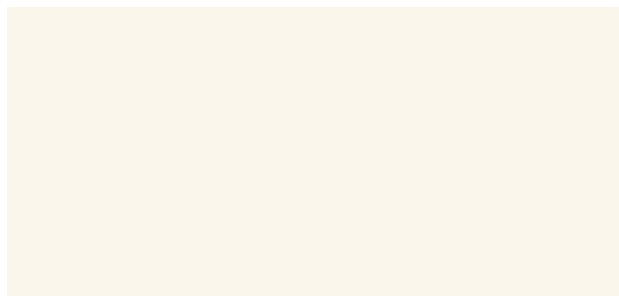
Artificial Intelligence (AI) and Machine Learning (ML) are transforming research across the world, touching all sectors and disciplines. Africa can benefit greatly from this revolution, particularly when it comes to climate change. The sheer scope and complexity of climate change necessities large amounts of data from different disciplines. Machine learning and AI techniques will, therefore, be essential in the coming years to make sense of all this information. Early career researchers will likely be the ones to spearhead these efforts. This session seeks to provide a forum for early career researchers to be exposed to applications and methods for AI in climate change. It will do this through a series of presentations from leaders in the field, followed by a round table discussion. Speakers will introduce AI applications in meteorology, remote sensing, emissions, urban planning, and landscape ecology, to provide participants with a broad overview of the role of AI in climate research. The discussions will allow for researchers to dive into specific methodologies and applications, ask questions, share information, and raise pertinent research questions for the future. A key output of this session will be a resource guide or toolkit to help early career researchers navigate this field.



ARUA CoE: Water

Topic: AI and Machine Learning in Water Research

This workshop demonstrates how AI and machine learning are transforming water resource monitoring, analysis, and decision-making—covering workflows from data ingestion to visualisation.. We will primarily run hands-on, technical tutorials using **Orange** (open-source visual data mining software). Orange is an open-source, visual programming software for data analysis, machine learning, and data mining that uses a drag-and-drop interface. It is designed to make complex data tasks accessible to both beginners and experts (you do not need coding experience). The tutorials will guide participants through core machine-learning tasks such as classification (e.g., predicting contamination levels), clustering (e.g., grouping water bodies by pollution profiles), and regression (e.g., forecasting water demand). Practical examples will include estimating soil hydraulic properties and predicting groundwater levels using neural-network models, all with example hydrology and water-quality datasets. We will also showcase ongoing research comparing traditional models with theory-guided machine-learning approaches in data-sparse contexts, and highlight AI-driven water-quality and remote-sensing applications. Alongside the technical track, we will offer **optional non-technical mini-sessions** for attendees who want to level up their practical AI use in day-to-day research—covering smarter reference-list workflows, generating figures/



diagrams (mind maps, flowcharts, decision trees), and more creative applications for communicating results.

We'll conclude with a facilitated discussion on gaps, good practices, and collaboration opportunities for AI adoption in water resource management, including integration with existing modelling and decision frameworks.

Logistics: Registration is required. – **use this link to register**
– <http://bit.ly/499EAuo>

Participants are **strongly encouraged to bring a laptop** (Orange runs on Windows, macOS, and Linux). Software setup instructions and datasets will be provided in advance.

Who should attend: Water researchers and practitioners seeking practical, tool-based AI skills, as well as colleagues interested in improving research productivity and communication with accessible AI methods.





ARUA CoE: Non-Communicable Diseases

Program for the ACENCD Workshop - ARUA Biennial Conference 2025

Moderators: Charles Nzioka and Innocent Besigye

Time	Activity	Moderator/Speaker
2:00 – 2:05 pm	Welcome and Introduction	Charles Nzioka (University of Nairobi)
2:05 – 2:20 pm	Overview of the ACENCD/CoRE: Networking, Research and Partnership Engagements	Fred Bukachi (University of Nairobi)
2:20 – 2:40 pm	Keynote Address: Leveraging AI in Higher Education Institutions for Teaching, Research, and Community Engagement	Inter-University Council for East Africa (IUCEA, Kampala , Uganda)
2:40 – 2:45 pm	Stories/Videos	
2:45 – 3:00 pm	Leveraging the Power of AI to Sustainably Solve Africa's NCD Epidemic: A 360-Degree Approach	Peter Waweru (University of Nairobi)
3:00 – 3:20 pm	Tackling NCDs in Africa: Integrative Epidemiology, Prevention and AI Solutions	Bamba Gaye (AMedRA, Dakar, Senegal)
3:20 – 3:40 pm	Panel Discussion	Innocent Besigye (Makerere University)
3:40 – 3:50 pm	Questions and Discussion	Charles Nzioka (University of Nairobi)
3:50 – 4:05 pm	Education and Research for Non-Communicable Diseases: Reflections from Makerere University College of Health Sciences	Richard Idro (Makerere University)
4:05 – 4:20 pm	Cloud-Based Integrative Phenotype and Genomic Clinical Support Tool for Predicting COVID-19 Severity and Prognosis Using Machine Learning	Comfort Folorunso (University of Lagos)

Time	Activity	Moderator/Speaker
4:20 – 4:35 pm	Enhancing the Caregiving of Patients with Non-Communicable Diseases: What Opportunities Exist in Artificial Intelligence?	Anne Kamau/Roseanne Njiru (University of Nairobi)
4:35- 4:50 pm	Patient-Centred Care for Non-Communicable Diseases	Innocent Besigye (Makerere University)
4:50 – 5:00 pm	Using Telemedicine to Improve Non-Communicable Diseases in Murang'a County, Kenya	Kairo Kimende (Murang'a County, Kenya)
5:00 – 5:10 pm	Closing Remarks and Group Photo	Innocent Besigye (Makerere University)



ARUA CENTRE OF EXCELLENCE
IN MATERIALS, ENERGY & NANOTECHNOLOGY

ARUA CoE: Materials, Energy and Nanotechnology

Topic: Advancing AI-Driven Materials Research and Innovation for Sustainable African Futures

The ARUA Centre of Excellence in Materials, Energy & Nanotechnology (CoE-MEN), hosted by the University of the Witwatersrand, is a collaborative platform for research and innovation in materials science, sustainable energy, and nanotechnology. Working with African Research Universities Alliance (ARUA) member institutions and international partners, the Centre promotes engagement between academia, industry, and government through a triple-helix approach. In line with the theme *Research, Innovation & Artificial Intelligence for Africa's Transformation*, CoE-MEN explores the integration of research in advanced materials and renewable energy with AI-enabled modelling, simulation, and optimisation. This work supports the

development of approaches that can move ideas from early-stage discovery toward potential applications in areas such as cleaner energy production, resource utilisation, and climate-resilient technologies. CoE-MEN also contributes to capacity development through transdisciplinary doctoral programmes, collaborative research activities, and skills-building initiatives aimed at supporting emerging scientists and engineers. These activities encourage the exchange of expertise and foster connections across institutions. Looking ahead, the Centre aims to facilitate further collaboration and dialogue around how AI, materials research, and innovation can intersect to address Africa's evolving needs and opportunities.

Program Structure:

1. Session will begin with a presentation introducing the Centre of Excellence in Materials, Energy, and Nanotechnology (CoE-MEN), highlighting how it aligns with the event theme and outlining potential opportunities for collaboration and funding.
2. This will be followed by presentations from participants whose research aligns with CoE-MEN's focus areas.

3. Finally, we will have a breakout session where interested participants can engage in an open discussion to explore potential initiatives that will advance the Centre's mission and address challenges relevant to Africa at large.

ARUA CoE: Energy

Topic: *Leveraging the power of Machine Learning and Artificial Intelligence in Renewable Energy Development*



ARUA Centre of Excellence (CoE) in Energy

Topic: *Leveraging the power of Machine Learning and Artificial Intelligence in Renewable Energy Development*

Abstract:

In Africa, energy demand is rapidly growing and access to reliable electricity remains uneven. Amidst the global call for a transition to renewable energy sources, Africa stands at a strategic crossroads, while the continent possesses vast fossil fuel reserves that could temporarily enhance energy access, pursuing this pathway would conflict with global decarbonization. However, one of the drawbacks of renewable energy sources is reliability. AI and ML provide opportunities to optimize the deployment, operation, and management of renewable energy systems. Recent applications include forecasting solar and wind resources, enhancing grid stability, improving feedstock quality, and enabling predictive maintenance of renewable energy

infrastructure. These technologies can also facilitate data-driven policymaking, enabling governments to plan and implement sustainable energy strategies. By leveraging AI and ML, African countries can accelerate the transition to clean energy, enhance energy security, and contribute to global sustainability efforts while fostering inclusive economic growth. In this workshop we will discuss demonstrated applications of AI and ML in Energy systems and potential pathways to leverage for sustainability in renewable energy systems in Africa.

Convenors:

- John E. Sempira (PhD)- **Research Fellow- ARUA CoE in Energy, Stellenbosch University.**
- Francis Mujjuni (PhD)- **Lecturer, Makerere University & Team Leader ARUA CoE WG1**

Virtual Link: Scan to Join Virtually



Meeting ID: 397 338 623 884 9

Passcode: u2uP7at3

Program

TIME	ACTIVITY	FACILITATOR
2:00 – 2:15 pm	Opening: Welcome & Introductions	Dr. John Edison Sempira Convenor
2:15-2:30 pm	Overview of ARUA CoE- Energy	Prof. Cristina Trois Director CoE in Energy./ Dr. Francis Mujjuni Team Leader WG1
2:30 – 2:55 pm	Speaker 1 "Just Energy Transitions, the Context for developing Economies"	Roula Inglesi-Lotz Bilateral SARChI Chair in Just Energy Transitions at the University of Pretoria, Team Lead Energy Economics Unit
3:00 – 3:25 pm	Speaker: 2 "Predictive Maintenance and Fault detection in PV Systems"	Dr. Armand du Plessis <i>Lecturer of Engineering, Faculty of Engineering, Stellenbosch University, South Africa.</i> <i>Short Course Manager. CRSES.</i>
3:30 – 3:55 pm	Speaker: 3 "Intelligent sorting of biomass for energy use"	Dr. Mengting Yu, <i>University of Tuscia</i>
4:00 - 4:15 pm	Interactions, Questions and Answers	



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Conference Steering Committee

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