



EAI
INNOVATING RESEARCH



**AFRICA
TEK**

11-13
Dec,
2023

Arusha
Tanzania



6th EAI International Conference on Emerging Technologies for
Developing Countries

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FINAL PROGRAMME



**Hosted by:
The Nelson Mandela
African Institution of
Science and Technology
(NM-AIST)**



INTRODUCTION

In the case of mega-cities in developed countries, the concept of smart cities has already left its infant stages, as demonstrated by real-life applications in domains such as smart public transport, smart homes and smart lots. However, the same cannot be said of most cities in Africa where an array of challenges make the realisation of smart cities, a pipe dream. Top on the list of these challenges are two issues: (1) ineffective baseline physical infrastructures and (2) poor quality, unsustainable and segregated social services. Mehmood, Ahmad, Yaqoob, Adnane, Imran and Guizani (2017), describe smart city as cycle that consists of numerous ICT technologies, maintenance, development platforms and sustainability, apps for evolving citizens, social, technical as well as economic key performance indicators. Intelligent cities use ICT advances and innovative practices to improve quality of life, accelerate economic growth, maintain a safe, sustainable environment, and streamline urban management.

On the other hand, since the inception of the concept smart cities, most key industries have been involved in the advancement of smart cities technologies or better known as dimensions. They range from Smart Mobility, Smart People, Smart Living, Smart Governance, Smart Economy, to Smart Environment. The common feature among them is the direct and/or indirect engage of the community. Guided by the smart-city vision that focuses on the growth of communities, cities and industry without disrupting facilities for future generations, this conference seeks to awaken the consciousness of the research community to the need for innovative and contextualised smart-city solutions.

Accordingly, this Conference presents publications that contribute towards increasing awareness of the utility and impact of smart-city technologies in stimulating economic growth and, also showcase various related technologies which are currently in play **within the African context.**

CONFERENCE THEMES

Framework for Smart City Planning and Management

This theme explores the comprehensive aspects of smart cities, including the concept, technologies, infrastructure, governance, planning, management, citizen engagement, social and environmental sustainability, emerging trends, and potential societal impact. It emphasizes the importance of effective governance models and citizen participation in successful smart city implementation. The integration of smart city solutions into existing urban infrastructures, tailored to the needs of diverse communities, is essential. Additionally, the theme highlights the potential of smart cities to drive economic growth and improve social development.

Technology Innovations

Internet of Things, Artificial Intelligence, and Data Analytics

Design Approaches and Categories of Smart Applications Relevant to Africa

This theme is targeted at researchers, policymakers, and industry leaders involved in smart city development, with a focus on applications that enhance the efficiency, sustainability, and liveability of cities in Africa. The sub-themes include: Water-Energy-Food Nexus, Governance and Smart Cities, Health, Well-being, and Decent Work, Smart Transitions, including Intelligent Transportation Systems and Circular Economy, Resilience and Disaster Management and Cultural Heritage Preservation. .



DAY 1 [12 DECEMBER 2023]

09:30 – 10:30	<ul style="list-style-type: none"> • Conference Registration and Opening [Session Chair – Dr Mussa Ally] • About EAI–European Alliance for Innovation [Ivana Bujdakova, Senior Conference Manager, EAI] • About AFRICATEK 2023 [Prof Muthoni Masinde, General Conference Chair] • Introduction of the Vice chancellor of NM-AIST [Prof Verdiana Masanja, General Conference Co-Chair] • Opening remarks and official Opening of the Conference [Prof. Maulilio John Kipanyula, Vice chancellor of NM-AIST] • Photo session 	
10:30 – 11:00	Keynote Speech 1: Tactile Internet for Less Developed Regions: The Road from 5G to 6G [Prof. Roch H. Gliho] Session Chair – Prof Muthoni Masinde/ Prof Antoine Bagula	
11:00 – 11:15 Q&A and Coffee/Tea Break		
Theme 1: Smart Infrastructure and Urban Management: Session Chair – Prof Verdiana Masanja		
11:15 – 11:30	Review of Smart Parking Occupancy Prediction Models in Nairobi City: Strengths, Weaknesses, and Research Gaps	Solomon Mwagha, Pwani University, Kenya
11:30 – 11:45	An internet of things and smart cities frameworks implementation in municipalities: A Systematic Literature Review	Moabi Kompi, Central University of Technology, Free State, South Africa
11:45 – 12:00	Accessibility Features for Augmented Reality Indoor Navigation Systems	Frank Samson, Nelson Mandela African Institution of Science and Technology
12:00 – 12:10	M&D presentation 1: A Comprehensive Blockchain-based System for the Issuance and Verification of Educational Qualifications utilising Smart Contracts and Interplanetary File System	Said Said, Nelson Mandela African Institution of Science and Technology
12:10 – 12:20	M&D presentation 2: Modeling of leakage in water pipelines: Coupling Computational Fluid Dynamics and Artificial Intelligence	Philbert F Mushumbusi, Nelson Mandela African Institution of Science and Technology
12:20 – 12:30	M&D presentation 3: Machine learning based sorting system for Aflatoxin contaminated maize kernels	Liston Kiwoli, Nelson Mandela African Institution of Science and Technology
12:30 – 14:00 Q&A and Lunch Break		
14:00 – 14:30	Keynote Speech 2: 6G Integrated Space-Terrestrial Networks (ISTNs) for Global Coverage of Mobile Service Tactile Internet for Less Developed Regions: The Road from 5G to 6G [Dr. Trung Q. Duong] Session Chair – Dr N Mabanza	
Theme 2 - Data Security and Digital Technologies: Session Chair – Dr N Mabanza		
14:30 – 14:45	Adopting Blockchain for Enhancing Data Security and Privacy in Service-based Digital Platforms: A Case Study of a Distributed Application (Dapp) Global Mission Services	Yves Bizumuremyi, Central University of Technology, Free State, South Africa
14:45 – 15:00	Towards AIDSS adoption at a selected higher education institution in South Africa	Vusumzi Funda, University of Fort Hare, South Africa
15:00 – 15:15 Q&A and Comfort Break		
Theme 3: Economic Growth and Social Development: Session Chair: Dr Mussa Ally		
15:15 – 15:30	The Impact of Online Entrepreneurship on South African Youths: Use of Vlogging and Blogging Applications	Sibusiso Simelane, University of Johannesburg, South Africa
15:30 – 15:45	Designing a Big Data Analytic Tool for Predicting Girl Child Learner Drop Out in the Eastern Cape Province of South Africa	Nosipho Mavuso, Walter Sisulu University, South Africa
15:30-16:00 Q&A, and closure of Day 1		



DAY 2 [13 DECEMBER 2023]

09:30 – 09:45	Day 2 Opening remarks [Dr Geminpeter Lyakurwa]	
09:45 – 10:15	Keynote Speech 3: A Secure Information Infrastructure Framework for Smart African Cities [Prof. Fungai Bhunu Shava], Session Chair – Prof Muthoni Masinde	
Theme 4: Health and Well-being Part I: Session Chair: Session Chair – Dr Geminpeter Lyakurwa		
10:15 – 10:30	A Systematic Review on the use of AI-Powered Cloud Computing for Healthcare Resilience	Kudakwashe Maguraushe, University of Johannesburg, South Africa
10:30 – 10:45	Towards a Smart Healthcare System for Non-Communicable Disease (NCDs) Management: A Bibliometric Analysis	
10:45 – 11:00	A Machine Learning Approach to Mental Disorder Prediction: Handling the Missing Data Challenge	Tsholofelo Mokheleli, University of Johannesburg, South Africa
11:00 – 11:10	M&D presentation 4: Development of an automatic system for monitoring oriental fruit fly (<i>Bactrocera dorsalis</i>) in mango farms using deep-learning and Internet of Things	Faraja Luhanda, Nelson Mandela African Institution of Science and Technology
11:10 – 11:20	M&D presentation 5: Transmission Dynamics of Cryptosporidiosis in Cattle and Immunocompetent and Immunocompromised Humans	Florence Leo, Nelson Mandela African Institution of Science and Technology
11:20 – 11:45		Q&A and Coffee/Tea Break
Theme 5 - Sustainability and Environmental Management: Session Chair: Dr Judith Flora/ Prof. Roch H. Glitho		
11:45 – 12:00	Predicting Malaria Outbreak using Indigenous Knowledge and Fuzzy Cognitive Maps: A Case Study of Vhembe District in South Africa	Paulina Maingosinathi Phoobane, Walter Sisulu University, South Africa
12:00 – 12:15	Integration of IK, satellite imagery data, weather data and time series models in season behavior predictions. Case of Swayimane, KZN, South Africa.	John Makhetha Nyetanyane, Central University of Technology, Free State, South Africa
12:15 – 12:30	Feature Extraction Using Deep Learning Techniques to Identify Microplastics in Open Sewer Systems	Mvurya Mgala, Technical University of Mombasa
12:30 – 12:45	State-of-the-art review on recent trends in Automatic Speech Recognition	Abdou Karim Kandji, Gaston Berger University, Senegal
12:45–14:00		Q&A and Lunch
14:00- 14:30	Keynote Speech 4: Advancing African Urban Environments: Utilizing IoT, AI, and Design for Intelligent and Sustainable Cities [Dr. Celestine Iwendi], Session Chair: Dr A. Akanbi/ Prof B Awuzie	
Theme 4 (continuation): Health and Well-being Part II: Session Chair: Prof Muthoni Masinde		
14:30– 14:45	Predictive Analytics for Retention in Care and Antiretroviral Treatment Adherence using Supervised Learning – A Case Study of County Health Facilities in Kenya	Geoffrey Sagwe Ombui, University of Nairobi, Kenya
14:45– 15:00	Health Information Systems Challenges - A Review of Literature	Hosea Chumba, Technical University of Kenya
15:00–15:30	Announcement of Best Paper Award Winners and Conference Closure	