



KNUST
Kwame Nkrumah
University of Science
and Technology, Kumasi



RESPONSIBLE
ARTIFICIAL
INTELLIGENCE
LAB



PAN-AFRICAN AI & SMART SYSTEMS CONFERENCE'25



FOURTH PAN-AFRICAN ARTIFICIAL INTELLIGENCE
AND SMART SYSTEMS CONFERENCE (PA-AISS 2025)



15TH-17TH OCTOBER, 2025



IDL CONFERENCE CENTRE, KNUST

FOURTH PAN-AFRICAN ARTIFICIAL INTELLIGENCE AND SMART SYSTEMS CONFERENCE (PA-AISS 2025)

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KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY (KNUST), KUMASI, GHANA

CONFERENCE PROGRAMMES

Day 1: Wednesday October 15 (GMT)	
08:45 – 09:00	Conference Logistics
09:00 – 10:00	OPENING CEREMONY - Prof Jerry John Kponyo, Conference Chair & PI / Scientific Director of RAIL - Prof. (Mrs.) Rita Akosua Dickson, Vice Chancellor of KNUST - Prof Thomas Ndousse-Fetter, Imhotep Geostrategic Innovations, USA
GROUP PHOTOGRAPH WITH DIGNITARIES	
10:00 – 11:00	Keynote Address 1 Integrating AI and Smart Sensors Towards Ubiquitous Healthcare Prof. Jamal Deen Distinguished University Professor, Electrical and Computer Engineering, McMaster University, Canada
11:00 – 11:50	Break

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	<p>Session 1: Applications of AI and Smart IoT</p> <p>Session Chair: <i>Jules M. Moualeu</i></p>	<p>Session 2: AI Ethics, Regulatory and Responsible Usage</p> <p>Session Chair: <i>Ahmed Dooguy Kora</i></p>	<p>Session 3: Artificial Intelligence: Theory and Foundations</p> <p>Session Chair: <i>Kwame Opuni-Boachie Obour Agyekum</i></p>
11:50 – 12:10	<p>S011: Multi-Stream Attention-Enhanced Deep Learning Framework for Cocoa Leaf Disease Detection and Classification in Ghana</p> <p><i>Tamimu Mohammed Gadafi, Liang Decui, Ansu Badjie and Toufic Seini</i></p>	<p>S021: AI Over-reliance and Cognitive Decline: Evidence from Higher Education Students</p> <p><i>Fakhroddin Noorbebahani and Kiemute Oyibo</i></p>	<p>S031: Improving Speech Recognition for Ghanaian Accents Using Transformer-Based Accent Classification</p> <p><i>Amina Salifu, Henry Nunoo-Mensah Nunoo-Mensah, Eric Tutu Tchao, Albert Dede, Lukman Kunveng, Francisca Adoma Acheampong, Matthew Cobbinah, Julius Adinkrah, Shafic Issahaku, Andrew Selasi Agbemenu and Jerry Jerry Kponyo</i></p>
12:15 – 12:35	<p>S012: A Comprehensive Overview of Edge Intelligence and the Internet of Medical Things in Healthcare for Real-time Monitoring Systems</p> <p><i>Fatimata Watt and Ibrahima Niang</i></p>	<p>S022: Large Language Models for Digital Health and Data Analytics in Low- and Middle-Income Countries: Practical Considerations</p> <p><i>Joel Herve Mboussam Emati, Hedgar Plessy Mboussam, Mounirah Djam-Doudou and Vianney Kengne Tchendji</i></p>	<p>S032: Answer Set Programming for the Median Facility Location Problem: A Constraint-Based Optimization Approach</p> <p><i>Babatunde Akinkunmi, Emmanuel Mgbeahuruike, Adesoji Adegbola, Babajide Adeoti, Sunday Oladipo and Emmanuel Oyerinde</i></p>
12:40 – 13:00	<p>S013: Smart Interpretable Dietary Recommender Model for Vulnerable Populations</p> <p><i>Zvinodashe Revesai and Okuthe P. Kogeda</i></p>	<p>S023: Advancing Responsible Artificial Intelligence Ecosystems in African Higher Education Institutions: A Roadmap for Inclusive Growth and Sustainable Development</p> <p><i>Prince Dawson Tetteh, Juliet Arthur and Dickson Marfo Fosu</i></p>	<p>S033: Error Analysis in Transformer Models for Relation Extraction from Texts: Challenges in Embedding Integration and Ambiguity Resolution</p> <p><i>Tsitsi Zengeya, Jean Vincent Fonou Dombeu and Mandlenkosi Gwetu</i></p>
13:00 – 14:30	Lunch Break		

Day 1: Wednesday October 15 (GMT)

14:30 – 15:30	<p>Keynote Address 2 Building AI for Social Good in the Age of Generative AI</p> <p>Dr. Joyce Nabende Nakatumba Senior Lecturer, Department of Computer Science, Makerere University, Uganda.</p>		
15:30 – 16:00	Break		
	<p>Session 4: Applications of AI and Smart IoT Session Chair: Andrew Selasi Agbemenu</p>	<p>Session 5: Smart Infrastructure and Intelligent Engineered Systems Session Chair : Jean Vincent Fonou Dombeu</p>	<p>Session 6: Artificial Intelligence: Theory and Foundations Session Chair : Edgar Jembere,</p>
16:05 – 16:25	<p>S041: Using AI to Automate Mnemonics Generation and Evaluation in Education: A Scoping Review</p> <p><i>Kiemute Oyibo</i></p>	<p>S051: Hybrid Indexing Strategies for Query Optimization in ROLAP Systems: A Performance Evaluation of Composite, Bitmap, and Zone Map Indexing.</p> <p><i>Charles Roland Haruna, Sandro Kwame Amofa, Maame Gyamfua Asante-Mensah and Stephen Julius Atsu</i></p>	<p>S061: Legal Text Clustering with Bidirectional Gated Recurrent Unit and GloVe Embedding Vectors using Spectral Clustering Algorithm: An Unsupervised Approach</p> <p><i>Tinashe Crispin Garidzira and William Tichaona Vambe</i></p>
16:30 – 16:50	<p>S042: IoT Systems Security Enhanced Based on Federated Learning and Blockchain Technology</p> <p><i>Manegawindin Léonard Sawadogo, Didier Bassole and Boureima Zerbo</i></p>	<p>S052: AV-Assisted Reconfigurable Intelligent Surface Sum Rate Optimization in Beyond 5G Communication Systems: A Machine Learning Perspective</p> <p><i>Peter Djakwah, William Mawuli Ahado, Andrew Essah Owiredu Annor, Aminatu Amadu, Akua Achiaa, Clarence Abraham Mensah, Justice Owusu Agyemang and James Dzisi Gadze</i></p>	<p>S062: The integration of traditional and AI-based approaches in mental healthcare</p> <p><i>Zahraa Vally, Patrick Ndayizigamiye, Tebogo Bokaba, Kudakwashe Maguraushe and Efosa C. Idemudia</i></p>
16:55 – 17:15	<p>S043: Fed-IDSRA: A Resource-Aware Federated Learning Framework for Collaborative Intrusion Detection in Heterogeneous IoT Networks</p> <p><i>Ayobami Mesioye, Olabisi Josh-Falade, John Tadema and Johnson Oluwabemi</i></p>	<p>S053: Machine Learning-Driven Rainfall Forecasting Model for Sustainable and Adaptive Infrastructure Planning</p> <p><i>Hasan Ahamed Alif</i></p>	<p>S063: A Scoping Review of Genetic Algorithms in Serious Games: Applications, Challenges, and Future Directions</p> <p><i>Vrushank Vaghani, Mohammed Abdulmawjood and Kiemute Oyibo</i></p>

Day 2: Thursday October 16 (GMT)

09:00 – 10:00	<p>Keynote Address 3 Deep Neural Networks for Cyber-Physical-Social Intelligence</p> <p>Professor Xiaokang Zhou Associate Professor Faculty of Business Data Science Kansai University Osaka, Japan</p>		
10:00 – 10:20	Break		
	<p>Session 7: Applications of AI and Smart IoT Session Chair: <i>Dr. Emmanuel Ahene</i></p>	<p>Session 8: AI and Medicine Session Chair: <i>Dr. Francisca Adoma Acheampong</i></p>	<p>Session 9: Artificial Intelligence and Applications Session Chair: <i>Sylvester B. Aboagye</i></p>
10:25 – 10:45	<p>S071: Physics informed Transformer-VAE for biophysical parameter estimation: PROSAIL model inversion in Sentinel-2 imagery</p> <p><i>Prince Mensah and Pelumi Aderinto</i></p>	<p>S081: Optimising Classifier-Based Synthetic Data Generation for Lung Cancer Prediction</p> <p><i>Ndivho Tshivhula, Tsholofelo Mokheleli, Tebogo Bokaba and Patrick Ndayizigamiye</i></p>	<p>S091: Real-Time IIoT Data Integrity via Zero-Knowledge Proofs and Signature Aggregation</p> <p><i>Benedict Appati, Abdul Samed Seidu, Nicholas Korblah Tali, Justice Owusu Agyemang and Kwame O. Obour Agyekum</i></p>
10:50 – 11:10	<p>S072: A Comparative Analysis of Leading AI Chatbots: Benchmarking ChatGPT, DeepSeek, Gemini, Grok, and Claude AI</p> <p><i>Elie Ngomseu Mambou and Ebenezer Esenogho</i></p>	<p>S082: A Novel GPT-2-Based Large Language Model for Expert-Level Radiology Report Generation from 3D Computed Tomography Images</p> <p><i>Pelumi Aderinto and Mehrdad Ghaziasgar</i></p>	<p>S092: Generating Word Embeddings for Sesotho</p> <p><i>Refuoe Mokhosi and Tumelo Pii</i></p>
11:15 – 11:35	<p>S073: Proposal and Implementation of a Water Quality Monitoring System Based on IoT and Deep Learning</p> <p><i>Damien Diop, Massa Ndong, Idy Diop, Nouhou Diaby and Alassane Bah</i></p>	<p>S083: Modeling, early detection, and diagnosis of black skin tumors based on artificial intelligence: a systematic review</p> <p><i>Monique Sene, Moustapha Mbaye and Idy Diop</i></p>	<p>S093: Temperature-Based Renewable Energy Forecasting: A Big Data Analysis for Sustainable Energy Planning in Bangladesh</p> <p><i>Hasan Ahamed Alif</i></p>

Day 2: Thursday October 16 (GMT)

11:40 – 12:00	<p>S074: A RAKEL-Based Approach for Multi-Label Classification in Vehicle Damage Detection</p> <p><i>Rasidatou Nabi, Zakaria Cheick Oumar Keita, Yaya Traore and Hamandé Koursangama</i></p>	<p>S084: Image-Wise CNN Ensemble for Brain Tumor MRI Classification</p> <p><i>Oscar Vianney Eone Etoua and Hippolyte Michel Tapamo Kenfack</i></p>	<p>S094: Preserving Cultural Heritage through Privacy-Aware Generative AI: A Split Learning GAN Approach for Image Restoration</p> <p><i>Benjamin Oleko, Auguste Muhau and Bigomokero Antoine Bagula</i></p>
12:00 – 14:00	Break		
14:00 – 15:30	<p>Discussion Panel 1</p> <p>Algorithmic Authority vs. Human Oversight: Who Should Make the Final Call?</p> <p>Dr. Topside E. Mathonsi, Associate Professor and HoD, Tshwane University of Technology, South Africa. Dr. Bruce W. Watson, Professor, National Security Centre of Excellence, South Africa Dr. Deon du Plessis, Associate Professor, University of Johannesburg, South Africa. Dr. Nobubele Shozi, Data Stewardship Manager, Council of Scientific and Industrial Research (CSIR), South Africa. Ms. Thulani Mashiane, InfoSec GRC Specialist (acting CISO), CSIR, South Africa Mr. Lethogonolo Makhoane, IT Security Analyst, First National Bank (FNB), South Africa.</p>		
15:30 – 16:00	Break		
16:00 – 17:30	<p>Panel Discussion 2</p> <p>Strategies and Tools to Enhance Research Productivity and Career Development</p> <p>Dr. Paul Kogeda, Associate Professor , University of KwaZulu Natal, South Africa Dr. Thomas Ndousse, Program Director, Office of Science, DOE, USA (retired) Dr. Isaac Wougang, Professor , Toronto Metropolitan University, CA Dr. Jules-Raymond Tapamo, Professor , School of Engineering, University of KwaZulu-Natal, South Africa</p>		

Day 3: Friday October 17 (GMT)

09:00 – 10:00	<p>Keynote Address 4 Beyond Black Boxes: Building Transparent, Reliable, and Locally-Relevant AI for Africa</p> <p>Prof. Tegawendé F. Bissyande, Associate professor/Chief scientist 2, TruX, University of Luxembourg</p>		
10:00- 10:30	Break		
	<p>Session 10: AI Ethics, Regulatory and Responsible Usage</p> <p>Session Chair: <i>Samuel Kojo Kwofie</i></p>	<p>Session 11: Applications of AI and Smart IoT</p> <p>Session Chair: <i>Olutayo O. Oyerinde</i></p>	<p>Session 12: Artificial Intelligence and Applications</p> <p>Session Chair: <i>Kwasi Adu-Boahen Opere</i></p>
10:30 – 10:50	<p>S101: Towards Equitable AI for Healthcare in Africa: Why Representative Data Matter</p> <p><i>Stanley Abhadiomhen and Kiemute Oyibo</i></p>	<p>S111: SpreadSentinel: A Forward-Chaining Approach to Early and Adaptive DDoS Mitigation</p> <p><i>Delwende. D. Arthur Sawadogo, Abdoul Rahim Kone, Zakaria Sawadogo, Didier Bassole, Roland Kalmogo and Gouayon Koala</i></p>	<p>S121: Towards accessible and interactive science education in Senegal</p> <p><i>Ousmane Ndiaye, Fatoumata Baldé and Adrien Basse</i></p>
10:55 - 11:15	<p>S102: Positioning AI to Transform Healthcare in Africa: Advocating a Strategic and Persuasive Technology-Centric Approach</p> <p><i>Mensah Mark Atta and Oyibo Kiemute</i></p>	<p>S112: Few-Shot Learning for Teaching Support in Rare Educational Scenarios and Special Needs Instruction</p> <p><i>Deborah Olaniyan, Serestina Viriri, Julius Olaniyan, Samson Akinpelu and Adesola Thanni</i></p>	<p>S122: Application of Unsupervised Machine Learning Models for Detecting Anomalous Healthcare Insurance Claims</p> <p><i>Bridget Rusere, Elliot Mbunge and John Batani</i></p>
11:20 – 11:40	<p>S103: Scaling Successful AI Initiatives Across African Higher Education</p> <p><i>Dickson Marfo Fosu, Musah Ibrahim Ali, Juliet Arthur, Prince Tetteh Dawson and Jerry John Kponyo</i></p>	<p>S113: Ensemble Learning Framework with Synthetic Data Expansion for Bovine Disease Prediction from Structured Symptomatology</p> <p><i>Julius Olaniyan, Samson Akinpelu, Serestina Viriri and Deborah Olaniyan</i></p>	<p>S123: FedDAFL-lite: A Federated Lightweight Machine Learning Model for Embedded AI in the Global South</p> <p><i>Bigomokero Antoine Bagula, Nathan Mbayo and Ferdinand Kahenga</i></p>
11:40 – 14:00	Break		

Day 3: Friday October 17

14:00 – 15:00	<p>Keynote Address 5 Cyber-Physical-Social Intelligence</p> <p>Professor Laurence T. Yang Professor, School of Computer Science and Artificial Intelligence Zhengzhou University, No.100 Kexue Avenue, Zhengzhou, Henan, China</p>		
15:00- 15:30	Break		
	<p>Session 13: AI and Medicine</p> <p>Session Chair: <i>Mandla Victor Gwetu</i></p>	<p>Session 14: AI and applications</p> <p>Session Chair: <i>Okuthe Paul Kogeda</i></p>	<p>Session 15: Optimization</p> <p>Session Chair: <i>Clement Nyieranda</i></p>
15:30 – 11:50	<p>S131: UNet Attention-based Encoding Model for Breast Cancer Segmentation</p> <p><i>Jelil Agbo-Ajala, Olufisayo Ekundayo, Lateef Akunyemi, Moulla Donatien, David Attipoe, Sree Tthotempudi and Ernest Mnkandla</i></p>	<p>S141: Chaos and Machine Learning in Cryptography: Dual Threats, Hybrid Defenses, and Post-Quantum Synergies</p> <p><i>Weston Govere and Jonathan Blackledge</i></p>	<p>S151: Moon Sighting Search Optimization Algorithm (MSSOA): A Review and Revolutionary Metaheuristic Method-based on Human Inspiration</p> <p><i>Lateef Akinyemi, Jelil Agbo-Ajala, Olufisayo Ekundayo, Moulla Donatien, David Attipoe, Ernest Mnkandla and Sree Thotempudi</i></p>
15:55 - 16:15	<p>S132: A Systematic Review of Artificial Intelligence Techniques for Early Detection of Uterine Fibroids</p> <p><i>Elliot Mbunge, Nombuso Chirwa and Stephen Fashoto</i></p>	<p>S142: A Machine Learning-based Routing Protocol for DTN-Assisted Flying Ad-Hoc Networks</p> <p><i>Jagdeep Singh, Sanjay Kumar Dhurandher, Isaac Woungang, Glaucio H.S. Carvalho and Periklis Chatzimisios</i></p>	<p>S152: Optimizing the Aol in RSMA Short Communication System Using Proximal Policy Optimization</p> <p><i>Simon Kaboyo, Majid H. Khoshafa, Telex M. N. Ngatched and Octavia A. Dobre</i></p>
16:15 – 16:30	Break		
16:30 – 17:00	Closing Remarks		



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