AASTU HPC-BDA Center: Advancing Cyber-Infrastructure for Data-to-Decision Transformation in Africa

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Abstract

High-Performance Computing (HPC) and Big Data Analytics (BDA) are rapidly transforming the global research and innovation landscape, enabling nations to turn massive data streams into actionable insights. While South Africa's Centre for High Performance Computing (CHPC) has demonstrated continental leadership, emerging ecosystems across Africa now have the opportunity to complement and expand this capacity. This presentation introduces the newly established HPC-BDA Centre at Addis Ababa Science and Technology University (AASTU), Ethiopia, as a strategic initiative designed to position Ethiopia as a regional knowledge hub.

The Center integrates state-of-the-art laboratories in Business Analytics, Cloud & HPC Systems, Bioinformatics, Computational Science, Agro-Informatics, Network & Cybersecurity, and Meteorological Modelling. Its dual-layer strategy links advanced cyber-infrastructure with thematic domains of national priority, agriculture, healthcare, climate resilience, and the digital economy. By embedding bioinformatics and genomics, the Center uniquely connects life sciences with data-driven decision systems, strengthening Africa's capacity for health security and food sustainability. Supported by the Information Network Security Administration (INSA), the Center also incorporates advanced cybersecurity and governance frameworks, ensuring ethical, secure, and policy-aligned use of HPC-BDA resources for both national and international collaboration.

The paper will highlight how this ecosystem fuels data-to-decision pipelines through advanced HPC workflows, robust partnerships, and alignment with Digital Ethiopia 2025 and the national Science, Technology, and Innovation (STI) policy framework. Furthermore, it will discuss the Center's regional role in fostering collaboration with continental cyber-infrastructure leaders, including CHPC and NICIS, towards a pan-African HPC-BDA network.

By demonstrating Ethiopia's novel model of integrating cyber-infrastructure, applied research, and innovation ecosystems, the AASTU HPC-BDA Center aspires to create a "Research Gravity Zone" in Africa, an engine attracting partnerships, funding, and global recognition while directly advancing the CHPC 2025 theme of *From Data to Decisions*.