

A Retrospective on South Africa's Student Cluster Competition and its Model for Inclusive HPC Outreach and Training (2012-2020)

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Johnston, Bryan J
Council for Scientific and Industrial Research (CSIR)
Meiring Naude Drive, Pretoria, 0184
Email: BJohnston@csir.co.za

The Centre for High Performance Computing (CHPC) is South Africa's national supercomputing facility. In 2012, it launched an outreach initiative to raise awareness of High-Performance Computing (HPC) among undergraduate students through the creation of the Student Cluster Competition (SCC). A national contest was designed to train and showcase student talent in a spirited, hands-on environment. The initial stage of the CHPC SCC saw twenty teams of four undergraduate students undergo an intensive week of HPC training, covering Linux fundamentals, cluster design, and system administration. Finalists from this selection round would then compete in a live challenge using HPC systems of their own design, with the top competitors selected to represent the CHPC at the International Student Cluster Competition hosted at the ISC High Performance conference in Germany. From its inception, the CHPC SCC has prioritised demographic diversity and equal opportunity, actively recruiting students from historically disadvantaged communities to ensure inclusive participation and representation. A rapid teaching framework was developed to address key knowledge gaps in HPC system design, administration, and optimisation: the empowerment of students with limited prior exposure in the field of HPC to excel. This approach has proven highly effective: South African teams ranked in the top three internationally for eight consecutive years, demonstrating the strength of the program. This paper presents the strategy and structure behind the CHPC SCC, detailing the training model, selection process, and evaluation methods used for both national and international rounds. It highlights how the initiative has evolved into a recognised platform for HPC education, enabling students to learn about HPC and become global contenders in the field.