

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG



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Big data under spotlight

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One of the biggest challenges for scientists this century will be to develop supercomputers that can process huge data output from big science projects such as the Square Kilometre Array.

To address this and other data questions, renowned world physicists and engineers will be attending the [2014 High-performance Signal and Data Processing workshop](#) to be held at Wits University from 27 to 31 January 2014.

They include Dr Peter Jenni, one of the “founding fathers” and former spokesperson of the ATLAS experiment at the CERN Large Hadron Collider in Switzerland that discovered the Higgs boson in 2012, and Dr Bernie Fanaroff, Wits alumni and Project Director of the Square Kilometre Array.

“There are supercomputers in the world, but they are essentially doing a lot of computation and are extremely expensive. We want to process big flows of data,” says Professor Bruce Mellado from the [High Energy Physics Group \(HEP\)](#) in the School of Physics at Wits University. Together with his colleagues in HEP and fellow workshop organisers, Dr Oana Boeriu and Dr Trevor Vickey, Mellado and his team is developing and building a [high-throughput supercomputer](#).

“Called the Massive Affordable Computing (MAC) project, HEP aims to use existing computer elements available on the market to build supercomputers that are cheap and energy efficient,” Mellado says.

Processing the vast quantities of data that the SKA will produce will require very high performance central supercomputers capable of 100 petaflops per second processing power. This is about 50 times more powerful than the current most powerful supercomputer and equivalent to the processing power of about one hundred million PCs. The technological challenges related to high-throughput data flows at the ATLAS detector today are common to those facing the SKA in the future.

With this workshop, themed [Challenges in Astro- and Particle Physics and Radio Astronomy Instrumentation](#), the organisers aim to bring together key people to discuss the grand challenges facing the signal processing community in Radio Astronomy, Gamma Ray Astronomy and Particle Physics. But, the development of high-throughput computers will also have a revolutionary impact on data processing in all fields of science - including the medical sciences, palaeosciences and engineering - and the organisers hope to attract delegates from those fields of study as well.

The workshop will also have plenary sessions for in-depth presentations and knowledge sharing between delegates will be in lecture format, as well as a classroom environment for hands-on hardware training. General overviews and in-depth presentations will be given.

Students and young researches are also welcome to deliver presentations and encouraged to submit abstracts. The [registration and abstract submission](#) are now open till 31 December 2013.

It is envisioned to publish a book of proceedings. Proceedings will be peer reviewed. The deadline for proceedings submission is 15 February 2014. The conference is co-presented by the SKA Africa, the University of Cape Town, the National Research Foundation/iThemba Labs, Stellenbosch University and CERN-SA.