SA readies for big data storm

BY ERNA VAN WYK

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South Africa is being hit by the "data tsunami" and the way in which the country positions itself in terms of big data infrastructure and policies, as well as hardware and software development, will determine our research capacity this century.

This is according to Dr Daniel Adams, Chief Director: Emerging Areas and Infrastructure, Department of Science and Technology (DST), who addressed the 2014 High-performance Signal and Data Processing workshop hosted by the School of Physics at Wits University in Johannesburg, South Africa, this week.

For the first time, representatives from two of the biggest science projects in the world – the Square Kilometre Array and the SA-CERN consortium, working on the Large Hadron Collider in Geneva, Switzerland – came together to share their knowledge and skills, and to discuss the challenges these projects present in dealing with big data.

"Data processing technologies should keep up with data production technologies," said Professor John Carter, Head of the Wits School of Physics. His colleague and workshop Co-chair, Professor Bruce Mellado from the School's High Energy Physics Group (HEP), said it had become a necessity for scientists in many fields to master the techniques of high-throughput signal and data processing.

"Science is becoming more complex and detailed. The amount of data now available and used to describe an object is growing very fast. It is now of strategic importance for the development and advancement of scientific research in South Africa that we develop our own electronics and computing architecture designs – to develop and build our own, affordable, supercomputers," Mellado said.

Dr Peter Jenni, one of the "founding fathers" and former spokesperson for the ATLAS experiment at the CERN Large Hadron Collider that discovered the Higgs boson in 2012, said: "We have built up an excellent collaboration with South African scientists and in particular with Wits. There is a common interest in the data produced in large radio astronomy facilities like the SKA, so it is exciting to share technical knowledge and challenges. It is also exciting from a science point of view, because the SKA and the Large Hadron Collider are both looking at the very fundamental questions in physics and there is synergy and motivation coming from the science itself." Listen to the audio clip.

Professor Justin Jonas, Associate Director of Science and Engineering (SKA South Africa), said big data was trending because of the applications from the development of hardware and software technologies that could be used in completely different areas of science and consumer electronics. Listen to the audio clip.

"It vindicates the South African government's policy of supporting fundamental science like astronomy and particle physics because these sciences do drive technology as well. It is not just to get pure science results out but when you are actually doing these experiments you have to use the very bleeding edge technologies that are available to you.

"It is excellent that we have now got together, between CERN and SKA, and together we will be able to push these technologies that much harder. These technologies have generic usage in other areas such as genome sequencing, in health sciences and others," Jonas said. Listen to the audio clip.

Dr Thomas Auf der Heyde, DST Deputy Director-General: Human Capital and Knowledge Systems said that science grows at the boundaries between different disciplines and sciences. "By bringing together these different disciplines and different institutional and technological platforms you are beginning to act on the understanding that we need to leverage investments we are making in South African science against each other as much as possible. We cannot pursue the development of any particular technology without leveraging investments in related technologies," he said. Listen to the audio clips here and here.

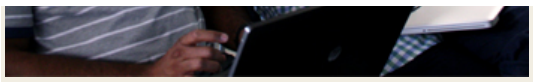
The workshop, themed: *Challenges in Astro- and Particle Physics and Radio Astronomy Instrumentation*, also consisted of more than 100 researchers in fields such as physics, astronomy, geosciences, anthropology, photonics, applied mathematics, electrical engineering and information technology – as well as graduate students and representatives from industry.

Highlighting the importance of big data workshops, research and development, Dr Daniel Adams (DST Chief Director: Emerging Areas and Infrastructure) said research infrastructure was central in the ecosystem for knowledge generation and investing in South Africa's cyber infrastructure was one of the key areas that needed to develop.

"It is important for us to be players in the big science projects. To have the infrastructure to manage and process the data but also to have the skills because the big data problem is not just about the infrastructure but also about the people who can manage the data," Adams added. Listen to the audio clip.

The workshop was jointly funded by SKA Africa and the University of the Witwatersrand and hosted in collaboration with the University of Cape Town, the National Research

Foundation/iThemba Labs, Stellenbosch University and SA-CERN.



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