

South Africa: SA Scientists Create Cheap Computers for Schools

By Ahmed Areff

A team of students and professors at the University of the Witwatersrand who are searching for the secrets of the universe, are also hoping to fundamentally change the educational system of the country with locally produced low-cost computers for pupils.

Professors and students with the university's High Energy Physics group, who are involved in dealing with "big data" from the European Organisation for Nuclear Research's (Cern) Large Hadron Collider (LHC), are also spearheading a project to create low cost PCs or tablets that could possibly be in the hands of each pupil in the country in the near future.

This work was being done in the physics department's new electronics lab.

"One of the big spin-offs of our work is the solution to the big data problem, which we deal with on a daily basis. We are creating this human capacity to solve complicated problems in software, hardware, electronics, computing and all that," Professor Bruce Mellado, who leads the university's involvement in the LHC, told News24.

He said this work helped to create "local solutions and local designs".

"The scope of our social impact is the high end devices for the big data problem, but we are also working with the Gauteng Department of Education to develop devices for schools in the Gauteng province, 2 100 schools, which will hopefully be extended to the rest of the country."

These devices could take the form of tablets or mini PCs.

"We realised that we had built up expertise with this high end work, and we could potentially leverage that expertise to create a low cost device."

Mellado said the ultimate target of the project was the entire educational system of SA, and that mission would be made easier with locally designed and manufactured devices.

"Someone could say I am producing something here, when [most of what they are using to built it] comes from China," he said.

"We are doing the whole thing. We are working with the local industry. We got a grant from the Technology Innovation Agency to start working with schools and produce the first devices here in South Africa.

"We are looking at finishing the pilot project by the end of the year."

He said the problem with what was happening in SA and other countries, was that while it was admirable to give pupils tablets, most of these devices were standard ones that came from "big companies".

"Do we even know that these tablets are appropriate, or tablets in that form are the appropriate tool for education? So we wanted to create devices that are geared toward learning and teaching, that are produced in South Africa."

He said SA would never come out of its "funk" unless it was industrialised, and this could not happen without the country developing its own ideas.

"If there is no fundamental science, there is no innovation. Our mission as physicists and engineers is not only to do our job, but to raise awareness that it is only through innovation... that we can turn around the country."

Mellado said people needed to know that it was the work of fundamental scientists that developed most inventions we used everyday, much like how Cern created the World Wide Web.

"The core of today's electronics... those properties were identified by physicists. A huge array of inventions came because we [scientists] had to do something complicated at the time."

He said SA in particular still lived in a "neo-colonial space".

"All of these big companies come with their very strong PR [public relations] and they tell you, 'you are too small, let us do it for you'. This is neo-colonialism.

"South Africa is a very interesting country in that it has a very strong academic infrastructure... it has amazing capabilities.

"This project... is supported by the university. That we will get funds for it from the government is a very good example that if you structure a project well and take into account the specifics of the country, you can achieve it."

Mellado said local media often spent time looking at technological developments "outside" of the country.

"They say, 'Oh what is Apple doing, what is this other company doing?'," he said.

"As a scientist that depresses me because if you see our lab, you see the youngsters and they are brilliant. It makes you think: 'What are they talking about - we can do this'."

Thomas Wrigley, a masters student in psychology is part of the team co-ordinating the creation of the devices.

"Thomas is studying the interaction between children and the devices.. so that these devices, if they are mini PCs or tablets, can help children engage in learning, especially in improving their mathematical skills," Mellado said.

Wrigley said work was being done on mini PCs, which are central processors a little larger than a deck of cards that can connect to a screen, laptops and eventually tablets.

"The strategy is you start with the simpler ones and then you build up. The tablet is probably the most complex," he said.

Wrigley said the "exact configuration" of the final device that would be rolled out was still being determined.

"When you look at the research, we don't know a lot about the impact of these devices on education."

He said the project would help bolster the economy by keeping more money inside the country, instead of sending it outside and it would also help to create jobs.

They both said the final device would be available commercially, however Mellado added: "I don't see that as having the same broad social impact as having every school in the country use the device."

Mellado said there were also big leaps being done in the big data aspect of the university's work on the LHC, which is the largest physics experiment in the world.

The collider, which lies between Switzerland and France, basically crashes together protons at speeds approaching the speed of light. Protons, together with neutrons and electrons make up atoms, are the building blocks of all matter in the universe.

Scientists have been studying the results of these collisions, and this had lead to the discovery of the Higgs Boson particle, and the Higgs field, which is responsible for matter gaining mass.

Mellado described the recent discovery at the LHC of the Higgs Boson as the "discovery of the century".

"We only know about 4% of the universe. This discovery is the key to understanding the rest."

He said the university expected to make a major announcement on its own discoveries very soon.

"We have found in the data accumulated so far, anomalies, and we are terribly excited about it. If these anomalies are confirmed, we are looking at a new discovery that is as important as that of the Higgs Boson," Mellado said.

"This will be a South African led discovery... Wits is certainly leading the understanding of that effort."

When asked what the nature of the anomalies implied, Mellado said: "In science you always have to be cautious about rushing to conclusions."

He said they think they knew what the anomalies were, but were busy developing the tools to extract those anomalies again in new data.

"By the end of 2015, we will be calling the press and announcing the discovery, or we will say we it looks like we are going to discover something soon."

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