

# SA students reign supreme at International Supercomputing Conference

The Centre for High Performance Computing (CHPC) has taken the top prize in the international Student Cluster Competition held at the International Supercomputing Conference (ISC) in Germany this week.



No newcomer in this competition, CHPC won the top prize in 2013 and 2014 and took second prize in 2015. This year the centre entered another team of undergraduate students and took the overall prize, beating 11 other contenders from across the globe.

## Other entrants included:

- Purdue University and University of Colorado, Boulder (USA)
- Nanyang Technological University (Singapore)
- National Energy Research Scientific Computing Center (USA)
- University of Science and Technology of China (China)
- University of Hamburg (Germany)
- Tsinghua University (China)
- University of Tartu (Estonia / USA)
- Boston Green Team (USA)
- Universitat Politècnica de Catalunya BarcelonaTech (Spain)
- Huazhong University of Science & Technology (China)
- Shanghai Jiao Tong University (China)

The awards ceremony took place on 22 June in front of ISC attendees from around the globe who met in Frankfurt to share the latest developments in high performance computing (HPC) and to witness student expertise in what is hoped to become the formation of a pipeline for future HPC experts. The international competition features small teams that compete to demonstrate the incredible capabilities of state-of-the-art high-performance cluster hardware and software.

In a real-time challenge, 12 teams of six undergraduate and/or high school students build a small cluster of their own design on the ISC exhibition floor and race to demonstrate the greatest performance across a series of benchmarks and applications.

## Winning team

Winning team members under the supervision of CHPC engineers, David Macleod and Matthew Cawood are:

- Andries Bingani – University of the Witwatersrand
- Ashley Naudé – Stellenbosch University
- Avraham Bank – University of the Witwatersrand
- Craig Bester – University of the Witwatersrand
- Sabeegah Ismail – University of the Witwatersrand
- Leanne Johnson – Stellenbosch University

Reserves:

- Kayla-Jade Butkow – University of the Witwatersrand
- Bakhekile Ndlovu – University of the Witwatersrand

The South African team is the only team that enters a brand new team each year. This is done to give as many students as possible exposure to the international HPC community. The international competition is a culmination of two rounds of national competition processes that CHPC starts every April with a call to students in all universities in the country.

The CHPC's ISC team was sponsored by Dell South Africa who provide the team with equipment, travel, accommodation, meals and training for the ISC competition. Mellanox sponsored the team's EDR Infiniband interconnect.

## Team selection

The competition begins with team selection, a process designed to impart critical knowledge for building a cluster. This includes: using Linux systems, the basic software stack of a cluster and considerations which should be taken into account when choosing hardware. Team selection concludes with each team presenting a theoretical design for a student cluster to a panel of judges. The results from the team selection project and applications are used to select the teams which will proceed to the CHPC Student Cluster Competition, a national competition.

## National CHPC Student Cluster Competition

In the CHPC Student Cluster Competition participants build small HPC clusters out of hardware provided by the CHPC and its industrial partners. The contest takes place on the exhibition floor at the CHPC National Meeting annually. The participants are given a selection of applications to optimise and run on their cluster to demonstrate their design's performance. Each team is assigned a budget of approximately R200,000 and a parts list from one of the CHPC's industry partners. With this budget and parts list, the team must design a cluster taking into consideration the set of applications which will be used to benchmark the cluster.

Once the cluster's design is finalised the hardware specification is submitted to the CHPC's partners for manufacturing. The hardware, as specified in the cluster design, is delivered to the exhibition floor of the CHPC National Meeting. Here the teams unpack their equipment, construct their cluster, install the software stack and perform benchmarks. The teams are judged on a combination of the performance of the applications and the design of the cluster.

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