

Making big data connections with RAS 200



Sue Bowler

reports on how an RAS 200 grant aims to link the world-class astronomical infrastructure taking shape in South Africa to the country's schools, society and future economy.

An RAS200 project called "Astronomical Big Data: from small and beautiful to big and overwhelming" will mark the 200th anniversary of the South African Astronomical Observatory (SAAO) as well as that of the RAS, with an exhibition at the Iziko Planetarium in Cape Town, and on tour, centred on the new observatories in South Africa. "We would love the public to be aware of what South Africa is contributing to science," said project leader Sivuyile Manxoyi of the SAAO, "as well as what the impact will be on our society and our economic development. We want to use the link to inspire young people to go into science and technology."

The project involves Manxoyi and Patricia Whitelock (SAAO), Julie Cleverdon (director of the Cape Town Science Centre), Matt Hoffman (Boyden Observatory in Bloemfontein), Russ Taylor and Lorenzo Raynard (SKA) and Phil Charles (University of Southampton). "200 years of astronomy in South Africa have left a lot of historical artefacts (plates and instruments) that represent what 'big data' meant in the 19th and early 20th centuries," says Charles. "Now, with the Southern African Large Telescope (SALT) in full operation, the completion of MeerKAT, part of the Square Kilometre Array (SKA), and with South Africa's involvement in the ultra-high-energy gamma-ray facility HESS (and its follow-on, the Cherenkov Telescope Array), the 21st-century version of big data really is going to be 'big and overwhelming!'"

The exhibition has four themes: astronomy as part of indigenous cultures; astrophotography, where Southern Africa has a rich heritage; the new observatories; and visualizing their enormous datasets and the new science that they make possible. "When you say astronomy, people think of work in Europe or the USA," says Manxoyi. "We want people to think of astronomy as happening in Africa too, and to consider the current developments in astronomy in South Africa on a continuum with their astronomical heritage."

Teaching the teachers

The team will also prepare materials for teachers and learners, using astronomy as a way into STEM subjects as part of a drive to boost science and technological education and support industry and business. There is already a precedent. "There used to be only two universities offering astronomy," says Manxoyi, "but since SALT started work, almost all our universities now offer astrophysics and astronomy." But most teachers have no training in astronomy, Manxoyi continues. "We want to empower teachers



The SAAO's McClean Telescope dates from 1898. (A Koeslag)

to use astronomy to teach maths and physics. We'll have teacher workshops, develop materials linked to the curriculum and help teachers find relevant practical activities using astronomy to inspire." They are also working with the IAU Office of Astronomy for Development to bring astrophysical concepts to visually impaired students.

In order to reach wider audiences across South Africa, the team knows that the science needs to go to where the people are. "It's a big challenge, in terms of public transport and security, for people to come to city centres," says Manxoyi. "We want to take our public lectures to different townships and town halls."

The new observatories taking shape in South Africa will bring a new world of multiwavelength astronomy – and new technical challenges from the large datasets. "We see this project as a prototype for data visualization on a grand scale," says Charles. "It's recognized that the SKA, and major surveys at other wavelengths (e.g. the Large Synoptic Survey Telescope), will provide new ways of looking at the universe, and require new ways of visualizing very large datasets. That's why the project has the involvement of South African members of the Inter-University Institute for Data Intensive Astronomy."

A goal of the project, and one of the ways in which it will bring a lasting legacy, is to strengthen the South African astronomy community. "This project offers us something we've never had before," says Manxoyi, "the opportunity to create a platform for collaboration to link professional scientists, amateur astronomers and science communicators. Combining our different experiences and expertise will make us all much more effective." ●

AUTHOR

Sue Bowler is editor of A&G and of A&G Forum.

MORE INFORMATION

Boyden Observatory <http://www.assabfn.co.za/friendsofboyden/index.htm>

Cape Town Science Centre <https://www.ctsc.org.za>

Iziko Planetarium <https://www.iziko.org.za/museums/planetarium>

RAS 200 <https://ras200.org>

SAAO <https://www.saa.ac.za>