Opening Remarks at the International Virtual Observatory Alliance (IVOA) Interoperability Meeting

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Prof Patricia Whitelock – Chair of the Session

Prof Christophe Arviset - the Chair of IVOA Executive
Prof Matthew Graham - the chair of the Technical Coordination Committee (TCG)
Distinguished guests
Ladies and gentlemen

On behalf of the National Research Foundation, I am delighted and honoured that South Africa is hosting the first IVO Interoperability meeting in Africa. Given the importance of both astronomy and data science to the continent, I am hopeful if not certain it will be the first of many such meetings.

We are particularly grateful to Mark Allen and his colleagues from the Strasbourg Astronomical Data Centre (CDS) who arrived in SA last week so that they could run a workshop for postgraduate students at the South African Astronomical Observatory.

South Africa as a middle income developing country, with its many social and economic challenges, has invested – rightly so – in the basic sciences, including serendipitous research. Astronomy currently receives the lion's share of this investment. In this regard, it is important that developing countries are not coerced into a cage of only investing in research to solve immediate problems.

It is as you would expect, important that the majority population of the country actively participates in and leads such endeavours. I thus note with appreciation that last week's workshop involved about 30 students from all over South Africa (UWC, UCT, NWU, UFS, UNISA, UKZN). It is particularly pleasing to know that more

than two thirds of these students are black South Africans. It is taking longer than it should to develop our home-grown talent, but it is good to see it happening at last.

If I were to be asked what is our most pressing priority at this juncture; I would state it must be to transform and make representative our science and technology system while going excellent scientific research.

In addition to my colleagues from the SKA Project, the SAAO, HartRAO, CSIR and our universities, I am pleased to note that Mr Kevin Govender, from the IAU Office of Astronomy for Development (OAD) is among the plenary speakers in your education session on Friday. As some of you know Kevin's achievements have recently been recognized with the award of the Edinburgh medal jointly to him and the IAU. This is a great honour for Kevin and for the NRF who, together with the IAU, support the OAD.

The only similar award of this medal to an individual and an organization was to Peter Higgs and CERN in 2011 in connection with the detection of the Higgs boson; a very tough act to follow! You will appreciate that Kevin's work, using astronomy as a tool to develop real skills in science and technology, is right at the heart of why South Africa has invested so heavily in astronomy.

The future of our country and our continent depends on our ability not simply to catch up in science and technology, but to move into the lead in chosen key fields where we have natural advantages by virtue of our geography, our organization and our skills. This of course includes palaeontology, biotechnology and of course astronomy where our clear skies and lack of pollution, industrial or electromagnetic, present us with special opportunities. We aim to make use of these by investing in our own projects as well as international projects such as SALT and SKA and thereby accelerate our development of vital technical skills.

Of the wide variety of skills that astronomy can help develop, those that you have are amongst the most important. Dealing with data, particularly big data, is a huge and growing challenge in science generally and the eyes of the world are on the astronomy community to see how you deal with the tsunami of data that will come from the Large Synoptic Survey Telescope (LSST) and the Square Kilometre Array (SKA).

I am informed that the focus of the IVOA is on “interoperability”; a requirement that will be increasingly important both within and outside of astronomy, (such as geo-spacial planning and health planning) as you deal with more complex datasets and the issues around truly Big Data. It is encouraging to see the breadth of interest and particularly the wide range of projects whose representatives will be participating in these discussions.

It is also particularly pleasing to note the international character of the IVOA activities are and that in addition to Europe and the USA there is major participation from Australia, China and of course South Africa. International collaboration can sometimes be complex and challenging, but it ultimately takes us further and makes many endeavours more rewarding.

Interoperability on the scale you are discussing is a truly global issue and I suspect other sciences as I alluded to earlier, have a great deal to learn from your successes. Needless to say, the SKA is touted as the ultimate producer of Big Data, but many of the other projects you are considering will provide stepping-stones for the SKA itself.

The South African Astro-informatics Alliance (SA cubed) is our own very youthful VO. It was started in 2013 and brings together those working on interoperability of optical and radio data in the National Research Facilities of the NRF, the SA SKA project and our universities. Its management committee is chaired by Lindsay Magnus from the SA SKA project.

Given our limited resources it is essential that the astronomy community harnesses the power of partnerships to enable us to work effectively whether locally or in the international arena. You will be interested to know that the SALT Virtual Observatory Data Archive Service (SALT VODAS) has been available since 2013 and that MeerKAT will deliver data using VO protocols. The VO also offers us a special opportunity to introduce astronomy at our universities currently not offering it as well as sister organisations on the Continent, especially as it provides knowledge and skills on statistics and data handling that go beyond astronomy.

Given our significant investment in Astronomy, the South African Government, through the Department of Science and Technology has developed a National Strategy for Multi-Wavelengh Astronomy. We are as a consequence and for other reasons very interested in multi-wavelenth interoperability and I am particularly pleased that we will be supporting some South African PIs to use the Large Synoptic Survey Telescope (LSST), because matching the data from this with those from the SKA will be a very exciting route to new discovery.

In SA and indeed on the rest of the African Continent we are keen to offer our young people opportunities to participate in the excitement of exploration science at the frontiers of discovery. This way we can retain, or attract home, the best of our young minds. But we have limited resources and cannot participate in everything that is going on, so our efforts go into those things where we have a strategic advantage by virtue of our geography.

Astronomy is one the most important of these and has led to our involvement in the HESS gamma-ray telescope in Namibia and our construction of the Southern African Large Telescope (SALT), now producing the most cost effective research of any large telescope in the word. As you know we are constructing the MeerKAT radio telescope as a pathfinder for SKA which we will co-host with Australia. Your deliberations are going to be crucial in ensuring the success of these tremendous projects.

As previously indicted, South Africa's investment in astronomy is significant by any standards and we expect the local community that benefits from this to do a great deal in return. I have already mentioned the importance of participating in frontier science, but science more generally and astronomy in particular must also impact on national development, in particular help the country respond to the national challenges of job-creation, health, education and eradication of poverty and inequality.

In this regard, Astronomy of course is known to attract people into science and technology and to provide a wonderful tool for education. The data scientists in the audience may be getting the upper hand though. We are told (by Johnathan Goldman https://hbr.org/2012/10/data-scientist-the-sexiest-job-of-the-21st-century/) that *Data Science is sexiest job in the 21st century*. There is already a shortage of people internationally with the kind of skills that most of you have and take for granted. The numbers are insufficient for business and industry, not just for research.

So it is gratifying to see courses being developed to train people in this area that are very closely linked to astronomy, but not exclusive to that field – such as the degree in Data Science from our newest university, Sol Plaatjie University in the Northern Cape – the same province where SALT and MeerKAT are located.

It is also good to see the collaborations forming, such as the Inter-University Institute for Data-Intensive Astronomy (IDIA), which brings people together across several universities and national facilities, and whose founder, Russ Taylor, will be speaking at your plenary focus sessions. We need more of these types of initiatives founded in SA with strong international links so that young Black South Africans in particular can realize their potential and play the role they should in the very exciting projects that you will be discussing this week.

You have a tremendous challenge ahead and I wish you all of the very best in dealing with it.

I thank you