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monthly notes of the astronomical society of southern africa

Volume 74 Nos 11 & 12 **December 2015**

CONTENTS

News Notes 249
Administration of Astronomy in South Africa 249
SA-Dutch SKA data science partnership seeks to address big data conundrum 251
Number of SA Astronomy Researchers 256
Southern African Fireball Observations: 2014-15 266
Finding the Blaauwberg Meridian Marker: Expedition 5 December 2015. 272
ASSA AGM 2015/16 MINUTES 275
ASSA Council and Appointees 2015/16 278
ASSET 2014 283
(A) Annual report 2015- ASSA Shallow Sky Observing Section 283
(B) Deep Sky Report to the AGM, 2014–2015 286
(C) Spectroscopy and Photometry Report 290
(D) Cosmology Section 2014 Annual Report 292
(E) Historical Section Annual Report 293
(G) Astrophotography Section Report - 2014/15 295
(H) Instrumentation Section Report 2014-15 297
Observing Section Report 2014 – 2015 298
Colloquia and Seminars 300
Sky Delights: Auriga the Coach Driver 305
On the Bookshelf 312
INDEX 2015 313

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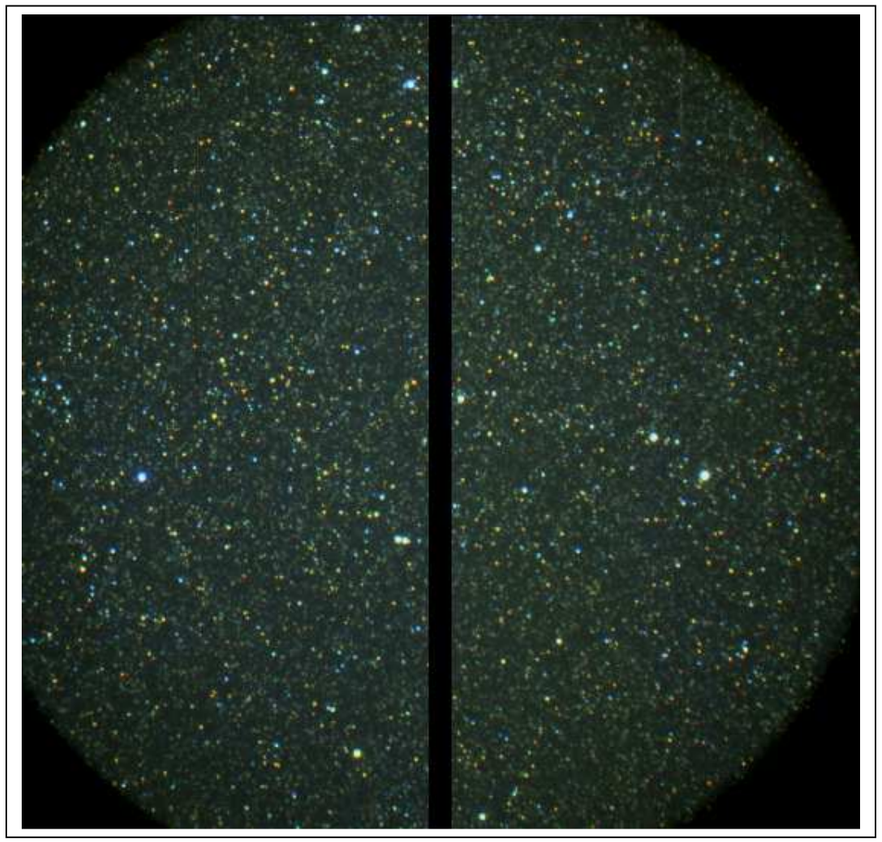
Volume 74 Nos 11 & 12 December 2015



In this issue

News Notes – Number of Research Astronomers in SA
Fireball Observations- Blaauwberg Meridian Marker
AGM – Colloquia and Seminars – Sky Delights

Cover picture: While observing dwarf novae in the Large Magellanic Cloud, Petri Vaisanen and Fred Marang captured a set of images through 3 of the Sloan filters (u, g & r). Combining these has produced one of SALT's most beautiful colour-composite images to date. The combination of 1 arcsec seeing and a freshly stacked primary shows what the telescope's capable of under good conditions. The late Darragh O'Donoghue would have been proud of the image quality!

The **Astronomical Society of Southern Africa** (ASSA) was formed in 1922 by the amalgamation of the Cape Astronomical Association (founded 1912) and the Johannesburg Astronomical Association (founded 1918). It is a body consisting of both amateur and professional astronomers.

Publications: The Society publishes its electronic journal, the *Monthly Notes of the Astronomical Society of Southern Africa (MNASSA)* bi-monthly as well as the annual *Sky Guide Africa South.*

Membership: Membership of the Society is open to all. Potential members should consult the Society's web page assa.saao.org.za for details. Joining is possible via one of the local Centres or as a Country Member.

Local Centres: Local Centres of the Society exist at Bloemfontein, Cape Town, Durban, Harare, Hermanus, Johannesburg, Pretoria and Sedgefield district (Garden Route Centre). Membership of any of these Centres automatically confers membership of the Society.

Sky & Telescope: Members may subscribe to Sky & Telescope at a significant discount (proof of membership is required). Please contact the Membership Secretary for details.

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Vol 74 Nos 11 & 12 December 2015

News Notes

Administration of Astronomy in South Africa

The National Research Foundation announced on 31 July that Prof Nithaya Chetty has been appointed as Deputy Chief Executive of the National Research Foundation for Astronomy with effect from 1 October 2014. As such, he will be responsible for coordinating the national strategy for astronomy. This will include supervision of the astronomy national facilities and the SKA-SA Project, developing synergies between the various astronomy departments, the astronomical facilities and the community at large, promoting public awareness and liaising with international partners,

Prof Chetty is currently a Professor of Physics at the University of Pretoria and has been seconded on a part-time basis to the NRF as Group Executive for Astronomy since 2011 (see *MNASSA* **70**, pp125-6, 2011). He is well-known in the physics community as a computational and solid state physicist and has been the recipient of several prestigious awards. Inter alia, he has served as the President of the Institute of Physics.

Last year, an Astronomy Advisory Council was set up to provide advice to the Astronomy sub-Agency of the NRF. Its membership, following their appointment by the NRF based on the nominations put forward by the South African astronomical community, is as follows:

R Kraan-Korteweg (Chair)
S Colafrancesco
R Davé
D Davidson
T Medupe
G Miley
K Moodley
B Peng
M Phakeng
F van Niekerk

Ex officio:

N Chetty (NRF; nithaya.chetty@nrf.ac.za)
B Fanaroff (SKA)
T Williams (SAAO)
M Gaylard (HartRAO) (unfortunately now deceased)
V Munsami (DST)

Y Manjoo (Secretariat; NRF)

Meanwhile, Dr Albert van Jaarsvelt, who had been re-appointed as CEO of the NRF on 17 July 2014 for a second five-year term, announced suddenly on 14 August that he will be leaving to become Vice-Chancellor of the University of Kwa-Zulu Natal.

He will be remembered by SAAO as having had to apologize to Prof Phil Charles for his unjust suspension in 2010 (see *MNASSA* **69**, 48-54, 201; **69**, 114, 2010).

HISTORICAL
Comet Chaser (Guy Ellis) 30
Amateur Optical Tracking in SA during 1957-2014 Part 6 (G Roberts) 34
Amateur Optical Tracking in SA during 1957-2014 Part 7 (G Roberts) 73
The Franklin-Adams Telescope (IS Glass) 127
The Moonwatch Programme – Part 8 (G Roberts) 163
The Magnetic Observatory Buildings at the Royal Observatory Cape (IS Glass) 204
Moonwatch Part 9 (G Roberts) 213

SKY DELIGHTS (M Streicher)
Crater, a Cup full of Stars 43
The Sailing Ark (Puppis) 98
The Slave Driver (Boötes) 148
Another Cross (Cygnus) 243
Auriga the Coach Driver 305

INSTRUMENTATION
Galileo's Finger (B Ardagh & K Crankshaw) 172

BOOK REVIEWS
Introduction to Astronomy for South Central Africa, [Mesu/Mussell]/Podmore (L Labuschagne) 49
The Royal Observatory at the Cape of Good Hope, [IS Glass], (M Soltynski) 236
The Cosmos: astronomy in the New Millenium [Pasachoff, Filippenko], (L Labuschagne) 240

COLLOQUIA AND SEMINARS 88, 136, 177, 223, 300

ON THE BOOKSHELF 234, 312

Authors

Ardagh, B & Crankshaw, K 172
Cooper, TP 266
Ellis, George 15
Ellis, Guy 30
Foster, E 272
Glass, IS 127, 256
Labuschagne, L 5, 49, 60, 240
Loaring, N 110, 155
Rijsdijk, C. 196
Roberts, G 34, 73, 120, 163,213
Silk, J 15
Slotegraaf, A 65
Soltynski, M 236
Streicher, M 43, 98, 148, 186, 243, 305
Van Staden, A 22
Whitelock, P & Crause, L 16

SA-Dutch SKA data science partnership seeks to address big data conundrum

The visit to South Africa by Netherlands Prime Minister Mark Rutte included a pivotal South African-Dutch data science partnership between key institutions from both countries bringing us closer to understanding the volume of data generated by the Square Kilometre Array (SKA), which was signed on Tuesday, 17 November 2015.

This signals the unlocking of the hidden secrets in the immense amount of data generated by SKA - the world's biggest radio telescope. The agreement is part of the visit to South Africa by the Prime Minister of the Netherlands, Mr Mark Rutte, and his trade delegation of 75 companies.

SKA South Africa and the University of Cape Town, through the newly established Inter-University Institute for Data Intensive Astronomy (IDIA), signed a Memorandum of Understanding (MoU) with fellow research institutions in the Netherlands, IBM and ASTRON, to collaborate in a ground-breaking research project entitled Precursor Regional Science Data Centres for the SKA (SKA-RSDC).

The MoU was celebrated as part of 'House of the Future' – a programme of workshops, seminars, presentations and round tables with South African and Dutch stakeholders, that took place from 16 to 20 November 2015 in Turbine Hall, Johannesburg.

The South Africa-Dutch agreement on data science aims to establish national and regional data centres – to tackle one of the most significant challenges presented by the SKA: how to manage, process, and make accessible the immense amount of data the telescope will generate.

The data centres will provide astronomers around the world with access to the large-scale data infrastructures and associated high performance computing (HPC) needed to make sense of the data.

"We assume that there will be at least two astronomy-focused sites, one each in South Africa and Netherlands," says Professor Russ Taylor, IDIA founding director and joint University of Cape Town/University of the Western Cape SKA Research Chair.

"The initial focus of the centres will be to service the current and future data archiving, distribution and science exploration needs of the MeerKAT and LOFAR radio telescopes in SA and the Netherlands, respectively. The activity, combining both operational and research components, is an important step on the path towards being able to efficiently extract major science value from the massive astronomical datasets which will be collected by the SKA," says Dr Jasper Horrell, General Manager: Science Computing and Innovation at SKA South Africa.

The techniques developed can, in turn, be applied in other fields such as big data analytics, high performance computing, green computing, and visualisation analytics.

The Data Challenge for SKA

SKA (Square Kilometre Array) will be the world's largest radio telescope – a hundred times bigger than any current radio telescope; it will revolutionise our understanding of the Universe. SKA will be built in two phases – SKA1 and SKA2 – starting in 2018. SKA 1 will include two instruments – SKA1 MID (to be built in South Africa) and SKA1 LOW (to be built in Australia); they will observe the Universe at different frequencies.

As astronomy has developed it has become increasingly clear that the old ways of working with data no longer apply. Precursors to SKA (telescopes on one of the two SKA sites) and Pathfinders (SKA-related technology, science and operations activities) have ushered in an era of data-intensive astronomy. One such Pathfinder – LOFAR (the Low Frequency Array telescope built by ASTRON, the Netherlands Institute for Radio Astronomy) has a data collection exceeding 20 petabytes. As a frame of reference, it would take about 2 000 years to play only one petabyte of average-length MP3-encoded songs.

Index *MNASSA* Vol 74 (2015)

General

ASSA NEWS
Scholarships 1
Membership Secretary 53
New Members 53
Scholarships 109
AGM Minutes and Section Reports.2016/16 275

NEWS NOTES
The star that narrowly missed the Earth 2
SAAO donates 0.5-m and 0.75m telescopes 3
Hydrogen Epoch of Reionization Array (HERA; L Labuschagne)) 5
Possible Ring System found around a minor planet 53
Discovery of a new luminous blue variable star 55
First SA Comet Discovery in 35 years 57
Hubble Space Telescope is 25
Pluto's atmosphere: What occultations reveal prior to New Horizons' Arrival (L Labuscagne) 60
Centenary of Discovery of Proxima Centauri 63
Darragh O'Donoghue (death of) 110
Sutherland High-speed optical camers (SHOC; N Loaring) 110
The SALT Science Conference 2015 115
Tracking Secret Satellite (G Roberts) 120
Prof Michael Feast honoured 153
The SALT Science Conference (N Loaring) 155
South African Large Telescope reveals too large a black hole 193
A Stellar Highway (C Rijsdijk) 196
Administration of Astronomy in SA 249
SA-Dutch SKA Science Partnership 251

OBITUARIES
Prof Eddie Baart 10
Darragh O'Donoghue 1957-2015) 160 (P Whitelock, L Crause)
ESO Astronomer Alfonse Florsch (Zeekoegat) 195

ARTICLES
Scientific Method: Defend the integrity of physics (G Ellis & J Silk) 15
Outburst of the Binary System PSR J1723-2837 (A van Staden) 22
DSLT Photometry, How many darks? A Slotegraaf 65
A Meeting to Remember (Webb Society, Cambridge) M Streicher 186
Number of SA Astronomy Researchers (IS Glass) 256
SA Fireball Observations 2014-2015 (TP Cooper) 266
Finding the Blaauwberg Meridian Marker (E Foster) 272

On the Bookshelf

The aim here to try to get readers to share their experience of “good reads” of popular science writing by some of the world’s leading scientists. These are not reviews, just comments and pointers to enjoyable and informative writing.

1 Our Cosmic Habitat

Professor Sir Martin Rees is the current Astronomer Royal and is also the Royal Society Research Professor at Cambridge University. Not only is he fine cosmologist, having made significant contributions to our understanding of black holes, galaxy formation and high-energy astrophysics, but also an extremely good science communicator, having written several popular science books. Our Cosmic Habitat is another and a great read. He lucidly explains the limits of our present knowledge of extra-terrestrial life, the Big Bang, multiverses and many other topical issues. Definitely worth having on your bookshelf, or your tablet as an e-Book!

With South Africa's MeerKAT and the Netherlands' Apertif (APERture Tile in Focus) telescopes both expected to come online in 2016, the scale of such data collection is poised to increase significantly. The large scale of the datasets and the requirements of the astronomers to perform complex scientific analyses, which are often compute-intensive, demand innovative approaches. Data at these scales present unique challenges not just for managing the collection, but also for how researchers extract their science.

In all of these Precursor and Pathfinder facilities, the data gathering and initial processing is done onsite – close to the instruments themselves – under the control and development of the core telescope project teams. However, to make as much sense of, and derive as much value from, the data as possible, this first level of data must be made available to a broader scientific community; hence the need to develop innovative ways to access, manage and process the data. This is what the SA-Dutch regional science and data centres (RSDCs) hope to realise.

How RSDCs could assist

With previous traditional radio facilities, the majority of this subsequent analysis, including providing the required processing and storage resources, has been the responsibility of the individual researcher or science team. However, at the data scales of the SKA, this is unfeasible. One way to address this issue is to establish national or regional centres to provide users with access to the large-scale, High Performance Computers (HPC) infrastructure they will require to extract the full range of SKA science.

The main aims of these Regional Science and Data Centres (RSDCs) will be:

- to ensure that the data collected by the instruments is well-curated and made available in an easily accessible way to downstream science processing centres and institutes;

- to maintain long-term archives of science data products;

- to provide sufficient extra compute and storage for researchers to be able to reprocess data, perform customised analysis, and visualise results without having to necessarily move all the data to their local facilities;

- to provide expert support to users with their specific analyses;

- develop and maintain new tools and functionality to increase scientific exploitation of the data collections;

- to provide mechanisms for security and federation.

The SA-Dutch collaboration will consider a multi-tier model, similar to CERN, where the core SKA telescope facilities would produce the initial data streams, while the RSDCs would provide sufficient resources to store subsets of the SKA archive, support significant processing and post-processing capability, and further distribute data to users and smaller sites. An alternative could be a more dynamic multi-cache approach where data is distributed in a demand driven flexible way. Given their likely scale and range of function, it is natural that these RSDC facilities may hold data from more than a single instrument, or even multiple disciplines.

South Africa, Dutch collaboration to establish RSDCs

Where possible the work will build on the knowledge and holistic models already developed as part of the DOME Project – a Dutch-government funded project between ASTRON and IBM. Precursor instruments like MeerKAT and Pathfinder facilities like LOFAR will provide an opportunity to tackle specific, realistic problems.

"We propose to establish a federated system that links the MeerKAT, LOFAR, and Apertif science archives with distributed RSDC facilities. We assume that there will be at least two astronomy-focused sites, one each in South Africa and Netherlands", says Professor Russ Taylor, IDIA founding director and joint UCT/UWC SKA Research Chair.

OBJECT	TYPE	RA	DEC	MAG	SIZE
NGC 1664	Open Cluster	04h51m.1	+43°42’.0	7.6	18’
IC 405	Bright Nebula	05h16m.2	+34°16’.0	2-5	30’x20’
NGC 1857	Open Cluster	05h20m.2	+39°21’.0	7	5’
NGC 1912 Messier 38	Open Cluster	05h28m.7	+35°50’.0	6.4	21’
NGC 1960 Messier 36	Open Cluster	05h36m.1	+34°08’.0	6	12’
NGC 2099 Messier 37	Open Cluster	05h52m.4	+32°33’.0	5.6	20’
NGC 2208	Galaxy	06h22m.5	+51°55’.0	12.8	1.6’x0.9’
NGC 2242	Planetary Nebula	06h34m.0	+44°46’.4	14.5	22”

dark object partially occults it every 27.1 years. I followed the dimming of epsilon Aurigae in the winter of 2010 from my dark northern site, from where this “kid” looks much fainter than the others.

The open cluster **NGC 1664** can be seen barely two degrees west of epsilon Aurigae. The star grouping contains around 30 faint members in nice decorative chains, edging more north but spread out towards the south. The grouping is situated on the border with the constellation Perseus.

About six degrees east from beta Aurigae, on the way to Lynx, a planetary nebula can be found. **NGC 2242** is on all counts faint and very small, although with high magnification and very dark skies it shows off a round glow somewhat brighter towards the middle. The centre star is not visible. In the far northern corner of the constellation, guess what: a galaxy has been found. **NGC 2208** appears to be nothing but a very faint little extended south-east to north-west glow barely seen in only the best of excellent dark starry skies with a reasonable large telescope

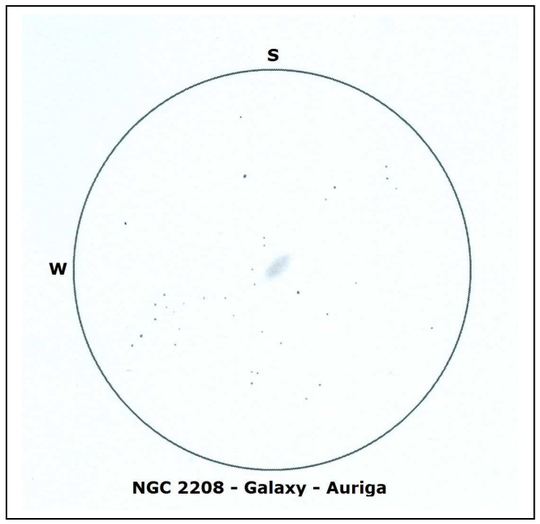


Fig 5. The galaxy NGC2208 in Auriga.

Our southern skies are rich in wonderful objects, but if one runs out of constellations for this column, as the case seems to be with me now, then it’s worth searching out the northern skies, which do not disappoint at all.

The collaborating organizations

The Inter-University Institute for Data-Intensive Astronomy (IDIA) was launched on 3 September 2015. This partnership between the University of Cape Town, the University of the Western Cape and the North-West University will develop crucial capacity for big data management and analysis, a spin-off of the SKA project. The R50-million, five-year IDIA partnership will integrate researchers in astronomy, computer science, statistics and eResearch technologies to create data science capacity for leadership in the MeerKAT SKA precursor projects, other precursor and pathfinder programmes and SKA key science.

ASTRON, the Netherlands Institute for Radio Astronomy is a division of the Netherlands Organisation for Scientific Research (NWO). ASTRON operates two well-known observatories in the Netherlands – the Westerbork Synthesis Radio Telescope and LOFAR, the Low Frequency Array.

The SKA project is an international effort to build the world's largest radio telescope with a square kilometre (one million square metres of collecting area). The first phase construction of SKA is being built in South Africa and in Australia. In South Africa, the SKA site is located in the Karoo near Carnarvon in the Northern Cape Province. SKA South Africa is building the MeerKAT, 64-antenna array radio telescope, which serves as a pathfinder instrument to SKA and will be integrated into SKA Phase 1.

The DOME project investigates approaches in exascale computing (which refers to computing systems capable of at least a billion billion calculations per second) at the ASTRON & IBM Centre for Exascale Technology in Drenthe, the Netherlands. The research is targeted at the specifications of SKA. SKA South Africa joined the DOME project in December 2012.

IBM-NL and ASTRON have been working together since 2012 in a 5-year collaboration totalling 32.9 million EURO to research exascale computer systems that will be needed by SKA.

MoU signatories: Mike Garrett, representing NWO and ASTRON; Alexander Brink, representing IBM; Jasper Horrell, representing SKA-SA/NRF; and Russ Taylor, representing IDIA/UCT.

Number of SA Astronomy Researchers

I.S. Glass (SAAO)

The SA professional astronomical community has grown enormously in recent years with the advent of SALT, SKA/MeerKAT/KAT and HESS (Namibia). In this article I have made an attempt to list the people involved, namely those with doctorates working in fields of astronomy and related technologies, cosmic rays, cosmology and space science. This was mainly undertaken to get some idea of the numbers.

I have not included research students. The many people in support roles and educational outreach are also not on this list. These comprise technical, computational, library, outreach, administrative and general maintenance staff.

The lists have been derived mainly from web pages, which in some cases may not be up-to-date since people join and leave from time to time. I have also asked several individuals known to me for information and have consulted the NRF list of rated researchers, which gives research interests. This research was done around 1-4 December 2015. Almost certainly some people will have been left out, especially those only marginally involved.

Some of the people listed are retired or emeritus and may or may not be paid for their work. Others are affiliated to more than one institution and have fractions in front of their names.

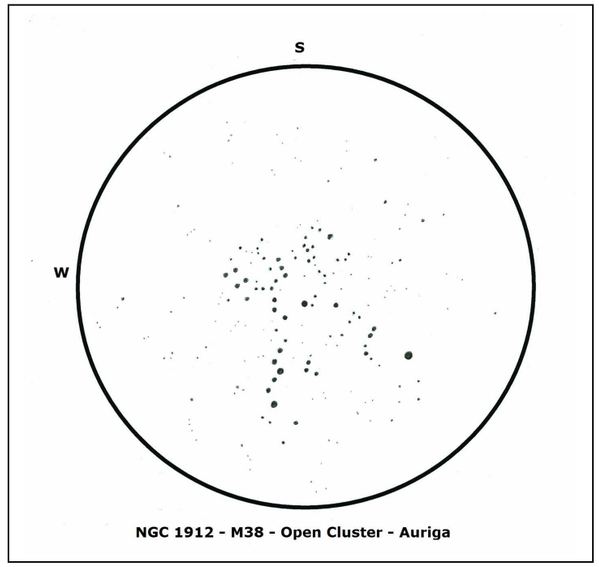
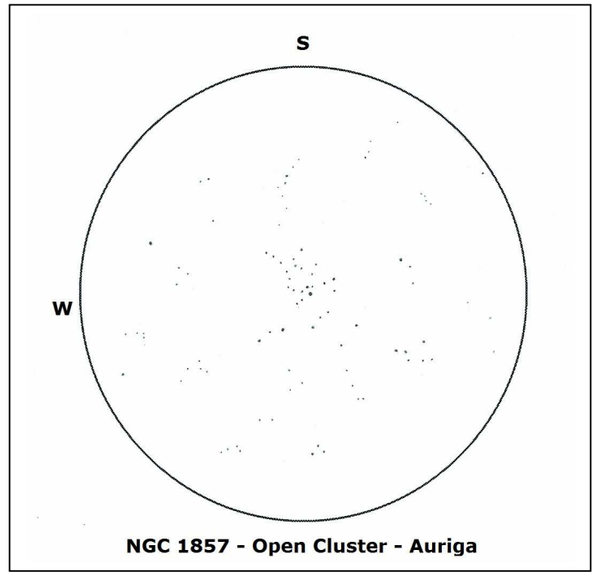


Fig 3. NGC1912 in Auriga

NGC 1857 can be found less than one degree south from 4.6 lambda Aurigae. It is a lovely, rich grouping with strings radiating out from the central area. Notable is the faint string swinging out towards the south. The faint grouping Czernik 20 forms part of the group as an extension towards the north.

Fig 4. NGC1857 in Auriga.



The magnitude 2.9 star epsilon Aurigae is an interesting eclipsing star, a super-giant type-F star some 2 000 light years distant. Although a secondary has never been seen and shows no spectrum, emits no infra-red radiation, and is silent at radio wavelengths, it was a puzzle. One of the suggestions is that it is a much smaller star surrounded by a shell of semi-opaque material. The German astronomer Johann Fritsch first reported the dimming of Epsilon Aurigae in 1821. In 1847 Friedrich W. Argelander and Eduard Heis tracked the next dimming. Only in 1982-1984 did astronomers have the equipment to observe the system in enough detail to suggest that a long

was discovered by Le Gentil in 1749, more than 4 100 light years away from us.

The western side of the constellation is rich in clusters and relatively bright nebulae perhaps worth exploring. Nearly 4 degrees west from M36 is the famous Flaming Star nebula (AE Auriga) also known as **IC 405**. The haziness around the star fans out in see-through wisps caused by the glowing gas of the star. Apparently high magnification and filters are needed to explore the area around the star.
A further 2.8° north-east the fine open cluster **NGC 1912**, better known as Messier 38, is easy to find. M38 was discovered in 1749 by Le Gentil and seen as a very large object. The cluster is bright in a somewhat loosely square shape with mixed-magnitude scattered stars. Brighter star strings resemble a figure with its legs standing apart with virtually no head on the shoulders. When carefully observed an uneven ring of stars will be seen at the centre dotted with brighter and even a few look-a-like double stars. The southern part seems denser, with a noticeable starless eastern part. The brightest star is a yellow giant 7.9 magnitude star situated on the north-eastern edge of the grouping. Star outliers extend to the south, reaching almost to the open cluster NGC 1907, like a tiny puff of smoke. Messier M38 is one of the older galactic clusters and contains about 120 stars in an area half the diameter of the full moon and 25 light years across. It has been referred to as a kite shape with two leading arms, although the bulk of stars are more or less of the same magnitude. Charles Messier noted a solitary magnitude 11 star to the centre with no concentration and arranged in a distinct cross. Harrington mentioned an oblique cross with a bright star at its centre. It is an outstanding grouping proudly showing off its beauty.

Lesser known clusters like Berkeley, Dolidze, Stock, King and Collinder are well documented in this area, and with the use of a star map it can be enjoyable searching it out.

SARCHI = SA Research Chairs Initiative.
r = rated researcher on the NRF scheme.

Please notify me of errors and omissions for possible inclusion in a later issue.

The total is about 190 of whom 56 or more are postdocs.

Astronomy and Cosmology Research Unit UKZN

Faculty
Senior Lect Gareth Amery
Sen Lect H.C. Chiang
Senior Lect Rituparno Goswami
Lect Gabriel Govender
Prof Kesh Govender
Sen Lect Sudan Hansraj
Senior Lect Matt Hilton
Sen Lect Yin-Zhe Ma
Prof Sunil Maharaj (Director) r
Assoc Prof Kavilan Moodley
Assoc Prof Subharti Ray r
Res Prof Jon Sievers
Zunkei, C.L. r

Postdocs

Gezahegn Abebe
Moumita Aich
Simon Muya Kasanda
Anne Marie Nziok
Aurelie Penin
Solohery Randriamampandry
Tabitha Voytek

North West University

Centre for Space Research (Potch)
Prof Markus Böttcher r
Prof Adri Burger r
Prof Stefan Ferreira r
Senior Lect Helena Kruger
Senior Lect Paulus Kruger
Senior Lect Ilani Loubser r
Prof Marius Potgieter r
Prof Felix Spanier r
Prof (Em) Peter Stoker
Senior Lect Du Toit Strauss
Prof Johan van der Walt r
Senior Lect Christo Venter r

Postdocs (Potch)
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Ando Ratsimbazafy
Iurii Sushch
Tania Garrigoux
Mehdi Jenab
Zorawar Wadiasingh

Mafikeng
Thebe Medupe

Postdocs (Mafikeng)
Bruno Letarte
Andry Rajoelimanana

was discovered by Charles Messier in 1764. Amateurs reckon it is the most beautiful cluster in Auriga and call it the “gold dust cluster” (although J. Bondona and H. Frommert refer to it as the salt and pepper cluster). In one word: as a grouping it is stunning.

The smallest of the three Messier groupings is **NGC 1960** (M36) very attractive in its own right situate 3.5° west. It is well outstanding and irregular with more or less three dozen stars, slightly compressed to the middle area with a handful of look-a-like double stars. This young cluster

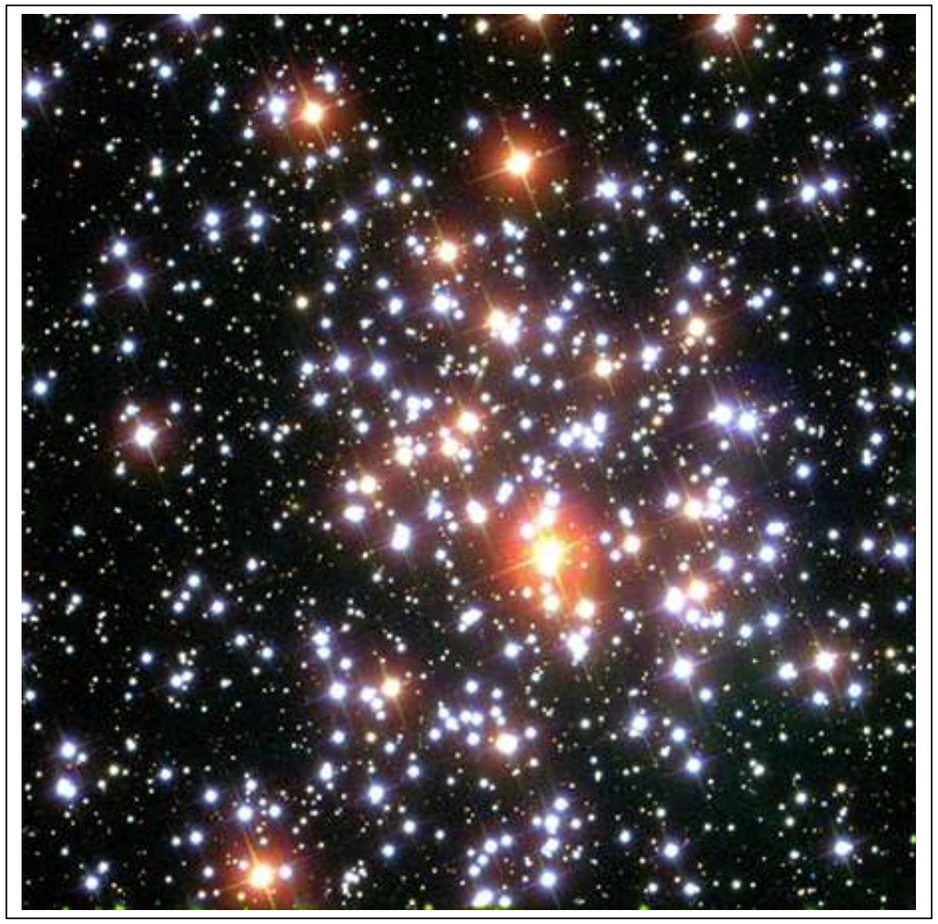


Fig 2. M37 or NGC2099

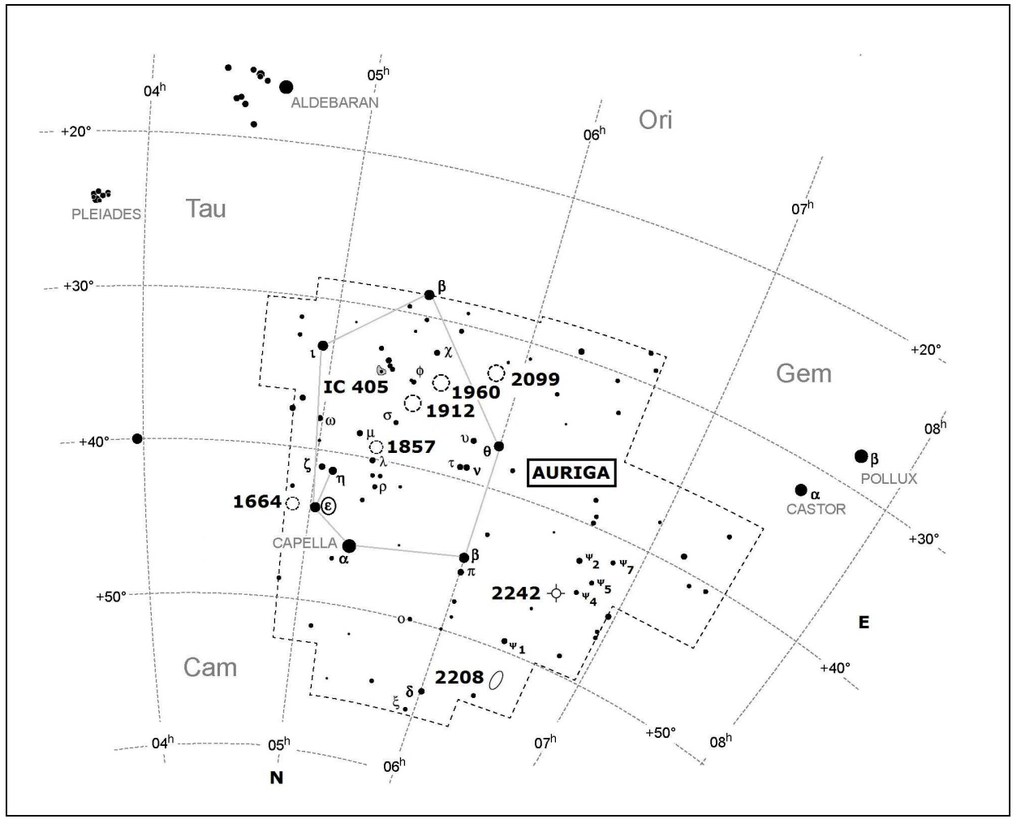


Fig 1. The constellation Auriga

To start off, the best would be to locate the northern horn of the constellation Taurus the Bull, which is situated on the border with the constellation Auriga. The constellation is popularly known that has been spoiled with three relatively bright Messier open clusters, seen even with the naked eye in very dark skies. The first of the three in question is **NGC 2099** (M37), a cluster with a lot of detail towards the southern part of the constellation (Fig 2). It is a bright grouping with mixed-magnitude stars in a cartwheel shape with curls and strings running out like sprouting arms from a relatively compact middle. Dark voids are randomly visible and wind their way between the members, with a striking orange star standing out towards the middle area. It has a bulk of almost 150 A-type stars and

Rhodes University Centre for Radio Astronomy Techniques and Technologies (RATT)

½ Gianni Bernardi (SKA)
Ian Heywood (Rhodes/CSIRO, Australia)
Prof Justin Jonas
½ Gyula Józsa (SKA)
Visiting Prof Aris Karastergiou
½ Sandeep Sirothia (SKA)
½ Prof Oleg Smirnov SKA/Rhodes Res Chair

Postdocs
Arun Aniyan
Roger Deane
Griffin Forster
Julien Girard
Trienko Grobler
Modhurita Mitra
Kshitij Thorat

Stellenbosch

National Institute for Theoretical Physics
Jacobus Diener

Applied Mathematics
Jeandrew Brink

Dept of Electrical and Electronic Eng.
Prof David Davidson (SKA Research Chair)

University of the Western Cape

Physics
Prof Romeel Davé (SARDHI) r
Assoc Prof Jarita Holbrook
½ Visiting Prof Mat Jarvis UWC/Oxford
Prof (Em) David Kilkenny r
Prof Roy Maartens (SKA/SARCHI Res Chair) Prof Mario Santos r
½ Prof Russ Taylor (SARCHI) r
Prof Smarajit Triambak (SARCHI) r

Postdocs
Michelle Cluver (NRF Fellow)
Daniel Cunnama (SKA)
Stephen Fine
José Fonseca (SKA)
Kim McAlpine
Sourav Mitra
Patrice Okouma
Prina Patel (SKA)
Matt Prescott (SKA)
Maciej Serylak
Vimal Sinha
Robert Thompson
Obinna Umeh (SKA)
Mattia Vaccari (SKA)
Imogen Whittam (SKA)
Neil Young (SKA/UWC)
½ Jonathan Zwart UCT/UWC Postdoct Fellow

Statistics and Population Studies
Sen Prof Chris Koen r

Abstract: Instantons are the solutions to classical equations of motion in Euclidean spacetime. They have finite nonzero action. They are used in cosmology in the theory of early universe and inflation. I will show how this approach is implemented in macroscopic quantum tunnelling of spins in condensed matter physics. I will present an exposition of this approach to tunnelling in antiferromagnetic exchanged-coupled dimer and one-dimensional antiferromagnetic spin chains. Using this approach, I will compute the energy splitting, the ground state, and the first excited state. I will also present numerical results to substantiate the analytical approach.

Sky Delights: Auriga the Coach Driver

Magda Streicher

The composition of some constellations can sometimes strike us as strange. The astronomers of old saw Auriga as a charioteer, and some saw a connection with a goat. Could the two have supported each other in the movement of the constellation?

The constellation can be easily recognised against the northern night sky as a pentagon-shaped figure and does not disappoint the observer as far as its exceptional star groupings are concerned. A charioteer or coach driver can be conjured up in one's imagination, well sort off. The beacon star is the magnitude 0.2 Capella (alpha Aurigae), a magnificent, bright white star carrying the name She-Goat, with her kids epsilon (3.0), zeta (3.7) en eta (3.1) Aurigae. It's just a pity that from our southern vantage point, alpha Aurigae is too low on the northern horizon to be able to appreciate it. Capella is only 42 light years distant and has a close double which turns out to be double as well. The royal temple in Porapora was named Fa'anui in honour of the golden star Capella and its garland of stars. Local chiefs were invested with a girdle of yellow feathers that symbolised their greatness.

is a new and as yet unsolved problem, with traditional radio astronomy methods for turning visibilities into images proving extremely poor at preserving shape information. We will also describe the progress of the radioGREAT challenge, which is generating a large suite of simulations of radio data for a blind shear measurement challenge and some of the potential avenues to progress in radio imaging and shear measurement for weak lensing cosmology.

ACGC

Title: How to model light propagation in a clumpy universe?
Speaker: Dr Pierre Fleury, (IAP, UCT/UWC)
Date**:** 12 November
Time**:** 12h00
Venue**:** M111 Maths Building, UCT

Abstract: In standard cosmology, all the observations are interpreted as if light propagated through a perfectly homogeneous and isotropic universe. The great success of this hypothesis is actually very surprising, given the variety of scales which are probed by such observations, in particular when very narrow light beams are involved (e.g. in supernova observations). In this talk, I will first provide a partial explanation for the success of the standard model, and evaluate its domain of validity. I will then propose a new framework, called stochastic cosmological lensing, for going beyond, i.e. determining the corrections to observational data caused by the small-scale inhomogeneity of the Universe.

AIMS

Title: Instanton approach to macroscopic quantum tunnelling of spins
Speaker: Dr Solomon Owerre (AIMS)
Date**:** 16 November
Time**:** 12h00
Venue**:** Upstairs Hall, AIMS

University of Cape Town

Astronomy Dept
Lect Sarah Blyth
Prof Claude Carignan (SKA SARCHI R. Chair)
½ Prof (Em) Michael Feast SAAO/UCT r Visiting Prof R Fender SKA
Prof Tom Jarrett (SKA SARCHI Res Chair)
Prof René Kraan-Korteweg
Senior Lect Vanessa McBride Joint SKA/UCT 1/2 Prof Russ Taylor Joint UCT/UWC/SKA r
Sen Lect Kurt v d Heyden (NASSP Dir) r
Prof (Em) Brian Warner r
½ Adj Prof Patricia Whitelock SAAO/UCT
Assoc Prof Patrick Woudt

Postdocs
½ Richard Armstrong UCT/Oxford
Liz Bartlett (Claude Leon Fund)
Luke Chamandy
Nathan Deg (SARCHI)
Ed Elson SKA Post-doc Fellow
Tana Joseph SKA Post-doc Fellow
Maria Kapala SARCHI
Yannick Libert SARCHI
Christine Magoulis SARCHI Post-doc Fellow
Zara Randriamanakoto
Matthew Schurch (Hon Res Assoc)
Lee Townsend
½ Jonathan Zwart UCT/UWC Post-doc Fellow

Mathematics and Applied M (Cosmology)
1/3 Prof Bruce Bassett UCT/SAAO/AIMS r
Assoc Prof Chris Clarkson
Prof Peter Dunsby

Prof (Em) George Ellis
Assoc Prof Charles Hellaby
Senior Lect Jeff Murugan
Lorenzo Reverberi
Senior Lect Amanda Weltman

Post-doc
David M Jacobs

Space Science (Electrical Engineering)
Prof Peter Martinez

Centre for High-Performance Computing

Catherine Cress
Sean February

University of the Witwatersrand

Physics
Assoc Prof Andrew Chen
Prof Sergio Colafrancesco (SKA Res Chair) r
Prof Andreas Faltenbacher
Senior Lect Fabio Frescura
Assoc Prof Vishno Jejjala
Senior Lect Nukri Komin

Computational and Applied Maths
Prof David Block

School of Interdisciplinary Research and Graduate Studies
Prof Lerothodi Leeuw r

starburst, and fuel an active galactic nucleus (AGN). If the starburst is subsequently quenched, the new elliptical will rapidly undergo blue-to-red migration, providing one attractive scenario to explain the well documented buildup of massive quenched galaxies over cosmic time. I will discuss two recent studies based on samples selected from the Sloan Digital Sky Survey that explore key aspects of the modern merger hypothesis. First, using IFU spectroscopy to identify recent central starbursts in a small sample of plausible postmergers, we find an association between different radial star-formation histories and specific merging signatures. Second, investigating the near-infrared colours from the Wide-field Infrared Survey Explorer for a complete sample of 45,000 high-mass (>2e10 Msun) galaxies, we find a clear connection between major mergers and dust-enshrouded AGNs and conclude that undetected AGNs at optical and shorter wavelengths are at the heart of an ongoing merger-AGN connection debate.

Title: The Promises and Challenges of Radio Weak Lensing with SKA
Speaker: Dr Ian Harrison
Date**:** 23 November
Time**:** 14h00
Venue: 2nd floor auditorium SKA office, Pinelands

Abstract: The Square Kilometre Array (SKA) will achieve the necessary galaxy number densities over large areas to be competitive with other stage IV weak lensing cosmology surveys such as Euclid, LSST and WFIRST-AFTA. We identify and summarise the unique and potentially very powerful aspects of surveys facilitated by the SKA which can solve major challenges in the field of weak lensing. These include the use of polarisation and rotational velocity information to control intrinsic alignments, and the new area of weak lensing using intensity mapping experiments. We show parameter constraint forecasts for both SKA weak lensing alone and also how cross-correlating shear maps between radio and optical can complement and enhance these constraints. However, measuring shear at high accuracy and precision from interferometer data

involved with that shed new light on the physical processes that quench star formation and reshape the structure of galaxy giants.

Astro-Coffee

Title: High-mass Star Formation: Multi-wavelength View and Science Cases for AVN and SKA
Speaker: Dr James Chibueze, East Asian ALMA Regional Centre
Date: 26 November
Time: 13h00
Venue: 2nd floor auditorium SKA office, Pinelands

Abstract: The formation processes of massive stars (> 8 solar masses) remain a hot topic in astronomy. A number of theoretical models have been proposed to explain how they form, yet observational confirmation of the how they form is very important. I will present a multi-wavelength approach to the observational study of massive stars, at various scales. Related science case that can be carried out with the AVN, meerKAT/SKA will also be explored.

UWC

Title: Two Tests of the Modern Merger Hypothesis at z~0: Radial SFHs and Dusty AGNs
Speaker: Prof Dan McIntosh, University of Missouri-Kansas City
Date**:** 23 November
Time**:** 14h00
Venue: 2nd floor auditorium SKA office, Pinelands

Abstract: The modern merger hypothesis, championed by Hopkins and others, offers a cosmologically motivated channel for the formation of massive quenched elliptical galaxies. Under the right conditions, simulations predict that the merging of two equal-mass, gas-rich spirals will produce a massive elliptical remnant, trigger a strong central

Miscellaneous

Claire Flanagan (Astronomy Educator)
Barbara Cunow (retired)

University of Free State

Prof Matie Hoffman
Prof Peter Meintjes r

University of South Africa

Prof Derck Smits
Lect Patricia Skelton

University of Johannesburg

Senior Lect Chris Engelbrecht
Prof Soebur Razzaque
Prof Hartmut Winkler

African Institute for Mathematical Sciences Cosmology Group

1/3 Prof Bruce Bassett UCT/SAAO/AIMS r

Post-doc
Pierre-Yves Lablanche

HartRAO

Prof Ludwig Combrinck r
Michael Bietenholz r
Aletha de Witt
Gordon McLeod

(Em) George Nicholson
Jonathan Quick

SAAO

(Em?) Luis Balona r
Sudanshu Barway
1/3 Prof Bruce Bassett (UCT/SAAO/AIMS) r
David Buckley r
Lisa Crause r
Steven Crawford r
Eric Depagne
½ Michael Feast (Hon Res Fellow) r
David Gilbank r
Ian Glass (Assoc Res Astr)
Alexei Kniazev r
Paul Kotze
John Menzies r
Brent Miszalski
Stephen Potter r
Encarni Romero Colmanero r
Anja Schroder r
Ramatholo Sefako
Amanda Sickafoose r
Petri Vaisanen
½ Patricia Whitelock (SAAO/UCT) r
Ted Williams (Director) r
Hannah Worters

Post-docs
Nicola Clementel
Rudi Kuhn
Shazrene Mohamed
Rosalind Skelton

Title: The SKA Shared Sky Exhibit and /Xam Skylore in the Karoo
Speaker: Jarita Holbrook (UWC)
Date: 19 November
Time: 11h00
Venue: SAAO Auditorium

No abstract.
Title: Galactic Capitalism: the Buildup of a Bimodal Galaxy Population
Speaker: Prof Dan McIntosh (Missouri-UMKC)
Date: 26 November
Time: 11h00
Venue: SAAO Library Lounge

Abstract: Our understanding of the universe is intimately tied to our study of galaxies. These behemoths are the birth places of all stars, which in turn are the crucibles creating the chemistry necessary for life. Physically, galaxies are dense concentrations of normal baryonic matter at the centers of deep gravitational wells of dark matter that define the underlying backbone of the cosmos. As such, the formation of new suns turns galaxies into blazing beacons that allow us to map the universe in both time and space. Yet, star formation has been steadily waning since "Cosmic High Noon", an epoch 10 billion years ago when galactic activity was booming. Conversely, individual galaxies continue to amass stars to the present day, and the number of spheroidal heavy weights is ballooning. In other words, a key feature of cosmic history is a 'galactic capitalism' of mergers and acquisitions that is producing a growing divide in the bimodal galaxy population of the `haves' and the `have nots'. The growth of galaxies and the simultaneous decline of star formation are understood broadly in the context of the standard cosmological model. Yet, an enduring mystery remains as to what exactly is killing off the production of new stars and what is reshaping disks into spheroidal galaxies at all cosmic epochs. I will discuss the latest theories of galaxy formation and growth, and focus on recent advances my team has been

Colloquia and Seminars

These form an important part of a research facility, often as a sort of pre-publication discussion or a discussion of an individual's current research, and as such it is virtually impossible to "publish" this material. However by recording the topics discussed in the form below does indicate to those, who are unable to attend, what current trends are and who has visited to do research: it keeps everyone 'in the loop' so to speak

Also included in this section are the colloquia/seminars at the SAAO, UWC and the Astrophysics, Cosmology and Gravity Centre at UCT, ACGC. Also included are the SAAO Astro-coffees which are 15-20min informal discussions on just about any topic including but not limited to: recent astro-ph papers, seminal/classic publications, education/outreach ideas and initiatives, preliminary results, student progress reports, conference/workshop feedback and skills-transfer.

SAAO

Title: SALT news
Speaker: Petri Vaisanen (SAAO)
Date: 12 November
Time: 11h00
Venue: SAAO Auditorium

Abstract: There are many positive things happening with SALT regarding the science output and projects, with more papers published and observations done than ever before. I will give an update on these aspects, plus other current SALT news and instrument mode status, as well as any feedback from the SALT Board meeting happening this week relevant to the community.

KAT, MEERKAT, SKA

Control and monitoring team
Neilen Marais

Digital hardware
Andrew van der Byl
Manley Jason
Monica Obroca-Tulinska
Marc Welz

Science processing team
Mattieu de Villiers
Thomas Mauch
Bruce Merry
Laura Richter
Ludwig Schwardt

Commissioning team
Anthony Foley
Sharmila Goedhart
Nadeem Oozeer
Sean Passmoor

System engineering
Richard Lord

SKA bid and site studies
Adrian Tiplady

Managers in science
Jasper Horrell (General manager in science and innovation)
Lindsay Magnus (Science processing, Commissioning and Operations mgr)
Robert Adam (Project director)

Bernie Fanaroff (Project director, retiring)

African VLBI Network
Charles Copley :
Craig Tong
Romeo Gamatham

Rhodes ARG
½ Gianni Bernardi
½ Gyula Jósza
½ Sandeep Sirothia

University of Zululand/Richards Bay

Prof Aroonkumar Beesham r

SANSA National Space Science Agency (Hermanus Magnetic Observatory)

Lee-Ann McKinnell
Jane Olwoch
Sandilile Malinga

Southern African Fireball Observations: 2014-15

Tim Cooper, Bredell Observatory

Catalogue of Recent Sightings

This article continues the sequential numbering of reported fireball sightings from southern Africa, and covers fireballs observed during 2014 and 2015. By definition, a fireball is any meteor event with brightness equal to or greater than visual magnitude (m_v) -3. The following events were reported to the author and details are reproduced as given by the observer. All times were converted to UT unless stated, and all coordinates are for epoch J2000.0.

Observable and astronomical related events have been posted using the various channels and include sightings, images, comments and questions from the public, to which I respond or pass on to the relevant ASSA Sections, specialists and collaborators. For this I would like to thank, Dave Blane (Shallow Sky Director), Tim Cooper and Greg Roberts for their help. Sightings are documented on the ASSA web page.

Thank you to Michael Poll (ASSA Pretoria Centre) for once again submitting the Centre's observing reports this year. These will be archived on the ASSA web page. I would like to encourage the other Centres to also submit theirs.

Comets featured prominently the past year, with C/2013 A1 (Siding Spring) making headlines as it approached Mars, as well as Rosetta and Philae's landing on comet 67P/Churyumov-Gerasimko. Comet C/2014 Q2 Lovejoy was a splendid naked-eye apparition with 15P Finlay, Pan STARRS (C/2012 K1) and C/2013 V5 (Oukaimeden) reasonably easy binocular and telescope targets. Comet C/2015 G2 (MASTER), was the first South African comet discovery in 37 years and is still visible in our early evening skies (25th June). Cloudy skies countrywide hampered documenting the close approach to Earth of asteroid BL 86 in January, Tim Cooper and myself did however manage to capture some images. South African astrophotographers and observers imaged and documented some of these events, as well as the novae in the constellation Scorpius and Sagittarius.
Various calls for the participation of South African observers have come from abroad and these have been passed on via the ASSA discussion group as well as posted on the Facebook page which in the last year has nearly doubled, with just short of 800 visitors participating (women 46%, men 54%). In conclusion I would like to wish observers clear skies for the 2015 – 2016 year.

The telescope making class, which has been continuously active for over 20 years, attracts a steady stream of newcomers to the art, with a good success rate of people finishing their first instruments. In addition, a fair proportion of participants stays on or returns after completion of their first telescope, in order to tackle more advanced projects. Notable challenges currently underway include a 24" mirror and a Yolo telescope.

ScopeX, which grew out of the telescope making class, is currently ramping up for the 14th annual event. In addition to the primary goals of general astronomy outreach and publicizing the Society, it provides a platform for the telescope making community to exhibit their work and encourage newcomers to engage in this fascinating hobby. Having a plethora of instruments at one place (both commercial and amateur-built/modified), enables visitors and members alike to see and touch a variety of instruments. This sparks discussion of ideas, approaches and relative merits, enabling people to make informed choices.

To date, no communal projects within the section have been initiated. The Director again asks those interested collaborative development to get in touch with him to discuss.

Observing Section Report 2014 – 2015

Kos Coronaios
ASSA Observing Director

It seems that it was only yesterday that the 2013 -2014 Observing Report was submitted, the 2014 – 2015 year has certainly flown by with plenty of observing opportunities, especially with load shedding during the evening.

Event 258 – 2014 January 27 – Western Cape
Four independent sightings of this fireball were reported as follows:

Dudley Field, 03h24, travelling east near Philadelphia, 30km north of Century City, duration 2-3 seconds, colour white to greenish, speed slow to medium, moved from altitude 40-45° right to left towards north east at an angle of 45° to the horizon. After about two thirds of its passage it peaked in brightness and then fragmented into at least 3 pieces before burning out, leaving a persistent train.

Anja Brand, 03h25, seen from her porch at home in Hermanus, very bright white light with burning appearance, duration 5-6 seconds and left a persistent train visible for about a minute afterwards. She did not see the object break up.

Peter Logue, 03h25, from Fish Hoek, very bright, duration 4-5 seconds, red/orange with bluish tinge, no fragmentation seen but left a persistent train visible for 2-3 seconds. Sky was already quite light before sunrise.

Nico Esterhuyse, 03h25, from Kraaifontein, very bright, duration 3 seconds, red, yellow and white colours observed, no fragmentation seen, but left a persistent train and smoke which slowly disappeared.

Event 259 – 2014 February 1 – Durbanville, Western Cape
Observed by David le Roux at 22h30 (January 31 UT), bright green meteor, duration 3 seconds, descending steeply from alt/az 15°, 133° to 5°, 130° towards his left, where it disappeared behind the Hottentots Holland mountains. No fragmentation, and no persistent train were left. The path given corresponds with the meteor emanating from the region of Centaurus, passing through Lupus to the horizon. The fireball may well have been a bright Centaurid, from any one of a number of suspected radiants active in this region during early February.

Event 260 – 2014 April 21 – Rooiberg, Limpopo
Observed by Angie Todd from Rooiberg, near Thabazimbi, at about 18h00, duration less than 5 seconds, fast-moving, brighter than the moon (which was not visible at the time), and she thought it seemed to be close by. Fireball was white with a red and blue tail moving due west just above the trees. Despite requests, the observer did not provide further details of the direction of the fireball.

Event 261 – 2014 August 15 – Constantia Park, Pretoria, Gauteng
Observed by Bruce Wells at about 18h15, facing south east, the meteor moved from east to south east low in the sky, starting at about altitude 20°. Brighter than Venus, so $m_v > -4$. The meteor faded, then re-appeared before burning out.

Event 262 – 2014 November 18 – Scarborough, Western Cape
Observed by Gerard Thiele at 22h45 (November 19, 00h45 SAST), very bright object which lit up the sky, moving from almost directly overhead and towards due west, duration 2-4 seconds. Colours were described variously as white, blue, yellow, orange and red, no fragmentation but left a trail visible for about 5 seconds.

Event 263 – 2015 January 27 – Somerset West, Helderberg
Observed by Wendy Vermeulen at 21h22, $m_v = -3$ or perhaps brighter, she described the path as from between Vela and Hydrus moving downwards and slightly east towards Hydrus, duration 1 second. Colour was yellow, and left a persistent train of short duration. The fireball may have emanated from one of the Puppid-Velid complex of radiants.

Event 264 – 2015 February 2 – Pretoria, Gauteng
Observed by Charles Biddulph at 18h52 while travelling due east on George Storrar Drive towards Brooklyn, with SABS buildings on the left. The meteor was white and very bright, fast moving and duration 2 seconds. The near full moon was visible low in the north east.

(H) Instrumentation Section Report 2014-15

By Chris Stewart

Activities of the Instrumentation Section largely revolve around communication, outreach, guidance and education, plus the important aspect of encouraging people in the pursuit of their personal instrumentation projects. There is no drive to formally induct members into the Section; rather, the approach has been to address ASSA members' needs for information on a case by case basis.

In support of the Society's general communication efforts, which equally support the instrumentation Section's goals, the following have been performed and are ongoing:

- Moderate the ASSA FaceBook page.
- Moderate the Yahoo! Group mail lists.
- Moderate the Telescope Making FaceBook page.
- Contributed links and suggestions for website, posted content on FaceBook

The Section directly supports the needs of both ASSA members and the general public regarding construction, purchase, maintenance and use of instrumentation. This is mostly done via the telescope making class, the Telescope Making SA FaceBook page, e-mail correspondence, telephonic discussion, and ScopeX.

The Telescope Making SA Facebook group - whilst distinctly South African - has at the time of writing attracted about 450 members from around the world, an increase of about 160 during the year. This international involvement produces an energetic bidirectional flow of ideas, information, technical assistance and encouragement. Some of the unusual approaches to instrumentation adopted locally and highlighted in this medium, have this year have been favourably received abroad and are starting to be copied.

Observations were primarily received from Australasia, South Africa and South America. South Africa was primarily represented by Kos Coronaios and Allen Versfeld. Our efforts were covered in the international press.
An asteroid occultation was recorded using video equipment on 20 July 2014. Paul Maley of Eclipse Tours travelled to Culinan, outside Pretoria, to observe asteroid Patientia occulting a star with the help of local volunteers stationed at several observing locations and equipped with video cameras fitted to small telescopes. The event was written up for MNASSA, and the results were reported to IOTA (International Occultation Timing Association).
Finally, the section director has given talks on astrophotography, both at ScopeX in 2014 (where he moderated a discussion panel), and for the West Rand Astronomy Club, speaking to some of the top astrophotographers in the country.

Failures and Successes
Early last year, the section kicked off an email discussion group, and took over the running of the ASSA flickr account. The mailing list has had very poor engagement, with the last message being sent many months ago. Presumably it does not meet the needs of the South African astrophotography community, and will likely be disbanded soon. The flickr page serves as an image archive, and astrophotographers are encouraged to submit copies of their images – both good and bad! This has been a big success, and has attracted over a thousand images in a little over a year, from more than twenty contributors. Images from the archive are automatically displayed on the ASSA gallery page, organised by photographer. Several photographers have joined ASSA after being solicited to share their images with the archive, and the use of flickr to store the archive has put these images on display to an international audience who would never have visited the ASSA gallery page.

Awards
Clyde Foster (Observing Certificate) for his consistent high quality observations of the Moon and planets.

Event 265 – 2015 February 23 – Rothdene, Gauteng
Observed by Manie Prinsloo at 17h17, very bright, fast moving meteor, he described 'coming towards me from the east going in a westerly direction'. Colour was bright orange. Despite requests, no further details could be obtained.

Event 266 – 2015 March 12 – Middelburg, Mpumalanga
Observed by Eugene van der Walt at 23h13 while driving east, bright green meteor with long tail moving quickly downwards from right to left at an angle of 45°, duration 2 seconds. No fragmentation, no sound heard, but left a persistent train. Eugene said it was very bright compared to the moon and stars, and remained so as it disappeared from view behind trees.

Event 267 – 2015 April 9 – Kloof, KZN
Observed by Savannah and Melanie Graham and Alex Schmid. Time 18h30, very bright, probably a little brighter and larger than Venus which set earlier, so m_v = -5. Duration of passage was about 5 seconds, the fireball broke into several fragments during its flight, like pieces breaking off, and left a persistent trail visible for 2 seconds. Path was from the direction of the sea to inland, very roughly from east towards west. Colours were said to be dark red/yellow, blue/purple and very bright white. The observers had the perception that the fireball was below clouds and very close.

Event 268 – 2015 May 6 – Bredell, Gauteng
Observed by Tim Cooper during observations of the eta Aquariids. m_v = -4. Emanated from the centre of the Water Jar asterism in Aquarius headed due south, speed fast and short path of 2°, vivid yellow colour, but no green observed, left a persistent train of 2 seconds duration.

Event 269 – 2015 July 16 – Auckland Park, Gauteng
Observed by Adriaan de Klerk at some time between 16h30 and 17h00 (did not note exact time), definitely brighter than Venus, so $m_v \geq$ -5,

looking towards the north, and through some light clouds, the object moved from right to left, and downwards at an angle of 30° to the horizon. From a sketch and GPS location supplied by Adriaan I calculate the start and end points very roughly alt/az +40°, 015° to +30°, 358°, corresponding to RA/Dec 15h00, +22° to 14h20, +33° and a path length of about 20°. This places the path crossing the constellation Boötes, just below the bright star Arcturus, and is consistent with a radiant in the ecliptic region of Sagittarius/Capricornus, which is well known to produce often-bright meteors around this time. Duration was 1 second, speed was fast-moving and colours noted were blue and white. The fireball had a long tail, but did not fragment and left no persistent trail.

Event 270 – 2015 July 27 – Noordhoek, Western Cape
Observed by Sue Visser at 03h45-03h50 while travelling in a northerly direction on Ou Kaapseweg, saw very bright flash, and then the passage of a meteor to her left, also moving northwards over the mountains near Silvermine. Duration was a few seconds, no fragmentation, but left a persistent trail visible for several seconds after the meteor.

Event 271 – 2015 November 4 – Rowallan Park, Eastern Cape
Footage of this fireball was captured on a CCTV security camera by Chantel Olivier at 00h50m51s SAST on November 5, corresponding to 22h50 UT on November 4. Matching the view in the footage to an image from Google Maps, I estimate the camera is centred in the direction of azimuth ~200°, i.e. in the direction of SSW. The fireball in the footage is clearly very bright, at one point saturating the image and lighting up the whole sky. The start of the passage is not captured, the fireball entering at top left of the field, duration 2-3 seconds, and descends at an angle of about 80-85° to the horizon, slightly from right to left, i.e. azimuth decreasing.

Event 272 – 2015 November 8 – Worcester, Western Cape
Benjamin Coetzee witnessed a fireball while travelling due east on the N1 at Worcester. He initially reported the event as a possible sighting of Event 273 below, but seeing as he gave the time as between 17h30 and

(G) Astrophotography Section Report - 2014/15

Allen Versveld

Current Status: The astrophotography section of ASSA has grown steadily over the past 12 months. Twenty seven active members who have submitted images to the ASSA image archive. Since the last report, they have collectively submitted 555 astronomical images.
At least one of the members has joined ASSA specifically because of his contributions to the Astrophotography Section.
We would like to welcome Neil Viljoen as our newest section specialist. He joins Dale Liebenberg, Brett du Preez, Hannes Pieterse, Jerome Jooste, Kos Coronaios, Martin Lyons, Gary Els in this role.

Recognition
Two members have been recognised outside of ASSA for their imaging:
Clyde Foster is a planetary imager working from the suburbs of Centurion, outside of Pretoria. He shares his images with several dedicated planetary observation networks. He has been credited with being the first observer on Earth to observe new dust storms on Mars, and has recently been monitoring atmospheric features on Saturn.
Richard Ford has been sharing his vast image collection with the British Astronomical Association, and recently had his image of the Omega Centaury Globular Cluster featured in their deep sky section's newsletter.
Congratulations and Well Done to both of them!

Collaborations
AP section members have been involved in several international collaborations over the past year.
The close encounter between Mars and Comet C/2013 A1 Siding Spring was a major event, leading Dr Padma Yanamandra-Fisher of the Space Science Institute (the same body responsible for the science operations of the Cassini probe currently exploring the Saturn system) to initiate a Professional/Amateur collaboration project to collect images of the comet for a period of about a month before, during and after the encounter.

Website
Preparation work was done to update the website to the new Wordpress format. Archival material was scanned and converted to readable PDF files.

Publications
Individuals in their private capacities wrote articles with historical content. Please note my appreciation to the following people:

- I.S. Glass; "Jacob Karl Ernst Halm (1865-1944)"; *MNASSA* Vol 73 Nos 1 & 2 February 2014
- Greg Roberts; "Amateur Optical Tracking in South Africa during 1957 - 2014. Part 3"; *MNASSA* Vol 73 Nos 5 & 6 June 2014
- Greg Roberts; "Amateur Optical Tracking in South Africa from 1957 – 2014. Part 4"; *MNASSA* Vol 73 Nos 7 & 8 August 2014
- Greg Roberts; "Amateur Optical Tracking in South Africa during 1957 – 2014 – Part 5"; *MNASSA* Vol 73 Nos 11 & 12 December 2014

Obituaries
MNASSA published obituaries on the following astronomers:

- Halton (Chip) Arp; *MNASSA* Vol 73 Nos 1 & 2 February 2014
- John Dobson; *MNASSA* Vol 73 Nos 1 & 2 February 2014
- Thomas Harry Hope (Tom) Lloyd Evans 1940 - 2014; *MNASSA* Vol 73 Nos 5 & 6 June 2014
- Dr Michael Gaylard; *MNASSA* Vol 73 Nos 7 & 8 August 2014
- Doc Jannie Smit; *MNASSA* Vol 73 Nos 9 & 10 October 2014
- Mary Fitzgerald; *MNASSA* Vol 73 Nos 11 & 12 December 2014

18h00 (he said strong dusk), the time is roughly an hour earlier, and therefore must have been a separate event. His report gives start point at azimuth 74° and altitude 45° and the fireball terminated in an explosion at 104°, 21°. Duration was 2 seconds, and he thought he heard a faint rumble immediately after the explosion (?). He said there were cumulus-stratus clouds in the sky, which were lit up by white light, and also noted red/orange light from the meteor.

Event 273 – 2015 November 8 – several sites, Eastern Cape
This object seems to have been a very bright bolide, reported variously as between 18h45-18h50. There were many casual reports of the event, but the only useful reports received by the writer were limited to the following:

Cas Bornman observing from Aston Bay, Jeffery's Bay, said she saw a large white flash like lightning high in sky (the view was constrained by the roof over her head) at 18h50. The flash was followed by three large pieces and several smaller ones burning as they fell. They burnt out about 20-30° above the horizon. Two or three minutes later there was a loud bang. Looking south the pieces moved from direction of north-east to south-west. She said 'We were looking south, with the roof over our heads we did not see the direction from where it came from but the whole sky lit up'.

Jonathan Balladon, a pilot, was returning to Cape Town cruising at 32 thousand feet at position 29°58'S, 23°34'E when he witnessed the event at 18h45. 'Impressive yellow white streak, possibly 3 seconds duration, ending in a bright white flash like a camera flash in brightness. Trail was full of bright spots and quite spectacular until the final explosion'. From details he gave of his heading and direction of the fireball, I derive the altitude and azimuth of start point as 25°, 154°. Angle of descent was steep, 70° to the horizon, and moving left to right, i.e. azimuth increasing.

Chantel Olivier captured the flash from the event at exactly 18h47m07s on the same CCTV camera as used for Event 271, facing azimuth ~200°, roughly SSW. Unfortunately the actual footage of the meteor is not captured, but several flashes for about 2-3 seconds are visible just above and outside of the field of view of the camera.

Finding the Blaauwberg Meridian Marker: Expedition, 5 December 2015

E.J.F. Foster, ASSA, Cape Centre.

In support of the efforts to document the architecture of the Royal Observatory at the Cape, historic material has been made available in digitized form by Auke Slotegraaf. I was working my way through some of this when I came across the following on page iii in **Astronomical Observations made at the Royal Observatory, Cape of Good Hope, in the year 1875, under the direction of Edward James Stone**, *"The "meridian mark" referred to in Table III, is on an undulation immediately to the east of the mountain called Blaauw Berg, and is situated some 13 miles north of the Observatory. It is a pillar built up to serve as a permanent meridian mark for the 10 feet Dolland's Transit....."*

A second reference, found by Dr Ian Glass, also mentions the meridian mark and pinpoints the construction to around August 1841. On page 403 in **Verification and Extension of La Caille's Arc of Meridian at the Cape Of Good Hope, Vol.1** (Sir Thomas Maclear, 1866), we read *"Having obtained permission on the 10th of August, 1841, from the trustees of Dirk Gysbert Kotze, to erect a pillar on the Blaauwberg estate, on a hill south-west of his dwelling house, in the meridian of the transit room of the Royal Observatory, a party was told off* for this service shortly after the return from the measurement of the Base. The pillar is a truncated pyramid 14 feet high, constructed of stone and lime masonry, cased with Roman cement.*

** "to assign somebody to a special duty".*

members advised Mr, Stewart that they did not wish to continue with membership. Since then there has been a steady increase in the number of members.

Activities

In the course of the year the director completed successfully an online course: "From the Big Bang to Dark Energy" presented by Prof Hitoshi Murayama of the University of Tokyo.

A total of 3 240 messages were sent/received and a large number of matters were covered. The discovery of the Higgs boson at the LHC and the implications thereof for the Standard Model of Particle Physics remained in the news. Primordial galaxies and the discovery of a satellite dwarf galaxy of the Milky Way consisting of pristine hydrogen received attention. Quasars and the role of supermassive black holes in the evolution of galaxies as well as Population III stars were discussed. Doubts about the cosmic inflation of the early universe were raised but there is currently no better explanation for the cosmological principles of homogeneity and isotropy. It was reported that new stars were observed which were born around black holes. After Gamma Ray Bursts were recorded scientists could normally observe the afterglow of the stellar explosion. An exception to this "rule" was found since there was no afterglow of the explosion. The explanation offered was that the explosion was possibly caused by a not a very massive star. Comets, supernovae and collisions of galaxies were reported.

(E) Historical Section Annual Report

Chris de Coning - Director Historical Section of ASSA

Introduction

During the past year (Calendar Year 2014) the following has happened concerning the History of Astronomy.

subsequently published this spectrum a few days later. The publication in S&T was fortuitous and important in that it showed that South Africa is also engaged in amateur spectroscopy in the southern hemisphere.

Conclusion

Visual observation of variable stars is still the method preferred by most observers worldwide and the shift to the use of digital cameras seems to remain very slow. I believe with sufficient understanding this hurdle can be crossed. Interest in spectroscopy from members has been slight with Percy Jacobs and myself occasionally sharing data there is the hope that other members will in time take on this interesting and challenging aspect of amateur astronomy.

(D) Cosmology Section 2014 Annual Report

Frikkie de Bruyn
Director: Cosmology Section

Purpose

(i) To disseminate news of importance in the field of cosmology to members;
(ii) To circulate scientific papers in the field of cosmology to members; and
(iii) To do research and promote the study of cosmology as a science.

Membership

The number of members at the end of 2014 was 15.

The year was marked by an unfortunate incident when the director was unable to get access to his account with Google. A word of thanks must go to Mr. Maciej Soltynski and Mr. Case Rijsdijk who attempted to help solve the problem. Mr. Chris Stewart solved the problem by creating an account with Yahoo which is working well. Many thanks to Chris. After the new account was established it became clear that a number of members have resigned without Google advising the director. A number of former

So where exactly is this truncated pyramid and does it still exist? Ian had e-mail correspondence from 2012, in which Mr Seymour Currie verified that that the object was in fact on his farm, but the farm's name was never mentioned. I sent an e-mail to Mr Currie who promptly phoned back saying we were more than welcome to come and examine the meridian mark.

On 5 December, 2015, Auke Slotegraaf, Chris Vermeulen, Dr Ian Glass, Chris de Coning, Johan Brink, Kechil Kirkham, Dirk Rossouw and I assembled at the Observatory, intent on finding the meridian mark. We first attempted to spot it from the roof of the main building at the Observatory, but trees hid that section of the horizon. Ian and Google Earth had pinpointed the position of the mark and it looked as if there were useable access roads to get to it. I had, however, been unable to contact Mr Currie again to obtain the name of his farm and to verify our planned access route. The route on Google Maps seemed straightforward, but Dirk had his reservations because; in out of the way areas, Google did not show the location of fences and farm gates. We set off, relying only on Google.

Auke, Kechil and Johan stayed behind to try to view the meridian mark from a position near the Bird Hide on the Observatory property. After various misadventures and 6 km of really bad road, the rest of us were stopped in our tracks by the Blaauwberg Nature Conservancy's fence. We took photos of the view toward the Observatory and of the meridian mark, which we could see in the distance through the fence, and then decided to call it a day.

Fig 1. The South Meridian Pillar.

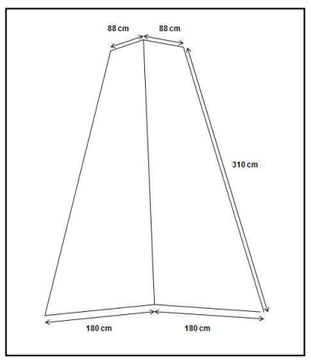
Fig 2. What appears to be the base of a later Trig Beacon that had fallen off.

I had to refuel in Killarney on the way home and, while doing that, decided to try and get to the meridian mark from a northerly direction. I located the farm Blaauwberg and discovered it was, in fact, owned by Mr Curry.

He offered me the use of a 4x4 vehicle to drive right up to the meridian mark. The first kilometre or so of the route is accessible in any vehicle, but the rest is 4x4 territory; uphill, sandy and riddled with mole tunnels.

Fig 3. Inscription on North face BL:RG SMM, probably "Blaauwberg South Meridian Mark 2".

Photographing and measuring the meridian mark was complicated by the surrounding chest-high, thorny shrubbery (Fig 1) and the long shadows cast by the late afternoon Sun. A section had come off the top of the construction but, after comparing the appearance of the cement, this seems to have been a later addition (Fig 2). Possibly it was put there by later surveyors (see Fig 3). I am sure this is the meridian mark, but it is not 14 feet (4.267 m) tall as stated in Verification and Extension of La Caille's Arc of Meridian at the Cape of Good Hope (See sketch, Fig 4 for its dimensions).



I strongly recommend a second visit to the site for verification purposes and to photograph it properly.

Fig. 4. Measured dimensions of the pillar.

of the setup to capture accurate data can be time consuming and takes away what little time we have for general observing and fun.

The Cost

Though DSLR's are mostly quite affordable and can be used successfully for photometry they are not the ideal camera for good spectroscopy and fall short due to the lack of a monochrome sensor. The requirements for photometry are minimal and can even be done without an equatorial mount though this is not ideal. For spectroscopy the requirements are very different. Over and above the main camera there is the spectrograph, a second camera for auto guiding as well as a good GEM for accurate tracking to consider when preparing your budget. This very quickly starts adding up to a large sum of money. With this in mind I felt it fair to give everybody an opportunity to learn how to process stellar spectra by supplying links to Fits format images taken by myself and placed in my Dropbox. This at least puts basic spectroscopy within the reach of anybody willing to take the time to learn the processes and software.

Future Developments

With regard to future developments it is intended to also supply images for those wanting to learn photometry but a plan has not yet been finalised on how best to approach this and whether it is fact a feasible project. The AAVSO and Variable Stars South have excellent educational and observing programs and it will be a waste of time trying to duplicate the work done by these established organisations.

Achievements

The high point of 2015 to date has to be Nova Sgr 2015 no 2. This transient was discovered on March 15 at mag 6 and the first photometric measurements and spectroscopic analysis started on March 16. Johannesburg was hampered by cloud and I was able to get my first reasonable low resolution spectrum on the morning of March 17 during a short break in the cloud. I then published this low resolution spectrum on the Yahoo Star Analyser and Spectroscopy forums. Sky and Telescope

actual visibility in the evening sky of the Big Five, which spans from January to August. I'd like to take the opportunity now to invite Centre chairs & observing officers, and any other interested parties (for example those active in outreach) to please contact me soonest to express their interest in taking part in the launch in 2016.

Finally, it's a great pleasure to announce that Hannes & Pieter Pieterse have been issued an Observing Certificate for planning and successfully completing an ASSA Top-100 Marathon, on the night of 2014 June 27/28.

(C) Spectroscopy and Photometry Report

Director – Jerome Jooste

Introduction

After taking the position of director of the photometry and spectroscopy section in 2014 it became very clear how few people were engaged in photometry and spectroscopy. Looking further afield to draw a reasonable comparison it is clear that on a global scale there are very few observers participating in these two fields. I took some time to research the reasons and came to the conclusion that there are several factors that mitigate the local amateurs from blame of lethargy and disinterest. The ASSA website was then updated with the intention of affording members sufficient information via links to stimulate interest.

Accurate Data

Both photometry and spectroscopy are areas where amateurs can add to data used by professionals. That said it must be considered that to provide useful data it has to be prepared with great care and stand up to rigorous scrutiny. This in itself is daunting and is also a factor that may deter members from participation. Objects such as bright transients that are at far southern declinations immediately puts our sparse bits of data in the limelight and not hidden in the throng of observations which is often the case for targets far north of the celestial equator. Also careful preparation

ASSA AGM 2015/16 MINUTES

Date: **5 Aug 2015**
Time : **20:00 to 22:00**
Venue: **SAAO Auditorium**

PRESENT

Council Members	Prof Matie Hoffman	President
	Dr Pierre de Villiers	Vice President
	Eddy Nijeboer	Cape Centre Chair
	Adv A J Nel	Treasurer
	Maciej Soltynski	Scholarships
	Lerika Cross	Secretary
Council Appointees	Auke Slotegraaf	Sky Guide Editor
	Christian Hettlage	Web Master
	James Smith	Web Manager
ASSET	Cliff Turk	ASSET Secretary
ASSA Members	Wendy Vermeulen	
	Keith Gottschalk	
	Richard Sessions	
	Heather Sessions	
	Chris Echard	
	Richard Ford	
	Willem Brazelle	

Apologies received: Dr I Glass, Chris Stewart, Case Rijsdijk, Peter Dormehl, Peter Cramb, Tim Cooper.

Welcome: E Nijeboer, the ASSA Cape Centre Chair, who fulfilled the role of host and Master of Ceremonies for the AGM, welcomed everyone and opened the meeting.

Minutes: The minutes of the previous AGM meeting, held on 6 August 2014, were accepted without amendments (Proposed A Slotegraaf, Seconded M Soltynski)

Reports (all reports are given at the end)
The ASSA President, M Hoffman, presented his Report on Council.

Reports received from the ASSA Directors
The reports that were received from ASSA Directors were tabled and presented and accepted by the meeting and will be placed on the website and in *MNASSA*:

A) Shallow Sky Section Report from the Director, D Blane.
B) Deep Sky Section Report from the Director, A Slotegraaf.
C) Imaging Section Report from the Director, A Versfeld.
D) Cosmology Section Report from the Director J de Bruyn.
E) Historical Section report from the Director C de Coning.
F) Instrumentation Section Report from the Director, C Stewart.
G) Observing Report received from the Director K Coronaios.
H) Photometry and Spectroscopy from the Director J Jooste.

Awards

ASSA Directors Awards: Dave Blane as Shallow Sky Director recommended Chris Vermeulen for a Director's Award for his Solar observations, see report.

Auke Slotegraaf as Deep Sky Observing Director recommended Hannes & Pieter Pieterse for Observing Certificates.

ASSA Scholarships: Convener Maciej Soltynski presented his report. He also announced that he has decided to step down after 14 years as Convenor of the ASSA Scholarships Committee. He gave the meeting an overview of how ASSA Scholarships progressed to the point where 29

Southern Skies" (by Dieter Willasch and myself) was published by Firefly Books (Canada) in November 2014.

During the year, Hannes Pieterse has taken on the task of Programme Co-ordinator for Deep-Sky Marathons, and he is thanked for this wonderful initiative.

Feedback was provided to several astrophotographers about the deep-sky objects they targeted, including Bob Sim and Leslie Rose.

In March, contact was made with Dr Glen Cozens regarding his recent publication on the intriguing catalogue by the early-19th century observer James Dunlop. An independent review of his conclusions is under way.

The Deep-sky Observer's Companion online database (DOCdb.net) continues to be used as a growing online repository, with 213 registered users. Prof Courtney Seligman contacted the Section via DOC with updated information, and I look forward to ongoing collaboration.

The year under review also saw the completion of the first phase of the "Big Five of the African Sky" project, an observing initiative aimed at creating public awareness of our night sky. During this completed phase, resources have been developed, in both English and Afrikaans, which include a handbook, flyers, sticker sets, T-shirts, mugs, and a digital media kit.
The support of ASSA Council, in the form of significant funding for the production of these materials, is gratefully acknowledged. Kos Coronaios, Carol Botha, Hannes Pieterse and Suki Lock are thanked for their significant input and continued support to reach this stage. Kyle Vorster is thanked for proof reading the documents, Hannes for taking care of the Afrikaans translation, and Dave Blane for his early promotional efforts.
During the second phase, ASSA Centres and other pockets of activity will be approached to gauge their interest, and local media will be used to promote the project. The timing will naturally have to coincide with the

also obtained an early spectrum of the nova which was published in Sky and Telescope magazine – well done Jerome!

In the Clusters and Nebulae division, observers have continued with their projects, as follows:

Magda Streicher's regular deep-sky writings continue to appear in MNASSA, the journal of the Webb Society, Canopus, and elsewhere. In the past year she has been revisiting brighter objects (above 9th magnitude) following the move of her observatory to less rural skies. She is working on Volume 2 of her "Deep-sky Delights", which she is considering bringing out as an e-publication, perhaps before the end of this year. A publisher has expressed interest in a book based on her deep-sky sketches, and negotiations are ongoing.

Richard Ford continues to work hard towards completing the Bennett Catalogue, a compilation of comet-like deep-sky objects identified by past ASSA President and comet hunter Jack Bennett.

Members of the Pretoria Centre continue to chase the ASSA Top-100 objects, and they and their ring leader Percy Jacobs are thanked for their dedication. The Top-100 featured in the 2014 November newsletter of the Centre, and in 2015 March Percy gave feedback on their activities.

The Director continues his observing programme of dark nebulae, with the goal of creating the first visual atlas of these most delightful objects. Astrophotographers and observers keen on collaborating are heartily welcome! Some small effort was put into developing an Android app for visual observers, and work is likely to continue on this in fits and starts in the months ahead. The first interview for a deep-sky documentary was filmed in February, and Hannes Pieterse and Hans van der Merwe are thanked for helping with the design and construction of the camera rig that was used to film the segment. The deep-sky book "Pearls of the

students have been funded up to now through part of their University courses.

M Hoffman thanked Maciej for his magnificent contribution to the area of student scholarships and his perseverance in finding funds.

Financial Reports 2014/15: AJ Nel presented the 2014 /15 Financial Report.

In response to a question from the floor he clarified accounting fees versus the auditing fees: Auditing fees were paid to the Auditor because of the extra effort required from the Auditor for the years 2011 to 2014, recently completed by R Glass, the Auditor. The fee paid was considered to be a once-off payment rather than recurring expense. The accounting fees are for services approved by ASSA council to enable a smooth auditing process going forward.

M Hoffman thanked AJ Nel for his effort and noted the effort that was required to get the auditor questions answered for the period 2011 to 2015.

It was agreed that the financial report will be placed on the website.

ASSA Endowment Trust: C Turk, the Secretary of the ASSA Endowment Trust, read extracts from the report from ASSET

ASSA Auditor: There were no objections to the proposal to request Ronnie Glass to continue as ASSA Auditor. It was noted that it is ASSA's own choice to be audited - it is not a mandatory requirement.

Office Bearers 2015/16: The meeting was advised that there was no need for voting for positions on Council o for Appointees as no more nominations were received than were required to fill available positions.

The Council and Appointees' positions for the 2015/16 year were presented and accepted as listed at the end. See separate list.

The new incumbents were welcomed: James Smith (Web Manager) and Claire Flanagan (Convenor of Scholarships).

M Hoffman also welcomed Pierre de Villiers as the new ASSA President for next two years and said ASSA is looking forward to his tenure.

AOB: As no other business was raised, E Nijeboer closed the formal part of the meeting.

Presidential Address: Prof Matie Hoffman presented his presidential address on Einstein.

Next Council Meeting: This will be held on 22 September 2015 19:30 via Skype.

Closure: E Nijeboer extended a gracious thank you to M Hoffman for his Presidential Address and thanked everyone for their attendance.

Gratitude and thanks were again extended to ASSA Cape Centre for their kind hospitality. The meeting closed at 22:05.

ASSA Council and Appointees 2015/16

To apply from 12 August 2015

Title	**Council Members 2015/16**
President	Dr Pierre de Villiers
Vice President	Prof Matie Hoffman
Vice President	Case Rijsdijk
Treasurer	Adv AJ Nel
Mem'ship Sec.	Bosman Olivier

the latter two areas, while I maintain the first. The Section's web pages have, following consultation with Dave, been fully restructured to reflect this reshuffling.

In April, the Section published its first "glossy" newsletter, titled 'Nightfall'. Available as a download from the Section's web pages, it features articles by Douglas Bullis, Carol Botha, Hannes & Pieter Pieterse, Magda Streicher, Dave Blane and myself. To date, the PDF has been downloaded 989 times. The next edition will appear in October.

In the Double Star division, Dave reports that activity has been low with no reports having been received from our members. Several "Double star of the Month" articles have been published on the website. Dave Blane continued with his measurements of the double star discoveries made by James Dunlop, and Magda Streicher continued her monitoring of 162 double stars as part of her 12-year follow-up programme.

Bob Argyle, the double star observer from Cambridge University, has published a series of double star measures in *Astronomische Nachrichten*. These were made with the 26-inch Innes telescope in Johannesburg during his recent visits to South Africa. In addition revised orbits for four southern double stars were calculated and published. His publication acknowledges the co-operation and assistance he has received from members of the Johannesburg Centre in getting the telescope to function correctly and for the repair of the Repsold filar micrometer which made his observing possible.

In the Variable Stars division, it is noted that visual estimates were submitted to the AAVSO by Peter Wedepohl, Percy Jacobs and Dave Blane. This year we again had a naked eye nova. Nova Sagittarii 2015 no. 2 reached magnitude 4.5 in April 2015 and was widely observed by observers around the world. South African observers Peter Wedepohl, Percy Jacobs, Dave Blane and Jerome Jooste observed the nova. Jerome

Thanks to Brian Fraser for providing alerts for minor planet occultations and for providing advice on observing these as well as Lunar occultations.

Satellites
Thanks to Greg for his input in handling queries on sightings of satellites and "UFO's" as well as the many interesting articles he posted on Facebook.

While many images of Shallow Sky objects have been submitted over the past year these are reported to the Imaging Section unless there is some analytical or observational component in the submission.

Awards
I would like to nominate Chris Vermeulen for a **Director's Award** for his Solar observations.

His monthly reports comprehensive and detailed analysis of Solar sunspot activity, including excellent images and graphs of sunspot groups and numbers. He has also analysed the variation of Mean Daily Frequency over a period of time and goes on to predict future activity.

Chris has also produced a comprehensive "*Amateur's Guide to Sunspot Observation*" which he has made freely available. He is also mentoring other observers who have expressed interest in observing sunspots.

(B) Deep Sky Report to the AGM, 2014–2015

Auke Slotegraaf

I'm pleased to report to this meeting that the Section has had a great year.

Administratively, the Section has re-organized into three activity areas: Nebulae & Clusters, Double Stars, and Variable Stars. Dave Blane has generously agreed to be a Variable Star Collaborator and he now oversees

Secretary	Lerika Cross
Council Member	Chris Stewart
Council Member	Dr Ian Glass
Cape Chair	Eddy Nijeboer
Durban Chair	Peter Dormehl
Garden Route Chair	Case Rijsdijk
Johannesburg Chair	Jerome Jooste
Pretoria Chair	Johan Smitjohanchsmit@gmail.com
Hermanus Chair	Dr Pierre de Villiers
Bloemfontein Chair	Marthinus Van Der Merwe
Midlands Chair	Steve de Vos

ASSA Council Appointees reporting to Council

MNASSA

Editor	Case Rijsdijk
Asst and Layout Ed.	Ian Glass
Asst. Layout Editor	Willie Koorts
Reviews Editor	Lia Labuschagne

Sky Guide

Editor	Auke Slotegraaf
Assistant Editor	Ian Glass

Website

Webmaster	Christian Hettlage
Web Manager	James Smith

ASSA

Convener of Scholarships	Claire Flanagan
Observing Director	Kos Coronaios

Comms. Officer	Case Rijsdijk
Outreach Officer	Johan Smit
Archivist	Chris de Coning

Sections (Groups)	**Directors 2015/16**
A - Shallow Sky: Asteroid, Meteors, Comets, Lunar, Occultations, Planetary, Satellites, Solar	Dave Blane
B - Deep Sky: Deep Sky, Double Stars, Variable Stars	Auke Slotegraaf
C - Photometry, Spectroscopy	Jerome Jooste
D - Cosmology and Astrophysics	Frikkie de Bruyn
E - Southern African Astronomy History	Chris de Coning
F Dark Sky	Johan Smit
G - Imaging Section	Allen Versfeld
H Instrumentation, including ATM	Chris Stewart

Editorial Board

MNASSA - Editor	Case Rijsdijk
MNASSA - Assistant Editor and Layout Editor	Ian Glass
MNASSA Assistant Layout Editor	Willie Koorts
Sky Guide - Editor	Auke Slotegraaf
Book Review Editor	Lia Labuschagne
Professional Astronomer	Emeritus Prof. Brian Warner
Professional Astronomer	Emeritus Prof. Michael Feast

Auke Slotegraaf, Hans and Evan spent three evenings with the Helderberg Eco Rangers observing and imaging the Geminid meteor shower. A comprehensive report was submitted which included a total of 53 Geminids and 23 sporadic meteors were counted. Thanks to Tim Cooper for his analysis and comments on these observations.

Asteroids

Regular workshops and training sessions for the International Asteroid Search Collaboration (IASC) were arranged and presented by Jerome Jooste with several schools being involved. At least two new asteroids have been discovered to date!

The IASC is an online educational outreach program for high schools and colleges, in which students make original asteroid discoveries. Each day students receive telescopic images, only hours old and taken along the ecliptic. Using the software Astrometrica, they accurately measure the time and position of asteroids moving in the background. The measurements are recorded in a report sent to the Minor Planet Centre (Harvard).

The ASSA NEO-Watch programme has been set up in collaboration with NASA. NASA has embarked on the Asteroid Grand Challenge, a program to "find all asteroid threats to human populations and know what to do about them". The Asteroid Grand Challenge involves detecting all near earth objects (NEOs) larger than 100 metres, characterise them and determine a way to mitigate them. But while dedicated search programs do a great job of finding these objects, follow up observations are required to characterise them and more precisely define their orbits. This pastime is well suited to dedicated amateur astronomers.

Occultations

The occultation of theta Librae by the Moon was observed with timing submitted by Kos Coroaios, Oleg Toumilovitch and Neville Young.

Chris Vermeulen has agreed accept the position of specialist/consultant in solar observing sub-section. His knowledge and experience will certainly be of great value to us in this area.

Moon

The Moon was a favourite target for our observers with numerous images of the Moon at all phases as well as conjunctions with bright stars and planets having been received.. Richard Ford was particularly prolific with his excellent images.

The International Observe the Moon Night initiative was well supported with reports received from Louis Trichardt, Henley-on-Klip, Johannesburg Observatory and the Orion Observation Group in Paarl.

Comets

The “Christmas Comet”, Comet 2014 Q2 Lovejoy was well observed by several Shallow Sky observers. Kos Coronaios submitted a number of images of the comet from November to February and described the development of the tail as well as tail disruption events.
Comet Siding Spring’s encounter with Mars was also well observed with numerous images of the encounter having been submitted.
Observations and images of Comet C/2013 V5 (Oukaimeden) were also submitted by Kos Coronaios.

Meteors

A number of fireball reports have been received, with some of them more convincing than others.

Several reports of “falling objects” and bright meteors were received which generated considerable discussion. Thanks to Tim Cooper, Brian Fraser and Allen Versfeld, among others, who helped in analysing the data and providing feed back to the people reporting the sightings.

ASSA Scholarships Report for the period 1 July 2014 to 30 June 2015

Maciej Soltynski (Convenor, ASSA Scholarships Committee)

The ASSA Scholarship

The ASSA Scholarship was established in 2000 to encourage the study of Astronomy at any Southern African university at the 2nd and 3rd year level. The Scholarship is funded by ASSA.

The ASSA Scholarship for 2015 has been awarded to Brandon du Preez, who is a second year science student at the University of Cape Town. He plans to major in physics and astrophysics.

Freya Bovim, who held the ASSA Scholarship in 2014, was forced to take an extended leave of absence from her studies for health reasons. She has in 2015 resumed her second academic year as a science student at the University of Cape Town.

HartRAO-ASSA Scholarships

The new HartRAO-ASSA Scholarships are generously sponsored by the Hartebeesthoek Radio Astronomy Observatory and are administered by ASSA. For 2015, the value of each one was R14 000, and they were awarded to the following students:

Michael Sarkis, a third year science student at the University of the Witwatersrand.

Jeremy Smith, a third year student studying electrical and computer engineering at the University of Cape Town.
Verlon Etsebeth, who is entering his third academic year in science at the University of South Africa. Verlon held a SAAO-ASSA Scholarship in 2014.

In 2016 the Hartebeesthoek Radio Astronomy Observatory will fund three HartRAO-ASSA Scholarships with a value of R16 000 each.

South African Astronomical Observatory - Astronomical Society of Southern Africa Scholarships

The SAAO - ASSA Scholarships for undergraduates are no longer available. They were awarded to twelve different students on 15 occasions in the period 2007-2014.

The three students who held the Scholarships in 2014, Francois Botha, Dean De Villiers and Verlon Etsebeth, are all continuing with their undergraduate studies in 2015. Verlon Etsebeth has been awarded a HartRAO-ASSA Scholarship for 2015.

Expressions of appreciation

Dr Ian Glass, Sivuyile Manxoyi (SAAO), Marion West (HartRAO) and Andrew Gray are thanked for their valued inputs in the evaluation and selection of candidates during the period under review. Thanks also go to the lecturers and teachers who supplied assessments of candidates.

HartRAO and its Director, Prof Ludwig Combrinck, is thanked for generously making funds available for the HartRAO Scholarships. The support of Prof Nithaya Chetty, Deputy CEO Astronomy at the NRF, is noted with appreciation.

SAAO is thanked for making funds available for the SAAO-ASSA Scholarships in 2014.

After serving as Convenor of the ASSA Scholarships Committee for 14 years, Maciej Soltynski will step from down this position at the end of the ASSA year.

ASSET 2014

Report to ASSA AGM on 5 August 2015

The Trustees are pleased to report that gross annual income from investment interest received during 2014 amounted to R6 043. From this Amount must be deducted a tax provision of R2 417 and operating costs of R217 which leaves a nett disposable income for the year of R3 409.

A grant of R5 739.90 was made to Johannesburg Centre of ASSA in January to cover the full cost of shelving to store and preserve the photographic plate collection from the Union/Republic Observatory.

The nett result is a loss for the year of R2 331. However, since the end of the year interest rates have improved and it is hoped that 2015 will show a recovery.

The Trust is always prepared to consider requests for financial assistance within the reasonable limits imposed by its income.

Signed: C.R.G. Turk. Trust Secretary.

(A) Annual report 2015- ASSA Shallow Sky Observing Section

by Dave Blane

Sun

Chris Vermeulen was the most active Shallow Sky contributor having submitted excellent solar images and sunspot analysis in regular monthly reports.

The spectacular naked-eye sunspot AR2192 was well observed with images and received from many observers including Chris Vermeulen, Richard Ford and Kos Coronaios.