



The PRETORIA CENTRE

of the

Astronomical Society of Southern Africa

www.pretoria-astronomy.co.za

NEWSLETTER OCTOBER 2014

Next meeting

Venue: The auditorium behind the main building at Christian Brothers College (CBC),
Mount Edmund, Pretoria Road, Silverton, Pretoria.

Date and time: Wednesday 22 October at 19h15.

Programme:

- **Beginner's Corner:** "A short focus refractor utilizing a camera lens" by Pat Kühn.
- **What's Up?** by Johan Smit.
- *****10 minute break — library will be open*****
- **Main talk:** "The longitude problem" by Andy Overbeek.
- Socializing over tea/coffee and biscuits.

The chairperson at the meeting will be Percy Jacobs.

Next observing evening

Friday 17 October from sunset onwards at the Pretoria Centre Observatory, which is also situated at CBC. Turn left immediately after entering the main gate and follow the road.

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NOTICE BOARD

Images and video clips

Winter in Argyre. Hooke crater imaged by ESA's Mars Express during winter in the southern hemisphere. http://www.esa.int/Our_Activities/Space_Science/Mars_Express/Winter_in_Argyre

Rainbow aurora. ESA astronaut Alexander Gerst has one of our planet's best views of this phenomenon, circling 400 km up on the ISS. http://www.esa.int/spaceinimages/Images/2014/09/Rainbow_aurora

Craters on the edge. The Moon's polar regions have been dubbed by astronomers as 'Luna Incognita', or 'the unknown Moon'. This mosaic shows a trio of craters very near to the Moon's north pole, on the edge of the Luna Incognita. http://www.esa.int/spaceinimages/Images/2007/02/Craters_on_the_edge

Astronomy Picture of the Day Archive. <http://apod.nasa.gov/apod/archivepix.html>

Giant solar flare. See an image of the giant solar flare monitored by SOHO in 2003. http://www.esa.int/spaceinimages/Images/2014/11/Giant_solar_flare

Rosetta mission selfie at 16 km. Rosetta snapped a 'selfie' at comet 67P/Churyumov-Gerasimenko from a distance of about 16 km, with the comet in the background. http://www.esa.int/spaceinimages/Images/2014/10/Rosetta_mission_selfie_at_16_km

Chairman's report for the meeting of 24 September 2014 - by Fred Oosthuizen

Notwithstanding the fact that many were celebrating Heritage Day the attendance at the meeting of 18 members and 3 visitors was good.

Announcements: The Pretoria club was once again well represented at SCOPEX. Chairman Bosman Olivier congratulated Johan Smit and his son Paul and Johan Moolman on their achievements in the Astro- Photographic section, and also Johan Smits simple but very effective method of collimating a pair of binoculars.

Beginner's corner was presented by Nigel Rotherham. *"Where have the stars gone?"* After some in depth elastration and the effects of light pollution Nigel explained that *"Globe Night"* is an international citizen-science campaign to raise public awareness of the impact of light pollution by inviting citizen-scientists to measure their night sky brightness and submit their observations to a website from a computer or smart phone.

Nigel indicated the 5 simple steps to be followed and made an appeal to club members to become involved.

Use the *"globeatnight.org"* website to help find your constellation in the night sky.

Use the same website to find your location (Latitude and longitude) that you are making your observation from.

About an hour after sunset allow your eyes to adjust to the darkness and make your observations.

Match your observation to one of the 7 magnitude charts and note the amount of cloud cover.

Report the Date, Time, Location (latitude/longitude), the chart you chose, and the amount of cloud cover at the time of observation. Make more observations from other locations, if possible.

The main talk of the evening was introduced by Johan Smit in the form of three videos which showed and explained in detail the **European Space Agency's GAIA mission**, which is to chart a three-dimensional map of our Galaxy, the Milky Way, in the process revealing the composition, formation and evaluation of our galaxy.

Gaia will provide unprecedented positional and radial velocity measurements with accuracies needed to produce a stereoscopic and kinematic census of about *one billion stars* in our galaxy and throughout the local group. This amounts to about only one percent of the Galactic stellar population.

Gaia will monitor each of its target stars about 70 times over a five year period. It will precisely chart their position, distance, movements, and changes in brightness. It is expected to discover hundreds of thousands of new celestial objects, such as extra-solar planets and brown dwarfs, and observe hundreds of thousands of Asteroids within our own solar system. The mission will also study about 500 000 distant quasars and will provide stringent new tests of Einstein's General Theory of Relativity.

Gaia will achieve its goals by repeatedly measuring the position of all objects down to magnitude 20 (about 400 000 times fainter than can be seen with the naked eye.) For all objects brighter than 15 magnitude (4000 times fainter than the naked eye limit), Gaia will measure their position to an accuracy of 24 microarcseconds. This is comparable to measuring the diameter of a human hair at a distance of 1000 Km.

Gaia was launched on a Soyuz- STB/Freget-MT rocket from the European Spaceport in Kourou, to a L2 Lagrangian point at a distance of 1.5 million Km beyond Earth's orbit where it is free from restriction and far from the heat radiated by Earth.

Gaia has a 10M in diameter skirt which acts as both a sunshade to permanently shade its two telescopes and allow their temperatures to drop to below – 100°C and also to power the generator for the spacecraft. The underside of the shield is partially covered with solar panels and will always be facing the Sun. Ω



Winner of the August 2014 Observing Challenge

The winner was James Smith. He receives a R100 voucher to spend at Eridanus Optics.

PRETORIA CENTRE ASSA - OCTOBER 2014
OBITUARY – Doc Jannie Smit
by Neville Young

Dr Jannie Smit – known to many as Doc - died on Sunday 7 September 2014 - three weeks short of his 90th birthday.

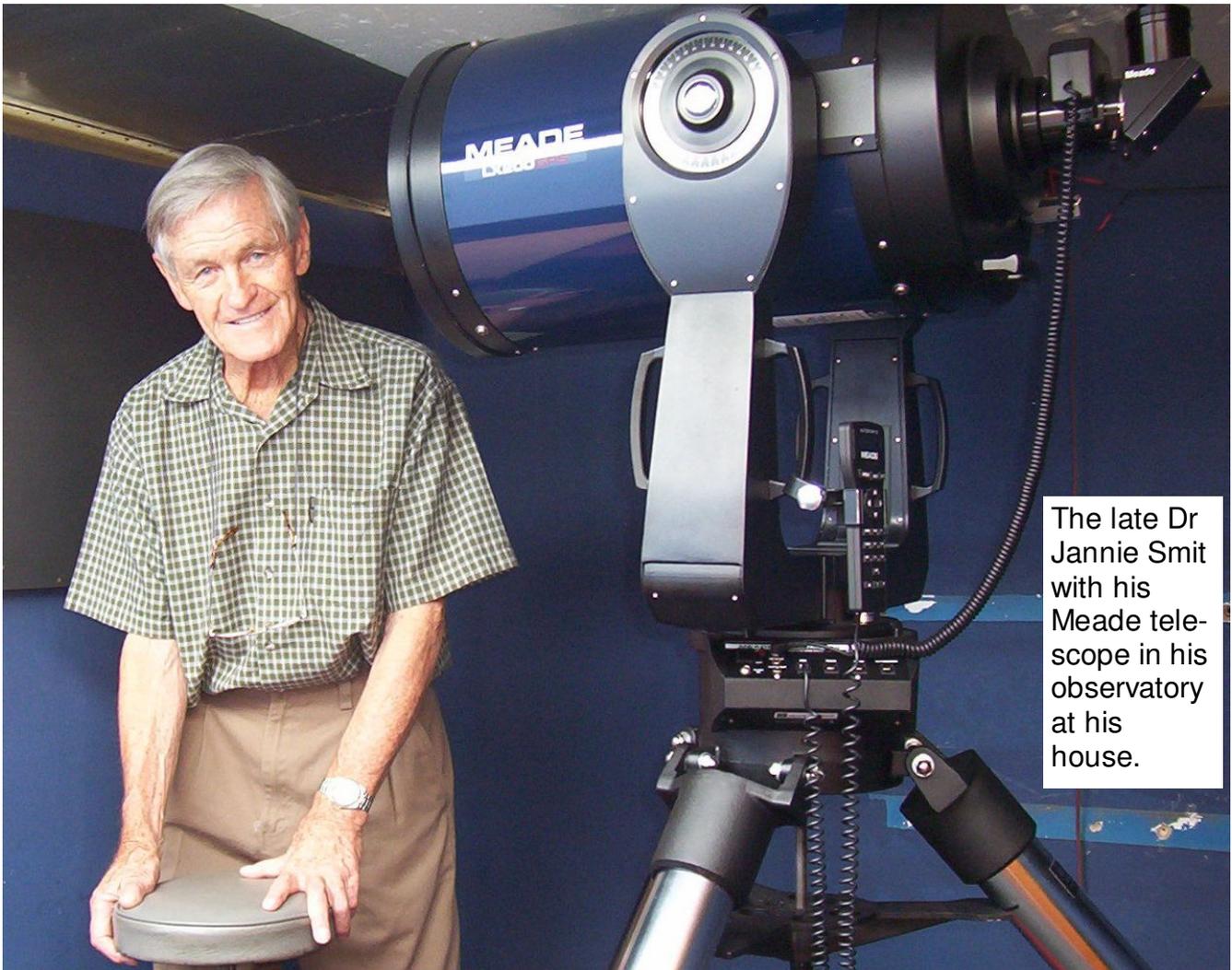
Jannie was a member of the Pretoria Centre of ASSA when I joined in October 1985. I recall him taking the floor at a meeting enthusiastically showing a number of astro photographs taken by a very young and shy Mauritz Geysler. Jannie's enthusiasm in sharing his hobby extended to teaching me how to do a grazing occultations and joining the club at several astronomy weekends away.

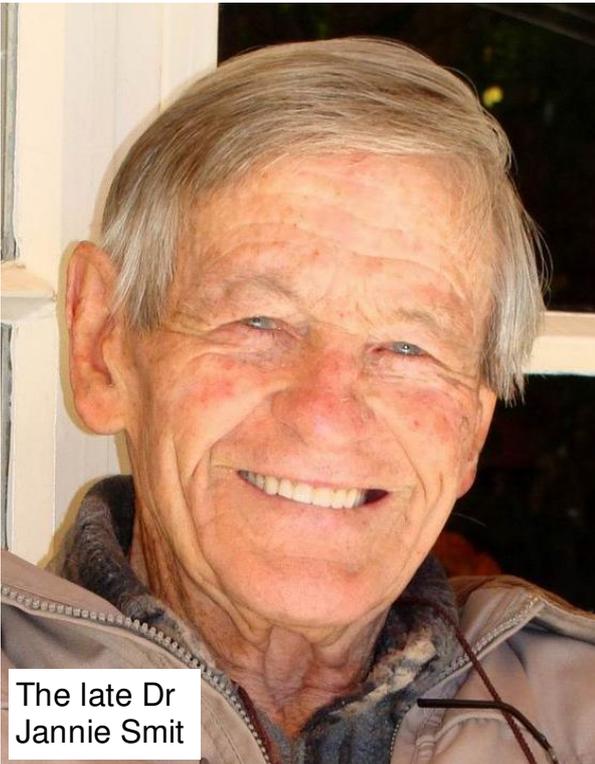
On one of these camps, Jannie's Schmidt-Cassegrain suddenly fogged up and I have a video of him frantically waving a clipboard back and forth past the correcting plate to dry off the dew.

My first grazing occultation was as an assistant to Jannie. He had organised the 'graze' and positioned the participants at 200 meter intervals along a road north of Pretoria. The timing method used in those days was to listen to the short-wave radio time signal and then to run a cassette tape recorder that recorded the observer's shouts of "Gone" and "Back" superimposed on the time signal. On that evening Jannie was unable to tune in to the time signal and it was left to me to make clucking sounds at one second intervals and the 'poop' tone every minute while keeping an eye on my wrist-watch. After 10 minutes of doing this, my tongue was in spasm and I had a very dry mouth, but not in vain – the data collected together with that of the other observers gave us a clear lunar limb profile.

My first view of a Mercury transit was at daybreak one morning from Jannie's house. He used a 4" reflector which he had modified for solar observing.

On another 'graze' occasion, he lent me a rifle telescope to make my own observations as part of





The late Dr Jannie Smit

the observing team. I mention this because Jannie was a keen marksman and for many years was a member of the Springbok Bisley target shooting team.

Tennis was a game that he and his wife Bokkie enjoyed till their seventies. Both were 'A' grade players in their club.

His birthplace was Reitz in the Free State, but once he had qualified as a Mathematics and Science high school teacher, he lived in Swaruggens and then spent several years in Alberton. In 1962 he moved to Pretoria where, after teaching at Hendrik Verwoerd Hoërskool for a few years, he joined the staff at the University of Pretoria lecturing in Applied Mathematics. By all accounts he was a highly motivated teacher, which explains his willingness to help those of us who were new to astronomy.

Astronomy must have been an interest of his from an early age because his daughter Sonja recalls as a little girl being very proud of her father for having built his own telescope, through which she had her first views of the stars and planets. After he retired, he decided to devote more time to astronomy and so he built an observatory on the roof of his house.

This was accessed from a beautifully crafted staircase in the lounge, which meant that he did not have to go outdoors to observe. I remember him feeling bad when he stopped regularly attending Pretoria Centre ASSA meetings, saying that he valued every clear sky opportunity to spend time in his observatory actually 'doing' astronomy as opposed to 'talking' astronomy.

This enthusiasm and dedication led to Jannie becoming an avid variable star observer, eventually logging 19,027 visual observations. According to Brian Fraser "Jannie Smit was one of the most accomplished variable star observers in South Africa." His efforts were recognised by the American Association of Variable Star Observers which extended its appreciation by way of a plaque awarded *in absentia* to him at the 100th meeting of the AAVSO in Massachusetts in 2011. At an informal ceremony attended by various representatives of ASSA and the Pretoria Centre and held at his home in 2012, the plaque was presented to him in person by Brian Fraser.

Another achievement was that of being the first person to visually observe the occultation of a moon of an asteroid, long before asteroids were known to have companions. Jannie leaves his wife Bokkie, daughters Sonja and Estelle and son Jan. Ω

The late Jannie Smit (seated) with some other well-known amateur astronomers, standing left to right: Brian Fraser, Tim Cooper, Neville Young, Michael Poll, Johan Smit.



The “saturated” moon: A glimpse at lunar chemistry - by Johan Moolman

| CAMERA/ Lens/ Tele- scope | MOUNT/ TRACK- ING | SETTINGS | FRAMES | LOCATION | COMMENTS |
|--|--|--|---|--|---|
| Canon 5D111 DSLR. TeleVue 127is refractor (Eq. to 660mm f5.2 lens), plus Large Field Corrector. | Celestron CGEM Dx mount, Un- guided | ISO 400, 1/125 th sec. exposure. Triggered with Canon cable re- mote. | Single expo- sure. JPEG. Cropped and curves ad- justed in Pi- casa and Paint.NET. | Pretoria residence. (south east- ern part of the city) | Should include “full disc” of the Moon. |

“Over-cooking” the saturation - yielding COLOUR on the Moon. Light areas: Southern highlands.

Mare regions: low reflectance due to a large amount of iron oxide (FeO).

Areas with HIGH titanium oxide (TiO₂) - in addition to FeO - have even LOWER reflectance.

TiO₂ shifts the colour from “red/ brown” to “blue”.

See the difference between Mare Serenitatis (lighter brown) and Mare Tranquillitatis (darker and bluer) because of it's >> TiO₂ levels.



Magda Streicher with her 16-inch telescope in her observatory.**Feature of the month: The close encounter of a comet with Mars on October 19
by Pierre Lourens**

Comet C/2013 A1, aka comet Siding Spring, will pass within about 139500 kilometers of Mars on 19 October. NASA's extensive fleet of science assets, particularly those orbiting and roving Mars, have front row seats to image and study the once-in-a-lifetime comet flyby. NASA is preparing to exploit the opportunity. Ω

<http://www.nasa.gov/press/2014/october/nasa-prepares-its-science-fleet-for-oct-19-mars-comet-encounter/>

A famous globular cluster named Messier 30 - by Magda Streicher

Manilius wrote at Caesar's birth, that the almanac of 1396 states: "Whoso is borne in Capricorn schal be ryche and wel lufyd."

The constellation Capricornus is home to a deep sky object, the globular cluster NGC 7099, popularly known as Messier 30. What a delight it must have been when Charles Messier discovered this object on the 3rd of August 1764. In his notes he said: "I discovered a nebula below the tail of Capricorn, very near the star of sixth magnitude, the 41st of that constellation." He noted it as "round and contains no stars." Globular Cluster M30 is 26000 light-years distance and about 90 light-years across.

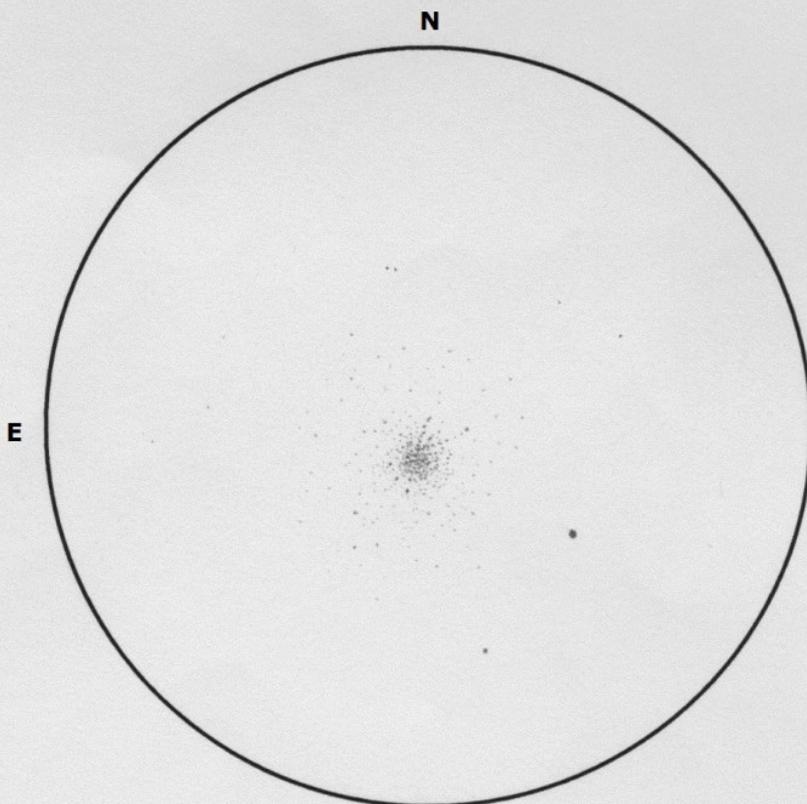
William Herschel described it as "a brilliant cluster, the stars of which are gradually more compressed in the middle. It is insulated, that is, none of the stars in the neighbourhood are likely to be connected with it. The figure is irregularly rounded, and towards the north are two rows of bright stars 4 or 5 in a line. In this accumulation of stars, we plainly see the exertion of a central clustering power, which may reside in a central mass." William Herschel was the first person to resolve the cluster around 1784.

Admiral Smythe was moved to wild speculation when he observed this Globular Cluster: "What an immensity of space is indicated and such an arrangement be intended, for a mere appendage to the speck of a world on which we dwell, and to soften the darkness."

The Globular Cluster resembles (at least to me) a sort of elongated south-north honeycomb covered with bee-stars, well resolved and more so to the northern side. Faint stars mingle

asterism-like in the northern section of the cluster while two prominent strings can be seen extended north and north-west. The north-western string is slightly longer than its northern counterpart, thereby giving me the impression of a pair of firefly antennae. The south-eastern part of the Globular is broken down in starlight, and, in a way, cut-off with a short string of four stars. About 23' towards the east south-east, the 5.2 magnitude 41 Capricornii can be seen showing off a yellow jacket (See sketch of M30 by me).

Each one of us has our own way of describing a deep sky object, and every viewing presents an opportunity which will create a wonderful memory.



NGC 7099 - Globular Cluster - Capricornus

| Object | Type | RA | DEC | MAG | SIZE |
|------------------------|---------------------|----------|-----------|-----|------|
| NGC 7099 Messier 30 | Globular Cluster | 21h40m.4 | -23°11'.0 | 7.3 | 11' |

Noteworthy astronomy-related articles on the Internet

Solar system

- **Rosetta to deploy lander on 12 November.** ESA's Rosetta mission will deploy its lander, Philae, to the surface of Comet 67P/Churyumov–Gerasimenko on 12 November. http://www.esa.int/Our_Activities/Space_Science/Rosetta/Rosetta_to_deploy_lander_on_12_November
- **Titan's polar cloud is cold and toxic.** As winter approaches on Titan, a giant, toxic cloud is hovering over its south pole, after the atmosphere has cooled in a dramatic fashion. http://www.esa.int/Our_Activities/Space_Science/Cassini-Huygens/Titan_s_swirling_polar_cloud_is_cold_and_toxic
- **NASA mission points to origin of “Ocean of Storms” on Earth’s moon.** Using data from NASA’s GRAIL mission, scientists have solved a lunar mystery almost as old as the moon itself. <http://www.nasa.gov/press/2014/october/nasa-mission-points-to-origin-of-ocean-of-storms-on-earth-s-moon/>
- **The Morokweng crater in NW Province.** http://en.wikipedia.org/wiki/Morokweng_crater
- **NASA’s newest Mars mission spacecraft enters orbit around Red Planet.** NASA’s Mars Atmosphere and Volatile Evolution (MAVEN) spacecraft successfully entered Mars’ orbit recently. It will now prepare to study the Red Planet’s upper atmosphere as never done before. MAVEN is the first spacecraft dedicated to exploring the tenuous upper atmosphere of Mars. <http://www.nasa.gov/press/2014/september/nasa-s-newest-mars-mission-spacecraft-enters-orbit-around-red-planet/>
- **NASA’s 3-D study of comets reveals chemical factory at work.** A NASA-led team of scientists has created detailed 3-D maps of the atmospheres surrounding comets, identifying several gases and mapping their spread at the highest resolution ever achieved. <http://www.nasa.gov/press/2014/august/goddard/nasa-s-3-d-study-of-comets-reveals-chemical-factory-at-work/>
- **Lutetia’s dark side hosts hidden crater.** Grooves found on Lutetia, an asteroid encountered by ESA’s spacecraft Rosetta, point to the existence of a large impact crater on the unseen side of the rocky world. http://www.esa.int/Our_Activities/Space_Science/Rosetta/Lutetia_s_dark_side_hosts_hidden_crater

Spin-offs from space research

- **Actor Seth Green shows how NASA is with you in the air and on the road.** <http://www.nasa.gov/press/2014/june/actor-seth-green-shows-how-nasa-is-with-you-in-the-air-and-on-the-road/>
Don't neglect to click on the following link on that website: <http://spinoff.nasa.gov>

Black holes

- **HST helps find smallest known galaxy containing a supermassive black hole.** <http://www.nasa.gov/press/2014/september/hubble-helps-find-smallest-known-galaxy-containing-a-supermassive-black-hole/>

Exoplanets

- **NASA telescopes find clear skies and water vapour on exoplanet.** Astronomers using data from three of NASA's space telescopes - Hubble, Spitzer and Kepler - have discovered clear skies and steamy water vapor on a gaseous planet outside our solar system. <http://www.nasa.gov/press/2014/september/nasa-telescopes-find-clear-skies-and-water-vapor-on-exoplanet/>
- **Proto-planetary smashup discovered around baby star.** A dramatic change in telltale infrared radiation emissions came from warm dust circling the star.

<http://news.discovery.com/space/alien-life-exoplanets/proto-planetary-smashup-discovered-around-baby-star-140828.htm>

Applications of Earth-orbiting artificial satellites

- **New NASA technology brings critical data to pilots over remote Alaskan territories.**
<http://www.nasa.gov/press/2014/october/new-nasa-technology-brings-critical-data-to-pilots-over-remote-alaskan/>

Extragalactic astronomy

- **HST spots spiral bridge of young stars linking two ancient galaxies.** NASA's HST has photographed an unusual structure 100 000 light years long, which resembles a corkscrew-shaped string of pearls and winds around the cores of two colliding galaxies. <http://www.nasa.gov/press/2014/july/hubble-spots-spiral-bridge-of-young-stars-linking-two-ancient-galaxies/>
- **Bizarre nearby blast mimics Universe's most ancient stars.** ESA's XMM-Newton observatory has helped to uncover how the Universe's first stars ended their lives in giant explosions. Astronomers studied a gamma-ray burst from a blue supergiant star. These stars are thought to have been very common in the early Universe. [http://www.esa.int/Our_Activities/Space_Science/Bizarre_nearby_blast_mimics_Universe s most ancient stars](http://www.esa.int/Our_Activities/Space_Science/Bizarre_nearby_blast_mimics_Universe_s_most_ancient_stars)

Basics: the Local Group of galaxies - by Pierre Lourens

The Virgo Supercluster (of galaxies), aka the Local Supercluster, contains the Virgo Cluster and the Local Group, amongst many other clusters and groups. The Local Group comprises more than 54 galaxies, including numerous dwarf galaxies. It includes the Andromeda galaxy, its most massive member and the Milky Way, its second most massive member. These two spiral galaxies each have a system of satellite galaxies. The gravitational center of the Local Group is located somewhere between these two galaxies. The Local Group has a diameter of 10 million light-years and has a binary (dumbbell) distribution.

And to give you some perspective: the Virgo Supercluster is just one of millions of superclusters in the observable Universe.....

See http://en.wikipedia.org/wiki/Local_Group for a clickable map of the Local Group.

Report of observing evening on September 19th 2014 - by Michael Poll

We were about 15 people with half a dozen telescopes. Tamsin brought some guests with the main idea of them seeing Saturn, and in the end that's most of what we did see! There was quite a lot of broken cloud, sufficient to overcome the making of any serious observations but we did make some progress.

We saw the brighter stars now and then through gaps in the cloud– one amazing event was an Iridium flare, it must have been about magnitude -8, and it could be seen through the cloud cover.

Of the bright stars, Vega was at its highest in the north, with Altair above and to the east, and Arcturus setting in the north west. We were looking for Mercury and Spica, but the cloud beat us there. The best bit of open sky showed us Saturn, Mars, the "head" of Scorpius, and most of the rest of the constellation, but not all at once. We were therefore able to show Saturn in the telescopes, and all the visitors saw it. We noted Mars had just moved into the head of Scorpius, and that it would be next to Antares on September 28th.

Otherwise we had discussions, in particular we showed the use of the Skymap.com and explained the rise and set chart in the Sky Guide.

The next observing evening will be on October 17th 2014 when we can at least try for comet Siding Spring as it closes in on Mars. Ω

Provide a caption. This photograph was taken by Johan Moolman at ScopeX on 13 September 2014. **Left to right:** Johan Smit, Dave Hughes, Rainer Jacob. Provide a caption to me at pierre.lourens@telkomsa.net - the funniest ones will be published in this newsletter next month.



Pretoria Centre committee

| | | |
|---------------------------------------|---------------------|--------------|
| Chairman | Bosman Olivier | 082 883 1869 |
| Vice Chairman | Pat Kühn | 082 895 5686 |
| Secretary | Michelle Ferreira | 073 173 0168 |
| Newsletter Editor | Pierre Lourens | 072 207 1403 |
| Treasurer and Membership Secretary | Rynhardt van Rooyen | 082 325 8745 |
| Assistant Treasurer | Michelle Ferreira | 073 173 0168 |
| Librarian | Danie Barnardo | 084 588 6668 |
| Assistant Librarian | Pat Kühn | 082 895 5686 |
| Curator of Instruments | Johan Smit | 072 806 2939 |
| Public Relations Officer | Fred Oosthuizen | 072 373 2865 |
| Observing Coordinator | Percy Jacobs | 082 498 4680 |
| Webmaster | Danie Barnardo | 084 588 6668 |
| Member | Michael Poll | 074 473 4785 |
| Member | Tony Viljoen | 072 247 6648 |

Old newsletters: All old newsletters from January 2004 onward are on our website. They contain a record of our Centre's activities as well as astronomical information.

Database: Members are reminded that a database of the books in our library is to be found on our website. The database was created by Danie Barnardo, one of our committee members.