UMnyele weZulu

EDITION 4: 9 AUGUST 2024 XXXII IAU GENERAL ASSEMBLY CAPE TOWN, SOUTH AFRICA

Happy National Women's Day

Celebrate Women in Space Science & Astronomy today

Satellite Mitigation Project Wins Major Grant

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Indigenous communities & astronomy

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Check out our curated Cape Town Food Guide - Pg 26

science & innovation
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NRF National Research Foundation

AfAS African Astronomical Society

UMnyele weZulu

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Welcome to our 4th issue of "Umnyele wezulu," the IAU General Assembly 2024's daily newspaper. We would like to wish all women in South Africa a happy Women's Day and encourage you to check out our special Public Women's Day Event. It is truly something special and celebrates the true spirit of Women in Space Scienc and Astronomy. You can also have a look at our specially curated Cape Town Food Guide if you are looking for something different.

Upcoming Events

Astronomers Got Other Talents
09 Aug

Cosmic Echoes art exhibition
06 to 15 Aug

Invited Discourse:
Prof Joop Schaye
09 Aug

IAUS 391: The first chapters of our cosmic history with JWST
09 Aug

Webb: A new exploration of the cosmos
09 Aug

Executive WG on Dark and Quiet Sky Protection
12 & 15 Aug

Live observing with Murriyang, CSIRO's Parkes radio telescope
12 & 13 Aug

IAU GA 2024 Online Networking Lunch
12 Aug

Cultural Evening
13 Aug

(Top & background) The galaxy PKS 2014-55, located 800 million light years from Earth, is classified as 'X-shaped'. Image: NRF-SARAO

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XXXII IAU GENERAL ASSEMBLY

CAPE TOWN, SOUTH AFRICA, 2024

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IAU-GA2024 Public Women's Day Event

Featuring Astronaut Mae Jemison and a live radio contact with the ISS! (in person and online)

(Top) Mae Jemison, NASA astronaut. Image: NASA

Commemorate Women's Day by celebrating Women in Space Science and Astronomy at IAU-GA2024.

Join us for an inspiring and educational event at the Cape Town International Convention Centre (CTICC) on 9 August as we commemorate Women's Day by celebrating the remarkable contributions of women in science and astronomy. This special occasion is open to the public, and we warmly invite you and your families to attend and be part of this enriching experience.

Keynote Speakers and Talks

We are honoured to host a lineup of distinguished women scientists and astronomers who will share their journeys, challenges, and achievements. Their talks aim to inspire the next generation of scientists and highlight the pivotal role women play in advancing scientific knowledge.

The event will feature:

- Talk and Q&A by Mae Jemison, NASA astronaut
- Live radio contact with Sunita Williams on board the International Space Station
- Thrilling science shows, fascinating exhibitions
- Tabletop telescope buildinag
- Interactions with leading astronomers

Come and be inspired by the incredible stories and achievements of women in science and astronomy.

Let's celebrate Women's Day by acknowledging their contributions and encouraging a future where women continue to thrive in these fields. The event is free to attend and open to all ages and genders. We look forward to seeing you and your family at this momentous event!

PLEASE NOTE

Entry is free, but please tickets will be required to enter the venue.

CLICK HERE for more info and to book your tickets

Watch the Live stream here

Satellite Mitigation Project Led by IAU CPS Wins Major Grant

The initiative is developing tools to accurately predict when satellites will cross the sky

The U.S. National Science Foundation has awarded $750,000 to a project led by the IAU Centre for the Protection of the Dark and Quiet Sky from Satellite Constellation Interference to reduce the science impact caused by satellite constellations on astronomical observatories.

The IAU Centre for the Protection of the Dark and Quiet Sky from Satellite Constellation Interference (IAU CPS), which is co-hosted by NSF NOIRLab and the SKAO, has received a SWIFT-SAT grant [1] from the U.S. National Science Foundation (NSF).

The funded project aims to develop a set of publicly accessible software tools and online services that for the first time would allow astronomers to precisely predict the positions, time of passage and brightness of satellites. One tool called SatChecker, an early version of which was developed by members of the CPS, will help ground-based observatories by providing accurate predictions of satellite positions and their optical brightness. This valuable information will aid astronomers in adapting observation schedules and mitigating some negative impacts on their observations.

“This NSF funding will improve observatories’ ability to reduce the frequency of satellite passes affecting observations, therefore improving science outcomes,” said Connie Walker, Co-Director of the IAU CPS and NOIRLab co-PI of the SWIFT-SAT proposal.

The past decade has seen a surge in commercial constellations, with thousands of satellites launched into low Earth orbit. In as little as five years, 7000 constellation satellites have been launched into orbit — almost as many as the number of individual satellites launched since the dawn of the Space Age. Their number, high brightness, and radio emissions pose a major challenge for ground-based telescopes as they fly over during astronomical observations.

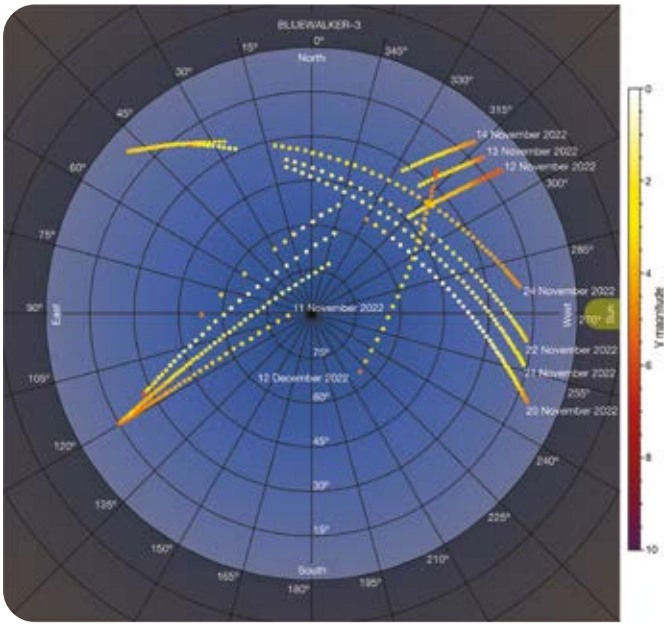
The grant from NSF supports the work of the CPS SatHub, a 200-member-strong international effort that works on the collection and analysis of artificial satellite observations and aims to centralise the development of software tools for the community.

In addition to developing tools to more precisely forecast satellite passes, the funded work will mitigate impacts on two key science goals for the Vera C. Rubin Observatory Legacy Survey of Space and Time (LSST) - characterising transients and performing a Solar System census.

Meredith Rawls, CPS SatHub Co-Lead and Research Scientist at the University of Washington, who works for Rubin Observatory and will advise colleagues working on the funded project, said, “Rubin Observatory is about to begin a groundbreaking decade-long survey of the night sky, and it will see loads of streaks, glints, and flares from artificial satellites. This funding will enable us to better understand and mitigate the resulting science impacts in Rubin data products.”

The news from NSF follows a range of positive developments on the protection of dark and quiet sky from satellite constellation interference in the past few

(Top) A long-exposure image of the Orion Nebula with a total exposure time of 208 minutes showing satellite trails in mid-December 2019. Credit: A. H. Abolfath/NOIRLab/NSF/AURA



Apparent brightness of the BlueWalker3 satellite after unfolding over multiple passes. This plot shows the correlation of apparent brightness with the on-sky position of the satellite relative to the Sun, becoming in some cases one of the brightest objects in the sky.

months.

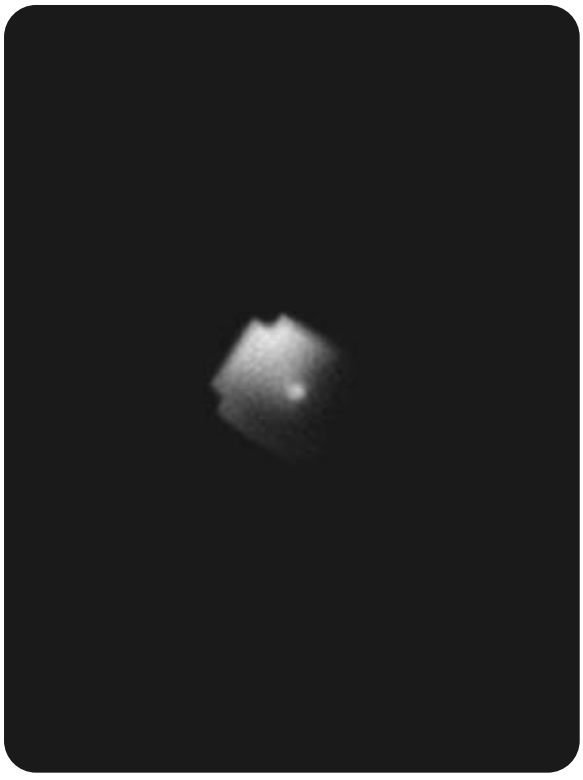
In December a UN agency, the International Telecommunication Union (ITU), agreed to look at the risks posed by satellite constellation interference on the protection of radio quiet zones and radio telescopes over the next three years, after intense discussions led to a resolution endorsed by its 193 member countries.

Similarly, the UN's Committee on the Peaceful Uses of Outer Space (COPUOS), the UN's top body for space matters, approved in June the inclusion of an item on one of its subcommittee's agenda for the next five years to address the emerging issues and challenges posed by large constellations. Several dozen nations have been supportive of efforts to address this topic within COPUOS, which has resulted in the establishment of a Group of Friends of the Dark and Quiet Sky within COPUOS to promote awareness of the issue.

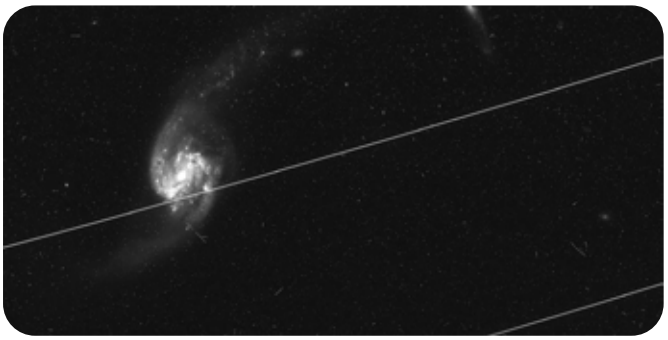
With growing momentum in international bodies such as the ITU and COPUOS, the CPS, until now run in large part through volunteer effort, a small grant from the IAU, and in-kind support from its host institutions NOIRLab and SKAO, is looking to increase its ability to support the protection of the dark and quiet sky by securing additional funding to conduct research and analysis.

"There's been significant progress in recent months in raising awareness of the issue," said Richard Green, interim CPS Director. "We now need increased financial support and advocacy at national level to impress on policy makers the need for further action and for industry to work with the astronomy field on mitigating the impact of satellite constellations."

Next week at the IAU General Assembly currently taking place in Cape Town, South Africa, the 12,000 members of the IAU will have a chance to vote on a resolution that proposes to add, for the first time, protection of the dark and quiet sky to the IAU's mandate, and urges the IAU to encourage organisations in its almost 100 member countries to increase advocacy of efforts to protect the dark and quiet sky with their respective governments. Adoption of the resolution would strengthen the IAU's and the CPS's mandate to address the challenges presented by satellite constellations to astronomy, as well as increasing pressure on governments to strengthen legislation in order to protect large public investments in astronomy infrastructure.



An image of the 8 meter x 8 meter BlueWalker 3 satellite's antenna taken from the ground. Credit: M. Tzukran



When satellites pass through a telescope's field of view, they leave trails behind. Sometimes those trails aren't bothersome or can be masked out; other times, such as in this Hubble image, that isn't possible. Credit: NASA / ESA / Kruk et al. / Nature 2023

Notes

[1] SWIFT-SAT grants (Spectrum and Wireless Innovation enabled by Future Technologies - Satellite-Terrestrial Coexistence) support research on techniques to overcome radio interference and light pollution conflicts between satellite users (communications, earth sensing) and terrestrial users (communications, astronomy) enabling usage growth to benefit society.

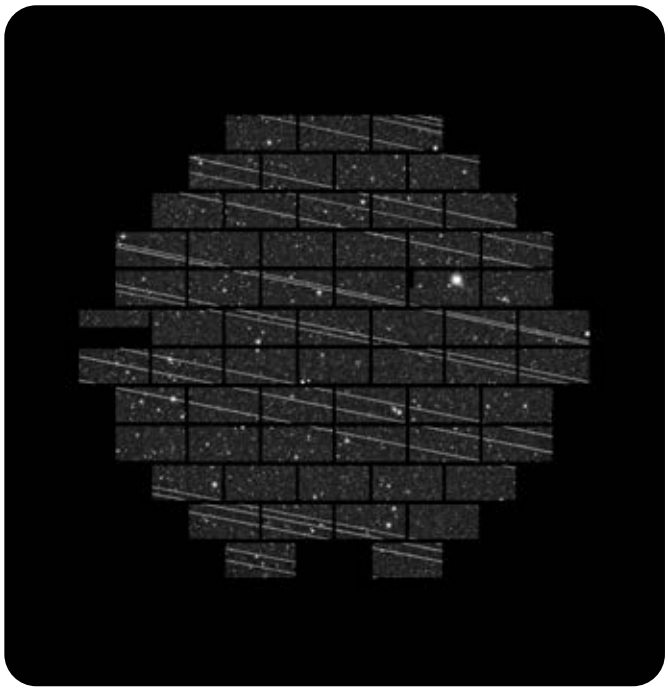
[2] The NSF award funds a graduate student position at the University of Illinois Urbana-Champaign (UIUC) and a NOIRLab postdoctoral position hosted at UC Davis. Additionally, 1 million hours of computing time will be made available for the project on UIUC supercomputers. The Aerospace Corporation will provide precise information on space object's orbits via the US Office of Space Commerce.

More Information

The IAU is the international astronomical organisation that brings together more than 12 000 active professional astronomers from more than 100 countries worldwide. Its mission is to promote and safeguard astronomy in all its aspects, including research, communication, education and development, through international cooperation. The IAU also serves as the internationally recognised authority for assigning designations to celestial bodies and the surface features on them. Founded in 1919, the IAU is the world's largest professional body for astronomers.

The International Astronomical Union's Centre for the Protection of the Dark and Quiet Sky from Satellite Constellation Interference (IAU CPS) is a global organization co-hosted by the US-based NSF NOIRLab and the SKA Observatory (SKAO), under the auspices of the IAU. The CPS facilitates global coordination of efforts by the astronomical community in concert with observatories, space agencies, industry, regulators and other sectors to help mitigate the negative consequences of satellite constellations on astronomy.

NSF NOIRLab (U.S. National Science Foundation National Optical-Infrared Astronomy Research Laboratory), the U.S. center for ground-based optical-infrared astronomy, operates the International Gemini Observatory (a facility of NSF, NRC–Canada, ANID–Chile, MCTIC–Brazil, MINCyT–Argentina, and KASI–Republic of Korea), Kitt Peak National Observatory (KPNO), Cerro Tololo Inter-American Observatory (CTIO), the Community Science and Data Center (CSDC), and Vera C. Rubin Observatory (operated in cooperation with the Department of Energy's SLAC National Accelerator Laboratory). It is managed by the Association of Universities for Research in Astronomy (AURA) under a cooperative agreement with NSF and



Starlink satellites on the way to parking orbit. Around 19 Starlink satellites were imaged shortly after launch in November 2019 by DECam on the Víctor M. Blanco 4-meter Telescope at the Cerro Tololo Inter-American Observatory (CTIO) by astronomers Clara Martínez-Vázquez and Cliff Johnson. The gaps in the satellite tracks are due to the gaps between the DECam CCD chips. Credit: CTIO/NOIRLab/NSF/AURA/DECam DELVE Survey

Starlink Satellites pass overhead near Carson National Forest, New Mexico, photographed soon after launch. Credit: M. Lewinsky

is headquartered in Tucson, Arizona. The astronomical community is honored to have the opportunity to conduct astronomical research on I'oligam Du'ag (Kitt Peak) in Arizona, on Maunakea in Hawai'i, and on Cerro Tololo and Cerro Pachón in Chile. We recognize and acknowledge the very significant cultural role and reverence that these sites have to the Tohono O'odham Nation, to the Native Hawaiian community, and to the local communities in Chile, respectively.

The SKAO, formally known as the SKA Observatory, is an inter-governmental organization composed of Member States from five continents. Its mission is to build and operate cutting-edge radio telescopes to transform our understanding of the Universe, and deliver benefits to society through global collaboration and innovation. Headquartered in the UK, its two telescope arrays will be constructed in Australia and South Africa and be the two most advanced radio telescope networks on Earth. Through the development of innovative technologies and its contribution to addressing societal challenges, the SKAO will play its part to address the United Nations' Sustainable Development Goals and deliver significant benefits across its membership and beyond. The SKAO recognises and acknowledges the Indigenous peoples and cultures that have traditionally lived on the lands on which the SKAO facilities are located.

Links

- NSF announcement of funding for the CPS
- CPS position paper, with recommendations for the mitigation of satellite constellations' impact on astronomy
- Optical observations of the AST SpaceMobile BlueWalker3 satellite
- Detection of unintended radio emissions from Starlink satellites

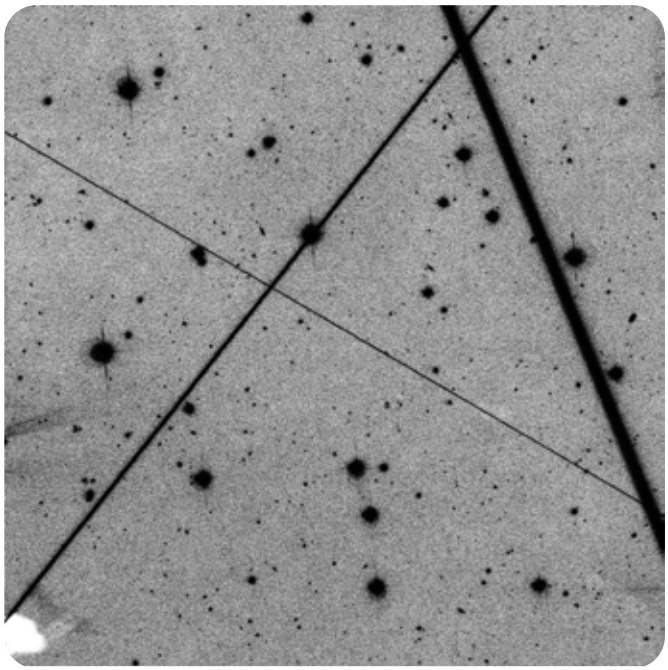


Image taken with the 1.8m Vatican Advanced Technology Telescope (VATT) located in Arizona, USA, featuring multiple satellite streaks. Credit: 20211212 VATT4K image. Observers: C. O. Chandler, W. J. Oldroyd, C. A. Trujillo; This material is based upon work supported by the National Science Foundation Graduate Research Fellowship Program under grant No. 2018258765. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation. C.O.C., H.H.H. and C.A.T. also acknowledge support from the NASA Solar System Observations program (grant 80NSSC19K0869)

Did You Know?

The African Network of Women in Astronomy (AfNWA) is composing a unique storytelling book about professional female astronomers in Africa .

Click here for more information

An evening with astronaut Dr Sian Proctor

Christina Thöne

A dream, a poem and a strong desire to be an astronaut

We spent a very inspiring evening listening to the life-long journey of Dr Sian Proctor to finally make her childhood dream of going into space a reality. The event was part of the Living Maths Space Tour 2024, which offers creative science classes, community outreach, and, events featuring important guest speakers. It was decided that this year's IAU General Assembly would be an ideal stopover for the tour. The audience was full of young people as well as learners and educators from schools near and far - one even having travelled five hours to attend the event.

Then Dr Proctor made her entrance and immediately connected with the audience eager to hear her story. When she asked the audience who would want to go to space, a lot of hands were raised. Dr Proctor dreamed of going to space since her childhood in Guam, where her father served on the NASA station tracking the Apollo missions, and actually managed to get an original autograph from Neil Armstrong. She confessed that she is a "moon celebration kid", born nine months after the first Moon landing.

She originally planned to become a fighter pilot, the main path to become an astronaut back then. While she obtained degrees in environmental sciences, geology and science education, she never lost sight of her dream. The dream finally became reality in March 2021. Space X had announced "INSPIRATION4", the first all-civilian mission, sponsored by billionaire Jared Isaacman. Seats were allocated according to donations to St. Jude's Children Hospital (the aim was to raise US$ 200 million for the hospital) or for making a short video about why potential space travellers should be the ones going to space. She applied for both. During the pandemic she had become a poet and a painter and her space poem won her a seat, "...It's about space to inspire, for all of humanity".

After six months of training with the other three astronauts, Jared, Hailey Arceneaux and Chris Sembroski, the day finally came. During her last phone call before takeoff, she spoke with her biggest

(Top) Dr Sian Proctor, mission pilot for the SpaceX Inspiration4, Image credit: Inspiration4

(Left) The SpaceX Dragon spacecraft piloted by Dr Proctor. Image: SpaceX

Image of earth taken by Inspiration4 mission. Image: Inspiration4 / Hayley Arceneaux

inspiration: Michelle Obama. She also spoke to Bono from U2 while in orbit. It takes only 10 minutes to reach space: it is closer than we think! Three days in space went by like nothing (the first is spent adjusting, the second getting into a routine and the third they call you back!). She recommended to the audience members that if they ever go, don't go for anything less than five days!

The most precious item she brought along with her was Neil Armstrong's autograph as it reminded her of her parents who had passed away.

Time rushed by, taken up by medical experiments such as tryng to find out why male (!) eyeballs sometimes go out of place and do not properly retract upon arriving back on Earth. She also completed her first painting in space and marvelled at the view of Earth from their spacecraft's large dome window.

These were her greatest moments in space, bathing in the Earthlight (a term she invented), and taking the ultimate selfie with the Earth. On returning to Earthoff the shore of Florida, she literally danced out of the spacecraft in her "Michelle Obama" moment. Since returning, she has continued to inspire people, and she works on trying to solve Earth problem by solving problems in space through her "JEDI space" project. Exactly 100 years after the first African American woman obtained her pilot license, she piloted a spacecraft as the first African American woman.

After this moving presentation, the evening finished off with a round of "kahoot", a quiz game, with prizes, and lot of pictures with the astronaut.

IAU GA 2024
Online Networking Lunch

for those interested in connecting and networking with others attending the GA, especially around the themes of women in astronomy and young astronomers, we will be hosting an online networking lunch in Spatial on Monday 12th August, 12:00-13:30 SAST.

Please register your interest in attending in either a mentor or mentee capacity here:

https://forms.gle/fEYr5EEoC2tKusbJ8
(by end of this week please!)

Please note that these are not intended to be overly structured mentor/mentee sessions, rather we are hoping to identify those who feel comfortable leading a table/discussion and guiding others within one of the two themes)

If you have any questions about this form, please post in the #social channel or get in touch with Genevieve Marshall and Vanessa Moss via the IAU GA Slack.

Plenary talks from IAUS 389

Christina Thöne

Gravitational wave astrophysics

Yesterday morning we had the pleasure of listening to three plenary talks that presented the latest results in the field of gravitational waves. Dr Sylvia Biscoveanu, Einstein Fellow at CIERA, gave updated us on the O4 run of the LIGO, Virgo, KAGRA and GO600 detectors, which has more than doubled the number of detected sources. Some of the most exciting results in O4 have been the detection of black holes of over a hundred solar masses, which cannot originate from single stellar explosions but can be explained by hierarchical mergers. On the low-mass side, GW230529 is an example of a merger between a neutron star and "mass-gap" object (3 to 5 solar masses), too massive for a neutron star but too light for black holes, and we are still unsure what these objects are or what is their final fate.

Although no new electromagnetic counterparts have been detected during O4, Dr Kenta Hotokezaka from the University of Tokyo presented the exquisite data of GW170817. In spectra of this object, heavy element features never observed before have been detected. Dr Kenta presented similar sources, such as GRB 230307A, a long GRB with a detected kilonova. JWST NIR spectra revealed [Te III] emission, also observed in late time data of GW170817. Given the known merger rates and the amounts of heavy elements formed through the r-process, neutron star mergers can be solely responsible for the production of all elements heavier than iron observed in the Milky Way.

The last talk, by Dr Ryan Shannon of OzGrav, showed us the progress and power of the pulsar timing networks. This technique uses the extremely precise timing observations of pulsars to serve as a gravitational wave observatory of the size of our galaxy and can detect mergers of supermassive black holes in interacting galaxies. After 12.5 years of data collection, 2020 saw the first tentative detection of the isotropic stochastic background from the combination of the sources of the Universe. As of 2023, the signal has been detected at significant confidence. MeerKAT, which joined only five years ago, has accelerated the progress with its enhanced sensitivity and, together with SKA, could allow the detection of individual sources in the near future.

If you are interested in the background story of gravitational wave detections, we recommend you to read Govert Schilling's book *Ripples in Space-Time. Einstein, Gravitational Waves, and the Future of Astronomy*. He is currently attending the GA if you want to go and meet him in person.

(Top) Atrist's impression of a pulsar. Image: http://photojournal.jpl.nasa.gov/catalog/PIA21085 & NASA/JPL-Caltech

KAGRA's arm tunnel (X arm). Photo courtesy: KAGRA Observatory, ICRR, The University of Tokyo

Astronomy Education Hack Day

Date 12 August 09:00 – 17:00

Venue Meeting Pod & **Online**

On Monday the 12th of August the IAU Office of Astronomy for Education (OAE) will be hosting an all-day educational resources translation hackday in the meeting pods and **online**. Come along to help expand the OAE's ever-growing multilingual repository of resources.

One of the key goals of the OAE is the creation of good educational resources in many different languages. Towards this goal the OAE has created a multilingual glossary of astronomical terms that will often appear in primary or secondary school lessons. We have completed the English version of this glossary and each term and definition has been reviewed and approved by at least one research astronomer and one teacher. In addition to this glossary the OAE has built up a library of media files available under Creative Commons licences with accompanying captions and is starting to build a library of fundamental diagrams and illustrations.

All of these resources are available for translation in our online translation and review system. We have ongoing translation efforts in Arabic, Bengali, Brazilian Portuguese, Chinese, French, German, Hindi, Iberian Portuguese, Japanese, Marathi, Persian and Spanish.

At the OAE educational resources hackday you can come along and contribute to our efforts by reviewing existing translations, creating new ones, making existing diagrams translatable or creating new diagrams. We would also love to hear from you if you are interested in starting translations in languages not listed above!

If you would like to support the OAE's translation efforts but aren't able to attend the hackday then please sign up as a volunteer on **our website**.

It is Discourse time today at the IAU!

Joop Schaye gives us an update on the achievements of hydrodynamical simulations to describe our Cosmos

Friday 9 August 17:15-18:15

Plenary talks from IAUS 390

Christina Thöne

"Magnetism across time and space" or "Beyond Flatland, a star of many dimensions"

Dr Sarah Gibson, director of the high-altitude observatory in Colorado, took the audience on an exciting journey of the "magnetic mysteries" of our closest star, the Sun. She strongly vouched for a mission observing the polar regions of the Sun to understand the Sun as a sphere and not a 2D surface, going away from "Flatland", the famous book of a square living in a 2D world.

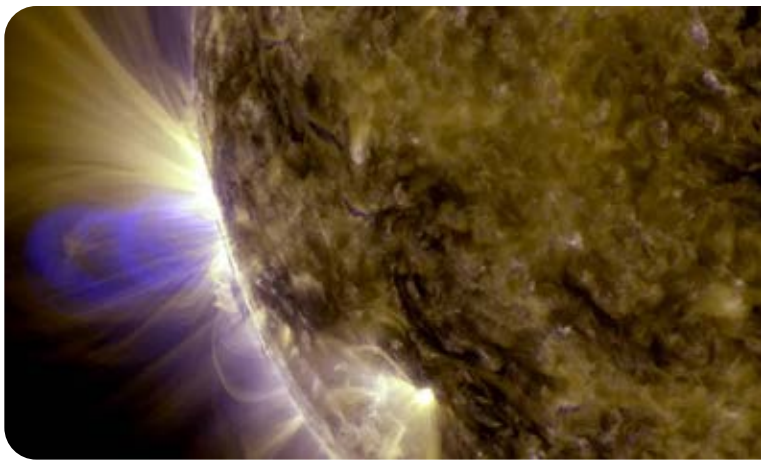
The talk commenced with a historical overview beginning with Galileo's discovery of the rotation of the Sun and showcased the work of Annie Maunder, who discovered the butterfly diagram of sunspots and the 11-year solar cycle. Finally, she highlighted the many contributions of Gene Parker, name giver to the Parker solar probe launched in 2018.

Despite centuries of research, many questions remain about the Sun. Which is the driving mechanism to transport energy from the photosphere to the corona? What causes the solar wind to be patchy? Is the Sun dominated by convection or by rotation? Which protuberances erupt as a CME and when? And is there a "conveyor belt" transporting energy under the surface back to the poles which could explain the solar dynamo and the 11-year cycle.

Dr Gibson introduced the concept of magnetic flux ropes. Those structures transport magnetic energy from the interior to the surface, where they move to the surface in prominences, make a coronal cavity, are squeezed until magnetic reconnection happens, and, if powerful enough, overcome the larger magnetic field that keeps the material down and end up in a CME. At the moment we are missing satellite information to follow this ejected material all the way from the surface to Earth - the four-satellite PUNCH mission starting operations in 2025 can help with this. A new ground-based telescope is planned for Mauna Loa that will study CMEs in detail.

We know that the Sun is differentially rotating at the surface with the equator rotating faster (below the convection zone it's a solid body), but does this continue to the poles or are they rotating again faster? If the poles are rotating faster (prograde), this would imply a Rossby number of exactly 1 (high Ro is a convection dominated star, low Ro is a rotation dominated star). Solar orbiter, which can go up to 30 deg solar latitude, will partially provide us with that needed polar view.

A lively discussion followed regarding future missions observing at multiple sightlines such as the proposed Solaris mission (polar) or the 4π mission. A polar probe always has the problem of a highly elliptical orbit, though you can use Venus to "circularize" your orbit. Certainly, the time is now for international collaborations and new instruments to better understand our most nearby star.



(Top) A mid-level solar flare that peaked at 8:13 p.m. EDT on Oct. 1, 2015, captured by NASA's Solar Dynamics Observatory. Credits: NASA/SDO

(Above) Magnetic loops on the sun, captured by NASA's Solar Dynamics Observatory (SDO). A series of loops such as this is known as a flux rope, and these lie at the heart of eruptions on the sun known as coronal mass ejections (CMEs). Image Credit: NASA/Goddard Space Flight Center/SDO

IAU General Assembly Session WG6:

Executive WG on Dark & Quiet Sky Protection

12 & 15 August 2024

Session:
12 August (10:00 – 17:00)
Commission B7 Business Meeting:
15 August (13:00 – 15:00)
(South Africa Standard Time = GMT + 2h)

Cape Town International Convention Centre
in Cape Town, South Africa
In-person and online

noirlab.edu/science/events/websites/iauga24wg6

slack
#wg6-dark-quiet-skies for the WG6 session

Brief Historical Insights into Africa's Astronomical Legacy

Jamal Mimouni

"Magnetism across time and space" or "Beyond Flatland, a star of many dimensions"

The history of African astronomy is a rich tapestry woven across various regions and eras, highlighting the continent's profound contributions to the cultural and observational study of the cosmos. However, given the vast time span and incredible diversity of astronomical traditions, it is impossible to do full justice to the subject in a single overview. Instead, we will focus on a few prominent traditions to showcase the depth and significance of African astronomy.

Ancient Egypt

It is one of the earliest known astronomical traditions. The pyramids of Giza, with their precise celestial alignment, reflect the constellation Orion and exemplify the Egyptians' advanced understanding of the night sky. Their calendar, based on lunar and solar cycles, included the heliacal rising of the star Sirius, signaling the annual flooding of the Nile, a critical event for their agricultural society.

The Dogon Astronomy of Mali

The Dogon people of Mali possess a remarkable astronomical tradition, particularly their knowledge of the Sirius star system. This knowledge may include the existence of Sirius B, a white dwarf star not visible without a telescope, although this claim is much controversial. This information is part of their rich oral traditions, which also encompass cosmological beliefs and which shows an intricate understanding of celestial phenomena passed down through generations.

The Legacy of Béjaia (Bougie) School with Fibonacci

Béjaia, a city in Algeria, was a pivotal center of learning during the Middle Ages (late 12th and early 13th centuries). It significantly influenced the mathematical and astronomical knowledge of the time. The renowned mathematician Fibonacci (Leonardo of Pisa) studied in Béjaia, where he was introduced to the Arabic numeral system. This system, which he later brought to Europe, revolutionized mathematics and astronomy, underscoring Béjaia's role in the transmission of crucial scientific knowledge between cultures.

Spherical globe, Alexandria, Egypt. The constellations are engraved on the external surface

Indigenous Astronomy in Zululand

The Zulu people of South Africa have a deep-rooted tradition of astronomy that has been vital for navigation and agriculture. Their star lore is rich with stories and practical knowledge used to guide seasonal activities and community events. The Zulu calendar like the Islamic calendar, based on lunar cycles, ties celestial observations to the timing of agricultural practices and social rituals, reflecting a profound connection between their cultural practices and the natural world.

Astronomy in Other Parts of Africa

Beyond these notable examples, many other regions in Africa have rich astronomical traditions. For instance, the Tswana people in Botswana use the Pleiades for planting and harvesting seasons, while the San people of the Kalahari Desert have complex star maps embedded

(Top) The pyramids of Meroe in Northern Sudan. The pyramids, among their many functions, had some astronomical significance.

in their cultural lore. In East Africa, the Maasai use the position of certain stars for seasonal cattle grazing patterns. Each of these traditions highlights the diverse and profound ways in which African cultures have engaged with and understood the cosmos.

Historical Observatories

For the recent period of history, let us focus on three historical observatories from the 19th century. Although they partly represent a colonial legacy, their contributions to astronomy are significant.

The Cape Observatory in South Africa

Founded in 1820 by the British Royal Observatory, the Cape Observatory was the first permanent astronomical observatory in the Southern Hemisphere. Its contributions include extensive cataloging of southern stars and vital astronomical observations that have had a lasting impact on both local and global astronomy.

Cairo University Observatory

Established first as the Khedivial Observatory in 1865 in Cairo, the Cairo University Observatory, or Helwan Observatory, has played a crucial role in Egyptian astronomy. It served as a hub for astronomical studies and advance astronomical research and education, contributing significantly to the region's scientific endeavor.

The Bouzaréah Observatory in Algeria

Established in 1890 in Algiers's suburb, it became a prominent center for astronomical research in North Africa. It conducted research across various astronomical fields and served as an educational institution advancing our understanding of the universe. It indeed participated to the "Carte du Ciel" international program in the early part of the 20th century.

The South African Astronomical Observatory at Cape Town. The Main Building then and now.

The 32cm coudé telescope at Algiers observatory

Mark Your Calendar

Check out the
Cultural Evening social
13 August
19:30 to 23:30.

Making a difference with astronomy

Willy Benz

The evolving IAU

In the more than one hundred years of the International Astronomical Union's (IAU) existence, society has evolved considerably, driven by the fantastic social and scientific advances of the time. No longer the preserve of an ivory-tower elite, science has become an activity from which society expects returns commensurate with the growing investment required. And so it is with astronomy.

From an organisation dedicated to the promotion of scientific exchange among professional astronomers through international cooperation, the IAU has evolved into an organisation for which the societal impact of astronomy has also become a priority. Astronomy has become more than a science; it has become a tool to make the world a better place for all.

Astronomy is unique

It is a real challenge, but astronomers know that we have an advantage: Our science is uniquely able to capture the imagination of adults and children, whatever their background or origin. We have all looked up at the night sky and wondered about the size of the Universe, how it came to be, and whether we are the only ones asking these questions. Astronomy is also the only science with so many dedicated amateurs who love to share their enthusiasm with the public. Together, we can truly use astronomy to make a difference.

To make this vision a reality, the IAU has worked with partners over the past fifteen years to establish four Offices: The Office of Astronomy for Development (OAD), the Office for Young Astronomers (OYA), the Office of Astronomy for Outreach (OAO), and the Office of Astronomy for Education (OAE), as well as a Centre for the Protection of the Dark Sky (CPS). Each of the Offices, as well as the CPS, have organised themselves with volunteers scattered around the world to create a unique global network of competence. In order to define its way forward while maintaining coherence and coordination, the IAU has published its Strategic Plan 2020-2030, which defines five overarching goals, three of which relate to societal issues. The actions highlighted in this plan are enormous in scope and will only be achieved with the dedicated commitment of all of us, as well as additional income.

Funding the vision

The IAU is a not-for-profit organisation funded by annual dues from national members and, to a lesser extent, by grants from foundations for specific activities. This income has enabled the IAU to fund all its activities to date, and we are very grateful to all for their support, which has made a real difference, and we certainly hope for continued support.

Today, however, we have reached a point where we have to make a choice. Do we limit ourselves to staying within the budget or do we stand up for our vision and try to raise additional funds to go the extra mile? Over the past few years, the IAU has made various attempts to raise funds with some success and the Executive Committee felt that this boded well for a bolder campaign and decided to include a professional fundraiser in its future budget to maximise the chances of success.

Working together

There is clearly a risk, as donations are never guaranteed. But we believe that astronomy is the right science to inspire and transform society, and that there are organisations and people out there who share our vision and see financial support for our projects as an investment in a better future. With them, we want to create a new sense of community and shared purpose and build long-term relationships. So, the risk is taken.

Fundraising is a responsibility. We see ourselves as a trustworthy organisation that delivers value in everything we do. As we develop our fundraising

activities, we will rely on your unique skills and expertise to ensure that this value is delivered. I am sure that you are as committed as the Executive Committee to seeing astronomy through the IAU make that difference! We look forward to working with you all.

Willy Benz is the President Elect of the IAU Executive Committee.

Office of Astronomy for Development (OAD)

https://www.astro4dev.org/

Office for Young Astronomers (OYA)

https://www.iau.org/education/office_for_young_astronomers/

Office of Astronomy for Outreach (OAO)

https://www.iau.org/public/oao/

Office of Astronomy for Education (OAE)

https://www.haus-der-astronomie.de/OAE

Centre for the Protection of the Dark Sky (CPS)

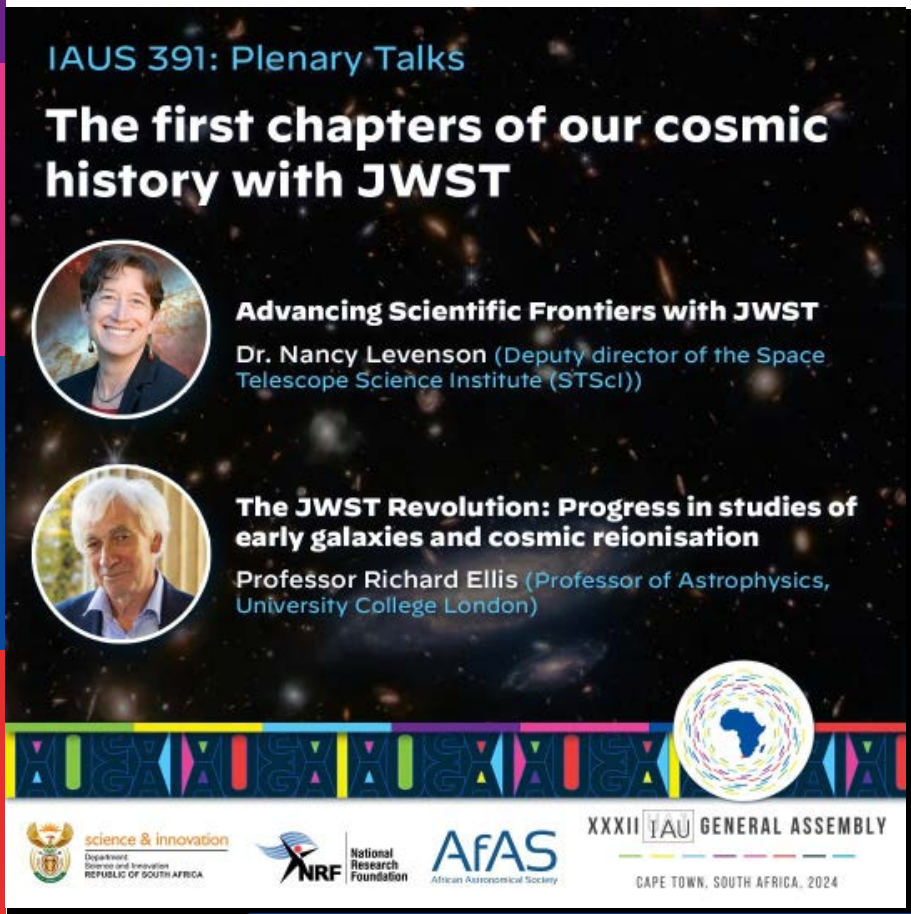
https://cps.iau.org/

CSIRO Australia Telescope National Facility

Live observing with Murriyang, CSIRO's Parkes radio telescope

This is your chance to control the 64m-dish radio telescope live and remotely. Observe pulsars and learn about our **PULSE@Parkes** education program.

Monday 12 and Tuesday 13 August
3 PM to 5 PM



IAUS 391 Plenary Talks

Dr Nancy Levenson
08:30-09:15

Prof Richard Ellis
09:15-10:00

9 August 2024

STREAM HERE

Providing sustainable benefits for Indigenous communities

9 August is the International Day of the World's Indigenous Peoples

August 9 marks the UN-recognised International Day of the World's Indigenous Peoples, an opportunity for the SKA Observatory to highlight the communities that have called our telescope sites home for millenia and the work that is happening to uplift them.

SKA-Low's tens of thousands of low-frequency antennas are under construction at Inyarrimanha Ilgari Bundara, the CSIRO Murchison Radio-astronomy Observatory. Meaning 'sharing sky and stars', the name was gifted by its Traditional Owners and Native Title Holders, the Wajarri Yamaji, in a ceremony marking the signing of an Indigenous Land Use Agreement (ILUA). The agreement, which enabled the start of on-site construction, was signed between the Wajarri Yamaji, the Australian and Western Australian governments, and Australia's national science agency, CSIRO, in November 2022. The ILUA ensures preservation of Wajarri Yamaji cultural heritage, and includes sustainable and intergenerational benefits in areas such as enterprise, training and education. In fact, the layout of the telescope was modified in consultation with the Wajarri community to avoid significant sites.

Today, 25% of the construction workforce on site are Wajarri Yamaji, and the majority of our first cohort of field technicians are young Wajarri employees who will soon share their expertise on the SKA-Low telescope's antennas and components leading future technicians as construction progresses. Construction contracts have also been awarded to Wajarri-owned companies.

The observatory on Wajarri Country is already inspiring the next generation of Wajarri Yamaji, with young students from the close-by Pia Wadjarri community visiting each year and seeing first hand the SKA-Low construction progress and other telescopes on site.

Here in South Africa, the construction of SKA-Mid's array of dishes is taking place in the Karoo region of the Northern Cape, on land first walked by the San, part of South Africa's First Nations people. As is the case in Australia, the community contributed to ecology and heritage studies conducted ahead of the start of construction to identify cultural heritage, fauna, and flora. The site was even declared a national park to better protect its rich biodiversity and cultural heritage.

Wajarri Enterprise Limited Chair Des Mongoo and SKAO Director General Prof. Philip Diamond mark the installation of the first SKA-Low antenna on Wajarri Country with a handshake.

(Top) SKA site in Carnarvon in the Karoo region of Soputh Africa. Image: NRF-SARAO

Still today, a majority of the local community living around the South African SKA site are of Indigenous descent. The SKAO works closely with the South African Radio Astronomy Observatory (NRF-SARAO) to create opportunities for the community and to promote Indigenous knowledge systems. The construction of South Africa's MeerKAT telescope has created job opportunities and supported SMMEs throughout the area, and SARAO's Schools and bursary programmes

have supported learners in acquiring valuable STEM skills.

On cultural aspects, the traditional ceremony that marked the start of construction on 5 December 2022 featured a riel dance performed by local youths, honouring the ancient dance practised by the Nama and Khoi people. More recently, NRF-SARAO worked with local Elders and researchers to facilitate the publication of a bilingual book documenting for the first time local plants and their medicinal use. They have also trained young Astro Guides, re-introducing ancient knowledge of the sky to capitalise on the burgeoning astro tourism in the region.

Finally, in bringing together ancient cultural knowledge and art, Cosmic Echoes, the SKAO's new Indigenous art exhibition available at the GA in the Clivia conservatory, also aims to promote the communities' cultural heritage internationally. Make sure to visit it!

We recognise and acknowledge the Indigenous peoples and cultures that have traditionally lived on the lands on which our facilities are located. In Australia, we acknowledge the Wajarri Yamaji as Traditional Owners and Native Title Holders of Inyarrimanha Ilgari Bundara, the CSIRO Murchison Radio-astronomy Observatory, the site where the SKA-Low telescope is based.

Invited discourse

Innovating at the periphery: The development of SKA and MeerKAT

Bernie Fanaroff, the first speaker of the evening, has had quite the career. Born in Johannesburg and trained as an astronomer in the UK, he returned in 1974 to teach physics and was also involved in the metal worker's trade union. He served in the Government of Nelson Mandela before leading the SKA bid and project.

Africa only became a democracy in 1994 and, early on, the Government realised the need to invest in technology and innovation in order to avoid falling behind in the field of knowledge production. The idea to promote an astronomical project was met with objections from several sides: why do astronomy if there are more urgent problems to solve? Bernie Fanaroff and the SKA, however, made sure that science would make a huge impact in fostering education in SA and beyond.

MeerKAT, with its 64 dishes, was built at a remote site in the Northern Cape Province where there is "only sheep". In 2003 there were only five radio astronomers in SA, all White, and even among MeerKAT technicians there were only three Black individuals. Efforts were made to improve high-school education in the surrounding communities as well as to initiate larger programs. The Government-funded NRF-SARAO program aims to bring in more Black students to pursue qualifications, not only in science, but also as technicians and even artisans. It has already funded over 2 000 students, but there is currently a lack supervisors. If you are willing to co-supervise a student in SA, please contact them!

In 2012, the SA bid for SKA was accepted and MeerKAT will be absorbed into the SKA-mid in 2028. Development of the MeerKAT has led to many technological advances, and even a spin-off during the COVID-19 pandemic. Many other projects on the African continent are on the way, such as the African VLBI network, which makes use of obsolete satellite communication stations; the DARA radio astronomy project; and the African Astronomical Society, with 300 members, which is growing rapidly. Dr Fanaroff seeks "…to produce as many astronomy stars as there are football stars in South Africa".

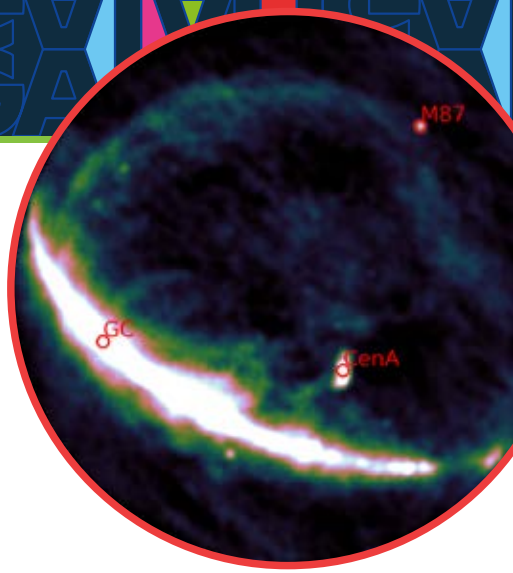
Dr Mpati Ramatsoku is originally from a small town in the Free State Province in South Africa. She studied astronomy and then pursued a scientific career in Europe before returning to her home country. Her work makes use of the exquisite MeerKAT data to study hidden structures in our own galaxy. As a beneficiary of the Human Development Program herself, she looked into the impact it has achieved. 60% of graduates stayed in the science field, but significant efforts have to be done to shorten the time to obtain a stasble career path.

(Top) Dr Bernie Fanaroff

(Above) Dr Mpati Ramatsoku

SKAO media briefing

IAU General Assembly, Cape Town, 8 August 2024



(Top) This image emphasises the large-scale structure from our Milky Way. Famous structures known from other radio surveys such as the North Polar Spur can be seen. Several notable locations are marked: the Galactic Centre (GC), the nearby radio galaxy Centaurus A (CenA), and M87, the giant elliptical galaxy in the Virgo Cluster.

We recognise and acknowledge the Indigenous peoples and cultures that have traditionally lived on the lands on which our facilities are located.

The SKAO has seen significant progress at the telescope sites and globally in the past 18 months since the start of construction. Below is a summary of recent activities across the Observatory.

The Observatory's membership has grown in recent months and components for both telescopes are being manufactured and developed globally across SKAO partner countries. For the SKA-Low telescope, this includes Italy, the Netherlands, the UK, and Australia. For the SKA-Mid telescope this includes China, Italy, Spain, Sweden, the UK and South Africa, where the Stellenbosch-based EMSS Antennas is delivering the band 2 receivers.

Latest developments in South Africa

A significant milestone for the SKA-Mid telescope came in July, when the first dish was assembled on site in South Africa's Northern Cape province. The "big lift" of the 15-m-wide main reflector onto the telescope pedestal was performed by a team from the SKAO, the South African Radio Astronomy Observatory (NRF-SARAO) and China's CETC54. CETC54 is manufacturing the dishes and also led the 10-country strong consortium behind their design.

(Above) The "big lift" of the main reflector onto the pedestal for the first SKA-Mid production dish on site in South Africa. The lift took place on 4 July 2024.

The "big lift" of the main reflector onto the pedestal for the first SKA-Mid production dish on site in South Africa. The lift took place on 4 July 2024, and was carried out by a team from the SKAO, South African Radio Astronomy Observatory (SARAO) and China's CETC54.

The dish now being completed is one of four that will comprise the first stage of SKA-Mid delivery, known as Array Assembly 0.5 (AA0.5). This allows for testing to take place prior to full-scale dish production. The huge feed indexer, manufactured in Italy, has now been fitted to the first dish. It will move the receivers into place depending on the observation being undertaken. The next steps will rigorously test the system to ensure everything is operating as expected.

In South Africa, the SKAO is partnering with NRF-SARAO, a national facility of the National Research Foundation, to build and operate the SKA-Mid telescope.

Latest developments in Australia

In Australia, we acknowledge the Wajarri Yamaji as the Traditional Owners and Native Title Holders of Inyarrimanha Ilgari Bundara, the CSIRO Murchison Radio-astronomy Observatory, the site where the SKA-Low telescope is being built.

This is the first image from observations using one complete SKA-Low station, known as S-8, only 18 months after the start of construction activities on site, and five months after the first antenna was installed. The completion of a station means not only assembling

and installing the 256 antennas, but also integrating them with all the computing systems behind them. It demonstrates the high sensitivity of a single station, the stability of the current system, and the ease of producing an image, which required relatively little processing.

The first antenna was installed in March. Antennas at four of the telescope's 512 stations have now been built, meaning more than 1 000 of its two-metre-tall antennas have been assembled and installed by field technicians on site at Inyarrimanha Ilgari Bundara, the CSIRO Murchison Radio-astronomy Observatory, on Wajarri Yamaji Country. The telescope will eventually comprise 131 072 antennas when complete, spread across 512 stations.

In Australia, the SKAO is partnering with CSIRO, Australia's national science agency, to build and operate the SKA-Low telescope.

The road to science operations

Anticipation for the first SKAO science is growing. More than 1 300 astronomers from 54 countries across the world have already assembled to prepare for science with the SKA telescopes. The SKAO expects to deliver ~700 PB/year of science-ready data products - equivalent to filling 4 000 laptops a day. Scientists will not have to wait for the arrays to be complete in order to begin using them. Early science will begin in 2026, when both SKA-Mid and SKA-Low will have achieved or surpassed the sensitivity of comparable existing facilities. This will be akin to a full dress rehearsal for the Observatory, with data being delivered publicly to the whole community. Early science will continue with increasing capabilities as the arrays grow in parallel, until the Observatory achieves full operations.

Bird's eye view of Low-Station S8 with two completed stations.

About the SKAO

The SKAO, formally known as the SKA Observatory, is an intergovernmental organisation composed of member states from five continents and headquartered in the UK. Its mission is to build and operate cutting-edge radio telescopes to transform our understanding of the Universe, and deliver benefits to society through global collaboration and innovation.

Its two telescopes, each composed of hundreds of dishes and thousands of antennas, will be constructed in South Africa and Australia and be the two most advanced radio telescopes on Earth. A later expansion is envisioned in both countries and other African partner countries.

Together with other state-of-the-art research facilities, the SKAO's telescopes will explore the unknown frontiers of science and deepen our understanding of key processes, including the formation and evolution of galaxies, fundamental physics in extreme environments and the origins of life. Through the development of innovative technologies and its contribution to addressing societal challenges, the SKAO will play its part to address the United Nations Sustainable Development Goals and deliver significant benefits across its membership and beyond.

Supporting imagery

Available here: https://skao.canto.global/b/O3OUJ

Contact

For further information about the project, construction progress, local employment, and other developments, or to arrange interviews during or after the General Assembly, contact Cassandra Cavallaro, SKAO Media Lead: cassandra.cavallaro@skao.int

Division B

Facilities, technologies, and data science

Division B days will kick off on Friday 9 August with talks by two winners of PhD Prizes - Joachim Moeyens (2022 winner), who developed a method to find solar system bodies in data of arbitrary cadence, and Jeroen Audenaer (2023 winner), who built a pipeline to classify millions of light curves in an automated manner. It will follow a Plenary Discussion on Division, Commission, and WGs activities.

High-energy astrophysics is also on the agenda. Soebur Razzaque, Professor at the University of Johannesburg, will discuss the present and future of neutrino astrophysics, and Markus Boettcher, Professor of Astrophysics and Space Physics at the North-West University (SA), will speak about the present and future of the Cherenkov Telescope Array (CTA).

Picking up again on Monday 12 August, we will start with two parallel sessions. A session is devoted to the Habitable Worlds Observatory (HWO), the concept of building a 6 m to 10 m space telescope designed to image Earth-like exoplanets around solar-like stars and the instrumentation being studied for it. Kevin France, Assistant Professor and Research Fellow at the University of Colorado, will describe the current status of the project. Paul S. Scowen, Senior Research Astrophysicist at NASA, will talk about the role of cubesats and small space missions in paving the path to the HWO. Ana I. Gómez de Castro, Full Professor at the Universidad Computense de Madrid, will outline the ongoing European participation in HWO activities.

Virtual Observatory (VO), an ecosystem of interoperating tools and services that enable new and innovative multi-dataset astronomy, is committed to advancing Open Science and the adoption of FAIR principles. Bruce Berriman (Caltech/IPAC) in the parallel session will discuss how VO will support exciting astronomy research and education in the coming years. This session addresses the role of the VO in important areas: time-domain and multi-messenger astronomy (Brad Cenko, NASA/GSFC, USA) and radio astronomy (Russ Taylor, Cape Town, SA). VO can also play a part in education, as we will learn in a presentation by Priya Shah (Hyderabad, India), while the application of VO tools to visualising large data sets will be presented by Mark Allen (Strasbourg).

Next, Steve Durst, Founding Director of the International Lunar Observatory Association (ILOA), will describe the first results from the ILO-X precursor that landed on the Moon on 22 February 2024. Juan D. Soler, Researcher at the Institute of Space Astrophysics and Planetology in Rome, will talk about the status and challenges of polarimetric observations. Eli Waxman, Professor at the University of Tel Aviv, will cover the advances in time-domain astrophysics within the context of the ULTRASAT mission.

Reflecting on the technological progress over the past decades, Justin L. Jonas (SKAO, Rhodes University) will present the last 65 years of Radio Astronomy in South Africa: from The Shack to SKA-Mid, while Roger Deane (University of the Witwatersrand/University of Pretoria) will review the activity and performance of Meerkat. Looking to the future, Tony Beasley and Phil Diamond (directors of NRAO and SKAO, respectively), will discuss the potential for synergies between the ngVLA and SKA-Mid.

It's a pivotal time for the next generation of powerful astronomical observatories.

MeerKAT radio telescope array in Carnarvon in South Africa. Image: NRF-SARAO

Historic astronomical artefacts return home

Facilities, technologies, and data science

In Wednesday's edition of the newspaper, Dr. Markus Pössel, Director of the IAU Office of Astronomy for Education (OAE) told the story of the discovery of the comet 55P/Tempel-Tuttle, and the key role played by photo plates taken at Boyden Observatory near Bloemfontein in South Africa.

The analysis was done by Joachim Schubart, a scientist based in Heidelberg, who was sent the plates in the 1960s. While emptying his office around 10 years ago, he rediscovered the plates and asked his colleagues in Heidelberg for help returning them to South Africa. With Markus, who is also based in Heidelberg, heading to Cape Town for the IAU XXXII General Assembly, the opportunity presented itself for the plates to come home.

The historic handover took place yesterday at the IAU booth in the exhibition hall. Dawid Van Jaarsveldt, of the University of the Free State, accepted the artefacts, and will add them to a special exhibition he is preparing on comet discovery at the Boyden Observatory.

Dr. Markus Pössel hands over the photo plates that captured the comet 55P/Tempel-Tuttle at Boyden Observatory to Dawid Van Jaarsveldt, of the University of the Free State, surrounded by members of the IAU Office of Astronomy for Education (OAE).

Markus Pössel (left) and Dawid Van Jaarsveldt (right)

From left to right: Markus Pössel, Dawid Van Jaarsveldt, and Tshiamiso Makwela, of the IAU OAE and the University of Cape Town

The Southern African Large Telescope (SALT)

A flagship of astronomy in Africa

SALT is the largest single optical telescope in the southern hemisphere and amongst the largest in the world. It has a hexagonal primary mirror array 11 metres across. The gathered light is fed into a suite of instruments from which astronomers infer the properties of planets, stars, galaxies, and the structure of the Universe. SALT is owned by the SALT Foundation, a private company registered in South Africa. Its shareholders include universities, institutions and science funding agencies from Africa, India, Europe and North America.

SALT provides a first-class and cost-effective facility for fundamental research. Strong ties with researchers around the world benefit local scientists and engineers in a stimulating, high-tech environment. SALT demonstrates that the frontiers of science are not exclusively reserved for the developed world.

The productivity of an observatory is measured by the science publications that are peer-reviewed and are based on data obtained at that observatory. SALT's publications demonstrate that it is a valuable resource for high-quality scientific research. As an example, the most important media news came from SALT's participation in the world-wide coverage of the scientific event of the century: the first multi-messenger event, which involved a binary neutron star merger. Initially detected by gravitational wave detectors, SALT was among the first telescopes to record a spectrum.

SALT is, first and foremost, a spectrographic telescope. Due to its operating mode and design, it is most efficient when employed as a survey telescope, with a wide range of targets available in the observing queue. SALT's forté is its capability of rapidly changing modes and instruments on-the-fly, thus responding to sudden events and requests during the course of a night.

Always striving for improvement, SALT is offering new capabilities:

- The new spectrograph NIRWALS provides medium-resolution spectroscopy in the near-infrared. Its IFU covers 29x18 arcseconds on the sky and is ideally suited for resolving nearby galaxies.
- Slitmask IFUs for the RSS expands its capabilities into the second spatial dimension. The first slitmask, with a footprint of 18x22 arcseconds, is available at a shared risk basis.

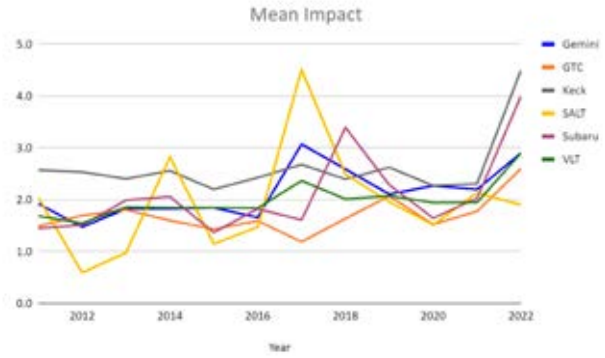
(Top) SALT. Image: NRF-SAAO

(Centre top left) The Lagoon Nebula; (Centre top right) NGC 6530; (Centre bottom left) NGC 6744; (Centre top right) 47 Tucanae. Images: NRF-SAAO

- A custom-built laser frequency comb will provide precision wavelength calibration for the high stability mode of SALT's High-Resolution Spectrograph. Available to users in 2025, it extends SALT's versatility to highly demanding precision radial velocity studies, e.g., studies of exoplanets.

SALT's impact extends far beyond scientific discoveries. By fostering a vibrant scientific community and engaging with the public, SALT inspires and educates, prompting a culture of scientific curiosity and innovation both in South Africa and internationally. SALT has taken a lead on the continent, organising data reduction workshops in various African countries and funding African astronomers to attend SALT conferences. Furthermore, PIs from all African countries can ask for South African share of time.

As a low-budget, high-quality science facility, the SALT project stands as a symbol of South Africa's scientific prowess and its commitment to pushing the boundaries of knowledge. Its contributions to astronomy, education, and technology development have far-reaching implications, not only for the country but for our understanding of the universe as a whole.



(Above) 'Mean impact' of optical observatories, based on normalised citation counts of papers based on the respective facility. Large telescope data publications are on average two times more cited than other papers. SALT is following the broad trend, emphasising SALT's scientifically relevant publications. The peak in 2017 is due to a single, extremely highly cited paper on the electromagnetic follow-up of the gravitational wave event that year. Credit: Xiaoyu Zhang

I am Victória da Graça Gilberto Samboco

Hi, my name is Victória da Graça Gilberto Samboco. I am Mozambican, a first-year PhD student at Rhodes University, South Africa, working on Pipelines for Image-plane transients in MeerkAT. I am in Germany, enrolled in a Summer Internship program at the Max-Planck Institute for Astronomy in Heidelberg. My internship project focuses on star formation and galaxy evolution by studying the correlation between CO lines and various galaxy properties.

As an African astronomer, I am excited to participate in the IAU General Assembly (IAU-GA) 2024. This is a historic moment for Africa, and I feel a deep sense of duty to be part of it. I am excited to contribute to this unique event. My expectations are high, as the assembly will bring together diverse astronomers and topics, providing a great opportunity to learn about others' work and fostering rich opportunities for networking and collaboration. The social activities, cultural diversity, and extensive training opportunities offered at this assembly are unique, and I am excited to have the opportunity to experience them. This is truly a momentous occasion - IT IS TIME FOR AFRICA.

I will contribute to the IAU-GA with a poster presentation of my completed MSc results. The title of my presentation is "SolarKAT: Imaging Pipeline for Solar Interference Mitigation in MeerKAT (Solar Image Products)." This presentation will showcase the SolarKAT pipeline, highlighting its capabilities as a solar imaging tool beyond just solar interference mitigation and how these images can be useful for scientific studies, including space weather. This will be presented at the IAUS 390 symposium, "A Multi-Point View of the Sun: Advances in Solar Observations and Space Weather Understanding."

Image credit: Victória Samboco

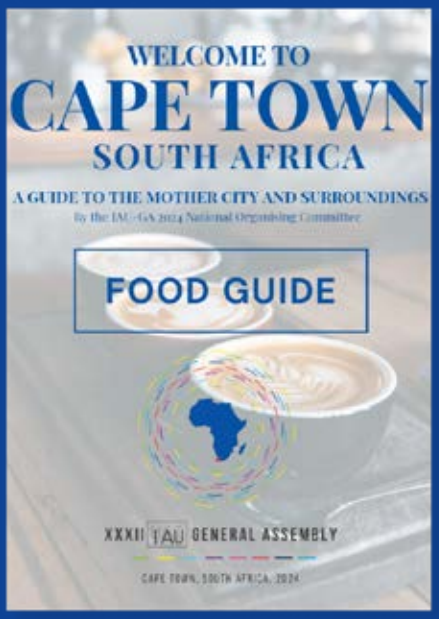
Cape Town's Time Ball & the Cape Town Food Guide

Time to have a ball in the Mother City

The Time Ball at the V&A Waterfront in Cape Town is a fascinating relic from the days of maritime navigation. Installed in 1883, this 17-foot diameter ball was originally part of a system to help ships' captains set their chronometers accurately, ensuring safe navigation. The ball was hoisted to the top of a pole and dropped at precisely 1:00 pm, providing a visual signal for ships in the harbour to synchronise their clocks. It's a testament to the ingenuity of the time when accurate timekeeping was crucial for navigation.

Fun Challenge

Next time you're at the V&A Waterfront, see if you can spot the Time Ball! It's nestled in the Clock Tower precinct, a lesser-known gem amid the bustling shops and restaurants. Keep an eye out for the tall pole and the ball that used to drop at 1:00 pm each day. It's a great piece of history and a fun scavenger hunt to add to your visit. Can you find it?



Click here to see the IAU's Cape Town Food Guide, a curated list of restaurants and food emporiums of all sorts across the Mother City. From fast food and snacks to fine dining and more.

Question of the day

Are you here for both weeks of the meeting? What are you plans for the weekend?

Got your weekend sorted out already? Here are some inspirations from other participants:

Antonio Porras is here only this week but stays for some sightseeing. “I am going on a safari and the travel booth here really helped me a lot, I want to see animals out in nature.” Neal Katz is an experienced SA traveler who has collaborators here. “I am thinking of going to Stellenbosch and do some wine tasting.” Zainab Awad only has ideas so far: “I want to see the Mandela house and do a boat tour”. The clear favorite of all three, however, is the penguins! According to Neal, the ones in Betty’s Bay are the best. Let’s hope there won’t be more astronomers than penguins then...

Antonio Porras, Yale University, working on how to make SMBHs in the early Universe.

Zainab Awab, Cairo University, simulates the chemical evolution of the ISM

Neal Katz, Univ. of Amherst, does cosmological simulations of galaxies (you can see his data at the IDIA VR booth!)

Click here to book your tickets

Friday, 9 August
19:30-21:30
CTICC Audi 1

PROGRAMME WEEK 1

	TUE - Aug 6th	WED - Aug 7th	THU - Aug 8th	FRI - Aug 9th
08:30 – 10:00 Morning plenary	Registration	IAUS 389 plenary	IAUS 390 plenary	IAUS 391 plenary
10:00 – 10:30 Morning e-poster & coffee break	IAUS 389, 390, 391 FM1, FM2, FM3, FM7 , OAO	IAUS 389, 390, 391 FM1, FM2, FM5, FM6, CPS , OAE	IAUS 389, 390, 391 FM3, FM7, FM5, FM6, OYA, OAD	Division e-poster
10:30 – 12:00 Morning oral session	S 389-1 S 390-1 S 391-1 OAO-1 / FM1-1 FM2-1 FM3-1 FM7-1	S 389-4 S 390-4 S 391-4 CPS-1 OAE-1 / FM1-4 FM2-4 FM5-1 FM6-1	S 389-7 S 390-7 S 391-7 OYA-1 OAD-1 / FM3-4 FM7-4 FM5-4 FM6-4	Parallel Division Oral Sessions
12:00 – 13:30 Lunch	Shaw Prize	ODE Prize Talks	Gruber Prize	Women in Astronomy
13:30 – 15:00 Afternoon oral session 1	S 389-2 S 390-2 S 391-2 OAO-2/ WG5 / FM1-2 FM2-2 FM3-2 FM7-2	S 389-5 S 390-5 S 391-5 CPS-2 OAE-2 / FM1-5 FM2-5 FM5-2 FM6-2	S 389-8 S 390-8 S 391-8 OYA-2 OAD-2 / FM3-5 FM7-5 FM5-5 FM6-5	Parallel Division Oral Sessions
15:00 – 15:30 Afternoon e-poster & coffee break	IAUS 389, 390, 391 FM1, FM2, FM3, FM7, WG5, OAO	IAUS 389, 390, 391 FM1, FM2, FM5, FM6, CPS , OAE	IAUS 389, 390, 391 FM3, FM7, FM5, FM6, OYA, OAD	Division e-poster
15:30 – 17:00 Afternoon oral session 2	S 389-3 S 390-3 S 391-3 OAO-3 / FM1-3 FM2-3 FM3-3 FM7-3	S 389-6 S 390-6 S 391-6 CPS-3 OAE-3 / FM1-6 FM2-6 FM5-3 FM6-3	S 389-9 S 390-9 S 391-9 OYA-3 OAD-3 / FM3-6 FM7-6 FM5-6 FM6-6	Joint Offices Meeting
17:15 – 18:30 Afternoon plenary	Opening Ceremony	Business 1	Invited Discourse: Dr Bernie Fanaroff	Invited Discourse: Prof Joop Schaye
18:30 - 21:30 Various	Welcome Reception	Public Talk: Astronaut Dr Sian Proctor 19:30 - 21:30	An evening with NASA 19:00 - 21:00	Public Talk: Prof Gerry Gilmore 18:15 - 19:15 / Astronomer's Got Other Talent 19:30 - 21:30

Background: Neutral hydrogen in the Large Magellanic Cloud. Image courtesy of CSIRO, L. Staveley-Smith.

PROGRAMME WEEK 2

	MON - Aug 12th	TUE - Aug 13th	WED - Aug 14th	THU - Aug 15th
08:30 – 10:00 Morning plenary	Offices plenary	IAUS 392 plenary	IAUS 393 plenary	IAUS 394 plenary
10:00 – 10:30 Morning e-poster & coffee break	Division e-poster	IAUS 392, 393, 394 FM4, FM8, FM9, FM10, WG1, WG2	IAUS 392, 393, 394 FM4, FM8, FM11, FM12, WG3	IAUS 392, 393, 394 FM9, FM10, FM11, FM12, WG6, WG4
10:30 – 12:00 Morning oral session	Parallel Division Oral Sessions	S 392-1 S 393-1 S 394-1 WG1-1 WG2-1 / FM4-1 FM8-1 FM9-1 FM10-1	S 392-4 S 393-4 S 394-4 WG1-4 WG3-2 / FM4-4 FM8-4 FM11-1 FM12-1	S 392-7 S 393-7 S 394-7 WG6-1 WG4-1 / FM9-4 FM10-4 FM11-4 FM12-4
12:00 – 13:30 Lunch		Kavli Prize Talk by David Charbonneau	Young Astronomers	
13:30 – 15:00 Afternoon oral session 1	Parallel Division Oral Sessions	S 392-2 S 393-2 S 394-2 WG1-2 WG2-2 / FM4-2 FM8-2 FM9-2 FM10-2	S 392-5 S 393-5 S 394-5 WG2-3 WG3-3 / FM4-5 FM8-5 FM11-2 FM12-2	S 392-8 S 393-8 S 394-8 WG6-2 WG4-2 / FM9-5 FM10-5 FM11-5 FM12-5
15:00 – 15:30 Afternoon e-poster & coffee break	Division e-poster	IAUS 392, 393, 394 FM4, FM8, FM9, FM10, WG1, WG2	IAUS 392, 393, 394 FM4, FM8, FM11, FM12, WG3	IAUS 392, 393, 394 FM9, FM10, FM11, FM12, WG6, WG4
15:30 – 17:00 Afternoon oral session 2	9 Parallel Division Oral Sessions	S 392-3 S 393-3 S 394-3 WG1-3 WG3-1 / FM4-3 FM8-3 FM9-3 FM10-3	S 392-6 S 393-6 S 394-6 WG2-4 WG3-4 / FM4-6 FM8-6 FM11-3 FM12-3	S 392-9 S 393-9 S 394-9 WG6-3 WG4-3 / FM9-6 FM10-6 FM11-6 FM12-6
17:15 – 18:30 Afternoon plenary	Gala Dinner	Invited Discourse: Prof Natalie Batalha	Business 2	Closing Ceremony Handover
18:30 - 21:30 Various		Public Talk: Prof George Ellis 18:15 - 19:15		
		Cultural Evening 19:30 - 21:30	The Cosmic Savannah Guest: Nobel Prize winner Prof Brian Schmidt 19:30 - 21:30	

Background: The Milky Way above the ATCA. Image courtesy of E. Lenc.

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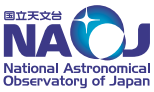
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PUBLIC EVENTS
IN PERSON & ONLINE

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07 /08 Journey into Space with Astronaut Dr. Sian Proctor

08/08 Evening With NASA

09/08 Women in Space Science & Astronomy
The Milky Way with Prof Gerry Gilmore
Astronomers Got Talent!

10/08 Stargazing at V & A Waterfront

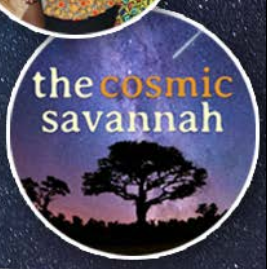
13/08 Nature of the Universe with Prof George Ellis

13/08 #AfricaLookUp Cultural Exchange Evening

14/08 The Cosmic Savannah Live Show with Nobel Prize Winner Prof Brian Schmidt





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NRF National Research Foundation

AfAS African Astronomical Society

XXXII IAU GENERAL ASSEMBLY
CAPE TOWN, SOUTH AFRICA, 2024

The team behind the design, layout, content writing and editing of the XXXII[nd] IAU GA newsletter includes Patrick Saunders; Guido Schwarz; Laura Hiscott; Maria Stone; Christina Thöne; Shirley Aoko; Gwen Sanderson; Marcelina Kinyumu; Daniel Cunnama; Susan Caras

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XXXII IAU GENERAL ASSEMBLY

6 - 15 AUGUST 2004

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