



Road to SDG5: Role of Women in Astronomy and Physics for African Growth

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(on behalf of the SciGirls team)

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Changing the scope of international cooperation with Africa, new EU-Africa Strategy in S&I

→ long-term measures for the benefit of our society

UN, January 2016 → 2030 Agenda



To combat poverty in the long-term

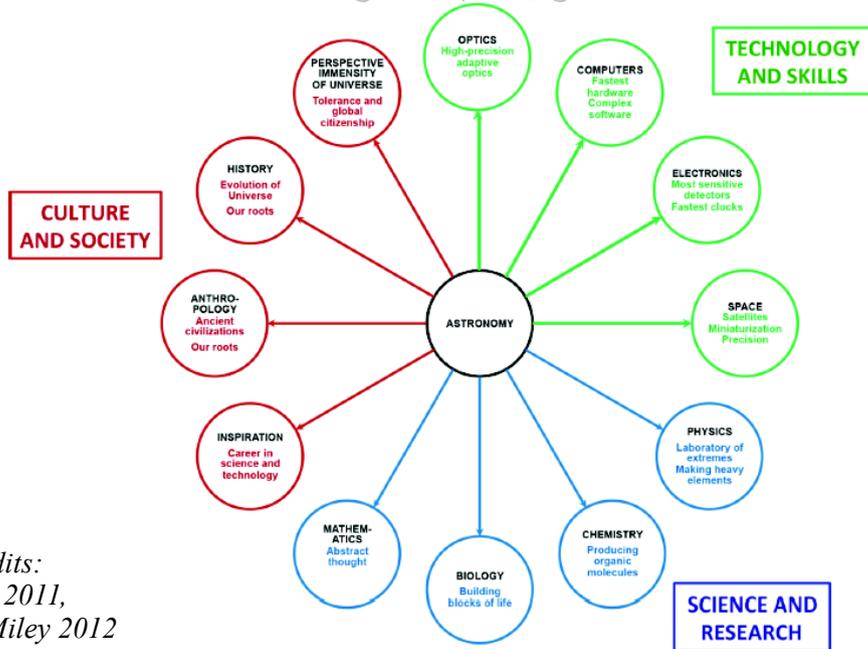


- education
- science
- strong technological development
- innovation
- empowering women and girls

→ ASTRONOMY and SPACE SCIENCE as important tools for development

ASTRONOMY is...

One of the most multidisciplinary sciences



A powerful tool for promoting education and science, and for empowering girls and women in STEM

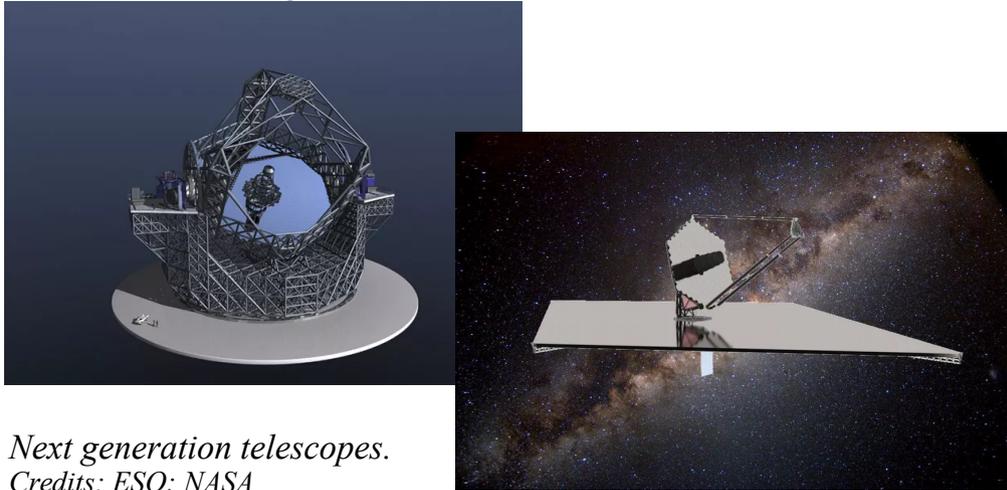


Outreach activities in Ethiopia.
Credits: ESSTI and ESSS

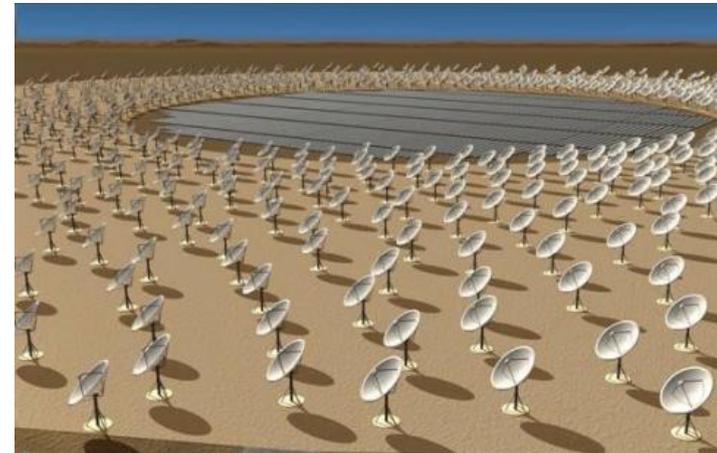
Credits:
IAU 2011,
G. Miley 2012

One of the leading sciences for bringing strong technological developments and innovation

A powerful tool for diplomacy and for promoting peace



Next generation telescopes.
Credits: ESO; NASA



Credits: SKA

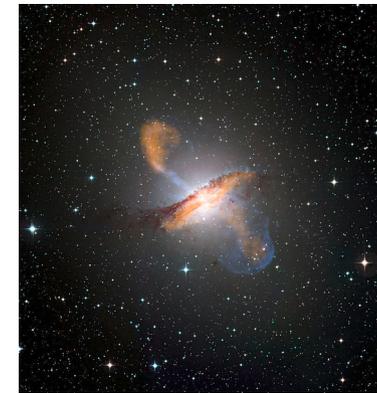
Astronomy is in the heart of the digital revolution and the coming AI revolution

WIFI

COMPUTING,
COMMUNICATION, GPS, IMAGING
(e.g., grid computing, satellite communications, atomic clocks, CCDs, etc.)

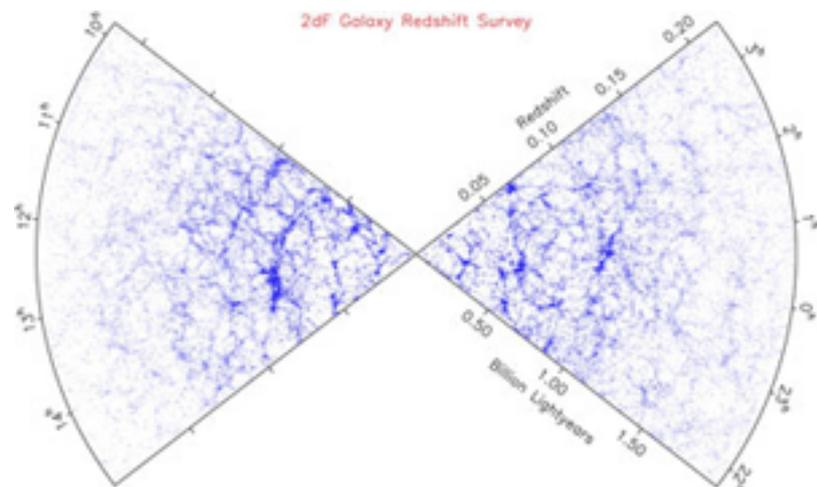


SKA artist's impression.
Credits: SKA



Optical, X-rays, and radio view of Centaurus A active galaxy.
Credits: ESO/WFI, MPIfR/ESO/APEX/A.Weiss et al.; NASA/CXC/CfA/R. Kraft et al.

BIG DATA
and new technologies
(e.g., SKA revolution and 100,000 times faster data flow than the current world one)



Large-scale structure in 2dF redshift survey with hundreds of thousands of galaxies.

Credits: 2dF and M. Colles

Africa has huge potential for astronomy development!!

Light pollution Atlas

The dark sky as an African natural resource!!



Chile, Canary Islands (Spain), and South Africa are great examples of how dark skies and their conservation can contribute to socio-economical development

Some of the main astronomical observational sites

Canary Islands, Spain



Hawaii, US



South Africa



Chile



All of these countries benefited from astronomy in terms of their social and economical growth, through international collaborations, access to the first-class data, first class technology development and innovation, strengthening of both private and public high-tech and IT sectors, etc.



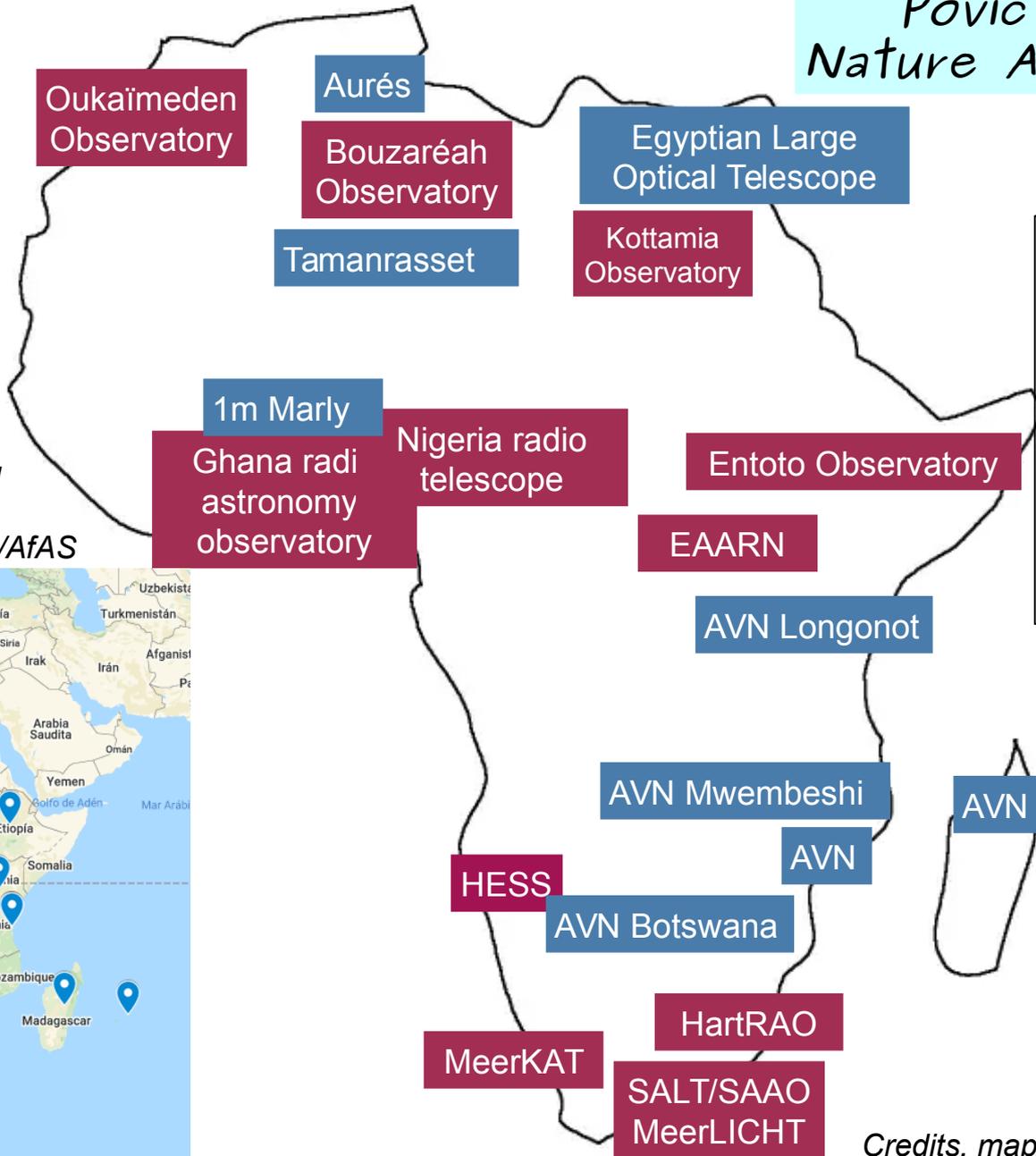
It's time for Africa!!

Investing in astronomy and investing in science is not a question of luxury or privilege it is a fundamental need!

Pović et al. 2018,
Nature Astronomy, 2, 507

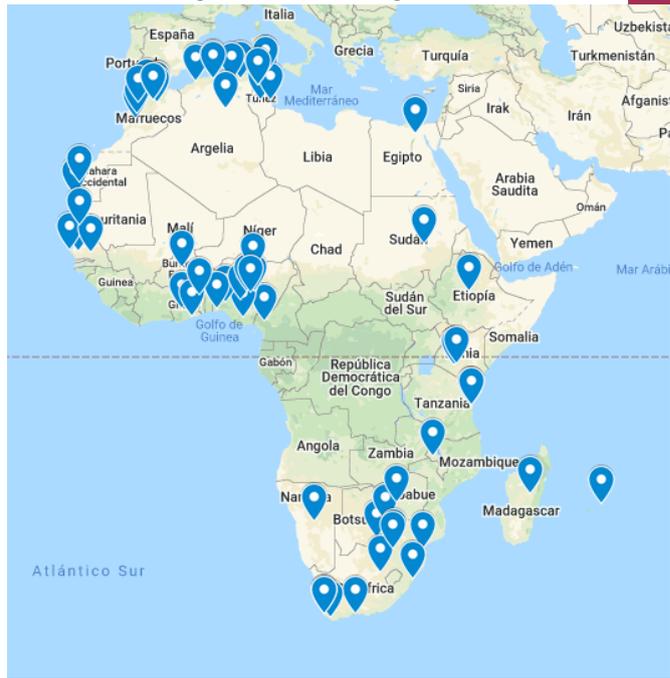
Existing

Forthcoming



Important
development
in astronomy
over the last
10 years!!

Map of amateur astronomical societies.
Credits: Niruj M. Ramanujam/AfAS



Credits, map design: Vanessa McBride

Signs of astronomy growth in Africa

- 
- New **post-graduate programs** in A&A across the continent (e.g., Uganda, Rwanda, Kenya, Sudan, SA, Namibia, Nigeria, Ethiopia, Egypt, Morocco, Ghana, etc.)
 - Strong increment in the number of **professional astronomers**
 - Significant **infrastructure development** in observational astronomy and many **site testings**
 - Strong **institutional development** (new research centers, space agencies, astronomy departments under the universities, etc.)
 - Establishment of the **African Astronomical Society (AfAS)** with different committees (science, education/outreach, AfNWA, etc.)
 - **Public awareness and outreach** increased everywhere, > 70 amateur astronomical societies
 - Change in the **political engagement** (e.g. AU post-development agenda, African Space Agency, new policies and strategies, etc.)

Principal difficulties/challenges

- Most of the countries are **starting from scratch** with astronomy development
 - **Limited** number of **human resources**
+
limited qualified sector to support all the needs
- **Lack of** the 'base' and **supportive infrastructure** for scientific (infrastructure) development
- **Lack of funding** (secured in the long-term) **and support** from local governments
+
many difficulties day-to-day
(including uninterrupted power, internet, etc.)
- **Astronomy in Africa is still not accessible to everyone!!**
- Need for **more awareness** to be done among the general public and among policy- and decision-makers regarding the importance of astronomy and science for African growth and inclusion

"A blueprint to achieve a better and more sustainable future for all people and the world by 2030."

(Mission Statement)

How astronomy contributes to



in Africa?

SDG5 plays a fundamental role in agenda

The current gender gap in science

The number of female researchers in the world is on average < 30%

In most of the African countries, it is < 25%, and even lower when considering fundamental sciences.

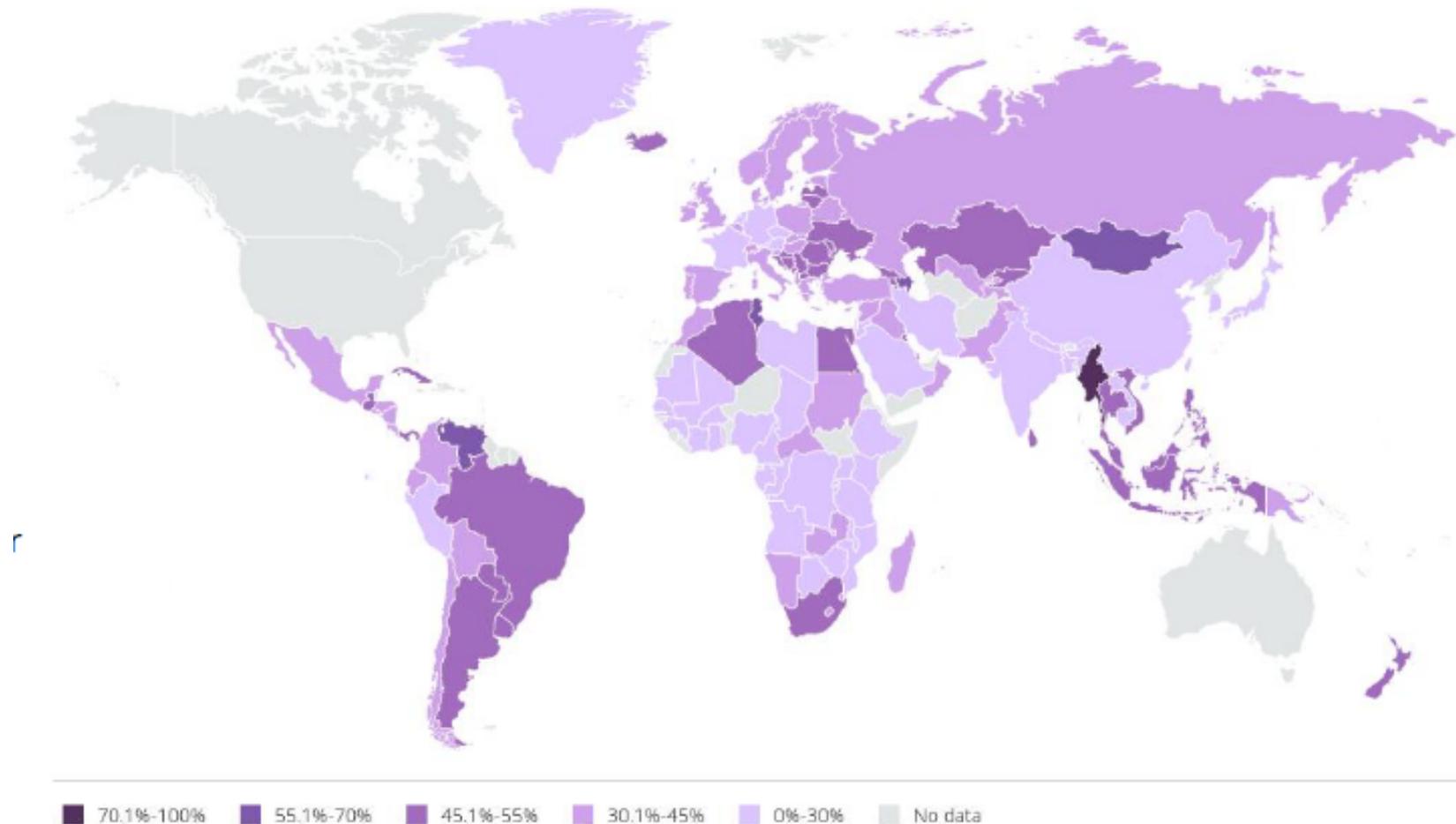
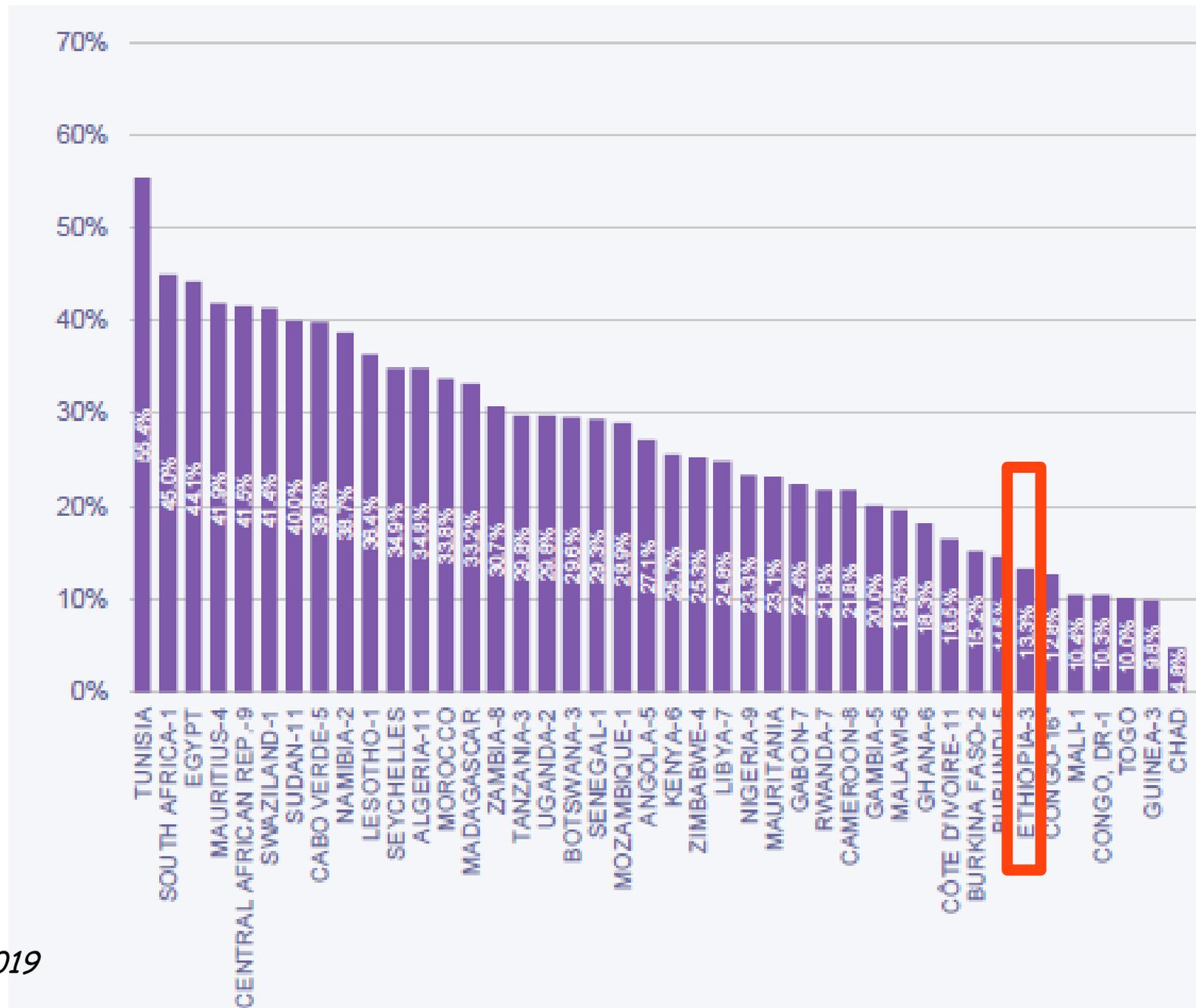


Image credits: UNESCO, 'Women in Science' report, 2019

The current gender gap in science

% of women researchers in Africa

(part-time and full-time)



Source: UNESCO, 2019

Is the gender gap in science really important?

Why do we care so much about the gender gap in science?

Does it really matter who do we empower, girls or boys, as long as the job is done?



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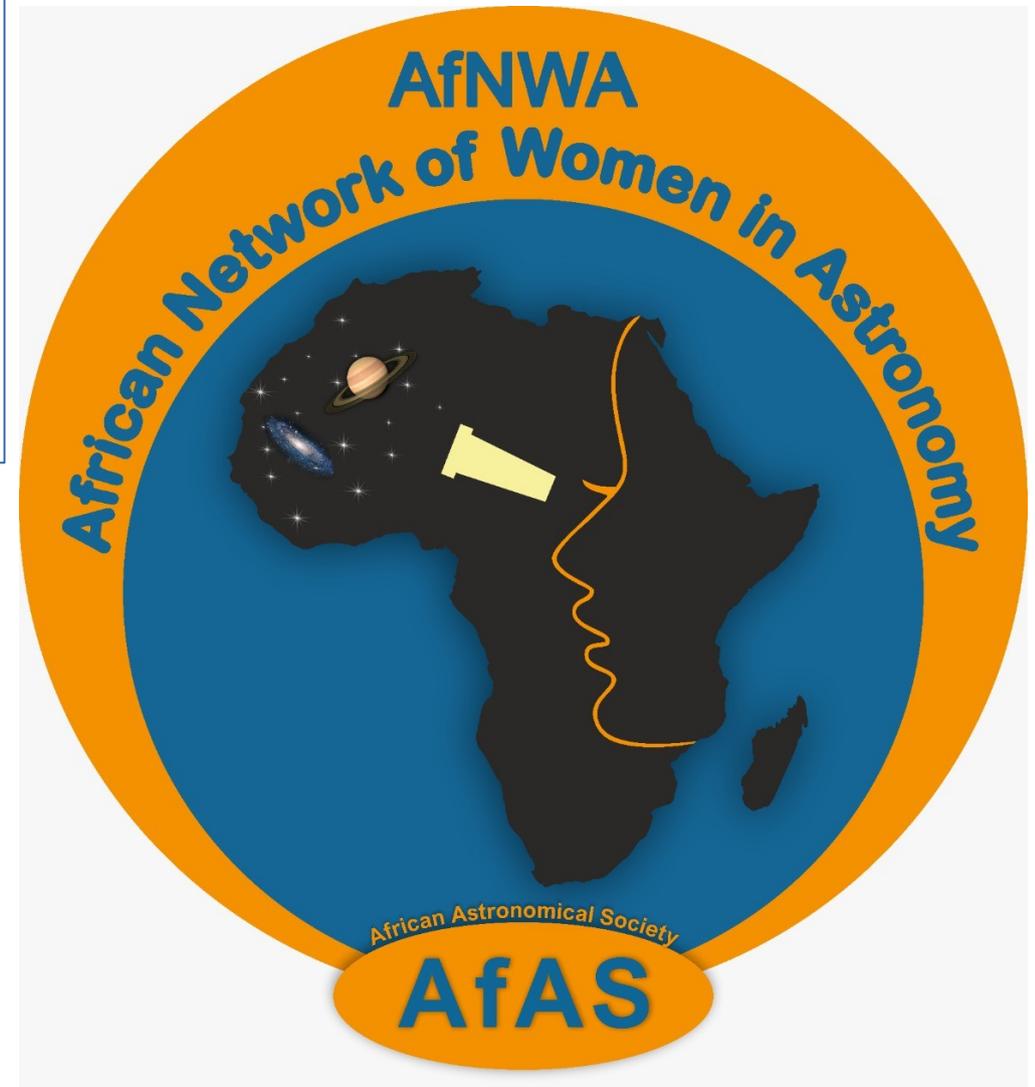
We can also ask the question in a different, very simple way, however in line with previous:

If rich people can do all the job, is it really important to empower poor and underprivileged groups?

Empowering women and girls through astronomy → need for AfNWA

The African Network of Women in Astronomy (AfNWA) is an initiative that aims to connect all women working in astronomy and related fields in Africa and to guarantee the participation of women in all astronomy and science developments.

Established under the African Astronomical Society (AfAS) as one of its sub-committees, to empower women and girls in science through astronomy.



Who is behind AfNWA and its current status?

Coordinating team:

Somaya Saad



Mirjana Pović



Nana Ama
Brown Klutse



Priscilla Muheki



Vanessa McBride



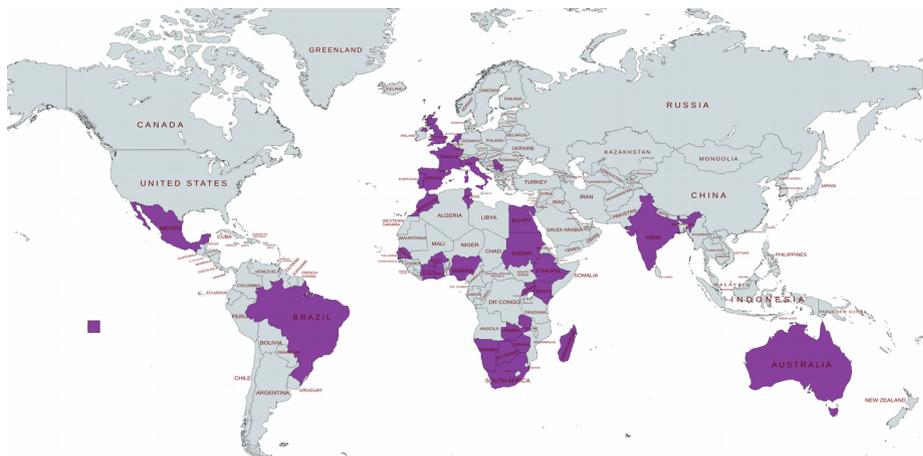
Carolina
Odman-Govender

Current status:

- Publicly launched in January 2021
- By now > 100 members from 30 countries
(~ 80% women, ~20% men)
- Only 18% are senior/faculty members,
> 80% are early-career researchers, PhD
and MSc students

AfNWA is timing to:

- strengthen the links between female researchers, collaborations, support, and supervision
- strengthen professional and leadership skills
- attract girls to STEM through astronomy outreach and role models
- understand the main factors responsible for the lack of women in science and explore the ways to retain women in astronomy



Main AfNWA activities

- Creation of the Network, bringing us together
- Virtual trainings (3 organised trainings in 2021)
- March 8 activity for giving visibility to African female astronomers (in 2021)
- Organised multiple discussion sessions and talks on women in science at international meetings (including several Africa-EU and UN meetings)
- Community meetings & outreach activities (currently preparing outreach videos)
- AfNWA Women in Astronomy awards (2021 the first edition)

Early Career Award:

**Dr. Marie Korsaga,
Burkina Faso &
France**



**Senior Astronomer
Award:**

**Prof. Renée Kraan-
Korteweg, South Africa**



Feedback from the 6th East African Astronomical Society Workshop

Main reasons responsible for the gender imbalance in astronomy and science in Africa (from > 60 participants, both men and women):

- poverty
- sexism
- cultural and traditional practices
- strong pressure from the family and society to get married
- lack of role models
- lack of sponsorship, funding
- lack of support for education, harassment at work or in places of learning
- gender inequality in society in general
- double load for them as being mothers and professionals, family responsibilities
- lack of kindergartens - lack of support with kids
- lack of institutional support for women who take a break
- lack of awareness - especially in astronomy, lack of awareness about work opportunities
- gender-based discouragement for science streams in schools
- wrong perception about women in the society
- lack of support for doing (fundamental) science from the family and society
- working environment with lack of women
- stereotype mindsets
- lack of confidence, female abuse leads to a lack of self-confidence
- discouragement from society towards those trying to study.

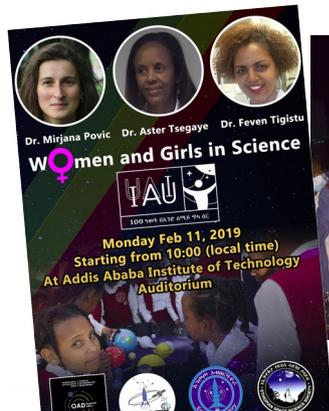


Achieve gender equality and empower all women and girls

Astronomy and STEM education for girls in Ethiopia

- 'STEM for GIRLS in Ethiopia' initiative:

- Since 2019 in collaboration with the Society of Ethiopian Women in Science and Technology (SEWIST)
- Work with ~ 1000 secondary school girls
- Work with > 30 teachers
- Strengthening the role-modeling and mentoring
- Survey conducted about girls in STEM





Achieve gender equality and empower all women and girls

The slogan of the Ethiopian Great Run, 2018

Main lessons learned:

- strong interest observed for astronomy and science
- lack of support for choosing STEM (in all aspects)
- lack of information
- lack of role models
- many difficulties faced in remote and rural areas (80% of the population)



Motivation for the SciGirls project under the OAD2022 call
→ Empowering girls in science through astronomy

SciGirls: main aims, objectives, and outcomes

SciGirls

(will train 40 girls from different regions in Ethiopia, focusing on public schools)

- to promote astronomy and science among the girls
- to make the girls advocates/promoters of STEM in their communities
- to develop materials to be used for STEM promotion (in 3 languages)

HCB

Communication skills

Leadership (girls as role models)

Understanding the scenario

Awareness (job opportunities)



Achieve gender equality and empower all women and girls



Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all



Reduce inequality within and among countries

What do we need with ASFAP?

We need a policy and road map regarding women and girls in physics and how through the joint work in Africa we can improve the current gender gap in science for the benefit of all.

AfNWA recommendations for African Strategy and future policies

To consider the following:

- Carry out the study to understand the main factors responsible for the lack of women and girls in STEM, in different parts of Africa, and develop the proper measures for improving the situation in the future. (e.g., feminisation of poverty, schooling of girls and drop-off, access to university, social pressure to marry and have children, family-members care load, and others).
- Give visibility to the work that women in science are doing, so that they can inspire many others, in particular girls.
- Strengthen the system of MSc and PhD scholarships for talented women, especially in developing countries, and the possibility of having a family during MSc and PhD studies.

AfNWA recommendations for African Strategy and future policies

To consider the following:

- Strengthen the system of taking into account family duties and/or any justified interruption in research in all CV evaluations (e.g., during job applications, scholarships, grant proposals, awards, etc.).
- Strengthen the support for the care of dependent family members during particular research activities (e.g., conference/training attendance, research visit, specific research activity, etc.).
- Enforce gender-balanced hiring (and other) committees.
- Strengthen the professional and leadership skills of women researchers.

AfNWA recommendations for African Strategy and future policies

To consider the following:

- We need measures to ensure that **women remain in science**.
- Guarantee **more stable positions** for women (and men) in science by substituting infinite post-doc positions and temporary research contracts with long-term positions that will permit them to combine family life with their research.
- Evaluate the use of double-blind methods in short-listing candidates for jobs and scholarships (short-listing without knowing names - and hence gender) for reducing unconscious bias and/or any conflict of interest.
- More awareness is needed to be done about the importance of science and job opportunities.

If we really want to see our world being a better place:



Achieve gender equality and empower all women and girls



Reduce inequality within and among the countries



End poverty in all its forms everywhere



By making Africa stronger, free, and more independent through:

- education
- science
- strong technological development
- innovation
- empowering women and girls

Credits: Chris Harrison
(Addis Ababa, Ethiopia, 2019)

→ Important role of ASFAP

Thank you very much for your attention!



Astronomy activities with girls at Menen School, Addis Ababa, Ethiopia. Credits: ESSS and ESSTI



The slogan of the Ethiopian Great Run, 2018



Solar eclipse observations in June 2020 at the north of Ethiopia. Credits: ESSS and ESSTI