KELEBOGILE IS REACHING FOR THE STARS

Astronomy is a natural science that studies celestial objects and phenomena. It uses mathematics, physics, and chemistry to explain their origin and evolution. Objects of interest include planets, moons, stars, nebulae, galaxies, and comets.

Astrophysics is a branch of astronomy concerned with the physical nature of stars and other celestial bodies, and the application of the laws and theories of physics to the interpretation of astronomical observations.

Kelebogile Gasealahwe, PhD Candidate in Astrophysics and Space Science

What is MeerKAT? This is a radio telescope, situated 90km outside the small Northern Cape town of Carnarvon. The telescope is an array of 64 interlinked receptors/antenna that collect data and information used for a variety of research purposes. Read more about it at https://www.sarao.ac.za/gallery/meerkat/

Kelebogile Gasealahwe learned about telescopes in primary school, which sparked her interest in the night sky and a curiosity to discover what lies beyond the earth. This, combined with hard work and dedication, has seen this remarkable young lady realise her dream to pursue a career in astronomy.

After completing a Bachelor of Science in Physics and Astrophysics in 2017, she went on to complete her Honours and then Masters in Astrophysics and Space Science. All these studies were undertaken at the University of Cape Town.

She is currently a PhD candidate in the field of Stellar Astrophysics, specifically the study of X-ray Binaries. These are two-star systems that produce high energies such as X-rays when they interact. She is involved in one of MeerKAT's large survey projects, focussing on the development of the relationship between outflows produced in these objects.

NRF-SAASTA met with Kelebogile to find out more about this exciting field and what is required to pursue a career in astronomy.

WHAT SUBJECTS SHOULD A YOUNG PERSON TAKE IN GRADE 10 TO STUDY ASTRONOMY?

Physics, mathematics, and languages are the main subjects required to get into university to study an astrophysics degree. Although the average marks required in matric range from 65 – 75%, university placement is competitive, so higher marks become more important.

WHAT SKILLS/PERSONALITY TRAITS DOES ONE NEED TO EXCEL IN THIS FIELD?

Analytical, problem-solving and computational skills are very important. In addition, a big part of research is reporting and written work, so it is important to have and develop writing skills, particularly scientific writing.

TELL US A BIT ABOUT WHAT YOUR JOB INVOLVES

I am a research student, and my functions revolve around my research project. These include data reduction and analysis and research outputs in the form of conference talks and journal publications. My responsibilities also include co-ordinating the stellar research group at the South African astronomical observatory.

WHAT ARE THE PROS AND CONS OF THE FIELD AS A CAREER?

A career in research has multiple pros and cons and often these are linked. One pro is traveling for research, involving conferences and collaborations. Office hours are flexible, however with research you can find yourself working all hours including weekends if you do not follow a strict schedule. A big con is that it is difficult to find a permanent job in research. It is common for PhD students to work multiple contract jobs, such as post doctorates and fellowships, before getting a faculty position or permanent position at a research institute.

APART FROM ASTRONOMY, WHAT OTHER CAREER OPPORTUNITIES DOES YOUR QUALIFICATION OPEN UP OR OFFER?

Due to the education gained from analysing astronomical data you are equipped with coding skills, analytics and problem solving. This opens doors to careers in finance, risk management, computing and machine learning industry jobs.

HOW IS YOUR CURRENT WORK POSITIVELY CONTRIBUTING TO A BETTER SOUTH AFRICAN SOCIETY?

Astronomy facilities have multiple outreach programs targeted at children, the youth and the public at large. The aim is to teach and transfer knowledge to build a strong STEM community and society in our country. My current work is about advancing the research in my area of expertise and I contribute to better the South African society by transferring this knowledge through the outreach I do with my affiliations to the University of Cape Town and South African Astronomical observatory.

WHAT IS THE FUTURE OF YOUR INDUSTRY AND CAREER, PARTICULARLY IN LIGHT OF THE DISRUPTION BROUGHT BY THE 4TH INDUSTRIAL REVOLUTION?

A large part of astronomy is driving the 4th industrial revolution through big data. Larger telescopes like the MeerKAT and upcoming SKA mean larger data sets and big storage facilities, to reduce and analyse this data machine learning is arguably one of the resources required. Remote observing is also more available for certain telescopes, and this allows astronomers to observe from their preferred location. I think there will always be a place for an astronomer in research, the ground-breaking facilities and resources are just making things simpler and improving the quality of research.

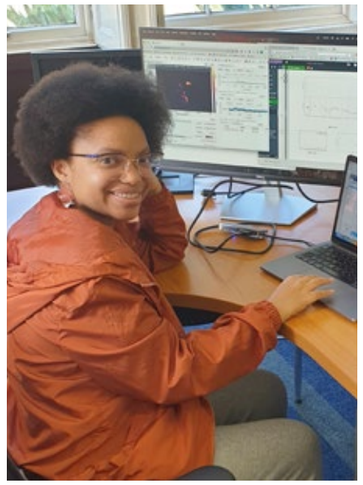
WHAT ADVICE WOULD YOU OFFER LEARNERS WHO ARE INTERESTED IN PURSUING THIS CAREER PATH?

I would advise anyone who is passionate about astronomy to make sure they pass their courses well and truly grasp what they are learning. In research, one gets very focused on their specific field but the things learnt in earlier degrees really help improve your experience when tackling challenging problems in your project.

Build a good network of fellow astronomers who have diverse expertise and be confident (or work on it), it will help with all aspects of academia.

THE INFORMATION YOU HAVE PROVIDED HAS MADE IT CLEAR THAT THE ROAD TO BECOMING AN ASTRONOMER IS NOT AN EASY ONE. WHAT HAS HELPED YOU GET WHERE YOU ARE TODAY?

I am someone who has had a big career goal from an early age. In the face of academic challenges, I have had to stay motivated and worked even harder to achieve success. I am passionate about my career and have grabbed every opportunity made available to me to achieve my goals. Every degree I have completed is a big achievement in my life. Later in my academic career, I received an invitation to the Golden Key honour society, which is something I never imagined would happen when I was an undergraduate. My loved ones are a massive part of my drive to achieve, they motivate me to be better and follow my dreams.



Kelebogile Gasealahwe at her desk in the PhD office at the SAAO, analysing an image of an X-ray binary observed with MeerKAT

The South African Astronomical Observatory was established in 1972 and is the national centre for optical and infrared astronomy in South Africa. The observatory is run by the National Research Foundation of South Africa and its core function is to conduct research in astronomy and astrophysics.

A BIT MORE ON THE SKA

The Square Kilometre Array (SKA) project situated in the Northern Cape is an international effort to build the world's largest radio telescope, with a square kilometre (one million square metres) of collecting area. The project represents a huge leap forward in engineering, as well as research and development towards building and delivering a radio telescope that will be able to deliver a transformational increase in science capability when operational. https://www.sarao.ac.za/about/the-project/

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