



## Inspirational Young Women in Science

The National Research Foundation (NRF) celebrated Youth Month in June 2020 by inviting students and researchers to tell their stories. During the month, 30 profiles were

shared via the NRF's social media channels. Here, *Quest* presents two of these profiles, featuring young scientists who got their start at the University of Zululand.



### Thuthukile Charmane Khumalo

*Miss Thuthukile Charmane Khumalo is a PhD student registered at the University of the Witwatersrand, but for research and supervision purposes is based at NRF-iThemba LABS (an acronym for Laboratory for Accelerator-Based Sciences). She has received funding from the NRF from her honours degree up to her current PhD studies.*

I grew up in Soweto, Gauteng, and later moved to the Umzinto area on the KZN South Coast. I come from a family of five: three sisters and one brother. I matriculated

at Sihle High School, Malangen, which is in the rural area. I am a very passionate and ambitious human who is always curious and keen to learn new things. I enjoy reading, which is what I spend most of my time doing. This really helped me academically – I wouldn't stop reading where the lecturer stopped in class, but would read further on my own. I was always working hard because it's hard not to when one is passion-driven.

As a curious individual, I always had questions about how everything on Earth came about. Why? How is it the way it is? How far can we divide things? So, as I was doing my matric, I came across an article in the community library that was talking about a lady named Marie Skłodowska Curie. Her story fascinated me so much that I did more research and, ever since that day, she has been my role model. Whilst doing my research about this lady, I somehow realised that for me to have an idea of answering the questions that I always had, I would have to study nuclear physics. And this is how I ended up in nuclear physics!

I did my undergraduate degree (physics and chemistry), honours (physics), and master's (experimental nuclear physics) at the University of Zululand. I did my honours and MSc under the MANUS/MATSci NRF programme, which is done through the University of Zululand and the University of the Western Cape, both of which are described as historically disadvantaged universities. This didn't stop me from pursuing my dream and excelling.

Coming from a historically disadvantaged university, I've had to teach myself a lot of things, but I also make sure that I ask questions so that I learn from the people around me. For example, programming (or coding) is one of the things I had to teach myself as it is an essential skill in this field and also in the era that we are living in (4IR). I also had to put myself first and make decisions that were for me, and not listen to the many voices around me telling me which career path I should take – this was not an easy

thing to do as support, especially from family, is important. For my MSc, my research was in experimental nuclear physics, where I was doing a conceptual (simulations) design of a new detector to be used with the K600 high-resolution magnetic spectrometer at NRF-iThemba LABS in Cape Town. This is part of a bigger project at the lab. This work was presented in both local and international conferences and workshops.

I've just started my PhD and my research focus is still nuclear physics – I am studying a phenomenon known as the 'pygmy dipole resonance'. The study of this phenomenon in nuclei also has an astrophysical importance; for example, it helps provide input for astrophysical models that are used to predict the different processes governing the abundance and synthesis of the different elements we see on Earth.

My research will contribute to the body of knowledge of the nuclear physics field and might lead to further studies arising from the results. This will mean a lot for the nuclear physics community in Africa.

**If I could invite any three researchers – living or deceased – to a dinner party,** I would pick:

- Retief Neveling (my MSc supervisor): I would invite him because he is my role model and I really admire his

work ethic. He is a very knowledgeable individual and one can learn a lot from him.

- Marie Skłodowska Curie (my everyday motivation): Her experience and success in the field of science is a true definition of 'against all odds'. I have so many questions to ask her, such as what kept her going, what made her continue with her work despite the lack of recognition and support from the then physics community?
- Richard Feynman: I believe he was the greatest teacher of all time and – paraphrasing his words – he said that if you can't explain or teach something to someone, it means you don't understand it fully yourself. I would also learn a lot from him. I would definitely also want to know about how he feels about the development that has been done in science, specifically in the field of physics.

**What do I hope to achieve in the future?** Make a major contribution to nuclear physics or physics as a body of knowledge, and perhaps win a Nobel Prize. (It doesn't hurt to dream!)

**My advice for young people who are considering a career in STEM** is to never stop asking questions. There is no such thing as a stupid question! Lastly, find a passion and pursue it.



### **Xolile Mbuyazi**

*Xolile Mbuyazi is a DSI-NRF intern under NRF-SAEON, the South African Environmental Observation Network. She also received funding from the NRF for her honours studies in 2018.*

I grew up in northern KwaZulu-Natal, in a town called Mtubatuba. I moved there after staying with my aunt in Empangeni for the first few years of my childhood. I then

moved to Mtubatuba to stay with my grandmother in a house that was always packed, and always filled with love and laughter. I stayed with my grandmother until I was in Grade 10, attending Mtubatuba High School. I had to move with my dad after my grandmother sadly passed on.

I fell in love with science when I was still in high school – I really enjoyed life sciences and agriculture. That was until I went to university, which is where I was introduced to hydrology.

I started my degree at the University of Zululand in 2014, completed it in 2017 and registered for an honours degree in 2018. Thanks to the NRF, I could afford to pay for my honours. In 2019, I started a DSI-NRF internship, hosted by NRF-SAEON at the Grasslands-Forests-Wetlands node based in Pietermaritzburg.

Growing up in Mtubatuba's KwaMsane township, we did not have water in our taps most of the time, and yet the Mfolozi River was flowing. So I was curious as to why this was happening, and since no one around home could help me get those answers, I figured what better than hydrology to help me answer those questions. Having to go looking for water all around the township after school with my cousins (just to have water for basic needs) served as a motivator. I therefore chose a career in hydrology, with the hope that one day I could help my community and other rural communities.

Growing up, I wanted to be a medical doctor because I loved science and I didn't know a lot about scientific careers, but now I am glad I found hydrology. I have had



to overcome a lot of obstacles in my life to get to where I am today, and I still have a lot of obstacles to overcome. I have had people telling me I can't do it, but I never gave up on myself.

My research focus is groundwater hydrology, which might change or be more focused as I am planning on starting my master's in 2021. Currently, however, I am working on an erosion project in Cathedral Peak research catchments as part of my intern project with NRF-SAEON. I would like to believe that, one day, my research will help my community understand the reasons behind the water situation – to get solutions as to why the taps are dry while the rivers are flowing, and to help other communities in South Africa and Africa – because that is the whole reason I chose this career.

**If I could invite any researcher to a dinner party,** I would pick Dr Ricky Taylor, my honours supervisor. I would invite him because he was the first researcher who believed in me, even when I didn't believe I could do it. Whenever I think of my future as a researcher, I think of the one person who believed in me and still does. It would be interesting to pick his brain about a lot of things besides my career as a researcher.

**My advice for young people who are considering a career in STEM?** The greatest advice I have is for a young black woman like me who is trying very hard to break through into this big scientific world. I would say to her: "Do not be scared, you have the potential and the capability of becoming whoever and whatever you want." There are generational curses and people telling us that we do not belong or that we can't do it. I would say to never give up on yourself, even when you feel like the odds are stacked against you. There are going to be many late and sleepless nights ahead, but do not give up. There is a young girl out there who will, one day, look at you and say: "I want to be like her when I grow up."

**What do you hope to achieve in the future?** I want to get my MSc and PhD. I want to be a known researcher in my field and publish articles. After all that, I want to start a foundation that helps young girls from townships and rural areas like me who are interested in STEM, a foundation that will deal with helping girls realise that there are occupational choices other than that of a teacher or a nurse. There is a whole world out there to explore!

The rest of the Youth Month profiles are available at <https://www.nrf.ac.za/tags/youth-month>

The NRF also published another 28 profiles on 'Women at the heart of STEM' in August to celebrate Women's Month, available at <https://www.nrf.ac.za/features-0>

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