

Work

Your
story

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ADIDJA AMANI SET YOURSELF CLEAR LIFE GOALS

It was not easy growing up in an environment where men are more valued than women. And the religious and cultural factors in my region mean that fewer women than men go to university. I had several marriage proposals while I was at secondary school. Fortunately, I did not get married, despite the pressures.

My mother was chronically ill when I was young, which motivated me to go to medical school at the University of Yaoundé I. In 2007, my last year, I won a US Fulbright scholarship to pursue a master's degree in public health at Georgia State University in Atlanta. That experience provided many opportunities to meet people from around the world, establish relationships and strengthen my bilingualism.

It also convinced me of the value of public health and the importance of investing in prevention. When I returned to Cameroon in 2010, my skills were in demand. Two directors at the Ministry of Public Health wanted to hire me: it was clear that the country needed the kind of human resource that I represented. I worked on a project to strengthen the public-health workforce. Next, I worked as a programme manager for an international non-governmental organization called Sightsavers. Then, the ministry recruited me back to become its head of child and newborn health.

Hard work and keeping good relationships with people in my networks have been key to my success. Just recently, I reached out to one of my US mentors for advice that I incorporated into a grant proposal on vaccination in Cameroon.

When I was younger, I had a role model, Yaou Aïssatou, who was then the minister of women's empowerment for Cameroon. She was from my region and she was also Muslim. During the school holidays, I would learn sewing and hairdressing because this was expected of women. I did it out of respect for my parents, but internally, I thought: "This is not for me." I would see Aïssatou, who is now the director of national investment, commanding so much respect, and I would think, "Why should I do hairdressing when I can be like her?"

Young women have to know their destination: what is their goal and what do they want people to say about them? When you are clear about where you want to go, then you can put the mechanisms in place to reach your goal.

I have a vision board in my bedroom that I renew every six months. It has my life goals



As a youngster, Adidja Amani looked up to Cameroon's minister of women's empowerment.

VOICES FROM AFRICA

In the first of a two-part series, four women share their career stories. **By Kendall Powell**

African women in science, technology, engineering and mathematics (STEM) face all the same challenges as women in those fields elsewhere – but they have even more barriers to success.

Many describe Africa's academic science as being like a start-up company: it often requires infrastructure and equipment generated from scratch, team capacity building and a frenetic pace of working, with periods

involving 12-hour days or 7-day weeks.

With limited resources for research – be they human, financial or infrastructural – researchers across the continent face an uphill battle to advance projects and publish. *Nature* asked women in sub-Saharan Africa about their careers and the scientific landscape in their countries. Here are four of their stories; the other four will be included in next week's issue.

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– the house and car I want to have – and my physical goals to keep fit. But it also has my academic goals on it, such as “Write 25 publications by the end of February 2022” and my priorities for what I want to publish. I see that when I wake up, and I know I have to work on a particular article.

Finding a good work–life balance is hard and, honestly, I’m not sure I’m doing it right. I have made sacrifices. I have cut off everything that is leisure and I work seven days per week. My first child, who is 14, stayed with my mother when I went to the United States, and my second child, who is 3, stays with my mother in my home town of Guider, a 1,200-kilometre drive from Yaoundé.

My keyword is delegation. If I don’t have to do something myself, I will delegate it to staff, or to medical graduates, students or research assistants. I also delegate housework, such as chores and cooking.

As a woman in this environment, it’s not easy to evolve. I’m part of the Higher Institute for Growth in Health Research for Women, also known as the HIGHER Women Consortium, a network of senior female researchers in Cameroon. Every year, we hold a retreat in which we talk about the challenges of marriage, family life and academic research. It’s an opportunity for me to learn from other women’s mistakes, and so avoid making the same ones myself.

Because these women want to see other women rise, it has been a tremendous motivation. Now, I mentor three younger researchers. When I have a research proposal or paper to write, I call them so that they can learn, and we publish together. One of the people I’m mentoring is Solange Ngo Bama, a primary-care physician at the Ministry of Public Health who is working for a master’s degree in epidemiology. Together, we have three publications about mass vaccination in peer review. My wealth comes from the people around me.

Adidja Amani is a lecturer at the University of Yaoundé I and the deputy director for vaccination at the Ministry of Public Health in Yaoundé, Cameroon.

AMINA AHMED EL-IMAM POOL RESOURCES TO BOOST IMPACT

By the time I was finishing my master’s degree in microbiology at Ahmadu Bello University in Zaria, Nigeria, in 2007, I was married and had had my first child. That’s when it hit me that it was going to be difficult to be a researcher and a wife and a mother.

In my experience as an African woman, your first responsibility is to be a mother. Anything else beyond that? Well, good luck to you, even



Microbiologist Amina Ahmed El-Imam’s personal sacrifices support her biofuel research.

if you have an understanding partner. The domestic and childcare chores rest 100% on the mothers’ shoulders – that is just the norm in our society. As a researcher, your career path is already more difficult and resource-limited than a man’s. You need some basic level of superhero skills.

When I went to the University of Nottingham, UK, to do my PhD in 2013, I brought my three children under the age of seven with me. It was hectic – there’s no other word for it – but they also brought me joy. My husband visited as much as he could and he supported us financially, which allowed me to pay for childcare. That was the only way it was doable.

When I returned to Nigeria, I became a lecturer, teaching courses and advising students. I’m also expected to conduct research that has value to our immediate community. My research is focused on producing industrial chemicals and fuels using microorganisms. I do have a research group of students, but there’s no research funding allocated by the university. If you are extremely lucky, you might get a government research grant

through the university of about US\$2,000. There are not that many grants and there is a lot of competition.

What matters most for promotion is your research, even though you don’t have the resources or time for it. This is not peculiar to academia. Much of Africa is poor and battling for resources – such as health care, infrastructure and education.

We just have to make it work. We apply for grants but we also pool from our own funds. The average professor’s salary at federal universities in Nigeria is around \$800 per month, and everyone of a lower rank gets less. But each person sets aside a huge chunk to fund research out of their own pocket. I might set aside \$2,000 for the year, a master’s student might set aside \$200–300 and an undergraduate \$100–150. This money is pooled to buy shared consumables and small equipment.

We collaborate extensively, partnering with colleagues in the engineering department to share equipment. We cannot afford basic microbiology equipment such as a large shaking incubator, which costs more than two

years of my salary, so we fabricate what we can locally. And then we standardize that equipment so that quality controls are in place.

The research is not as in-depth or impactful as we'd like it to be – as we know we could make it. We do all this because we want to publish in Scopus-indexed journals. The cost of publication is another barrier. So we submit to free or open-access journals that don't charge fees, but which take a long time to publish our research. It's hectic and demoralizing, but we push on. Not happily, but willingly, we make these sacrifices to do the research.

I have published studies on food spoilage, the microbes that cause it and how to prevent it, as well as profiling the microbial community of a mining site using metagenomics tools. I am particularly proud of that last one. It's the kind of research we can do, but we can't do much of it.

The university sits on land where there's no shortage of biomass material, which we could use to make biofuels. But the initial set-up to produce biofuels costs a lot. We applied for one government grant and were unsuccessful, but we'll keep trying.

Many people in Nigeria are afraid for their own safety amid continuing violent crimes and kidnappings. The universities do whatever they can to increase security by investing in security guards and installing cameras in strategic areas on campus. We don't leave work late, we avoid isolated places and mostly we pray a lot.

Nigeria has a severe unemployment problem in young people. I tell students in STEM to learn digital-technology skills to increase their chances. If they want to continue to an advanced degree in STEM, I suggest they do as many internships as possible in related areas to improve their chances of getting a scholarship to study abroad or here.

Being a woman in STEM in my part of Africa is daunting. I sometimes work 12-hour days for weeks at a time. When I come home at 6 p.m. or 7 p.m., I still have to cook dinner, help my children with their homework and prepare them for bed. I'm lucky to have a supportive husband who partakes in caring for our kids. Still, I rarely have the 20 extra hours or more that is needed to devote to a grant application. Who has time for attending conferences or writing papers? It's a zero-sum game: the more time you spend on domestic chores, the less time you spend on your career. All of this perpetuates the perception that women are incapable or incompetent, and that's just not true.

The burden is uniquely higher for mothers in more traditional societies. We literally spend our whole lives working hard, but I can't put raising four kids on my CV and get credit for it.

The academic job is still wonderful. In my opinion, there is nothing else that has such a direct role in shaping tomorrow. It's extra

rewarding to have those eureka moments in the laboratory. My children have this love for science – my daughter has just won a primary-school award for the 'scientists of the future'. So yes, it's worth it.

Amina Ahmed El-Imam is a senior lecturer in microbiology at the University of Ilorin in Nigeria.

PONTSHO MARUPING MANAGE COLLEAGUES' EXPECTATIONS

I started out in South Africa's mining sector, but when the country transitioned to a democratic government in 1994, I wanted to help rebuild our science system. I got involved in developing our space programme and did a master's degree in space-systems engineering at Delft University of Technology in the Netherlands, followed by a master's in business administration at the International Institute for Management Development (IMD) in Lausanne, Switzerland.

I began working with South Africa's Technology Innovation Agency to support innovators and technology start-ups with early-stage funding. I then joined the South African Radio Astronomy Observatory (SARAO) in Cape Town about five years ago as head of commercialization, finding other applications for the technologies that were used to build the institution's radio telescope. Now, as a deputy managing director, I'm also responsible for human resources, finances, computing infrastructure and telescope operations.

I have worked in some of the most

male-dominated sectors. Several things are necessary for overcoming racial or gender bias. One is to do the work you are given, commit wholeheartedly and deliver. Providing what is needed can erase people's biases.

Having good mentors helps. My first boss was a woman who recognized my abilities to lead and gave me a team to manage early in my career.

When asking advice from mentors, I would be very specific – I would turn to them only for things they would have insights on, not as a general sounding board.

Later in my career, as the only woman in a leadership role, it was important to manage colleagues' expectations. The women expect me to be always on their side. Men expect me to fit in with them. I need the courage to speak up on things that matter, and to let things go sometimes. For example, I speak up a lot more about diversity and inclusion than I do about the less-than-ideal office space.

Some team members are passionate about community development. I advocate hard on their behalf because I understand their motivation.

There was a time when I travelled a lot. It was a challenge to make sure that my young daughter was taken care of. But it's also important for my daughter to see her mum doing jobs that women typically don't do, to help her to see that she can go after anything. Policies I've worked on mean that future generations of women will have opportunities in STEM that weren't open to previous generations.

For most of my career, I could take a later lunch break to pick my daughter up from school and then go back to work. I would combine work trips with my daughter's field-hockey games. This let me create bonding moments and be a hands-on parent.

Working mothers cannot chase perfection – you cannot do everything exactly right. I used to joke with male counterparts and say: "I need a wife, too!" They don't realize that there are some things their wives cannot do, because they are taking on the bulk of family responsibilities. There's definitely more to be done to create work environments that enable women to integrate their work with their home life.

Simple things can help women to stay in science. One is to make grants specific to researchers rather than institutions so they have more flexibility to take time off or move to another institution without losing their funding.

It's sometimes lonely without other senior women around, so I've created a network of professional women in other organizations. I talk things through with them, such as when a male colleague agreed to a particular project and then objected to it in front of the full committee meeting – something I don't think he would have done if I'd been a man. I ask these other women: "Is this really happening or am



Pontsho Maruping found support in networks of professional women with shared interests.

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I imagining it?" During the pandemic, I suggested that SARAO should make counselling available to all staff members and their families. Some colleagues suggested that people could go to their own physicians. I pushed back, saying that not everyone has access to such services. They also suggested that people would not ask for help because it would be a sign of weakness. I think it is actually a show of strength to acknowledge when you are not coping.

When offered a chance to lead a new project, I tell young professionals to say 'yes'. It's the times when I've said yes to challenges that have provided the biggest opportunities to grow career-wise. Sometimes I've failed, but I've learnt in the process. So say to yourself, "I'll do it, I'll manage the team." In general, unless it is completely out of your reach or education level, you can learn and there's help around.

Pontsho Maruping is deputy managing director of operations and business processes at the South African Radio Astronomy Observatory in Cape Town.

ANGELA TABIRI YOU CANNOT BE WHAT YOU CANNOT SEE

I graduated from the University of Ghana in Accra with a combined degree in economics and mathematics. One of my mentors told me about the opportunity to study for a master's degree at the African Institute for Mathematical Sciences, a network of centres of excellence across Africa, which had just opened a site in Accra.

That was a turning point for me. It was like being immersed in a 24-hour learning environment. They bring in renowned lecturers from around the world to live there and teach three-week intensive courses. It was tough, with assignments due every Saturday at midnight. But I liked doing the challenging bits. That training also helped me to acquire digital and presentation skills.

I decided to apply to the University of Glasgow, UK, for a PhD. But that meant that I needed funding. I applied for and won a Faculty for the Future fellowship from the Schlumberger Foundation, which provides funding for women in STEM from low-income countries to study at leading universities around the world. The foundation is looking for female leaders – you have to have academic excellence, but also show a commitment to promoting women in STEM in your home country.

In Glasgow, I really grew in terms of my skills and abilities. I also realized the power of social media to showcase and promote my research online. There is an audience out there looking for something beyond the



ANGELA TABIRI

Angela Tabiri uses social media to encourage young girls to pursue a career in mathematics.

'maths is difficult' narrative.

I started an initiative called Femafrikmaths because I didn't see many mathematicians who were people of colour, and particularly women of colour – it's not a narrative for most girls in Africa. Femafrikmaths is a network of African female mathematicians who highlight their different career paths through social media and promote the study of maths at schools. The vision is to help young girls to become confident to pursue careers in mathematics and related fields.

I returned to Ghana in 2019 and started a postdoctoral position at AIMS. Often, in the field of maths, you might be the only woman in a workplace team, and that means that you have to be a bit tough. When I was teaching, instead of 'Doctor' the students called me 'Madame'. Colleagues made comments about me starting a family and said that I might never get married. There's a cultural pressure of 'What are you doing competing in the space of men? You should be in the kitchen.'

Women should find their voice. People will always find ways to bully you or look down on you. Whatever environment I'm in, I need to find my voice and speak up.

Once you know what you want to do, carve

your own niche. I'm good at algebra, but I'm also good at science communication and helping girls to follow STEM studies. So I developed myself in those areas – there are so many things I bring to the table. Find your voice, develop your skills and then, when people downplay your abilities on the basis of gender, let all your success speak for you.

One challenge in abstract maths research is staying motivated. I tell myself that my research will enable technology to be built 100 years from now. So I had better make sure my work is true and accurate, so that it can be picked up when needed. I also teach pure maths to people who want to become engineers and computer scientists. They need to be taught well.

Maths research is hard – you have to be patient and determined to keep coming back to the same problem and trying it in different ways. The answer might not come to you for years. But, when you finally have a discovery and something eventually works – I don't even know how to describe that feeling.

Angela Tabiri is a research associate who studies quantum algebra at the African Institute for Mathematical Sciences in Accra.