

COUNTRY PROFILE



Photo: © www.mamutravel.com

South Africa

## Advancing South Africa's Science, Technology and Innovation Impact

South Africa has shown leadership in advancing science and technology in Africa since its transition to democracy in 1994. The country's Gross Expenditure on Research & Development (GERD) stands at 0.80% of its Gross Domestic Product (GDP) and almost meets the African Union target of 1%. The investment in R&D has resulted in the country's high number of researchers (26,000) and publications (9,309), which is far ahead other African countries.

The country's National Development Plan (NDP) prioritises an R&D led development agenda and has made tremendous progress in achieving developmental goals including increasing the country's life expectancy rate and reducing maternal and child mortality.

Nevertheless, to expand and amplify efforts to advance science and technology in the country, increased strategic partnerships are required. The African Academy of Sciences (AAS), which is driving an Africa-led and Africa-centred approach to the development of science, technology and innovation on the continent, is keen to expand its partnership with South Africa to promote ownership and ensure an Africa-driven science agenda.

## The AAS' Footprint in South Africa

The AAS has built grant management capacities that have positioned it to be Africa's foremost grant making body. The Academy is currently managing funding soon to be in excess of \$200 M invested by its partners through the Alliance for Accelerating Excellence in Science in Africa (AESAs), a funding and agenda setting platform that the AAS created in partnership with the NEPAD Agency.

The AAS has a large footprint in South Africa where it has Fellows and Affiliates who are distinguished researchers who represent the most talented and promising men and women on the continent. 42 of the 396 Fellows and 5 of the 62 Affiliates are South African. The AAS is also funding programmes of strategic importance to the southern African country while promoting national and intra-Africa collaboration. South Africa based researchers have leveraged their AAS grants to attract additional international and local funding and have successfully recruited a ratio of close to 50% of women with Master's, PhD and Postdoctoral fellows most of whom are black. This contributes to South Africa's ambition and strategic focus to increase its population of black and women scientists.

Some of the South African scientists who are part of the AAS community



Banothile Makhubela, AAS Affiliate



Thumbi Ndung'u, DELTAS Africa PI



Zaza Ndhlovu, PhD Trainee



Roelf DuToit Strauss, AAS Affiliate



Sharon Fonn, DELTAS Africa PI



Tobias Chirwa, DELTAS Africa PI



A formalised partnership with the AAS will provide a platform for the country to train its future black scientific leaders and promote gender equity in the scientific sector.

The AAS is looking to intensify and extend the impact of its current programmes in the country. For example, South Africa could provide matching funding to local investigators and institutions involved in these programmes to drive progress on national development priorities.

AAS key areas include:

## R&D and Innovation

**DELTA Africa:** In 2015, the AAS launched the Developing Excellence in Leadership, Training and Science (DELTA) Africa to develop world-class researchers and scientific leaders conducting cutting-edge health research in infectious diseases, non-communicable diseases, population and public health. Nearly \$100 M has been awarded to 11 leading African researchers to implement cutting-edge research programmes involving 54 institutions across the continent. South Africa hosts three DELTA Africa funded programmes:

- The Consortium of Advanced Biostatistics Training in Sub-Saharan Africa (SSACABT), which has received \$5.1 M from DELTA Africa and is led by Tobias Chirwa at the University of Witwatersrand
- The Sub-Saharan African Network for TB/HIV Research Excellence (SANTHE) led by Thumbi Ndung'u at the Africa Health Research Institute, which received \$11.2 M to research and train future scientific leaders in HIV and TB
- The African Mental Health Research Initiative (AMARI) is spending \$5.1 M in South Africa to research on mental health and train Master's, PhD and Postdoctoral fellows. With one out of three South Africans suffering from mental health disorders and HIV/TB co-morbidity, advancing mental health research is important to ensure wellbeing and productive societies

**H3Africa:** Human Heredity and Health in Africa (H3Africa) was started in 2010 by the US National Institutes of Health (NIH), Wellcome Trust and the African Society of Human Genetics (AfSHG). H3Africa supports population based studies that use genetic, clinical and epidemiological tools to better understand the relationship between human genes and environmental factors that influence disease susceptibility, pathogenesis and prevention to improve the health of African populations.

Nearly \$76 M was invested in the first phase of 25 projects in 27 African countries focused on communicable and non-communicable diseases. These projects, have documented some novel discoveries relevant to the continent. Seventeen of the projects are led by South African researchers who seek to close the knowledge gap and to understand the genetic and environmental factors influencing diseases, such as rheumatic heart disease, hearing impairment, sickle cell anemia and schizophrenia. Their research will promote tailored public health interventions for South Africa and African populations for maximum impact. The Southern African Human Genome Programme (SAHGP), which aims to unlock the unique genetic character of southern African populations, can leverage on the research produced by H3Africa to achieve its goals.

**GC Africa:** Grand Challenges Africa (GC Africa) is a programme to spur innovation on the continent. The Medical Research Council through a partnership with the GC Africa programme has invested nearly \$1 M to fund South African researcher partnerships with peers across the continent and in scientific areas of national importance including maternal, child and neonatal healthcare and antimicrobial resistance (AMR). The former is an issue of ongoing importance in South Africa and Africa while AMR is increasingly becoming a global threat and of concern in South Africa due to multi-drug resistance tuberculosis.

The AAS is managing 45 projects in South Africa worth approximately \$9 M that have been funded by other GC partners, such as Grand Challenges Canada, the Bill & Melinda Gates Foundation and USAID since 2006. The GC model is to provide up to \$100,000 as seed funding. Some projects have produced groundbreaking results and are in need of funding to scale up. These include J Coenie Louw, the Medical Director for Gateway Health Institute, who developed an innovation, which suspends amoxicillin, the preferred treatment for childhood pneumonia in oil allowing it to extend its shelf life and reduce the risk of contamination. Peter Lubega Yiga an innovator developed a natural repellent that can be safely used on babies and provides protection for four hours longer and at a cheaper cost than the current repellents on the market. The product provides at least six hours of protection and has been successfully tested by the South African Bureau of Standards. As with its partnership with the MRC, the AAS could manage the scale up grants invested by South Africa for projects that have shown promise.



## Rising Research Leaders

The AESA's postdoctoral fellowship programmes supporting early career researchers include:

- **Climate Impact Research Capacity and Leadership Enhancement (CIRCLE)**, which has provided 98 post Master's and PhD fellowships to develop skills and research experience for early career African researchers in the field of climate change in 5 thematic areas of health, agriculture, water, energy and policy. In South Africa, CIRCLE awarded a total of 23 fellows (6 post Masters and 17 post PhDs) worth \$101,340 whose research was focused on providing solutions for local farmers to improve their agricultural yields in the face of water challenges. CIRCLE provides a training model for South Africa to replicate and invest in to generate the evidence it will need to reduce the impact of climate change on agricultural productivity, ensuring water and food security, particularly in light of the current drought facing major agricultural producing areas, such as the Western Cape Province
- **AESA-RISE Postdoctoral Programme** was launched in 2016 to support the postdoctoral training and research to produce leaders in areas that include material sciences and engineering. It is due to announce its first grantees in due course, one of whom is based in South Africa, Michael Bodunrin from the University of Witwatersrand
- **The Africa Postdoctoral Training Initiative (APTI)**, which is a partnership between the AAS, the Bill & Melinda Gates Foundation and the NIH. Fellows are hosted at the NIH for two years. A key component of its success is ensuring that African students can return to strong home institutions, where they can access both a support system and funding to continue their research. A partnership with South Africa could provide participating students, who would be selected on merit, with the mentorship and resources they need to not only further their own careers but also advance health and development goals by providing additional technical assistance and funding when fellows return to their home institutions

## Critical Gaps

**Africa Science Desk (ASD):** aims to ensure science is communicated to the public to promote its understanding and use. The ASD has awarded grants to six journalists from South Africa worth \$4,656 to publish science stories in topics of national significance in the country's major publications since its launch in 2017.

## Tracing Impact

### DELTA Africa



**\$ 12.3 M**

in additional funding attracted by the South Africa based grantees



**\$55,000**

total monetary value of awards, recognition received by South Africa grantees



**118**

Master's, PhD and Postdoctoral fellows being trained



**Over 49**

publications produced by South Africa based researchers

### GC Africa



**45**

projects in South Africa worth



**\$9 M**

being managed by the AAS and that have been funded by other Grand Challenges partners.

### H3Africa



**17**

genomics research projects funded in South Africa by the AAS and partners

### CIRCLE



**23**

climate scientists trained to tackle the global phenomenon

## Expanding the Current Partnerships

Funding from South Africa for the above projects could focus on promoting partnerships with historically disadvantaged universities to improve their research capacity.

In addition to funding South African researchers in DELTA Africa, H3Africa and postdoctoral programmes, the AAS has other opportunities for collaboration. These include:





AAS Affiliate Christina Thobakgale-Tshabalala (seated and with glasses)

The **AAS Endowment Fund**: The AAS uses the interest generated from the Endowment Fund to finance a portion of the operational and capital requirements of the Academy. This funding is also directed to programmes and would benefit from additional funding to promote investment in science, technology and innovation and transform the lives of Africans.

The **AAS Open Research**, an innovative open source platform to enable researchers to publish immediately –within a matter of days –and without barriers. The platform’s objectives match those of South Africa of ensuring that knowledge that benefits the continent is readily available. The continent’s challenges call for expedited access to knowledge and research, which is not possible with the current publishing models.

**Good Financial Grants Practice**: Research Management thrives in environments with good research and financial management capacities. The Good Financial Grant Practice (GFGP) was established as an innovative tool for standardising, simplifying and strengthening financial governance, providing a specification for both grantors and grantees of what is good practice for financial management throughout the grant life cycle. Institutions are rated according to how they manage funding. South Africa would benefit from subscribing to the GFGP standard to enable it to easily assess institutions applying for its grants.

**Policy and advocacy**: Through its Fellows and Affiliates, the AAS provides horizon scanning of the scientific landscape, promotes research uptake, production of policy papers and convenes stakeholder forums. In addition to assessing policy advice, the partnership could extend to identifying more Affiliates who are early career scientists and providing career development opportunities.

## Benefits of Partnering with the AAS

As outlined above, the benefits for joining and funding AAS programmes are:

- Accessing a huge pan African and international community of scientists, which provides opportunities for partnerships for the government and particularly for South African scientists to collaborate on areas of mutual benefit and priority
- The network of scientists is also a resource for governments and policy makers to enable wise investment and decision-making in the future of the country and continent
- Providing a platform for South Africa to train and increase the population of black scientific leaders and promote gender equity in the scientific sector
- Increased science, technology and innovation funding for South African researchers enabling them to grow their research output while making the country globally competitive and ensuring it meets its target of increasing its GERD to 1.5% of GDP
- Promoting national and intra-African collaboration
- Contributing to efforts to increase South Africa’s health workforce, a priority in the NDP
- Building the capacity of historically disadvantaged South African universities
- Conducting research to meet South Africa’s developmental needs, for example, maternal and child health, and HIV/TB
- Data to enhance the Southern African Human Genome Programme.

### The African Academy of Sciences

8 Miotoni Lane, Karen, P.O. Box 24916-00502 Nairobi, Kenya  
 Tel: +254 20 240 5150; +254 736 888 001 | Email: communication@aasciences.ac.ke  
 www.aasciences.ac.ke | Twitter: aasciences | Facebook: aasciences