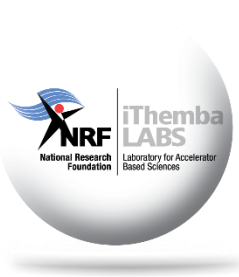


Unpacking the NRF's Role in South Africa's Research Software Development



Alistair White
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8 October 2026

The National Research Foundation

The NRF's mandate is to contribute to national development by:

1. supporting, promoting and advancing research and human capacity development, through funding and the provision of the necessary research infrastructure, in order to facilitate the creation of knowledge, innovation and development in all fields of science and technology, including humanities, social sciences and indigenous knowledge;
2. developing, supporting and maintaining national research facilities;
3. supporting and promoting public awareness of, and engagement with, science; and
4. promoting the development and maintenance of the national science system and support of Government priorities.

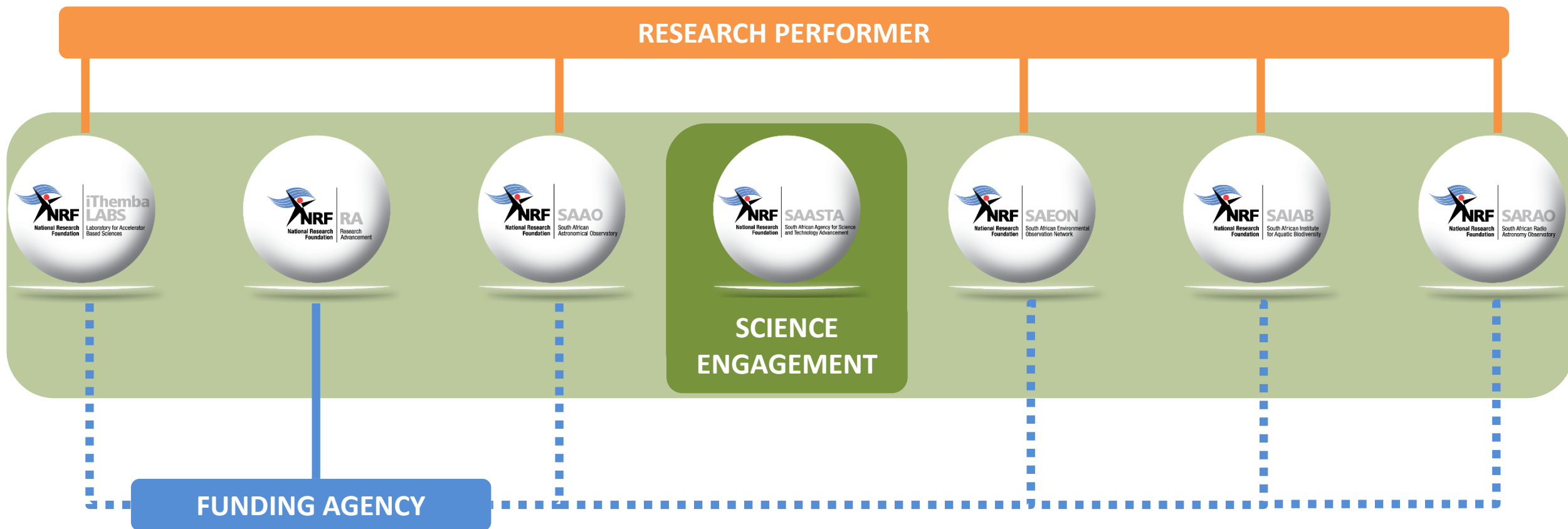
To summarise, the NRF is a

FUNDING AGENCY

RESEARCH PERFORMER

**SCIENCE ENGAGEMENT
ENABLER**

The National Research Foundation – Business Units

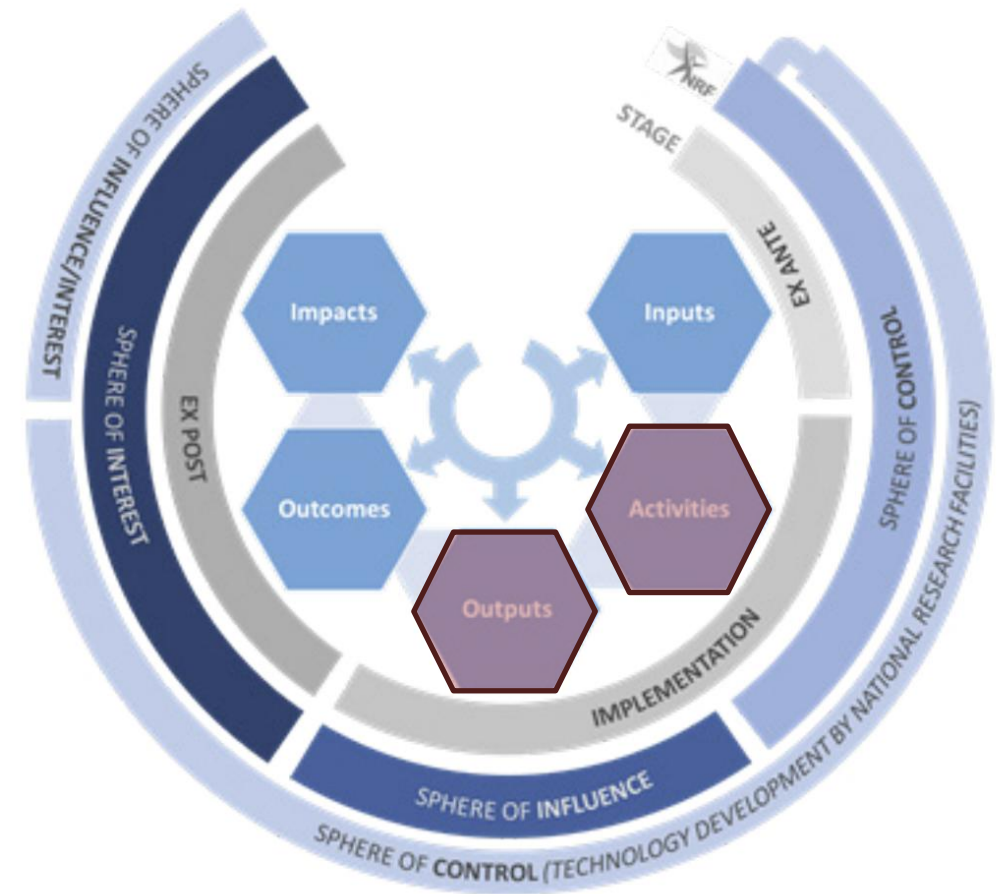


The NRF's Impact Pathways

The NRF recognises that the nature of research impact implies that it often lies outside of the NRF's sphere of control.

In the NRF's core focus areas of supporting and advancing research, it does not generally control how research is further developed and used outside of the research enterprise, but in the area of technology development and research performance within the in the National Research Facilities this sphere of control extends into the area of outcomes, and on occasion impact.

Research software can be used to perform the research (as an enabler) and can be produced (as a research output).



NRF impact pathways and spheres of control

NRF Framework to Advance the Societal and Knowledge Impact of Research

<https://www.nrf.ac.za/wp-content/uploads/2021/12/NRF-Framework-to-Advance-the-Societal-and-Knowledge-Impact-of-Research.pdf>

The NRF as a Research Performer

As a research performer, the NRF provides cutting-edge, shared research infrastructure, large-scale scientific platforms, and specialized laboratories staffed by world-class scientists and technicians. Rather than competing directly with traditional universities, the NRF performs research by managing and operating National Research Facilities

- iThemba LABS
- South African Astronomical Observatory (SAAO)
- South African Environmental Observation Network (SAEON)
- South African Institute for Aquatic Biodiversity (SAIAB)
- South African Radio Astronomy Observatory (SARAO)



iThemba LABS

iThemba LABS features a dedicated R&D Software Engineering and AI-ML department that develops advanced software for particle accelerators, real-time data processing, and big data analysis.

Core Software and Control Frameworks: EPICS Platform, EtherCAT Standard, React Automation Studio (RAS) (developed and maintained by Stellenbosch University), Legacy/Specialized Tools

Research and Development Focus: R&D Software Engineering & AI-ML, SA-JINR Virtual Laboratory



South African Astronomical Observatory (SAAO)



Research software is an integral part of SAAO's scientific infrastructure, spanning the full chain from telescope and instrument control through observation scheduling, data processing, monitoring and scientific analysis.

SAAO develops and maintains software for:

- **Telescope and instrumentation control**
- **Observatory automation**
- **Scientific data processing and operations**
- **AI-enabled research infrastructure**

The Intelligent Observatory is now bringing these individual capabilities together, with the longer-term aim of providing a common intelligent software layer across SAAO's telescopes, instruments, data, knowledge and operational systems.

South African Environmental Observation Network (SAEON)

SAEON develops and maintains several specialized, open-source research software platforms and data tools. These systems are primarily engineered by the uLwazi Node, SAEON's dedicated data and information management hub. They are designed to collect, archive, visualize, and distribute complex environmental and earth observation data.

Core Data & Observation Platforms: SAEON Observations Monitor, SAEON Open Data Platform (ODP), SAEON Observations Database

Spatial & Environmental Mapping Tools: Carbon Sinks Atlas (CSA 2.0), GIS Plugins, South African Estuary Information System (SAEIS)



South African Institute for Aquatic Biodiversity (SAIAB)

The South African Institute for Aquatic Biodiversity uses, develops, and contributes to several specialized research software platforms and data tools. Because SAIAB operates as a national facility tracking marine and freshwater ecosystems, its software ecosystems cover collections management, environmental monitoring, imagery analysis, and regional data sharing.

Biodiversity Informatics & Collections Management (National Fish Collection, Aquatic Biobank & National Hosting): Specify 7 (Enterprise Web Platform), National Multi-Tenant Hosting & Administration, IPT (Integrated Publishing Toolkit), GBIF (Global Biodiversity Information Facility), FBIS (Freshwater Biodiversity Information System)

Marine Remote Imagery Platform (MaRIP): SeaGIS Software Suite, R & Rstudio, VirtualHere, [Rhodes University Computer Science Collaboration],

African Coelacanth Ecosystem Programme (ACEP) Marine Platform: Sea-Bird Scientific Seasave / SBE Data Processing

Aquatic Genomics Research Platform (AGRP): MinKNOW, Illumina Control Software & MiSeq Reporter, Applied Biosystems Data Collection, Geneious Prime, Mothur, SPAdes, Conda / Bioconda Ecosystem

Acoustic Tracking Array Platform (ATAP): Innovasea / VEMCO Receiver Software (VUE & Fathom), Structured Data Repositories, Ocean Tracking Network (OTN)

Geophysics Mapping Platform (GeMaP): HYPACK / HYSWEEP, Golden Software Surfer, QGIS (Open-Source GIS)



South African Radio Astronomy Observatory (SARAO)

SARAO provides specialized research and simulation software tailored for radio interferometry and large-scale telescope arrays like MeerKAT and the Square Kilometre Array (SKA).



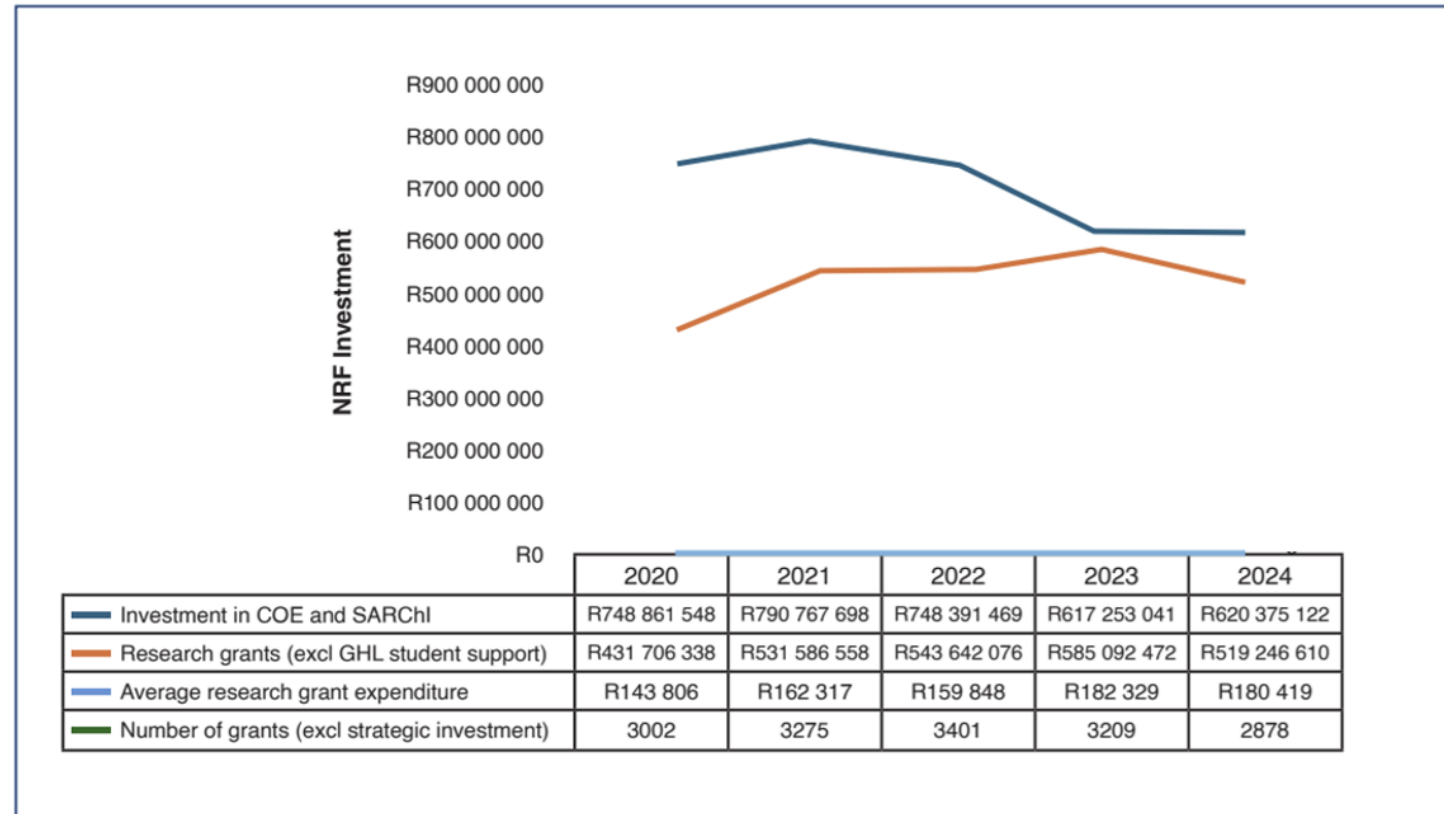
iAntConfig (2023)
AntConfigServer
Platform & Operations Software
Science Data Processing Pipelines
Simulation & Analysis software

NRF as a Funding Agency

The Research Advancement (RA) business unit is a multi-disciplinary funding division of the NRF that supports, promote, and advance the creation of knowledge and innovation, through research funding, human capacity development funding, and research infrastructure funding.

Some of the major funding instruments include

- The South African Research Chairs Initiative
- Centres of Excellence
- National Equipment Programme
- Established Researcher Grants
- Emerging Researcher Grants
- Postgraduate Student Scholarships



South African Research Chairs Initiative (SARChI)

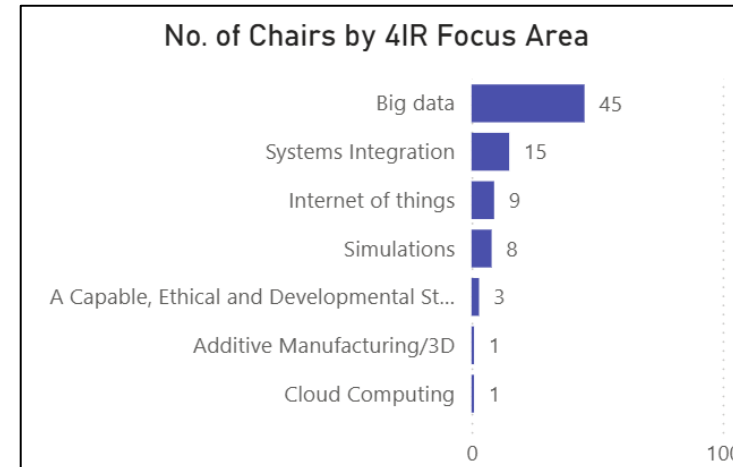
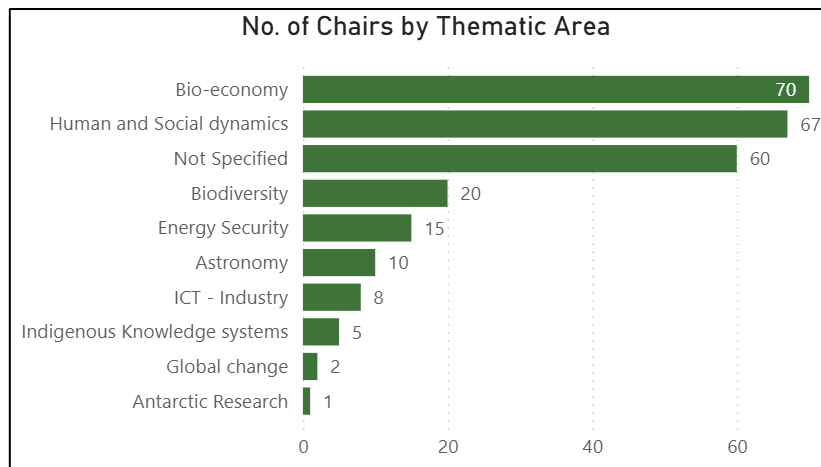
The South African Research Chairs Initiative is a national program designed to attract and retain top-tier research and innovation excellence at South African public universities.

The programme was launched in 2006, and offers long-term investment trajectories lasting up to 15 years per chair.

Main Goals

- **Capacity Building:** Strengthen research and postgraduate training (master's and doctoral degrees).
- **Global Competitiveness:** Improve South Africa's international standing in science and technology.
- **Transformation:** Support historically disadvantaged institutions, universities of technology, and emerging research hubs.

There are currently 258 active SARChI grants, spread across many disciplines.



Centres of Excellence (CoE)

Centres of Excellence are physical or virtual centres of research that concentrate existing research excellence and capacity and resources to enable researchers to collaborate across disciplines and institutions on long-term projects that are locally relevant and internationally competitive, in order to enhance the pursuit of research excellence and capacity development.

The five key performance areas of the CoEs are:

- Research/Knowledge Production
- Education and Training
- Information Brokerage
- Networking
- Service Rendering

CoE for Biomedical Tuberculosis Research (CBTBR)
CoE for Invasion Biology (CIB)
CoE in Birds as Keys to Biodiversity Conservation
CoE in Catalysis (C*change)
CoE in Epidemiological Modelling and Analysis (SACEMA)
CoE in Food Security (FS)
CoE in HIV Prevention (CAPRISA)
CoE in Human Development (Human)
CoE in Indigenous Knowledge Systems (IKS)
CoE in Integrated Mineral and Energy Resource Analysis (CIMERA)
CoE in Mathematical and Statistical Sciences (MaSS)
CoE in Palaeosciences (GENUS)
CoE in Plant Health Biotechnology (CPHB)
CoE in Scientometrics and Science, Technology and Innovation (STI) Policy (SciSTIP)
CoE in Strong Material (SM)
The National Institute for the Preparedness and Prevention of Pandemics (IP3)
The National Institute for Theoretical and Computational Sciences (NITheCS)

CoE: Research Software

CoE in HIV Prevention (CAPRISA)

- BioRender
- Canva
- SAS
- SPSS
- STATA
- GraphPad
- R (R Core Team; R Foundation for Statistical Computing)
- NQuery
- Python
- RedCap
- DFNet
- LabWare
- Claude Enterprise

CoE in Food Security (FS)

- R / RStudio
- Python
- Jupyter Notebook / JupyterLab
- SPSS
- Stata
- NVivo
- ATLAS.ti
- QGIS
- Zotero
- EndNote

CoE in Human Development (Human)

- STATA
- MAXQDA

CoE in Indigenous Knowledge Systems (IKS)

- Nvivo
- SPSS

CoE in Integrated Mineral and Energy Resource Analysis (CIMERA)

- QGIS
- Petrel Schlumberger
- COMAGMAT, PELE
- ISOPLOT
- Claude Code
- DUGInsight
- ArcMap 10.7.1
- Google Earth Pro
- IsoplotR (online)
- Stereonet
- GeoRose
- 3DVista
- V3Geo
- PTGui
- Lithostudio

National Equipment Programme (NEP)

Supports the acquisition, upgrade, or development of state-of-the-art, major research equipment for multi-disciplinary and inter-disciplinary research.

The software license included in the grant usually caters for propriety software, not necessarily research software.

However, some grant applications refer to various types of research software that will be used, along with the proprietary software. Some examples include:

- LabSolutions™
- FactSage™
- Kaluza Analysis Software
- RSCAD FX



Established / Emerging Researcher Grants

Emerging researchers are supported through various funding programmes, such as Thuthuka and postdoctoral grants.

Established researchers are often awarded larger grants for longer durations, and can include budgeted line items to support students.

Applicants are required to submit detailed applications for the duration of the project.

Applicants are required to indicate:

- budgeted line items for various activities and items, such as travel, equipment, consumables, software licenses (under running expenses), etc.
- their expected research outputs emanating from the project
- their intended science engagement activities / societal impact
- their intended human capacity development
- their data management and utilization plan

Applicants are required to provide annual progress reports after each funding year, to monitor the progress of the project and to allow the NRF to provide interventions where necessary.

Postgraduate Student Scholarships

The NRF provides the following types of postgraduate student scholarships:

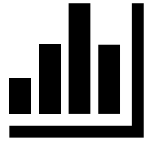
- Free-standing grants – the student applies for a bursary through the application process, and is awarded a direct grant (administered through the university's financial office)
- Grant holder-linked nominations – the researcher nominates a student (usually as the student's supervisor), and the bursary is managed under the researcher's grant
- No-amount nominations – the CoEs provide data and infrastructure for students and their research, but do not have financial components allocated to it

Under certain conditions, students can request extension support for their Masters or PhD.

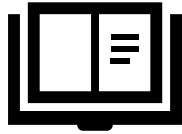
Some funding programmes offer additional equipment included in the free-standing grants, such as laptops (universities might provide software licenses, but we cannot monitor the use of research software used or developed).

Students are also required to provide annual progress reports after each funding year, to monitor the progress of the project and to allow the NRF to provide interventions where necessary.

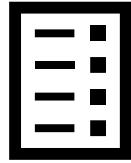
The NRF's BI Ecosystem



Datasets used / created



Research Outputs



Annual Progress Reports



Post funding Output,
Outcome & Impact



Student Applications And Grants



Post-doc Applications And Grants



Research Software used / created



Person



Equipment Usage



Student Supervision



NRF Panels



NRF Ratings



Research / Equipment / Rating Applications
and Grants

NRF as a Science Engagement Enabler

The NRF acts as a primary enabler of science engagement by bridging the gap between science and society to support national development and inclusive innovation.

Each business unit has its own role to play in science engagement – they conduct their own workshops and programmes, and support various projects within local communities to have a positive societal impact.

The South Africa Agency for Science and Technology Advancement (SAASTA) brings all of this together through their national coordination, including coordination across the NRF business units.



SOUTH AFRICAN NATIONAL SCIENCE MONTH
Science, technology and innovation are for everyone

1 – 31 JULY 2026

National launch event:
Vaal University of Technology Sebokeng
4 July 2026

Focus month:
Nationwide
1 – 31 July 2026

**Minister
Prof. Blade Nzimande**

Participation guidelines for National Science Month: www.saasta.ac.za

Making sure it's possible

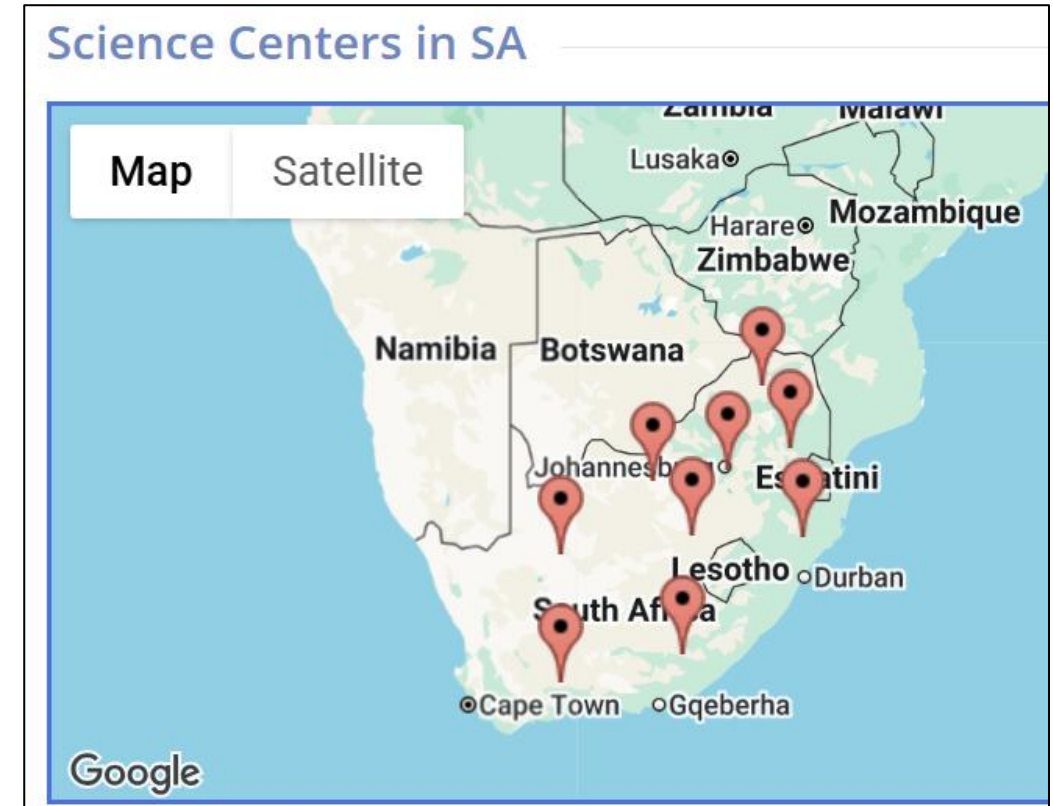
South Africa Agency for Science and Technology Advancement (SAASTA)

The South Africa Agency for Science and Technology Advancement has a mandate to advance public awareness, appreciation and engagement of science, engineering, innovation and technology in South Africa.

SAASTA does not develop commercial research software. However, they manage specific digital and data platforms for the research and academic community.

South African Network of Science Centres (SANSC)

Online Platform: An automated, online management system used for profiling, evaluating, monitoring, and connecting science centers across South Africa.



How can NRF improve research software development as a funding agency?

Update the application processes to include:

- a plan for research software usage within the scope of the project
- a plan for the use of AI within the scope of the project
- planned development of research software as a research output, if any

Consider funding research software as a budgeted line item.

Include feedback sections within the APRs on the usage of research software and AI.

Recognise research software as a valid research output.

Monitoring the usage and citations of NRF-funded research software outputs.

NRF is open to engage with the various Research Software forums and committees.

*Enkosi, Thank you,
Re a leboga, Siyabonga, Dankie*

