Sasol-NRF Postdoctoral Innovation Fellowship Programme

Framework

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1. Introduction

Sasol and the NRF have a long-standing partnership supporting the science and innovation system in South Africa.

In 2021, Sasol and the NRF entered into a strategic partnership to support Science and Engineering research initiatives intended to strengthen collaboration between industry and academia. The partnership is also intended to enhance research capacity and capability, and grow the science and engineering pipeline nationally to enable South Africa's energy transition to a green economy.

Additional Postdoctoral Fellowship support is needed both for the national system, but especially also to advance industry exposure, research excellence and engagement with academia. An expanded partnership with Sasol in this regard will not only improve critical mass of much needed skills in science and engineering, but will also contribute to growing the pool of early career researchers in specific research areas related to a just energy transition.

Sasol and the NRF intend to directly support Postdoctoral Fellows in research areas that are aligned to Sasol's research foci in addition to the Postdoctoral Fellows that are currently supported through the NRF Grantholder-linked Postdoctoral Programme. These additional Postdoctoral Fellows will be supported through the Sasol-NRF Postdoctoral Innovation Fellowship Programme.

2. Programme Description

The Sasol-NRF Postdoctoral Innovation Fellowships Programme is aimed at providing a comprehensive training, development and mentorship programme for the establishment of an independent researcher involved in engaged and industrially relevant research. The intent is for the Postdoctoral Fellows to spend a significant part of their fellowship at Sasol's Research and Technology facilities in Sasolburg. This will be determined in discussion with the academic host, Sasol and the Postdoctoral Fellow and informed by the specific components of the work programme. In addition, the fellowship period should allow for and promote the professional development and competence of Postdoctoral Fellows to:

- develop an independent research focus;
- produce research outputs with both knowledge and socio and/or economic impact;
- increase mentoring and postgraduate supervision capabilities;
- develop networking capabilities;
- develop insights into the effective application of fundamental knowledge in a multi-disciplinary industrial research setting;
- develop the necessary administrative/managerial skills in research, including the ability to properly frame, plan and define clear value of a given research project;
- engage in science outreach and communication to the general public; and
- manage and lead research teams.

While at Sasol, the Postdoctoral Fellow will have the opportunity to participate in the relevant structured Graduate Development Programme which is also offered to Sasol's new employees.

Objectives

The following objectives inform the strategic direction of the Postdoctoral Innovation Fellowship Programme:

- Facilitate world-class research training to strengthen the research profiles of Postdoctoral Fellows;
- Support the Postdoctoral Fellows to develop research networks nationally and internationally that will grow their research profiles;
- Develop industrially relevant long-term research capacity in energy transition and sustainability at academic institutions that will solve strategic industry challenges.

3. Research Focus

The following six themes are targeted for this Call, and funding will be awarded to applicants with proposals that are aligned to one of these themes.

Green Hydrogen

The scope of this theme covers novel approaches across the range of green hydrogen production technologies (electrolysis, thermochemical, photoelectrochemical and photobiological). Projects should seek to find solutions which address critical commercialisation hurdles for green hydrogen production, namely cost effect economics (increased conversion efficiency, lower capital cost), ability to integrate with variable renewable energy sources and safe operation.

Energy Storage

The scope of this theme covers novel approaches within the range of energy storage technologies (chemical, electrical, electrochemical, thermal, gravimetric and mechanical), with a specific focus on applications that can benefit South African-based systems and processes. Consideration should be given to cost-effective economics for sustainable solutions, and could consider integration opportunities with other South African industries.

Waste Utilisation towards a Circular Economy

The scope of this theme covers new or improved waste utilisation concepts, addressing key hurdles standing in the way of commercial deployment. This includes enhancing the recovery of plastic and other wastes for cost effective integration into existing processes, as well as new approaches to the value enhancement of industrial waste which could utilise the existing asset base of typical refinery and chemical value chains.

Air Quality Assessment

The scope of this theme covers studies of the comparability of different dispersion modelling tools such as AERMOD, CALPUFF and SCIPUFF within a level 3 assessment for a nationally relevant scenario. A governing document supplemented by a Code of Practice provides direction for the utilisation of dispersion modelling in South Africa. The primary objective of this Code of Practice is to standardise model applications for regulatory purposes and to make sure that dispersion modelling studies in South Africa are performed on a consistent basis and comparable to ensure that results from one study can be compared directly to those from another.

Fischer-Tropsch Catalysis for Power-to-Liquids Applications

The scope of this theme covers catalyst preparation, characterization and testing in the field of Cobalt-based Fischer-Tropsch catalysts for Power-to-Liquids (PtL) applications. This involves development of novel CO_2 hydrogenation catalysts with the aim of combining CO/CO_2 and Hydrogen to produce longer chain hydrocarbons. The ultimate goal is to further the understanding of fundamental aspects linked to design and synthesis of suitable PtL catalysts.

In situ Characterisation of Catalysts

The scope of this theme covers fundamental research on the observed changes within nanostructure of catalysts using advanced surface and bulk characterisation techniques. Focus should be on the in-depth fundamental *in-situ* study of the catalyst surface after exposure to different reaction conditions, employing a combination of complementary techniques to elucidate the structure and determine its relationship with observed adsorption properties and catalytic performance. These studies should be applied to a relevant area of catalysis in the Sustainability or Energy Transition field such as CO_2 conversion.

4. Eligibility

The following are guidelines for interested applicants:

- Applicants' research area must be in the areas indicated in the section above;
- Applicants must have graduated with their doctoral degree within four (4) years of applying to the NRF;
- Applicants who are currently completing their doctoral dissertation for submission may apply. They should however complete their doctoral degree by 31 December 2022, as all awards that are not taken up by 30 June 2023 will be cancelled by the NRF;
- Full-time employees of Higher Education Institutions (HEIs) or other research institutions are only eligible to apply if they intend to take unpaid leave for the duration of the postdoctoral fellowship;
- Applicants who are applying for a second NRF Postdoctoral research placement will be eligible if they intend undertaking research on a new project.
- Applicants should apply to undertake postdoctoral research (i) on a research project that is different from the doctoral research; (ii) located in a different department from that where the doctoral training was undertaken; or (iii) at a different institution to that where the previous study was undertaken, as fellowships will preferably be awarded to individuals that will be expanding their research training on a new project and/or at a new institution
- Applicants who are applying for a third NRF Postdoctoral research placement are not eligible.

Please note that proposals will be rejected if they do not meet all of the above eligibility criteria.

5. Application Process

Applications submitted by the institutions to the NRF and Sasol must be aligned with the following equity targets:

- 80% South African citizens and permanent residents
- 80% Black (African, Indian and Coloured)
- 55% Female.

Applications must be submitted through the NRF Connect system at https://nrfconnect.nrf.ac.za/.

Institutions are required to implement internal processes to ensure that the NRF receives complete applications by the closing date.

All applicants will be notified about the outcome of their applications ***before the end of September 2022***.

6. Funding values

Successful applicants will receive funding for a maximum period of two (2) years based on the initial commencement date of the project. Female Postdoctoral Fellows that take maternity leave during the tenure of the fellowship, are eligible for an additional four (4) months of support beyond the two (2) year fellowship period. The funding will be awarded under the following categories

- R350 000 per annum as a non-taxable stipend.
- R50 000 per annum research running costs.
- R65 000 travel cost to conference or workshops: out of this amount, R50 000 is for international conferences and R15 000 is for local conferences. This is a once-off award.

Additional funding may be considered for travel between Sasol and the University on a case-by-case basis.

7. Ethical Clearance

It is the responsibility of the applicant, in conjunction with the institution, to ensure that all research activities carried out comply with the laws and regulations of South Africa and/or the foreign country in which the research activities are conducted. These include all human and animal subjects, copyright and intellectual property protection, and other regulations or laws, as appropriate.

A research ethics committee at the respective institution must review and approve the ethical and academic rigor of all research prior to the commencement of the research and acceptance of the grant. The awarded amount will not be released for payment if a copy of the required ethical clearance certificate, as indicated in the application, is not attached to the Conditions of Grant. Also refer to the "Statement on Ethical Research and Scholarly Publishing Practices" on the NRF website.

8. Contractual Conditions

The awardees must abide by the following conditions.

- The grant must be taken up within two (2) months of receipt of the award letter, through submission of a signed Conditions of Grant (CoG), except in cases where the result of the doctoral degree is pending.
- Carry-over of unspent funds will not be permitted for Postdoctoral Fellowships, except under extenuating circumstances, e.g., ill-health, and must be motivated for in writing.
- The awards must be taken up in 2023 and awards not taken up by 30 June 2023 will be cancelled by the NRF;
- The award, if successful, will be explicitly awarded for the research area as indicated in the application;

- The fellow is not permitted to engage in any other research project not approved by the NRF nor that which has not been subjected to a scientific review process by the NRF;
- Fellowships may not be held simultaneously with another fellowship from any other government or NRF source or NRF administered source;
- Postdoctoral Fellows may hold non-binding supplementary grants or emoluments from the South African government or from a private sector funder to the institutional capped value;
- Postdoctoral Fellows are permitted to spend a maximum of 20% of their time undertaking lecturing and student supervision;
- Postdoctoral Fellows may not concurrently hold the fellowship with any full-time salaried employment;
- For the fellowship to be tax exempt, in compliance with section 10(1)(q) of the Income Tax Act No. 58 of 1962, "at the time of the award, the candidate should have graduated with his/her doctorate degree no longer than within the previous five (5) years. The applicant must receive an institution Letter of Award within a period of having graduated with his/her doctorate degree no longer than within the previous five years;"
- Upon receipt of the signed Conditions of Grant, the NRF will release the awarded amount for the year. Fellows will then be required to comply with the standard NRF financial management procedures, including the submission of a Progress Report. A mid-term Progress Reports will only be required for 1-year projects, and annual reports will be required for 1-year and multi-year projects;
- The Annual Progress Reports are prerequisites for the release of the subsequent year's funding. Failure to submit a Progress Report will result in the cancellation of the grant award.

9. Review Process

All applications will be screened based on the eligibility criteria and application requirements. Should an application not be eligible, it will be rejected without review. All eligible and appropriately completed applications are subjected to a competitive merit review process. The reviewers are selected by the NRF and Sasol from an existing reviewer databases. In assessing the proposals, the reviewers' reports are referred to, and agreed assessment criteria are applied in the form of a scorecard during the panel review process. The purpose of the scoring system is to evaluate applications in order to identify applicants that are most deserving of the limited number of Postdoctoral Fellowships available. All research proposals submitted to the NRF for funding are evaluated according to the predetermined criteria that are presented in **Table 1** below:

Table 1: **Evaluation criteria for the Sasol-NRF Postdoctoral Innovation Fellowship Program**

Criteria	Sub-Criteria	Weighting (Total = 100%)
Track Record of Applicant	Relevant expertise/training that will enable the applicant to successfully undertake the proposed research.	10%
	The applicant's research track record which could include peer-reviewed publications, conference proceedings, research prizes and awards.	10%
Scientific and Technical quality of proposed research	Literature review with citations; significance of the research in terms of the problem statement, aims and objectives. Scientific contribution; originality and new knowledge to be generated.	20%
	Research design and methodology developed to address the aims and objectives of the research.	20%

Criteria	Sub-Criteria	Weighting (Total = 100%)
	Provision of a work plan aligned to the objectives including feasible timelines and milestones for the research.	
	Alignment with national and institutional research priorities.	5%
Institutional Support	Institutional support for the postdoctoral fellowship through mentorship, infrastructure and facilities for an enabling environment.	10%
Potential Research Outputs and Impact of the research	Details of envisaged realistic research outputs such as books, chapters in books, articles in refereed/peer-reviewed journals, refereed/peer-reviewed conference outputs, patents, articles in non-refereed / non-peer reviewed journals, Technical/Policy reports, products, artefacts, prototypes and other recognised research outputs.	5%
	Contribution to postdoctoral research skills development in a priority research area (human capacity development of the applicant).	10%
	Potential for impact of the research in South Africa realised through either: ▪ Knowledge impact - scientific advances in understanding, interpretation, methods, theory and applications. ▪ Societal impact - the value research adds to society through improvements in the social, economic or environmental spheres.	10%
TOTAL		100%

10. Reporting

For continuous monitoring of progress, the awardees are required to submit a Progress Report on the NRF Connect system against deliverables as outlined in the application form and the signed Conditions of Grants.

11. Contact Details

For programme-related enquiries, please contact:
Ms Zodwa Masinga
Professional Officer: Knowledge Advancement and Support
Tel: 012 481 4310
Email: ZM.Masinga@risa.nrf.ac.za

For NRF Connect technical enquiries, please contact the NRF Support Desk during office hours (08:00 to 16:30 from Monday to Friday).

E-mail: supportdesk@nrf.ac.za