SAccess
ACCESS4EU – South Africa
(Contract Number 243851)

"Supporting the EU access to South Africa's research and innovation Programmes"

Opportunities for European Researchers within the South African Innovation System

The SAccess project has received funding from the European Community's Seventh Framework Programme FP7 (2007-2013), Theme: INCO-2009-5, under Grant Agreement no 243851

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INTRODUCTION

This report is aimed at identifying opportunities on Research and Innovation (R&I) programmes managed by South African institutions which are open for access European researchers.

In the scope of this study, the concept of opportunities has been considered in a broader sense: including not only calls for proposals but different kind of "access opportunities/schemes" that can be offered to European researchers desiring to have a research experience in South Africa.

Institutions at two levels were analysed: Agency level and R&I performers level (mainly sciences councils and universities). The process implemented to gather information from these institutions and complete this report will be described in detail in Section 1 (Methodology).

Considering that opportunities for European researchers in South Africa depend on current evolutions on the national R&I system, special attention has been given to contextual factors and more recent changes operated by South African research institutions. Such factors - addressed in Section 2- should be carefully considered by European institutions interested in programmes and forming partnerships with South Africa.

Section 3 presents the typology of opportunities identified so far within the South African R&I System and its common characteristics (kind of support, duration of the activity, financial aspects, etc.). These aspects are subsequently detailed in individuals info-sheets prepared with information from agencies with potential opportunities for European researchers (Section 4).

Finally, recommendations are offered at the end of the report (Section 5) aimed at a) facilitating European researchers access to opportunities in South Africa; b) improving how SAccess can identify and disseminate information to the European research community; and c) providing feedback at the JSTCC policy dialogue–concerning reciprocity in Scientific and Technological cooperation between Europe and South Africa.

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1. METHODOLOGY

This report is part of SAccess Project deliverables within the WP2 "*Identification of South Africa's national research and innovation programmes".* According to the DoW, this report is aimed at:

- Mapping specific research and innovation opportunities (calls) open to European stakeholders;
- Identification of specific participation issues/rules related to European stakeholders; and
- Analysing the reciprocity conditions.

The report "*provide a comprehensive, horizontal perspective of the openness of South African programmes to European participation, i.e. identifying provisions common to several programmes as well as areas where for example ambiguity could be clarified*".

Four stages have been implemented to reach these objectives:

1- First overview on the opportunities, prepared by the DST and submitted on May 2010.
2- Mission to South Africa to conduct interviews with programme owners in order to identify opportunities that have not been identified so far. This mission was conducted by the IRD, with DST support, between November 16 and December 16, 2010.
3- Desktop study to complete information collected through interviews: review of institutional documents and websites. This phase was implemented between January and March 2011.
4- Drafting of the report and info-sheets by institutions, until the end of March 2011.

1.1 Interviews with programme owners and R&I performers

After the first intermediary report on opportunities for European researchers in South Africa, prepared by the DST, a mission conducted by the IRD was organized with the strong support of the DST.

The mission took place from November 17 to December 16, 2010. Based in Pretoria at the DST premises, meetings were held mostly in and around this city but also in Johannesburg and in the region of Cape Town.

The mission enabled collection of information, through interviews with programme owners, in order to:

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- Improve and complete the present report on opportunities for EU researchers in South Africa (D2-3): *Roadmap of research and innovation calls, rules for participation, and reciprocity conditions*;
- Obtain information to complete the reports on *South African research and innovation capacity including bilateral agreements and bibliographic inventory* (D 2.2) and the *Report on access barriers and related methodology to assure EU participation* (D 2.4).

A total of Eighteen (18) South African Research and Innovation institutions were visited during the mission:

1- National Research Foundation (NRF)
2- Technology Innovation Agency (TIA)
3- The Hartebeesthoek Radio Astronomy Observatory (HartRAO)
4- National Zoo gical Garden (NZO)
5- Hermanus Magnetic Observatory (HMO)
6- Council for Scientific and Industrial Research (CSIR)
7- South African Environmental Observation Network (SAEON)
8- South African Institute for Aquatic Biodiversity (SAIAB)
9- MINTEK - South Africa's national mineral research organisation
10- iTHEMBA Laboratory for Accelerator Based Sciences
11- South African Astronomical Observatory (SAAO)
12- South African Large Telescope (SALT)
13- University of Cape Town (UCT)
14- Medical Research Council (MRC)
15- Human Sciences Research Council (HSRC)
16- Water Research Commission (WRC)
17- South Africa's National Energy Research Institute (SANERI)
18- SASOL

Five (5) meetings were organized with the NRF. In addition, the two Vice Presidents of the NRF – Dr G Mazithulela (Vice-President: Research Infrastructure and National Research Facilities); and Dr D Pillay (Vice-President: Research and Innovation Support and Advancement (RISA) - as well as the CEO – Dr AS Van Jaarsveld - were met and informed on the objectives of the mission.

Additional meetings were organized with:

- Researchers working with 3 different Universities: to identify difficulties and success stories (See list in Appendix 1);
- The DST team in order to evaluate progress of the mission;
- The Attaché for Science and Technology at the Embassy of France in South Africa. This meeting was aimed to present the SAccess project and results of the mission;
- The IRD Representative in South Africa and ERAfrica's coordinator, Yves Savidan, who was duly informed of the scope and involved in the preparation of the mission with the aim of building synergies between SAccess and ERAfrica.

Two other activities organized by the DST in the Gauteng region were attended:

- INCONTACT meeting of the African NCP network (December 3),
- National System of Innovation Partnership Forum (December 7).

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In total, 31 engagements in the form of meetings and interviews were conducted during the mission (See appendix 1).

Given the number of persons we had meetings with and interviewed, this mission allowed increased awareness on SAccess objectives and activities among a large number of South African (SA) Research and Innovation stakeholders. Furthermore, this was an opportunity to present the SAccess dissemination strategy and interlocutors were strongly urged to contribute to the common call database and info-days.

1.2 Methodological tools

Several tools (templates) were designed to gather information during and after the mission. Some of these tools were designed with the aim of facilitating the update of the report and, especially the follow-up of potential programme owners:

- A Questionnaire which was sent to South African research institutions before interviews.
- Programme and calls matrix: Excel file mapping calls open to European researchers and organizing the information on a thematic basis.
- Potential programme owner's matrix: institutions which had no open calls when the report was written but which manage programmes with potential openness to European researchers. Sections of respective websites where calls are published have been included in this matrix in order to facilitate the follow up. Programme owners are also classified, where possible, on a thematic basis.
- Info-sheet: template to collect and present information by institution related to working modalities, opportunities and conditions, among others. Each info-sheet includes notes for the follow-up which constitute recommendations to be considered by the SAccess consortium in order to enhance the dialog with programme owners.
- List of research programmes by theme: a list of research programmes organized by themes to be integrated as a section of the SAccess Website.
- Database of contacts in South Africa: filed to facilitate activities related to the dialog with programme owners as well as the dissemination tasks.

These templates have been filed during and after the mission (until March 31 2011). However, they should be considered as "open documents" to be regularly updated.

1.3 Desktop study

After the mission to South Africa, a desktop study was conducted in order to contextualise and deepen on aspects that were raised during the interviews. Several sources were exploited for this purpose:

- Institutional information: annual reports, official budgets, websites, newsletters, research briefs etc. ;
- Digital newspapers and institutional press releases: Engineering News, University World News for example;

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- National and International reports including analysis related to South Africa's R&I system: Reports produced by the Human Science Research Council, by the OCDE, among others.
- Scientific articles related to the analysis of R&D systems.

During this phase of the study, contacts have been re-established with persons who had participated in interviews but also with other officials that have not been met during the visit to South Africa. In several cases, they are persons directly involved in the management of calls including Research Offices of major South African Universities, researchers, agency officials, etc. The database mentioned above includes all these contacts.

1.4 Methodological difficulties

It was difficult for some interviewees to understand the objective of the interviews since the funding of the organisations visited is limited to SA researchers and does not necessarily extend to EU researchers. The idea of South African programmes offering funding for European researchers is not a priority for some of the agencies visited. This reflected the fact that it is not common for South African players to provide funding for international researchers since most of cooperation with international partners is linked to external or bilateral funding.

In some cases, representatives interviewed were not aware of all the international cooperation activities of their institution. To resolve these obstacles, additional contacts were established after the interviews with other programme managers.

In addition, it was difficult in some cases to establish when an international researcher is funded with national funding or with international funding. This is the case of research institutes at universities where different sources of funding (national, international, public and private) are used for the same activity or project.

Finally, in most cases, calls for proposals and guidelines are not explicit with regards to the openness to international or European researchers.

1.5 Contributions of consortium members

1.5.1 IRD

On behalf of the IRD, Zoraida Martinez, Yves Savidan and Lukovi Seke were involved in the activities of the mission.

Zoraida Martinez, project manager, was in charge of:

- Submitting to the DST and to the SAccess coordinator a work plan and methodology regarding the activities to be developed during the mission;
- Organizing, with the DST, the schedule of meetings;
- Conducting interviews in South Africa and collecting additional information through institutional documentation and websites;

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- Drafting the report D2.3.

After the mission, Zoraida Martinez also completed the "*South Africa's R&D Country Profile*" as past of IRD contribution to the D2.2.

Yves Savidan, IRD Representative in South Africa, has provided guidance for the preparation of the mission and feedback regarding the institutions to be contacted. He was also involved in the preparation of the reports resulting from the mission.

Lukovi Seke participated in the meetings in South Africa in order to obtain information for the preparation of the report D 4.1 "*Monitoring of the EU participation in SA S&T programmes*".

1.5.2 DST

On behalf of the DST, Mabatho Ndwandwa and Thabisa Mbungwana participated in the activities of the mission in South Africa. They ensured the involvement of South African agencies' representatives at the relevant level and gave the appropriate contextual information and feedback to conduct the interviews.

Daan Du Toit, from Brussels, helped to establish the scope and feasibility of the mission. During the development of the mission, he also gave feedback on the activities implemented and on the preliminary results.

It is noteworthy to mention the support of the DST which was essential to ensure the success of the mission. All the resources required for the mission were made available to make sure the mission will be as productive as possible (transport, offices, etc.). Given the characteristics of the country and the distances, the mission could not be realised without DST's support.

All DST team has provided feedback on the drafting of the present report.

1.5.3 APRE

During the week of 22 November, Christian Pfeiffer (APRE) organized a series of interviews in South Africa aimed at obtaining testimonials and images for the SAccess DVD. Researchers and institutional representatives with very interesting profiles were invited to participate to these interviews. This was also the occasion to obtain information regarding the objectives of the mission and to have information on the attractiveness of the South African S&T system as well as inputs on the obstacles encountered by European researchers to work with South African partners.

1.5.4 FORTH

All activities related to the present report were implemented under the guidance and with the support of the Coordinator of the Project, Constantine Vaitsas.

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2. CONTEXTUAL FACTORS CHARACTERISING OPPORTUNITIES

This part of the report has been prepared considering a *leitmotiv* during the interviews: European researchers have partial knowledge of questions affecting the openness and internationalisation of South African research programmes and institutions.

Main contextual factors have been identified during the mission to South Africa in relation to the available opportunities for EU researchers and their access to SA R&I programmes:

- National focus on Human and Institutional Capacity Development whose causes and apparent adverse effects also deserve consideration;
- Autonomy and Internationalisation of HEIs;
- Recent evolutions in the South African R&I system creation of the TIA, SANSA and the SANEDI;
- Reinforced partnership with the private sector.

2.1 National focus on Human and Institutional Capacity Development

Strengthening human and institutional capacity in South Africa is a common goal to all South African research institutions and the main priority highlighted during interviews.

Based in the Skills Development Act (No. 97 of 1998), this national priority is looking at "*increasing the overall level of skills in the country and to improve access to quality learning, especially for the previously disadvantaged sectors of the population*"[1] i.e. women, Black, Indian and Coloured population. Within the South African R&I system, the NRF has a mandate to support this national priority across all disciplines while the 9 Science Councils and the Higher Education Institutions (HEIs) are expected to build capacities in specific fields.

Human and Institutional Capacity Development is a national issue related to identified weaknesses of the R&I system detailed in the following paragraphs. These are major challenges to be considered in collaborations with South African research institutions since all projects financed by South Africa should contribute in some way to these national concerns:

2.1.1 The PhD problem and the abandon of the academic pathway

The need to increase significantly the number of Post Docs in South Africa is a challenge met by all research institutions in South Africa. Thus, a target was set: to multiply by 4 the

[1] NRF, *Scarce skills development Fund Review 2002/2003-2008/2009.*

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number of PhDs by 2025. In facts, while South Africa produces 27 PhDs for every million of its population, Brazil produces 42, South Korea 172, Australia 240 and UK 259[2].

Recently, a study of the Academy of Science of South Africa (ASSAF)[3] published in September 2010, presented different sides of the problem, the abandon of the academic pathway being one of major concerns.

The *PhD Report* explained that in 2007, 564 381 students wrote the National Senior Certificate (NSC, examination prior to the tertiary level studies) while only 1 274 student obtained a PhD certificate. This corresponds to a ratio of 443:1. Major leaks rates were found at NSC (85% of students writing a NSC) and at the Doctorate level (83% of students).

According to interviewees, abandon of the academic pathway -especially at Doctorate level - is frequently linked to financial problems since bursaries do not seem to provide sufficient funding for doctoral studies. *The PhD Study* confirms this testimonial: "*Interviews with leaders of a number of exemplary South African PhD programmes reveal that event these prestigious, well-funded and input-intensive programmes are not immune from attrition. The main reason for non-completion in these programmes is reported as insufficient bursary funding, which often leads to student's premature entry into the job market"*.

Linked to funding problem is the fact that doctoral students have frequently a part-time or even a full-time job which seems to be one major factor of attrition. According to interviewees, attractive salaries and possibilities for advancement in careers in the private sector reinforce the abandon of the academic pathway.

Thus, a dynamic -maybe unintentionally- of pull and push is entertained between the academia and the private sector. On the one hand, structural problems motivate the abandon from the academic pathway (funding problems, limited supervisory capacity, among others) while on the other hand attractive and well remunerated carriers in the private sector encourage young students to entry into the enterprise business sector.

This trend is reinforced in growth sectors with a lack of skilled professionals, i.e. the energy sector. For example, it was recently informed that "*almost one third of artisans, technicians and engineers at Eskom* –a state-owned enterprise generating approximately 95% of the electricity used in South Africa and approximately 45% of the electricity used in Africa - *are approaching retirement*"[4]. To replace this staff, Eskom and its suppliers would require about 3 000 scientists and engineers, creating interesting opportunities for graduates at different levels.

2.1.2 Limited supervisory capacity

Another structural problem linked to the low production of PhD is the limited supervisory capacity. The *PhD Study* established that in 2007 only 33% of permanent academic staff in South Africa held a doctorate (i.e. 5 191 permanent staff). This percentage remained constant between 2000 (32%) and 2007. Given that the limited doctoral supervisory capacity affects the reproduction of highly skilled workforce necessary to a knowledge based

[2] NRF, *South African PhD Project Partnership Guide*.
[3] ASSAF, *The PhD study*, September 2010
[4] Engineering News, URL: http://www.engineeringnews.co.za/article/30-of-eskom-engineers-near-retirement-2011-03-14

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economy, it is a priority for South Africa to reinforce the number of academic staff with a PhD or its equivalent.

As a share of total permanent staff with a doctoral qualification, natural, agricultural and social sciences have the highest doctoral supervisory capacity (21%). But in some fields the need to strengthen the doctorate supervisory capacity is the highest. This is the case of Engineering Sciences, Materials and Technologies with only 6% of total permanent academic staff with a PhD.

2.1.3 Human capital flight

Points of view regarding the human capital discussion in South Africa are not homogeneous among reports available so far.

An International Labour Organization's (ILO) study[5] affirmed in 2002 that by all standards immigration of highly skilled people from South Africa is high. In another perspective, a study published by the Human Science Research Council (2007) affirmed that no evidence was found of a brain crisis and indicated that brain drain could be overestimated in that the rate to return to South Africa is not clear[6].

According to two international surveys conducted in 2005 (OECD and World Bank), countries with stronger Innovation System's are relatively spared from the brain drain[7]. In the case of South Africa, in 2005, only 10.3% of High Qualified Population has migrated to the OECD area[8]. South Africa being among the stronger Innovation System's in Africa, along with Nigeria and Egypt, it seems that brain drain problem has less impact than in other African countries where the brain drain represent nearly a half of total high qualified population. This is the case of Angola (53%), Maurice (53%) and Mozambique (47%).

Although there are different approaches of the problem, some convergent aspects were found. First, there is a common finding to all studies: emigration official statistics in South Africa are underestimated. While 6 563 emigrations of Human Resources in Science and Technology (HRSC) were registered by Statics South Africa between 1998 et 2001, 24 952 emigrations were registered by statistics from the five top destinations of South African emigrants (UK, US, Canada, New Zealand, and Australia)[9].

Second, some fields of research are particularly affected. A study of the University of Cape Town affirmed that health professionals and engineers account for the greatest share of migration to Canada and New Zealand[10] two of top-five destination for skilled emigrants. This finding is confirmed through articles published in different reports and journals[11].

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[5] ILO, *Skilled Labour migration from Developing countries: Study on South and Southern Africa countries*, 2002, URL: http://www.ilo.int/public/english/protection/migrant/download/imp/imp52e.pdf
[6] HRSC & CSIR, *Flight of the Flamingos. A study on the mobility of R&D workers*. 2004
[7] Gaillard A.M., Gaillard Jacques, *Fuite des cerveaux, circulation des compétences et développement en Afrique : un défi global,* Défis du développement en Afrique subsaharienne : l'éducation en jeu, 2006, p. 46.
[8] OECD, 2005.
[9] HRSC & CSIR, *Idem.*
[10] Crush J. and Williams V., Southern African Migration Project (SAMP), University of Cape Town, *Counting Brains:Measuring Emigration From South Africa*, 2001.
[11] i.e. Medecins Sans Frontières, *Confronting the health care worker crisis to expand access to HIV/AIDS treatment:MSF experience in southern Africa,* http://www.doctorswithoutborders.org/publications/reports/2007/healthcare_worker_report_05-2007.pdf

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Third, from the interviewees' point of view, the Diaspora of skilled human resources is affecting especially White researchers and this wouldn't be without effects on the supervisory capacity at doctoral level. White capital flight could be motivated by the government's affirmative action (see below) in direction of previously disadvantaged populations. But no recent statistics characterising the Diaspora were found to confirm this perception. Predominance of Whites among Diaspora can be partially explained by the fact that given the South Africa's past, skilled population was historically mostly white[12].

Although divergent positions face to the human capital flight, the debate has contributed to the positioning of the problem on the policy agenda. Programmes such as the South African Research Chairs (SARC) and the Rated Researchers Incentive Funding (RRIF), managed by the NRF, have been launched and focus on addressing the crisis of brain drain in South African universities and rewarding research excellence.

2.1.4 Affirmative action

To counteract the legacy of Apartheid and help to balance the representation of previously disadvantaged groups, the South African government has implemented a set of affirmative action policies.

At the economy level, the Broad-Based Black Economic Empowerment (BEE) is defined as "*an integrated and coherent socio-economic process that directly contributes to the economic transformation of South Africa and brings about significant increases in the numbers of black people that manage, own and control the country's economy, as well as significant decreases in income inequalities*"[13]. This strategy seeks to increase the ownership and control of enterprises by black people, increase the number of black people in executive and senior management of enterprises, as well as the ownership of land and other productive assets. Human resource development and employment equity are also core elements of the BEE.

Access to education and tertiary studies has been also subject to affirmative action policies. Historically disadvantaged universities are granted with special support and all universities are encouraged to increase the number of students among previously disadvantaged groups. These policies look to reflect national demographics among student profiles at universities and positive results have been already observed.

As a result, 36,970 black Africans - excluding coloureds (people of mixed race) and Indians- were awarded degrees in 2008, an increase of 334% compared to the 8,514 awarded degrees in 1991[14]. According to 2010 estimates from Statistics South Africa, black Africans make up 79.4% of a total population of 49.9 million, while whites make up 9.2%, coloureds 8.8% and Indians 2.6%. Out of a total number of 80,803 degrees awarded in South Africa in 2008, 45.8% of these were awarded to black Africans, 39% to whites, 8.5% to Indians and 6.5% to coloureds.

[12] The permanent academic staff of the University of Cape Town in 2009 were 76% South African and 24% international;of the South Africans 28% were black and 72% were white; and of all permanent academic staff 41% were women[12].

[13]Department of Trade and Industry (DTI), A Strategy for Broad-Based Black Economic Empowerment, URL: http://www.dti.gov.za/bee/bee.htm.

[14] University World News, URL: http://www.universityworldnews.com/article.php?story=20110128230457673&mode=print

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However, points of view concerning affirmative action are not always approving. According to a study of the UCT, "*Among skilled whites, there was overwhelming opposition to affirmative action, while 20% of skilled blacks felt opposed to this programme*"[15]. Concerning the BEE, critics point out the increase of inequalities among black populations (10% of blacks are now a middle-class or upper middle, the absence of impact on economic growth and the risk of frustration among poor blacks and rich whites[16].

2.1.5 Link to SAccess objectives

Considering the focus on Human and Institutional Capacity Development in South Africa, several aspects should be taken into account when analysing opportunities for EU researches in South Africa.

First, the Department of Science and Technology (DST), as well as the Departments of Labour (DoL) and Education (DoE) are mandated to ensure training in scarce skills at higher education and training institutions, especially in the fields of science, engineering and technology (SET). Thus, the participation of European (and other international) researchers is encouraged especially in programmes where international partners will help to build capacities in South Africa. Funding opportunities are more likely to be associated to scarce skills, not available in the country, and whose development requires the involvement of international researchers.

Second, projects that support the promotion of previously disadvantaged populations are more likely to be supported[17] by the agencies and research institutions in South Africa. This priority is clearly reflected in the text of calls for proposals as well as on the evaluation grids. For example, the first among the priorities presented in the Guideline for applications to THRIP projects is the "increase in the number of black and female students who intend to pursue technological and engineering careers".

Third, it was also pointed out during interviews that partnerships with foreign institutions and researchers are welcome to increase the supervisory capacity at South African universities and help the country to reach the target of a four-fold increase in the number of PhD by 2025.

Fourth, while South Africa will be favourable to initiatives enabling national researchers to have international experiences, European institutions interested in South Africa should be aware of -and do not encourage- the brain drain.

These priorities have been fully integrated in the strategic plans off all the R&I institutions and have been translated into specific programmes. A great coherence among programme owners was observed regarding these national concerns. Therefore, the impact in terms of human and institutional capacity building – especially in relation to scarce skills and previously disadvantaged populations - is a major condition when deciding on projects to be supported or funded.

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[15] Waller L., Southern African Migration Project (SAMP), University of Cape Town, *Migration of Skills in South Africa: Patterns, Trends and Challenges, 2006. URL: http://www.queensu.ca/samp/sampresources/samppublications/policybriefs/brief20.pdf*

[16] Gilles Genre-Grandpierre *Le Black Economic Empowerment en Afrique du Sud : fondements, contraintes et risques*, *Afrique contemporaine* 2/2004 (n°210), p. 95-108.

[17] NRF, *Scarce skills development Fund Review 2002/2003-2008/2009*.

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The development of strategic platforms is part of the actions implemented to build human and institutional capacities. To this end, the NRF has implemented a specific programme aimed to support the "production of high quality PhDs" and to enable international partnerships in an equal base. The acquisition of the first high resolution transmission microscope is an example of such an initiative. Placed at the Nelson Mandela Metropolitan University, this cutting-edge facility is attracting researchers from the Oxford University (UK) and the Max-Planck-Institute (Germany).

2.2 Autonomy and Internationalisation of HEIs

As presented in the D2.2, the Higher Education Institutions (HEIs) in South Africa includes 23 universities (List in Appendix) and concentrates 69.23% of total the full-time equivalent researchers[18].

According to the *National Survey of Research and Experimental Development (2008/2009 Fiscal Year*), the universities received nearly 20% of the gross expenditure on R&D (GERD). In addition, Universities obtain supplementary funding through the programmes managed by agencies and Sciences Councils. The private sector is also contributing to their programmes. For example, annually 25 Millions Rands of SASOL expenditure in R&D is allocated to SA Universities.

The funds managed by the Universities and distributed to their structures are administered with a considerable autonomy. Well implicated in international scientific networks, South African Universities are willing to host international researchers and Post Doctorates that can support the Human and Institutional Capacity development in identified fields (See D2.2).

Internationalisation of universities is observed through their staff as well as by student's profile. According to the PhD study, the number of non South African doctoral graduates has increased significantly from 86 in 2000 to 338 in 2007. At the UCT, the permanent academic staff in 2009 was 76% South African and 24% international[19].

Mobility opportunities are the most common among the Universities but should not be underestimated. They often have led to long-term partnerships as well as to an improvement of opportunities for other international researchers.

The case of the Marine Research Institute (MA-RE), created at the UCT in 2006, is a good example. MA-RE currently funds in total 36 students and Post-Docs. Nine (9) European students and Post Docs are currently funded by this structure: 5 Post Doctoral Fellows, 3 PHD students and 1 Msc. student.

In the case of SASOL, funding is provided to universities for targeted research in line with SASOL activities for attracting national as well as international Post-Docs. The universities are given guidelines defining the thematic scope but there are no expectations from SASOL on return on investment. This is the SASOL contribution to human capital development in the

[18] Human Science Research Council, *National Survey of Research and Experimental Development (2008/2009 Fiscal Year).*
[19] UCT, Annual Financial Statement, 2009, URL: http://www.uct.ac.za/usr/finance/afs/afs2009.pdf, Page 10.

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country. The universities are autonomous to involve foreign students and Post-Docs in the targeted fields.

2.2.1 Link to SAccess objectives

As explained in the UCT info-sheet (Section 4), openness is facilitated by the autonomy given to Universities within the National Innovation System as wells as by the independence agreed to Faculties, Departments and researchers as a guarantee to develop outstanding research. For example, the *UCT Policy on Internationalisation* emphasized the principle of "Research and Academic Autonomy" and defines that the "*UCT strongly supports the rights of academics to develop their own individual academic links and collaborations, both formal and informal*".

Through these conditions provided by South African universities European researchers can access opportunities that are not directly accessible to European applicants such as programmes funded by the NRF or other agencies (WRC, NRF -SARCHis, THRIP) as well as top research projects funded by the university with a mix of governmental, private and international funding. In addition, regular and interesting Post-Doctoral opportunities are offered to international researchers especially in fields with scarce skills.

There is no doubt that universities are a key entry point for European researchers into the South African R&I landscape. While agencies should clearly show results regarding the Human and Institutional Capacity Development, researchers at universities are granted autonomy to define how excellence is reached. Therefore, SAccess should develop a follow-up system to ensure the identification of opportunities in this regard. Contacts established directly with Faculties and Research offices at universities seem to be the best way to access such research opportunities.

2.3 Recent evolutions in the South African R&I system

Important changes are being implemented in the SA R&I landscape. These changes have an impact on the scope of activity of the institutions, on the way of funding research and/or the coordination of the South African research in certain fields. Opportunities for EU researches are therefore being influenced by these dynamics.

Key examples of evolutions in the SA R&I system are listed below.

2.3.1 Establishment of the Technology Innovation Agency (TIA)

As explained on the D 2.2, the TIA, established April in 2010, "*is a public entity with the aim to enhance the countries capacity to translate a greater proportion of local research and development into commercial technology products and services*".

This new agency, will involve the integration of 4 DST entities, namely:

- Tshumisano;

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- The Advanced Manufacturing Technology Strategy;
- Biotechnology Regional Innovation Centres (BRICs): Plant Bio, Life Lab, Bio Ped and Cape Bio Tech;
- The Innovation Fund.

This agency should increase the impact of programmes that were so far managed in a disarticulated way with resources often "*spread too thin across projects*" in some fields of research[20]. This problem had been particularly pointed out by an OECD report[21] in the field of Biotechnology and the case of BRICs which are now under the mandate of the TIA.

Programmes of this agency are being defined and, although for now no clear opportunities have been identified for European researchers, the structuring and coordination effort implemented by the TIA could facilitate cooperation with international partners in promising sectors as biotechnology.

2.3.2 Creation of the South African National Energy Development Institute (SANEDI)

The South African National Energy Research Institute (SANERI) and the National Energy Efficiency Agency (NEEA) will be incorporated into the new South African National Energy Development Institute (SANEDI).

Until now, SANERI has been largely funded by the Department of Science and Technology. With the new structure, the funding will come mainly from the Department of Minerals and Energy. Funding from the Department of Science and Technology will be granted to SANEDI on a project basis.

SANERI has funded until now non directed projects with the aim to identify was is the state of the art of Energy research in South Africa. This process enabled the identification of priorities that will be later addressed by directed calls. As in the case of the TIA, the SANERI has contributed to the structuring of research in a specific field and it will be mandated to develop activities in more advanced phases of the innovation value chain i.e. demonstration and commercialisation.

SANEDI would be largely responsible for the development of energy industries. After this change some programmes managed by the SANERI will have to be migrated back to the DST[22].

2.3.3 Launching of the South African National Space Agency (SANSA)

South Africa has a diversity of facilities, institutions and academic programmes related to the Space Science (See Box 1). In order to structure this field of research, Minister Pandor launched on the 9 December 2010 the South African National Space Agency (SANSA). As explained in a DST press release, "*The National Space Strategy provides a framework for the coordination of all space-related activities in South Africa. Its key focus areas are environmental and resource management, health, safety and security, and innovation and economic growth… it will coordinate and integrate national space science*

[20] OECD, *Review of Innovation Policy - South Africa*, 2007
[21] OECD, *Idem.*
[22] SANERI, Annual *Report 2009/20010*.

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and technology programmes, and conduct long-term planning for the implementation of space-related activities"[23].

Space in South Africa[24]

Astronomical Facilities

- **The South African Astronomical Observatory (SAAO)** is the national facility for optical and infared astronomy in South Africa. The headquarters are in Observatory, Cape Town, and the various telescopes, including the Southern African Large Telescope (SALT), are at Sutherland in the Northern Cape.
- **Hartebeeshoek Radio Astronomy Observatory (HartRAO)** operates a telescope 26 metres in diameter that can detect radio waves emitted by many different kinds of objects in the sky. HartRAO conducts a space geodesy programme using the radio telescope, together with global positioning equipment and a satellite laser ranger.
- **The High Energy Stereoscopic System (HESS)** consists of an array of four telescopes which can detect the light produced by gamma rays entering the atmosphere. HESS is located on the Khomas Hochland in Namibia.
- **Boyden Observatory**, just outside Bloemfontein, has several telescopes used for research and educational purposes.

Satellite Applications

- **CSIR Satellite Applications Centre (SAC)** at Hartebeeshoek provides tracking and control services for satellites and support for a wide variety of satellite applications.
- The **Institute for Satellite and Software Applications (ISSA)** is based at the Houwted satellite integration facility in Grabouw. It offers post-graduate qualifications in Engineering and Information & Communication Technology. Excellent facilities are available for designing and testing small satellites.

Space Physics

- The **Hermanus Magnetic Observatory (HMO)** is part of an international network of magnetic observatories which monitor and model changes in the Earth's magnetic field.
- The **South African National Antarctic Programme (SANAP)**: South Africa has had a scientific base called SANAE in Antarctica since 1960. SANAE is an observatory to study the uper layers of the atmosphere, especially the ionosphere and the magnetosphere.

National Astrophysics and Space Science Programme (NASSP)

The NASSP is a national initiative hosted by the UCT given that this university has a critical mass on Astronomical sciences including researches coming from other regions of South Africa and other countries(See UCT info-sheet). This programme has strategic partnerships with the Astronomical National Research Facilities thus NASSP's students can have access to this platform.

According to the South African National Space Agency Act (2008)[25], the objectives of the agency will be as follows:

- Promote the peaceful use of space;
- Support the creation of an environment conducive to industrial development in space technology;
- Foster research in space science, communications, navigation and space physics;
- Advance scientific, engineering and technological competencies and capabilities through human capital development, outreach programmes and infrastructure development; and Foster international co-operation in space-related activities.

[23] DST Press release, *Minister Pandor to launch the South African National Space Agency,* 8 December 2010.
[24] South African Space Portal; URL: http://www.space.gov.za/spaceinza/facilities.php
[25] Government Gazette, Vol. 522, *South African National Space Agency Act*, http://www.info.gov.za/view/DownloadFileAction?id=94358

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In the future, the SANSA could absorb existing institutions like the HMO, the HartRAO and the SAAO.

2.3.4 Bid to host the Square Kilometre Array (SKA)

South Africa is bidding against Australia to host what would be the world's biggest radio telescope. A final decision is expected next year. Construction should start in 2016 to be operational by 2024.

The SKA should have a positive impact in the human capital and infrastructure development. It should also generate employment in South Africa and the African partner countries including Botswana, Ghana, Kenya, Madagascar, Mauritius, Mozambique, Namibia and Zambia.

For SA to win the dib and host the SKA means that the country will be managing a budget of €1,5 billion Euros. Thus, South Africa would attract a substantial part of the €150-million to €200-million a year necessary for the operations and maintenance of the telescope over 30 to 40 years[26].

The government announced that about R110-million have been already spent on almost 300 grants to train students in physics, astronomy, engineering, as well as technicians and artisans.

This important project provides international researchers access to Post-doc opportunities at the National Research Facilities and represent an attractive development of the national research landscape.

2.3.5 Link to SAccess objectives

Important changes within the South African Innovation System were materialized by the creation of new agencies. Such evolutions reflect a tendency to reinforce the structuring of the national system and to lead efforts and budget towards priority fields.

It is impossible to affirm if the implementation of mentioned changes is consistent with the Ten Year Innovation Plan. It is also difficult to establish when the scope of actions of these agencies will be completely defined. However, main aspects concerning the above-mentioned evolutions arise of interviews:

- They are aimed at improving the coordination between research institutions of a same field and also look at pooling resources to enhance the impact of institutions and to facilitate their insertion in large-scale partnerships;

- New agencies are innovation-oriented. The emerging agencies are focused on the advanced steps of the innovation chain. Therefore, they are reinforcing or expanding the scope of the assimilated institutions to involve technology development, demonstration

[26] Engineering News, URL: http://www.engineeringnews.co.za/article/south-africans-should-rally-behind-the-ska-bid-pandor-2011-03-04

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activities and product commercialisation. The link with the private sector is consequently reinforced and is often among the main objectives.

- It is observed a transition form demand-driven calls to “solicited” or “directed” projects targeting specific priorities by sector.

Finally, the creation of new agencies is also related to the objective of strengthening international partnerships on an equal basis. Their operational model is being finalized and potential opportunities for collaboration with Europe can be opened. Therefore, the evolution of the new agencies should be closely monitored by the SAccess project.

2.4 Reinforced partnership with the private sector

As presented in D2.2, the business enterprise sector is the highest R&D performer in South Africa in terms of R&D Expenditure: the private sector’s R&D expenditure is 58.6%, and has been increasing in the past few years from 8 243 millions Rands in 2005/06 to 12 332 million Rands in 2008/09.

The business enterprise expenditure in R&D (BERD) is funded essentially by private companies (67.62%) but also by the government (20.81%) and foreign sources (11.32%). The BERD is allocated for the bulk to Experimental research (62.7%)[27].

The *OECD Science, Technology and Industry Outlook 2010* emphasises the increase in the country’s trade in high technology by 4 percentage points between 1997 and 2007. In addition, it pointed out that during 2002-04, 61% of firms in South Africa engaged in non-technological innovations, i.e. marketing and organisational innovations that go along with a new production techniques or the commercialisation of new products. Finally the report highlighted that for the same period, 21% of firms introduced new-to-market product innovations, being above the OECD average.

SASOL (See respective info-sheet in Section 3) is a clear example of enterprises with a high investment in research and working closely with universities.

2.4.1 Link to SAccess objectives

Programmes launched jointly with the private sector can involve a major openness to international researchers given that investment from enterprises is mostly oriented to market needs than to capacity building. This trend has been also observed in Brazil after an APORTA[28] study which analyzed about 400 calls for proposal in Science and Technology.

[27] HSRC, National Survey of Research and Experimental Development: 2007/08, Page 56 and 57.
[28] Access4Eu project targeting Brazil.

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3. TYPOLOGY OF OPPORTUNITIES FOR EU RESEARCHERS IN SOUTH AFRICA

This section describes briefly all kind of opportunities for European researchers identified so far within the South African Research and Innovation System.

This typology has been developed bearing in mind that not all types of opportunities identified can be disseminated through SAccess. However, from the point of view of the author, it is important to have a complete picture of existing and potential opportunities in South Africa. This will allow reporting at the policy level (JSTCC) on further opportunities that can be jointly explored by EU and SA institutions.

3.1 Scoping opportunities

Within the frame of Access4Eu project "opportunities" for European researchers in third countries have been defined essentially as "open calls" offering funding for research projects. The Access4EU common call database and the dissemination strategy have been defined accordingly.

However, within the context of the South African Research and Innovation landscape this definition seems narrow and does not reflect national advantages that can raise the interest of European researchers.

In fact, to define what an opportunity is, it would be necessary to answer to the question of why the European Union is interested in scientific cooperation with third countries. It does not make sense that European countries expect that third countries finance the development of its critical mass. However, these countries have significant advantages that can be profitable to European researchers: geographical advantages as well as platforms and knowledge (historical databases related to ecosystems, for example) related to such advantages.

This represents significant opportunities to address research related to societal and global challenges mentioned in the Innovation Union Communication: climate change, scarcity of resources, energy, health, impact of demographic changes, ageing, high quality affordable food, environmentally-friendly production methods and pollution reduction, land management, security, and transport.

Thus, opportunities can not be limited to calls and the typology developed below is aimed at explaining why. This typology is expected to evolve in the extent in which new opportunities will be identified and analyzed.

The conditions of accessibility to each programme are described in detail through the analysis by institution/agency. To this end, a set of info-sheets by agency has been prepared (presented in Section 4). In addition, three appendixes have been elaborated:

- Programmes and calls matrix: All calls identified so far are mapped through this table (Appendix in Excel file) among which there are calls from institutions which were not

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visited during the mission in South Africa. In this table the information is presented according to the Access4EU Common Call Database template. Therefore, it will be the bases to publish information on opportunities and calls on the SAccess and Access4Eu websites.
- Potential programme owners: a list of institutions with programmes open to European researchers, the appropriate contacts and the link to websites that will facilitate to update the information on open calls.
- A roadmap of research programmes by thematic fields to be integrated on the website as a new section.

With information collected through these tools, main types of opportunities for European researchers have been identified as follows:

3.2 Post-docs

This is the most common opportunity identified so far within the South African Research and Innovation System. For reasons explained in Section 2 (contextual factors), most opportunities will be linked to scarce skills, especially in the fields of Science, Engineering and Technology.

Post-doc opportunities can also include academic tasks as a contribution to the "reproduction of PhD" in South Africa. As explained in Section 2, the number of PhD in South Africa represents a weakness of the systems[29].

→Institutions given access

- The National Research Facilities of the clusters "*Nuclear Sciences*" and "*Astronomy, Space, Geosciences*" are particularly open to host international researchers even if its budget for this purpose is limited and profiles required are very specific.
- But most Post-doc opportunities identified so far are launched and managed by universities (See list and links below). The University of Cape Town (UCT) seems to be among the most open to international student in a large range of themes.
- In the frame of the SKA project, very attractive Post-doctoral opportunities, open to international researchers, have been recently launched. They are accessible through universities -UCT, Johannesburg, Western Cape- and national facilities such as (SAAO).
- Foundations such as the Claude Leon Foundation also offer Post-doctoral opportunities with the condition that grant should be spent in South Africa.

→Budget

Annual budget of Post-doctoral grants varies from programme to programme. The highest budget identified so far is that proposed by Post-doctoral opportunities within the SKA project: 300 000 Rands (about 30 000 euros by year).
On average, annual grants for Post-docs is established at R 150 000 which is the maximum offered by the NRF.

[29] Only 26 doctorates per million of the country's population in 2007 while there were 52 in Brazil or 162 in France, for example

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→Duration

Most of Post-doctoral opportunities offer a one year support, renewable for one year. The renewal is subject to an annual advancement report.

SKA opportunities are advantageous in this criterion: they are awarded for a period of two years plus one additional year if agreed to by the host institution, the candidate and the SKA Project. But in this particular case, fellowships are renewable every six months based on progress.

→Themes

In Post-docs open to European researchers and identified so far, themes targeted are as follows:

- Space Sciences
- Climate change, ecosystems
- Mathematics, physics
- Engineering
- Molecular biosciences

3.3 Competitive programmes for senior researchers: SARChi

The South African Research Chairs Initiative (SARChis) is a programme managed by the NRF, aimed at developing high level research and to attract the best skills to South Africa (See NRF info-sheet). Means made available for this programme represent a singular opportunity within the South African R&I landscape. Chair holders are designed in a highly competitive basis and no restriction linked to nationalities is considered.

→Institutions given access

The SARChis are granted through a two-stage process: first, universities send applications to the NRF to host a Chair and, second, universities selected to host a chair launch calls to identify the chair holder. Thus, universities are the key entry point to access to SARCHis opportunities.

It was explained by a SARChi holder that the University applied to host a SARChi after his initiative. He was involved in the two-stages of the process.

→Budget and duration

A SARCHi is funded at 2 500 000 Rands per annum (about 250 000 Euros) for a period of 5 years renewable 3 times.

→Themes

78 Chairs have been granted until now covering a large range of themes in the following fields:

- Natural and Agricultural Sciences: 32 Chairs
- Engineering and applied Technology: 5 Chairs
- Health Sciences: 16 Chairs

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- Humanities: 9 Chairs
- Social Sciences: 16 Chairs

The government has decided to reach a total of 210 SARCHis which will be filled during the next years opening new opportunities for European researchers in South Africa.

3.4 Indirect support and subcontracting

This kind of opportunities exists within the frame of projects funded by institutions at the agency level (NRF, TIA, WRC and SANERI for example). Some of their programmes do not enable European researchers to apply directly for funding. In some cases openness policy is not clearly defined.

In the case of THRIP (NRF info-sheet) European researchers are allowed to work as contracting personnel, scientific consultants or technical specialist. In WRC projects, European researchers can receive funding for expenses linked to the production of specific deliverables but their salaries can not be reimbursed by the project budget. In the case of projects funded by TIA, Europeans can be subcontracted. Finally, even if the research policy of the SANEDI is being defined, it was informed during the interviews that European researchers can receive funding to implement tasks for which specific skills, not available in South Africa, are required. European researchers can be also funded by the WRC when specific consultancies are required.

→Institutions given access

This kind of projects is leaded by a senior research who is employed by a South African institution. In general, project leaders work at universities or Sciences councils, such institutions being the key entry point to access opportunities offered by these projects. Foreign researchers living and working in South Africa are also in most cases eligible as project leaders.

→Budget and duration

Projects concerned with this kind of opportunity are medium to long term (average of 3 years) and budget is variable in function of the project and the availability of funding. In the case of THRIP the maximum contribution per project is about 8 million Rands (about 820 000 Euros) and can be approved for the duration of the project to a maximum of three years.

→Themes

While THRIP and TIA are oriented to innovative technologies applied to different fields (see NRF and TIA info-seet), SANERI funds Energy research projects and the WRC supports water research projects.

However, the “innovation” component in such well-funded projects is gaining an important place.

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3.5 Access to research platforms, singular ecosystems and long-term databases

Opportunities without funding are also provided to European researchers by the South African R&I system.

As explained by the NRF, as part of the Human and Institutional Capacity Development Strategy, South Africa is investing in state-of-the-art infrastructures enabling national researchers to cooperate with international researchers on an equal basis.

iThemba Labs and the National Research Facilities of the Space cluster, represent attractive platforms in which European researchers are welcome. Teams in thess institutions are willing to share with international researchers and opportunities for cooperation without funding are to be explored. HarTRAO (see info-sheet) for example is involved in technical collaboration with foreign partners interested in data exchange related to Radio Astronomy.

According to the NRF Annual Report 2009/2010, the High Resolution Transmission Electron Microscope (HRTEM) "*will catapult the country to the top end of the global nanotechnology stakes*". European researchers have shown interest and some European universities are already involved (Oxford, Max Planck Institute) in research projects linked to this facility.

In the case of SAEON (See info-sheet), opportunities for European researchers working in the field of Ecosystems research and climate change:

- Access to field sites with different ecosystems, including National parks as well as to private sites managed by SAEON;
- Field support for observations in dangerous contexts with a possibility of accommodation in remote sites.
- Access to historical data on a large range of fields related to ecosystems.
- SAEON can also facilitate the access to laboratories through its network of universities and help international researchers to obtain scientific supervision for their studies in South Africa.

In the case of the UCT, French modelling researchers have taken advantage of data registered by the Department of Oceanography, related to upwelling ecosystems, provided that long-term observation had been conducted in the Benguela system. This is an example of geographical advantage that makes South Africa an interesting partner in research related to Climate Change and Biodiversity.

3.6 Job opportunities

Contract opportunities have been also funded in universities, National Research Facilities and the Private Sector. This kind of opportunities has not been mapped since it is out of the scope of the SAccess project.

However, given that this aspect indicates an idea of the openness of the R&I system, it is noteworthy to mention that international researchers applications are welcome for senior positions, including at the level of national facilities management.

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As explained above, universities also have international researchers among the permanent staff personnel (24% in the case of the UCT).

3.7 Concluding on opportunities: Universities as the key entry point

As explained in the above developed typology of opportunities, universities –and not the agencies- are in general the key entry point for European researchers.

Aspects highlighted in the UCT analysis (See info-sheet) are valid for all of major South African Universities:

> *…Openness of the UCT is facilitated by the autonomy given to Universities within the National Innovation System as wells as by the independence agreed to Faculties, Departments and researchers as a guarantee to develop outstanding research.*
>
> *… the Research Office represents a key point of information as this office coordinates research strategies at UCT and manages grant funding opportunities. In addition, opportunities for EU researchers at UCT can be identified through specific Faculties and their Departments and their independent websites.*
>
> *…Frequently, opportunities for European researchers are linked to specific needs of research projects and less often to programmes that have a long term funding. Therefore establish direct contact with Professors and keep track of vacancies represent key ways to access to UCT opportunities for European researchers.*

Thus, European interested in scientific cooperation should consider establishing contacts with major South African universities, through their Research Offices and Faculties and Departments. Three of South African universities are in the Academic Ranking of World Universities -Cape Town, Witwatersrand and Kwazulu-Natal. Along with the university of Pretoria and Stellenbosch, these universities hold more than 65% of total universities research expenditure, more than 50% of researchers and 56% of total doctoral students[30].

Figures of major South African Universities

	% of total Univ. R&D expenditure	Researchers (Headcount)	Doctoral students (Headcount
University of Cape Town	15,79%	2321	1203
University of the Witwatersrand	15,50%	1630	1105
University of KwaZulu-Natal	12,85%	1910	1162
University of Pretoria	11,48%	1996	1585
University of Stellenbosch	9,99%	1034	1001
University of Johannesburg	4,12%	683	565

[30] HSRC, National Survey of Research and Experimental Development: 2007/08 http://www.hsrc.ac.za/Page-108.phtml

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4. ANALYSIS BY INSTITUTION (INFO-SHEETS)
National Research Foundation (NRF)
http://www.nrf.ac.za/

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THE NRF WITHIN THE SOUTH AFRICAN S&T SYSTEM

The NRF is an agency with a double role within the South African Innovation System (See Figure 1).

First, as an “Agency”, the NRF provides funding to research institutions and invests in people, infrastructure and institutional capacity through the Research and Innovation Support and Advancement Division (RISA).

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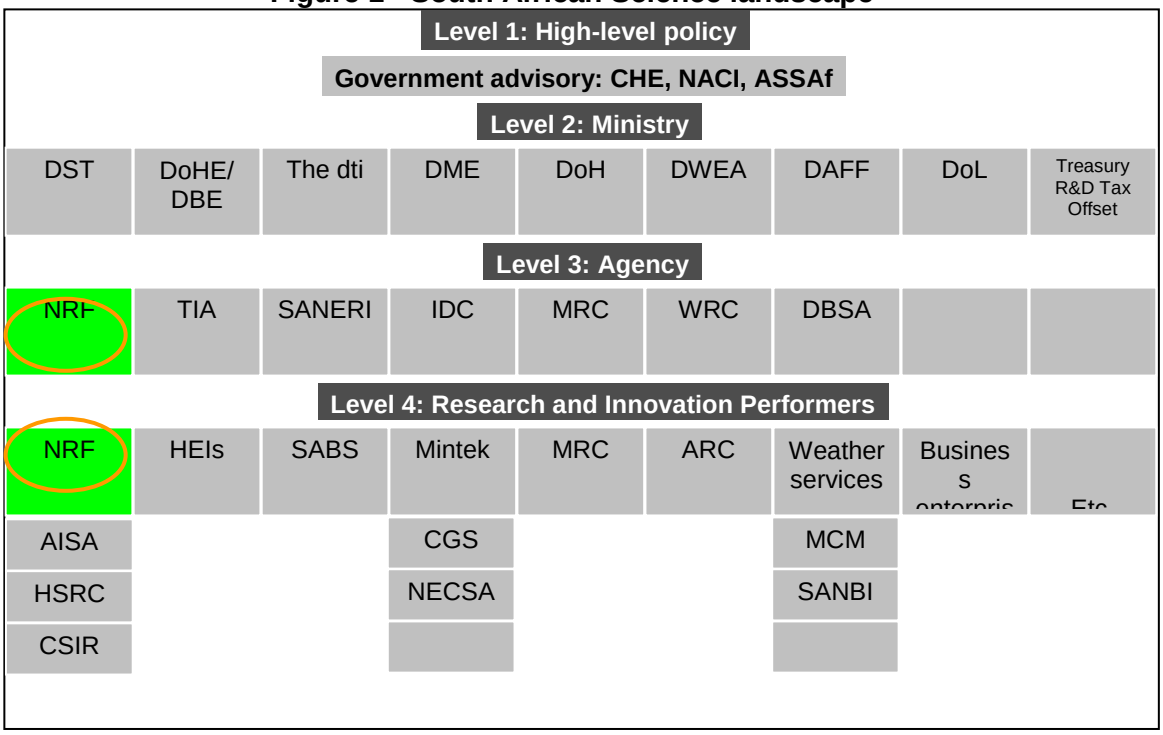
Second, as a "Research and Innovation Performer" the National Research Facilities Division manages the network of 7 national platforms clustered in three categories: Astro/Space/Geosciences, Biodiversity/Concervation and Nuclear Sciences (Figure 2).

In addition, as a cross-cutting mission, the NRF strives to promote the science in society through the South African Agency and Technology Advancement (SAASTA).

Funded essentially by the DST (41% of total budget - 1 761 615 Million Rands), the NRF perceives also support through contract funds for specific actions from DST and other Departments (52% of the total budget)[31]: the DTI (for the Technology and Human Resources for Industry Programme –THRIP), the DoL (for the National Skills Funds) and Department for Environmental Affairs (For the South African National Antartic Programme –SANAP).

According to the NRF's Annual Report 2010, RISA accounted for 70% of its expenditures while the National Research Facilities account for about 30% of the NRF's expenditure.

Figure 1 - South African Science landscape[32]



THEMES OF RESEARCH

The NRF is expected to contribute to the 5 Grand Challenges of the Ten Year Innovation Plan (TYIP), namely: Bio-economy, Space Science and Energy Security, Global change, Human and Social dynamics.

[31] National Research Foundation (NRF), *Annual Report*, 2010, Page 85.
[32] Key Performance Indicators Report 2008/2009, National Research Fondation.

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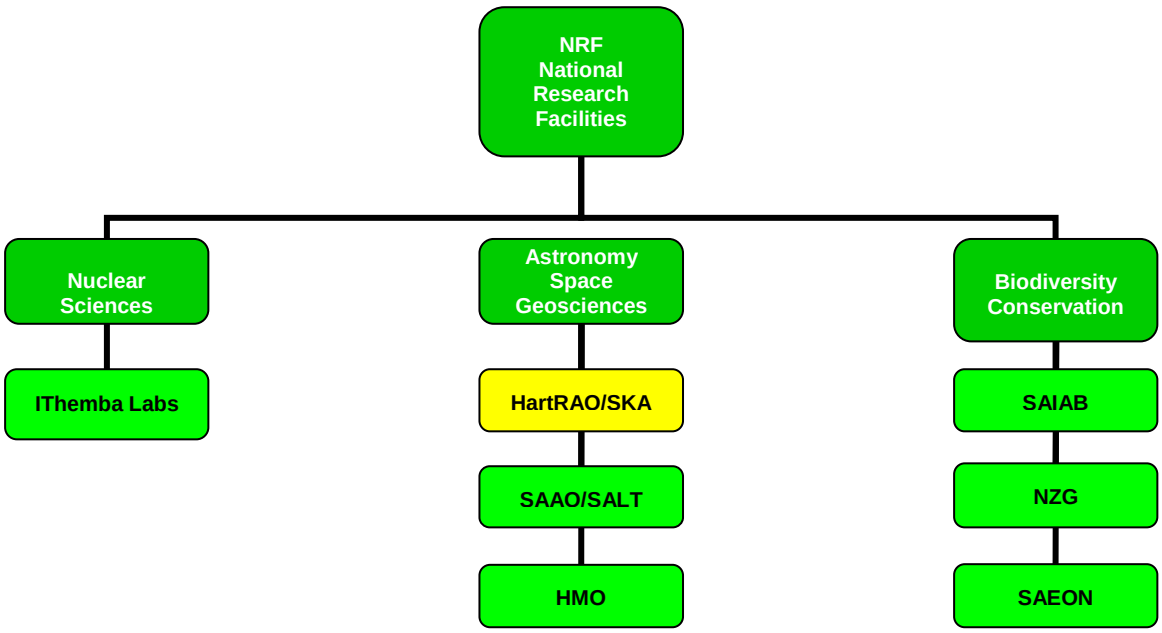
In addition, three key themes are addressed by the NRF through the National Research Facilities: a) Nuclear Sciences, b) Astronomy, space and geosciences, c) Biodiversity and Conservation.

But the according to its Mandate, the NRF is expected to "facilitate the creation of knowledge, innovation and development in all fields of science and technology…".

Figure 2 – Structure of the National Research Facilities[33]



MODALITIES OF WORK

Considering that the D2.2 have previously depicted some activities of the NRF and that National Research Facilities will be described through individual info-sheets, this section point out activities specifically related to the Human and Institutional Capacity Development. Lowermost will be described two large programmes presenting opportunities for EU researchers (SARCHi and THRIP).

a) PhD project

The PhD project (http://www.phdproject.co.za/) is a strategic programme to address the challenge of improving the number of PhD in South Africa as well as the required academic staff to ensure the supervision and training of a "high skilled workforce" for the public and private sector. This programme looks to a five fold increase in the annual production of PhD by 2025.

As explained above as well as in the D2.2, in 2007 South Africa has 26 Doctorates graduates per million population[34] while Brazil has 52, France, 162 and Portugal, 569. In addition, this

[33] NRF, Business Plan 2010 – 2013.

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country has a limited doctoral supervisory capacity with only a third of total permanent academic staff with a PhD or equivalent.

As presented by the NRF, "this is neither a funding nor a doctoral training programme" but a support and networking initiative that offers guidance for potential PhDs. This is part of the Human and Institutional Capacity Development Directorate which leads a set of programmes among which there are funding opportunities, reserved the most part for South African citizens or residents in South Africa:

- The Human Capacity Programme (HCP) ensure support for honours, masters and doctoral students and postdoctoral research fellows to extend their learning and research training;
- The Student and Postdoctoral Support (SPS) programme is aimed at increasing skilled human resources in Science, Engineering and Technology and in Social Sciences and Humanities. The Postdoctoral Fellowships are given to all nationalities for use in South Africa universities.
- The Internship Programme provides unemployed graduates with experiential learning and an opportunity to enhance workplace competencies.

Overview on all NRF grant opportunities: http://www.nrf.ac.za/publications.php?pid=14

b) Rated Researchers Incentive Funding

This programme aims to incentivize excellent research. The evaluation and rating of individuals is based primarily on the quality of the research outputs in the recent past (8 years) and is undertaken by national and international peers/reviewers who are requested to critically scrutinise the completed research.

Applications are submitted to the NRF by the institution where the applicant is employed. The programme is open to applications from all disciplines and is demand-driven.

Rating categories are as follows:

- Leading international researcher
- Internationally acclaimed researcher
- Established researcher
- NRF President's Awardee
- Promising young researcher
- Late entrant into research (category terminated at the end of 2009)

Until august 2010, 2 149 researchers had been rated. Among then there were 85 "Leading international researcher", i.e. "*researchers who are unequivocally recognized by their peers as leading international scholars in their field for the high quality and impact of their recent research outputs*"[35].

This rating allows access to NRF funding. Until 2010, 678 rated researchers (31% of total rated researchers) had been granted with funding from the *Rated Researchers Incentive Funding.*

[34] ASSAF, *The PhD study*, September 2010
[35] NRF Website, URL: http://hicd.nrf.ac.za/sarchi/rated.htm

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c) Strategic Platforms Programme

The Strategic Platforms Programme "*supports a knowledge economy through the acquisition, up-grade and development of state-of-the-art research equipment; incentivising quality research outputs from national facilities and facilitating access to research equipment*"[36].

This programme includes several sub-programmes with strategic goals for investment in infrastructures as presented in the table below. It should be pointed out the acquisition of the High-Resolution Transmission Electron Microscopy (HRTEM). Placed at the Nelson Mandela University, this state-of-the-art equipment has raised the interest of international institutions as the Oxford University and the Max Planck Institute.

PROGRAMME	OBJECTIVE
NATIONAL NANOTECHNOLOGY EQUIPMENT PROGRAMME	To support the development of human capital and infrastructure for nanoscience and Nanotechnology.
NATIONAL EQUIPMENT PROGRAMME	To support the acquisition and up-grade to state-of-the-art equipment and promote research collaboration.
NANOTECHNOLOGY FLAGSHIP PROJECTS	To support over a three year period platform projects in the field of nanoscience and Nanotechnology.
SYNCHROTON CAPACITY BUILDING FUND	To develop capacity in South Africa for the use of the synchrotron as a radiation source in experimental applications. To expose researchers to established international synchrotron facilities by awarding travel grants.
EQUIPMENT RELATED MOBILITY AND TRAINING GRANTS	To enable researchers to access research equipment, both locally and abroad, that is not available to them at their own research institutions.
NATIONAL RESEARCH FACILITIES	To incentivise quality research outputs from researchers at the National Research Facilities. To provide funding to researchers at South African universities to conduct research at National Research Facilities.
BRIDGING FINANCE	To make non-interesting bearing finance available to research institutions to cover the costs associated with refurbishments. This finance is repayable to the NRF after 12 months.
STRATEGIC RESEARCH INFRASTRUCTURE GRANTS	To support the acquisition, upgrade and development of state-of-the-art research equipment in support of the grand challenges, science and technology missions and other strategic research areas.

Investment in facilities represents for South Africa a way to attract international high skilled researchers and to ensure more balanced partnerships with international researchers and institutions.

The three above mentioned programmes are part of a dynamic that will enhance the critical mass of South Africa and enable the country to improve the internationalization of its National Innovation System.

For SAccess, the group of rated researchers under the first 2 categories (A-Leading international researcher and B-internationally acclaimed researcher) should be targeted by the dissemination activities since these researchers are involved in –and frequently leading- flagship projects and programmes which can allow international participation (List of rated researchers:

[36] NRR Website, URL: http://hicd.nrf.ac.za/spp/spp_overview.htm

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http://www.nrf.ac.za/files/file/Rated%20researchers%20as%20at%2016%20Aug%202010(1).xls).

Finally, SAccess should ensure the follow-up of investments within the Strategic Platforms Programmes which are likely to generate opportunities for European researchers.

INTERNATIONAL COOPERATION POLICY AND OPENNESS TOWARDS EU RESEARCHERS

International Cooperation and Relations (ICR) Directorate is in charge of implementation of international joint projects and acts as liaison between South Africa and the international research community.

The IRC is particularly in charge of bilateral agreements in Science and Technology, and the DST has mandated the NRF as the implementing agency for these agreements in order to:

- Develop the Science and Technology Cooperation Agreements;
- Draft the programme of cooperation, which generally details modalities, criteria, priorities and conditions;
- and Negotiate funding levels.

It was mentioned during the interviews that a first evaluation of the bilateral cooperation is in progress and should be made public during 2011. The Key Performance Indicators Report 2009 present some statistics on international cooperation performance (See table below) but no further information on this activity could be obtained since these indicators are built on the basis of very diverse data sent by the National Research Facilities.

Performance indicators of agency-to-agency and country-to-country agreements
Performance indicators 2008/09

No. of projects funded	**254**
No. of SA research institutions involved	**37**
No. of joint workshops funded	**282**
No. of SA researchers involved	**988**
No. scientists (SA and foreign) exchanged	**482**
No. students (SA and foreign) exchanged	**343**

However, it was pointed out that in terms of funding the bilateral cooperation with Norway is the most important while the cooperation with Germany presents a high diversity of instruments.

The D2.2 develops a chapter with information on the extent and modalities of the bilateral cooperation with European Union Members States.

OPPORTUNITIES, CALLS AND GUIDELINES

Technology and Human Resources for Industry Programme (THRIP)

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According to the "THRIP Guide to Research Support", this programme is aimed at producing "*a flow of highly skilled researchers and technology managers who understand research, technology development and the diffusion of technology from the viewpoints of both industry and academia*; and to "*foster collaboration among industry, Higher Education Institutions (HEIs), Science, Engineering and Technology Institutions (SETIs)*".

The programme has also defined a set of priorities that reflects important concerns of the National Innovation System: increase the number of black and female students in technological and engineering careers, support the Small, Medium and Micro Enterprise (SMME) sector as well as the competitiveness of Black Economic Empowerment and Black owned enterprises (BEEs) and support multi-firm projects.

The programme, funded mainly by the Department of Trade and Industry (DTI), is managed by the NRF.

In 2008-2009 the programme funded 240 of a total of 291 project applications. For the same period 942 researchers participated in THRIP projects.

a) International participation

THRIP Projects Leaders are academic staff of South African Higher Education Institutions (HEIs) or Science Engineering and Technology Institutions (SETIs), including foreign researchers working in South African universities. In facts, payment of grant is made by NRF to the HEI/SETI at which the project leader is based.

But foreign participants not employed by South African universities or research institutions can be involved under different modalities.

First, European researchers can be involved as contracting personnel, scientific consultants or technical specialist. These modalities allow the participation of European partners also after approval of the project.

Second, *"any qualifying industrial partner* -including foreign owned firms with or without legal presence in South Africa- *can leverage THRIP funding for projects that they conduct jointly with a South African HEI/SETI*"[37]. In case of firms without a legal presence in South Africa, leverage of funding is limited to 15% of the total annual THRIP contribution to the project.

It should be noted that the Strategic Plan 2009-2013 of the programme mentions among its key challenges: "*to leverage, enable and extend international participation in projects… THRIP will need to look beyond the borders of South Africa to increase applied research capacity at all levels (early- mid- and senior-career) researchers, practitioners and research managers*[38]".

b) Budget and duration

The maximum contribution per project is about 8 million Rands and can be approved for the duration of the project to a maximum of three years.

Calls are launched once a year between Mai and July.

[37] NRF, *Guide to THRIP Support*.
[38] THRIP Strategic Plan http://thrip.nrf.ac.za/documents/Strategic%20plan/THRIP%20Stratplan_15%20April%2009.pdf

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c) Criteria for support

- Projects should make a contribution towards improving the industry partner's competitiveness;
- The project intention should be an innovation;
- At least a South African student should be involved and trained;
- Non South Africans students can be involved for every 50 000 Rands of THIRP investment.
- As mentioned by the programme administrator, a THRIP project should have at least a student at postgraduate level (i.e- 4th year or honours, MSc, and PhD). The amount indicated is paid towards the running cost of the project, and it is the discretion of the project leader to pay the student in the form of a bursary from this budget;
- The project must have defined scientific, technology and human resources outputs;

d) Participants

- The project leader must have a contract with a Higher Education Institution (HEI) or with a Science Engineering and Technology Institution (SETI) in South Africa.
- At least one HEI and one Industrial partners contributing financially must be involved;
- Foreign industrial partners can participate if the benefit for South Africa from the technology outputs is clear.

Enquiries
THRIP Management: NRF
PO Box 2600, Pretoria 0001
Tel: +27 (0)12 481 4043
Fax: +27 (0)12 481 4197
thrip@nrf.ac.za

South African Research Chairs Initiative (SARChis)

The South African Research Chairs Initiative (SARChis) is aimed at developing "high-level research and innovation that will make South Africa internationally competitive[39]" by improving research and academic leadership in South African universities.

Among other objectives, this initiative looks to retain or bring back qualified researchers to the higher education sector.

This programme is open to participation of international researchers as it seeks to attract the best skills to South Africa to contribute to the development of research capacities and reinforce the national critical mass.

About 200 Chairs should be funded. So far, 82 have been awarded to 16 public universities. Among them, 6 SARChis are held by European researchers: 2 from Germany, 2 from Netherlands,1 from Sweden and 1 from UK.

a) Institution

[39] NRF, *South African Research Chairs and Research and Development Chairs, Chair holder profile 2010*

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The Research Chairs award is an extremely competitive process that seeks the best proposals from public universities in South Africa in any field of science research. Research Chairs are awarded to publicly funded Higher Education Institutions (HEIs) which can hold such Research Chairs in their own right or jointly with Research Councils, museums or other institutions that conduct research and develop research capacity as part of their strategic functioning. The practice has been that Research Chairs are only awarded to HEIs but where they 'sit' is immaterial as long as they are in an environment where they conduct research and mentor post-graduate students. Such an environment could be an academic hospital, a national research facility, government laboratory, or a science council. These institutions then become co-hosts with HEIs.

b) Candidate

Candidates are internationally acclaimed researchers and scientists who have a track record four years or more in research and student supervision that is excellent and sustained and/or clearly on an upward trajectory. Candidates in their present positions must be at an Associate Professor or Professor Level – benchmarked nationally. Candidates should reside full time in South Africa for the duration of the Research Chair award. As this is a brain gain initiative, the programme aims at attracting South African expatriates, established researchers and scientists from abroad. The initiative also targets the attraction of candidates from the private sector so as to increase capacity in the Higher Education sector. This called the 'additionally principle'.

d) Budget and duration

A Research Chair is funded at Two Million and Five Hundred Thousand Rands (R2 500 000) per annum. This amount covers the Research Chair's salary, postdoctoral and post-graduate student awards, research operating and small equipment costs. The provision for large equipment is made under the National Equipment Programme. The funding amount is annually revised by an inflation-related adjustment. Research Chairs could also leverage their funding from other sources such as industry, business, donors, and philanthropic organizations.

Research Chairs are tenable for fifteen years, with renewals after every five year cycle, based on satisfactory performance.

Contextual factors and difficulties to EU participation

a) THRIP

Mechanisms to access to THRIP funding are complex so guidelines should be read with attention.

All THRIP projects must involve private and academia partners with clear research, technology and human resources outputs. In addition, questions related to Intellectual Property need to be noticeably defined in the proposal. For this reason, partnerships need to be built with enough time to negotiate the conditions of participation.

b) SARChi

European researchers interested to apply for a Chair should wait until the end of the first phase of the process during which a South African university is selected by the NRF to host

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the Chair. After this phase, European researchers have to wait for call proposals launched by Universities to nominate the staff of the Chair, especially, the Chair holder. In this process, Europeans who have previous contacts with the concerned Department or structure will be more likely to succeed in the process.

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University of Cape Town (UCT)

http://www.uct.ac.za/

Date visit: 18 November 2010

Contact details

- Wilna Venter
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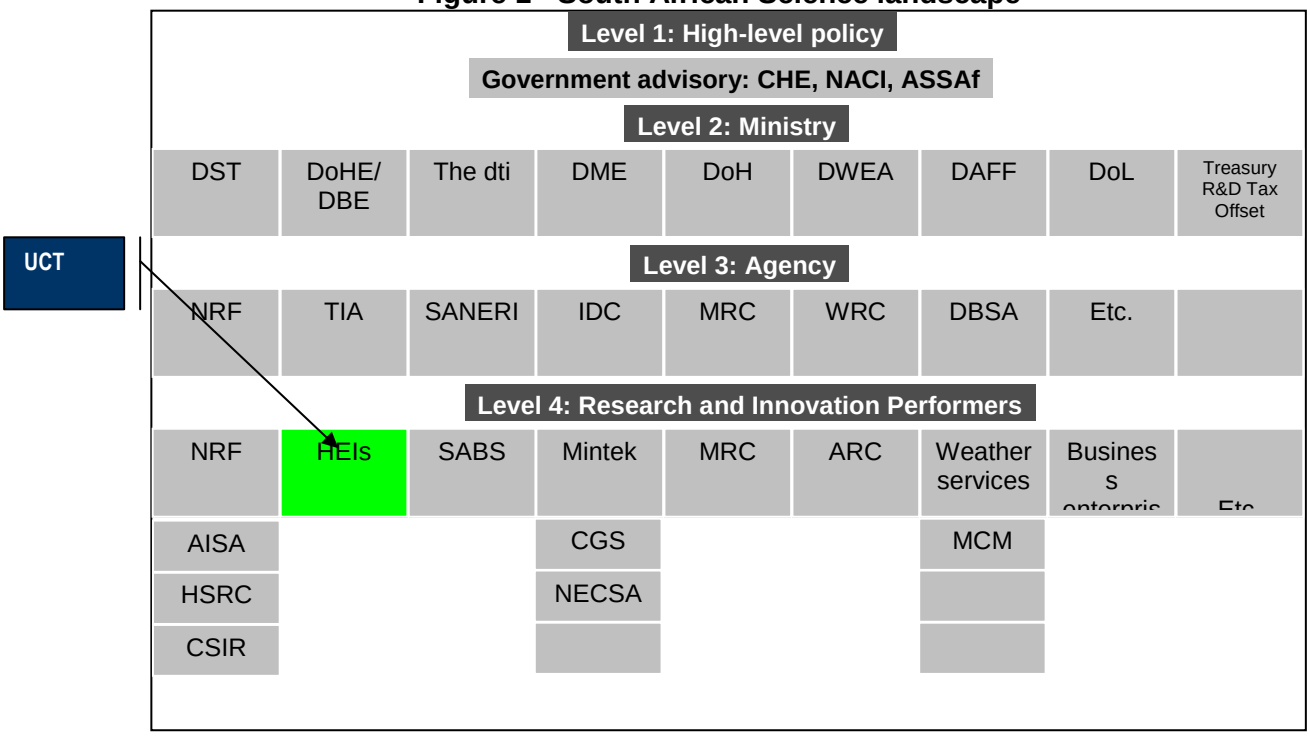
  wilna.venter@uct.ac.za

- Mr. Emlyn Balarin
  Manager Marine Research (MA-RE) Institute
  Emlyn.Balarin@uct.ac.za

THE UNIVERSITY OF CAPE TOWN WITHIN THE SOUTH AFRICAN S&T SYSTEM

According to the latest Times Higher Education World University Rankings, UCT is listed as 107 globally and as the number one university in Africa. Oldest university in South Africa, the UCT accounts for 15.79% of total universities R&D expenditure and has the most important number of researchers among South African Universities (2 321 researchers headcount of total 4 500 staff members). Within the South African Innovation system, the UCT is among the Higher Education Institutions (HEIs) under the umbrella of the Department of Higher Education and Training (DoHET).

Figure 1 - South African Science landscape[40]



[40] Key Performance Indicators Report 2008/2009, National Research Foundation.

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THEMES OF RESEARCH

The University of Cape Town has an extensive research activity organised through six faculties:

- Faculty of Commerce: http://www.commerce.uct.ac.za/
- Faculty of Engineering and the Built Environment: http://www.ebe.uct.ac.za/
- Faculty of Health Sciences: http://www.health.uct.ac.za/
- Faculty of Humanities: http://www.humanities.uct.ac.za/
- Faculty of Law: http://www.law.uct.ac.za/
- Faculty of Science: http://www.science.uct.ac.za/

MODALITIES OF WORK

Given the variety of research activity within the UCT, this section is aimed to present its Focus Research Areas.

Four main instruments have been implemented to promote collaborative and interdisciplinary research in order to enhance the international competitiveness of the university, namely: Institutional "Signature Themes", Centres of Excellence, National South African Research Chairs and the Accredited Research Groupings.

e) Signature themes

The Signature Themes are the main Research Focus Areas. They should give access to "large external grants and help attract postgraduate students and postdoctoral fellows to areas of novel interdisciplinary"[41].

Five Signature Themes have been selected at the UCT. They are expected to work on "existing research strengths while developing standards and capacity in prioritised areas" and become "mechanisms to build critical mass" in strategic areas:

- *Brain and Behaviour Initiative*: cross-faculty, multidisciplinary, collaborative framework to promote research in the cognitive and affective neurosciences.
- *African Centre for Cities (ACC)*: aimed at partnering closely with policy-making centres and provide an intellectual base and home for interdisciplinary, urban-related research at UCT.
- *Drug Discovery*: aims to foster new collaborations and strengthen existing ones between UCT researchers; build enabling technological platforms to increase research capacity; provide inter-disciplinary undergraduate and postgraduate training in drug-discovery to drive research and build a critical mass of future scientists; create mechanisms for securing interdisciplinary and overarching funding.
- *Marine Research (MA-RE) Institute*: open to all marine-related research groups and individuals at UCT, studying the ocean and "salty waters of the coastal zone", as well as

[41] http://www.researchoffice.uct.ac.za/strategic_initiatives/themes/overview/

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all issues influencing these areas (e.g. socio-economic, legal, historical, etc.), with a particular focus on implementing a coordinated multidisciplinary research approach.
- *Minerals to Metals*: aims to integrate and enhance the activities of four major research units all of which presently enjoy international reputations for their research in the general area of the beneficiation of minerals i.e. the complete extraction of metals, from ore to final saleable metal, in a clean and sustainable manner.

More information about Signature Themes:
http://www.researchoffice.uct.ac.za/strategic_initiatives/themes/overview/

f) National Centres of Excellence

The UCT host two of six National Centres of Excellence (CoE) granted by the National Research Foundation. These CoE are expected to become nodes of research and excellence in key areas for the South African research and development. The CoE mobilise other HEIs and are expected to produce new PhD graduates, as well as engineers and technicians and develop international partnerships. The following two CoE are hosted by UCT:

- *c*change*: focuses the conversion of gas to fuels -comprising research programmes for the Fischer-Tropsch, methanol-to-chemical fuels and "direct" syngas to chemicals routes- and downstream chemicals -to support the growth of the underdeveloped, small-volume fine and specialty-chemicals sector.
- *Birds as Key to Biodiversity Conservation:* hosted at the Percy FitzPatrick Institute, this CoE aims to understand and conserve the biodiversity. http://www.fitzpatrick.uct.ac.za/docs/intro.html

More information about CoE:
http://www.researchoffice.uct.ac.za/strategic_initiatives/excellence/overview/

g) South African Research Chairs (SARChIs)

The SARChIs are expected to contribute significantly towards helping universities realise their strategic research plans and to provide a base on which to consolidate and extend excellence in research in South Africa. Although the programme aims to attract South African and other international research expertise from abroad, universities may nominate current staff members for Research Chairs.

27 of 82 Chair awarded to date hosted by UCT (3 Chairs holders are European).

1. Prof Jonathan Blackburn - Applied Proteomics and Chemical Biology
2. Prof Haroon Bhorat -Economic Growth, Poverty and Inequality
3. Prof Frank Brombacher - Immunology of Infectious Diseases in Africa
4. Prof Kelly Chibale - Drug Discovery
5. Dr Marc Combrinck - Clinical Neurosciences Research
6. Prof Erwin de Blok - Astrophysics and Space Science
7. A/Prof Keertan Dheda - Lung Infection & Immunity in Poverty Related Diseases
8. Prof Jean-Paul Franzidis - Minerals Beneficiation
9. Prof Carolyn Hamilton - Archive and Public Culture
10. Prof Susan Harrison - Bioprocess Engineering
11. Prof Bruce Hewitson - Climate Change
12. Prof Chuma Himonga - Customary Law, Dignity, and Human Rights

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13. Prof David Jacobs - Animal Evolution and Systematics
14. Prof Murray Leibbrandt - Poverty and Inequality Research
15. Prof Di McIntyre - Health and Wealth in South Africa
16. A/Prof Ernesta Meintjes - Brain Imaging
17. Prof Rajend Mesthrie - Migration, Language and Social Change
18. A/Prof Kevin Naidoo - Scientific Computing
19. Prof Lungisile Ntsebeza - Land Reform and Democracy in South Africa: State and Civil Society Dynamics
20. Prof Iqbal Parker - Cancer Biology
21. Prof George Philander - Modelling of the coupled ocean-land-atmosphere phenomena related to climate
22. Prof Edgar Pieterse - Urban Policy
23. Prof Daya Reddy - Computational Mechanics
24. Prof Clifford Shearing - Security and Justice
25. Prof Abdulkader Tayob - Islam, African Publics and Religious Values
26. Prof Anna-Lise Williamson – Vaccinology
27. Prof AC Jarre – Earth and Marine Sciences

See description of SARChIs at:
http://www.researchoffice.uct.ac.za/strategic_initiatives/research/

h) Accredited Research Groupings

There are currently in total 62 accredited Research Groupings at the UCT (See list: http://www.research2009.uct.ac.za/nodepage.php?nid=874&pid=2444).

INTERNATIONAL COOPERATION POLICY AND OPENNESS TOWARDS EU RESEARCHERS

The UCT is a very open institution with more than 4 300 international students from more than 100 countries.

Cooperation with international researchers, developed through all Faculties and Departments, is facilitated by the **UCT Policy on Internationalisation** which emphasized the principle of "Research and Academic Autonomy" and defines that the "*UCT strongly supports the rights of academics to develop their own individual academic links and collaborations, both formal and informal*".

The UCT has also established institutional offices that support and structure its internationalisation.

Thus, the **International Academic Programmes Office – IAPO** (http://www.uct.ac.za/about/iapo/overview/welcome/) is aimed to promote and facilitate UCT's internationalisation as well as the integration of diverse communities across the university. This office represents an important reference for international student desiring to be enrolled at the UCT.

The **Research Office** (http://www.researchoffice.uct.ac.za/) is in charge of providing "expert support to research as core activity at UCT". Among other missions, this office manages a grant funding system and develops targeted interventions to enhance research capacity *i.e* the Research Focus Areas (See below). These are key programmes for UCT competitiveness in most of which international participation is perceived as an asset.

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CALLS, OPPORTUNITIES AND GUIDELINES

Overview

As in the case of other South African research institutions, opportunities at the UCT target mostly South African citizens or permanent residents as well as students from the Southern African Development Community (SADC). In addition, previously disadvantaged groups[42] are specially prioritized by funding programmes.

Nonetheless, openness of the UCT is facilitated by the autonomy given to Universities within the National Innovation System as wells as by the independence agreed to Faculties, Departments and researchers as a guarantee to develop outstanding research.

Therefore, the Research Office represents a key point of information as this office coordinates research strategies at UCT and manages grant funding opportunities. In addition, opportunities for EU researchers at UCT can be identified through specific Faculties and their Departments and their independent websites. A detailed list of departments and links to their websites is available at: http://www.uct.ac.za/faculties/list/.

Frequently, opportunities for European researchers are linked to specific needs of research projects and less often to programmes that have a long term funding. Therefore establish direct contact with Professors and keep track of vacancies (see links below) represent key ways to access to UCT opportunities for European researchers.

Three examples at the UCT in which autonomy of researchers and theirs structures can assist in creating opportunities for EU researchers:

- Funding opportunities from the University Research Committee (URC). Each Faculty receives an annual block grant calculated in direct relation to the research outputs produced in the previous year. Funding is purpose-driven to stimulate and support research endeavour and eligibility is based on the university's need for a return on investment. International scholars' visits (see below) are among the eligible activities that can be funded by Departments through URC funding.
- NRF funding that is not directly accessible by European researchers. This is the case of the THRIP Programme and the South African Research Chairs (SARChIs)[43] in which the designed research coordinator –a South African citizen or permanent resident- has a large autonomy to manage funding and can involve European researchers.
- UCT Research Focus Areas: as modalities to enhance the international competitiveness, these initiatives can involve opportunities for European researchers, some times with funding. This is the case of the Marine Research Institute, a research grouping of the UCT, which funds currently nine (9) European students and Post Docs are currently funded by this structure: 5 Post Doctoral Fellows, 3 PHD students and 1 Msc. Students (See success story presented in the D4.1).

Post-doctoral opportunities and fellowships

[42] Using the racial categories employed by apartheid South Africa, previously disadvantaged groups comprise black Africans, descendants of Indian and Chinese indentured labourers, and "coloureds", i.e. those from mixed descent.
[43] C.f. NRF info-sheet

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A wide range of calls are published regularly on the UCT website. They concern UCT funded opportunities or opportunities funded by other institutions that can be accessed through the UCT.

Some opportunities for European researchers have been identified:

- *Scholarships for International Graduates Applying From Abroad:* A limited number of scholarships are available to non-South African graduates who are residents of countries other than South Africa. These are awarded on a competitive basis with emphasis given to the seniority of candidates.

  - Eric Abrahams Scholarships for Refugee Students:
  - International Students' Scholarship (UCT Council & URS)
  - Jagger, J W, Trust and Centenary Scholarships

  Interested should be attentive to calls published at the UCT vacancies website (http://www.uct.ac.za/about/intro/vacancies/external/) as well as Postdoctoral fellowships board (http://www.uct.ac.za/research/pgfo/noticeboard/).
  Closing Date: 31 July preceding year of study.
  Application for this can be downloaded from:
  http://www.uct.ac.za/apply/funding/postgraduate/awards/international/

- *Sydney Brenner Fellowships on Molecular and Cellular Biosciences***:** The Fellowships are awarded to post-doctoral students for two-year periods, as personal support for high-level research work. Applications may be submitted as nominations by institutions or directly by individuals. Full CV, plus details of preceding doctoral work and publications, a description of the rationale and methodology of proposed project, evidence of operational funding, facilities and equipment that does not depend on the fellowship. The call will be normally published on Mars.

  Contact person: EM. Prof. Wieland Gevers.
  wieland@telkomsa.net

  Philistas Masinga
  Liaison Officer
  Academy of Science of South Africa (ASSAf)
  philistas@assaf.org.za

- *Leon, Claude Foundation Postdoctoral Fellowship*: awarded on a competitive basis, taking the applicants' academic achievements and potential as researchers into account. Value: R175,000 per annum for two years. The application form is available for download from the Claude Leon Foundation (www.leonfoundation.co.za) and must be returned to the UCT Postgraduate Centre & Funding Office.
  Guidelines: http://www.leonfoundation.co.za/?page_id=15

  Contact person: Gale Minnaar
  postdocadmin@leonfoundation.co.za

- *Smuts Memorial Botanical Fellowship*: For Post-Doctoral applicants who have exhibited proficiency in independent research to undertake study in systematic botany & geographical distribution of SA flora. Open to all nationalities. R150,000 One year, renewable for one year on satisfactory progress.

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Contact person: Sandy Smuts
Botany Department, UCT.
Closing Date: 31 July

Other programmes Programmes that can involve opportunities for European researchers

Visiting Scholars fund (VSF)

The VSF is one of the activities funded through the URC. Grant is allocated to Faculties that decide how employ these funds. The VSF is specifically used to bring to the University eminent academics from outside South Africa.

As European researchers can not apply directly to URC funding, they can however establish direct contact with UCT Departments in order to know if their proposal can be considered when UCT Departments present a URC funding grant.

The Centre for Higher Education Development (C.H.E.D.) Research Committee Chair will consider in their next committee a request from SAccess in order to make clear how European researchers can have access to this programme.

Usually deadlines for VSF are as follows: 19 February, 17 May and 13 September.

More information on URC funding:
http://www.researchoffice.uct.ac.za/usr/researchoffice/funding/URC2010.doc

UCT Research Associateships

Awarded on academic excellence and seniority of candidate, this programme gives preference to PhD candidates although Masters & Masters students. Open to all nationalities, only registered postgraduate students at UCT can be nominated for this award via their Supervisor and Head of Department. Values: Doctoral - R45 000, Masters - R30 000.
Contact: Chantel.Reed@uct.ac.za or Erica.VanWyk@uct.ac.za

National Astrophysics and Space Science Programme (NASSP)

The NASSP is a national initiative hosted by the UCT given that this university has a critical mass on Astronomical sciences including researches coming from other regions of South Africa and other countries.

The NASSP is a multidisciplinary programme which targets students who do not have an astronomical background but who want to pursue a carrier on this area and who have a background on other studies as physics.

This programme has strategic partnerships with the Astronomical National Research Facilities thus NASSP's students can have access to this platform.

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EU students can apply and are welcome to this academic programme. However, they will not receive financial aid from the South African government. Some European researchers have participated in this programme and applied for funding from the Marie Curie programme.

Useful links and contacts

Vacancies boards

Almost all opportunities at UCT are covered by the following vacancies boards:

- Research Office announcements page: http://www.researchoffice.uct.ac.za/announcements/
- General Vacancies http://www.uct.ac.za/about/intro/vacancies/external/
- Postgraduate opportunity funding: http://www.uct.ac.za/students/postgraduates/funding/degrees/notice/
- Postdoctoral Research Fellowships http://www.uct.ac.za/research/pgfo/noticeboard/

Other

- Engineering and Built Environment opportunities: http://www.ebe.uct.ac.za/research/funding/
- Marine Research Institut (MA-RE) calls and news: http://ma-re.uct.ac.za/news/
- General information on Postgraduate Funding is available at: http://www.uct.ac.za/apply/funding/postgraduate/applications
- The document on Financial Assistance for Postgraduate Study and Postdoctoral Research 2012 is available at: http://www.uct.ac.za/downloads/uct.ac.za/apply/handbooks/postgradfunding_2012.pdf
- A flow Chart related to International Postdoctoral Research Fellow Process: http://www.uct.ac.za/usr/pgfo/postdocs/international_flowchart.pdf
- Postgraduate Centre and Funding Office Email: pgfunding@uct.ac.za

Contextual factors and difficulties to the EU participation

As explained above, the UCT is a very open institution committed to outstanding research focus programme and willing to host international researchers able to reinforce the competitiveness of the university. However, the university is expected to play a key role in the research capacity building which is a national priority targeting previous disadvantaged populations (Black, Coloured and Indian).

In this context, opportunities for European researchers will be frequently related to specific areas in which national skills should be enhanced or developed.

Nonetheless, most of Postdoctoral fellowships are open to European researchers, in these cases the problem being that calls do not always mention explicitly the openness to all nationalities. Thus, European researchers shouldn't hesitate to contact the appropriate

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liaison officer to verify this aspect, especially as at the UCT persons in charge of calls respond very quickly to requests.

Finally, if the vacancies board of the UCT presents very complete information on opportunities for the whole university, some opportunities can be only accessed through the Faculties or Departments websites. This is why is highly recommended to follow-up funding opportunities thought their specific websites.

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Water Research Commission - WRC

http://www.wrc.org.za/

Date visit: 13 December 2010

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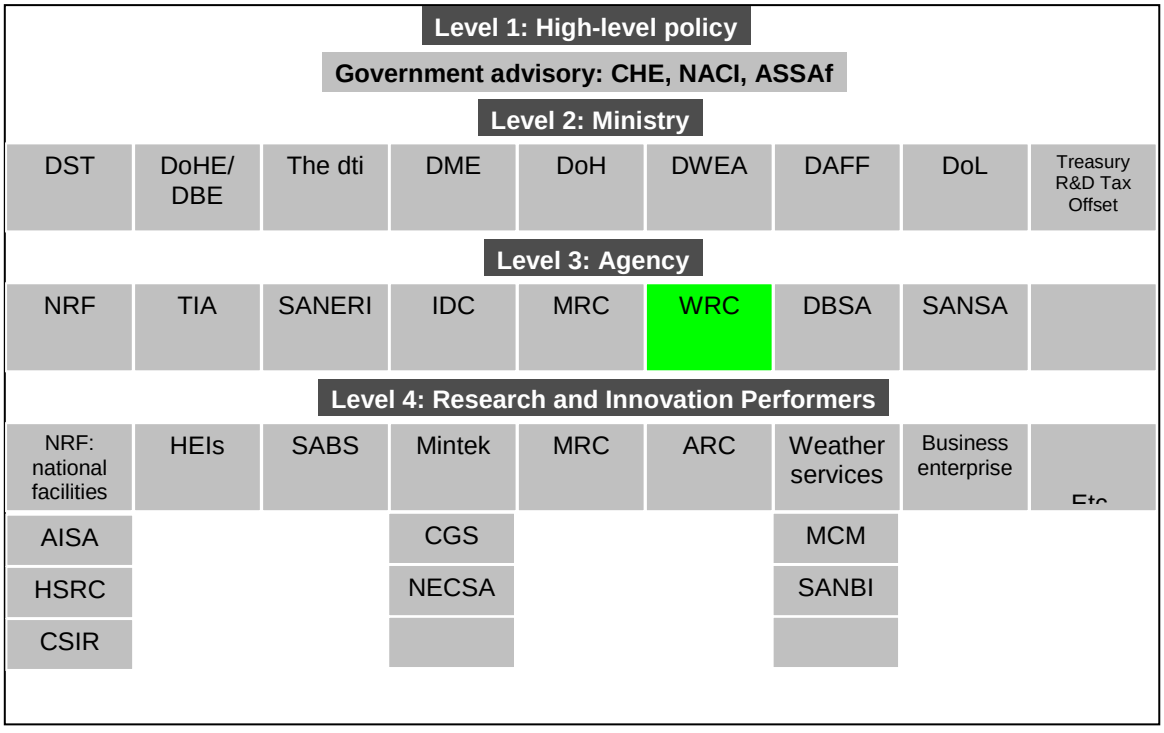
THE WRC WITHIN THE SOUTH AFRICAN S&T SYSTEM

The WRC is a funding agency (Figure 1) which has been established in 1971 with the aim to "*generate new knowledge and to promote the country's water research purposefully, owing to the view held that water would be one of South Africa's most limiting factors in the 21st century".* Thus, the WRC has been tasked to provide research coordination, identification of priority areas and technology transfer. In addition, the WRC promotes water-related innovation and its commercialization as well as capacity bulging.

Figure 1 - South African Science landscape



The SAccess project has received funding from the European Community's Seventh Framework Programme FP7 (2007-2013), Theme: INCO-2009-5, under Grant Agreement no 243851

THEMES OF RESEARCH

Research activity at the WRC is organized through five key strategic areas (KSAs) each with its own research portfolio. Four of KSA are aimed at the knowledge creation while the last one targets knowledge dissemination and information management.

As presented by the WRC, the Key Strategic Areas (SKAs) are as follows[44]:

- **KSA 1 - Water Resource Management:** generating the knowledge, tools and skills to ensure that water resources of South Africa are protected, utilised, developed, conserved and managed to achieve environmental, social and economic sustainability.
- **KSA 2 - Water-Linked Ecosystems**: Providing knowledge to ensure sustained functioning of aquatic ecosystems and ongoing provision of ecosystem goods and services.
- **KSA 3 - Water Use and Waste Management:** Researching effective and efficient water service provision to, and use of water in, the domestic, industrial and mining sectors. This includes the prevention of pollution and the development of technologies for treatment of water and wastewater.
- **KSA 4 - Water Utilisation in Agriculture:** Meeting needs of present and future generations of subsistence and commercial farmers through researching the role water (quantity and quality) plays in agriculture and forestry and supporting the development of water-efficient production technologies, decision-support models and information systems.
- **KSA 5 - Water-Centred Knowledge:** support for the WRC and service to the water sector and society through IT services, knowledge sharing, scientific communication and the furthering of public understanding of science.

Each KSA is provided with its own budget.

MODALITIES OF WORK

Funding

WRC is a funding agency and its core activity is implemented through three modalities of funding:

- Solicited projects: calls for proposals are announced normally once a year related to priorities identified by the WRC through the SKAs. Proposals should response to the Terms of References published with the call. Characteristics of these projects are as follows:
    - Large projects or programmes
    - Addressing mid to long term issues
    - Normally implemented by Consortia
    - According to the last call (2010), budget per project was between 700 000 and 6 000 000 Rands.

[44] *http://www.wrc.org.za/Pages/Research_Overview.aspx*

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- Non-solicited research proposals: in this case no Terms of Reference are proposed but only "*a list of preferred thrusts and programmes (research areas) to be addressed together with an indication of funds available against each research area*". Non-solicited projects are normally smaller than Solicited projects and can be implemented by a single organisation in a period of up to three years. These projects are expected to:

    - Address a national priority and particularly, be in line with WRC's strategic research objectives and focus of the KSA,
    - Constitute an innovative proposal,
    - Have an added value, considering projects that have been already funded by the WRC.

- Consultancies: There is no formal call for proposals in this category. Consultancies are required in general for quick studies –i.e. scoping studies- with duration of 6 to 12 months. These projects should not exceed a total budget of 200 000 Rands. Proposals for consultancies can be submitted to the WRC staff at any time.

The first two modalities (Solicited and non-Solicited) represent the major investment of the WRC. Each SKA can have a budget for Solicited and non-Solicited projects and their ratio can differ annually, depending on the availability of funding.

In the year 2009/2010, the WRC supported a 284 research projects, including 105 solicited projects[45]. Over the last five years, non-solicited projects have represented the majority of projects supported but there is a clear trend to increase the number of Solicited projects, responding to specific priorities defined by the WRC.

IN 2009/2010, the total budget allowed to research project was about 86.7 millions Rands.

Capacity Building

The WRC contributes to train future researchers by integrating students in research projects. During the past five years, 3 500 students participated to WRC research projects. Among them, 2 200 were from historically disadvantaged groups.

The WRC is also involved in other capacity building initiatives such as the Technical Assistance Centre (TAC) to assist rural water service providers and the FETwater (Framework for Education and Training in Water). The latter is a joint UNESCO, Belgian and South African programme aimed at developing competencies for water management.

Knowledge Dissemination

Dissemination activities include the elaboration of Briefing notes from research results, the organisation of Knowledges Cafés –targeting students, NGOs, municipalities and water users- and conferences, exhibilitions, publications, among others.

The WRC is also developing through its website an Electronic Water Knowledge Hub (EWKH), giving access to 40 year of research.

Technology Transfer

[45] WRC, Annual Report 2009/2010

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The WRC supported the intellectual protection and transfer of technologies resulted from WRC funded projects. For example, in 2009 three patent applications were filed and a number of patented innovations were licensed out, some of then with large-scale commercialisation such as the Capillary Ultra Filtration (CUF), technology for the treatment of water without the use of chemicals and with membranes locally produced.

Finally, the WRC produce policy reviews and represents South Africa in international forums.

INTERNATIONAL COOPERATION POLICY AND OPENNESS TOWARDS EU RESEARCHERS

As a coordination agency, the WRC has developed competencies enabling its participation to numerous international initiatives.

The WRC is a member of the World Water Council (WWC) and member of the Global Water Research Coalition (GWRC). The latter is an international network that serves as collaborative mechanism for water research.

The WRC also continues to host Cap-Net, a global network addressing training for Integrated Water Resource Management (IWRM), under UNDP.

WRC participates in a study initiated by the Inter Academy Council (IAC). The IAC is an association of the world's academies of sciences, located in Amsterdam.

Within a bilateral frame, the WRC has developed collaborations with the Netherlands as well as with the Water Engineering and Development Centre (UK).

CALLS, OPPORTUNITIES AND GUIDELINES

Solicited and non-solicited projects

No restriction to European participation has been identified in calls for proposals or in guidelines for applications for solicited and non-solicited projects. In facts, European researchers are currently participating along with South African researchers in different projects funded by the WRC.

However, WRC representatives, as well as two European researchers, informed that only South Africans or residents employed by South African institutions can act as project leaders and human resources budget should be used only for South African researchers.

It has been also emphasized by WRC representatives and European researchers that funding allowed to projects is linked to specific deliverables. While Europeans could not receive funding for human resources, they can be allowed with funds related to the production of a specific deliverable.

Calls for proposals for solicited and non-solicited projects are launched once a year, normally in May, and closed by July. Projects start in March of the following year.

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Applications are prepared with the Project leader who is in charge of submitting the proposal on-line.

Consultancies and other opportunities

In addition to solicited and non-solicited annual calls, ad hoc calls for proposals for specific projects or consultancies are also published where necessary through a specific website section:
http://www.wrc.org.za/Pages/Research_Opportunities.aspx

CONTEXTUAL FACTORS AND DIFFICULTIES TO EU PARTICIPATION

Strategic objectives of the WRC are oriented to specific national priorities. European researchers could have difficulties to find potential South African project leaders with same scientific interest and with a profile enabling to respond to a WRC call.

The bulk of institutions working on water issues in South Africa have contracts with the WRC. Considering that finding the appropriate South African partner represent the major difficulty to respond to a WRC call, European researchers can have a look at the project register (http://www.wrc.org.za/Pages/Research_DocumentsAndGuidelinesResearchProjectRegisters.aspx?rdt=Research%20project%20registers)which includes a list of contractors (institutions) granted by the WRC.

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Council for Scientific and Industrial Research (CSIR)

http://www.csir.co.za/

Date visit: December 2, 2010

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CSIR within the South African S&T system

The CSIR is one of the 9 South African Research Councils which together represent 15.5 % of the R&D expenditure in South Africa (2007/08). On its own, the CSIR accounts for about 15% of total public expenditure in research and development and nearly 4% of the total South African expenditure.

The CSIR is a Research and Technology Performer (Figure 1) which conducts research across the Research and Development (R&D) value chain, from basic research but focusing mainly on directed research, development and technology or knowledge transfer for commercial or social benefit. These characteristics differentiate it from the High Education Institutions (HEIs) and from the public and private sector.

Funded through grants of the Department of Science and Technology (DST), the CSIR also derives its income from research and development contracts (private and public, local and international) and from intellectual property exploits or technology transfers.

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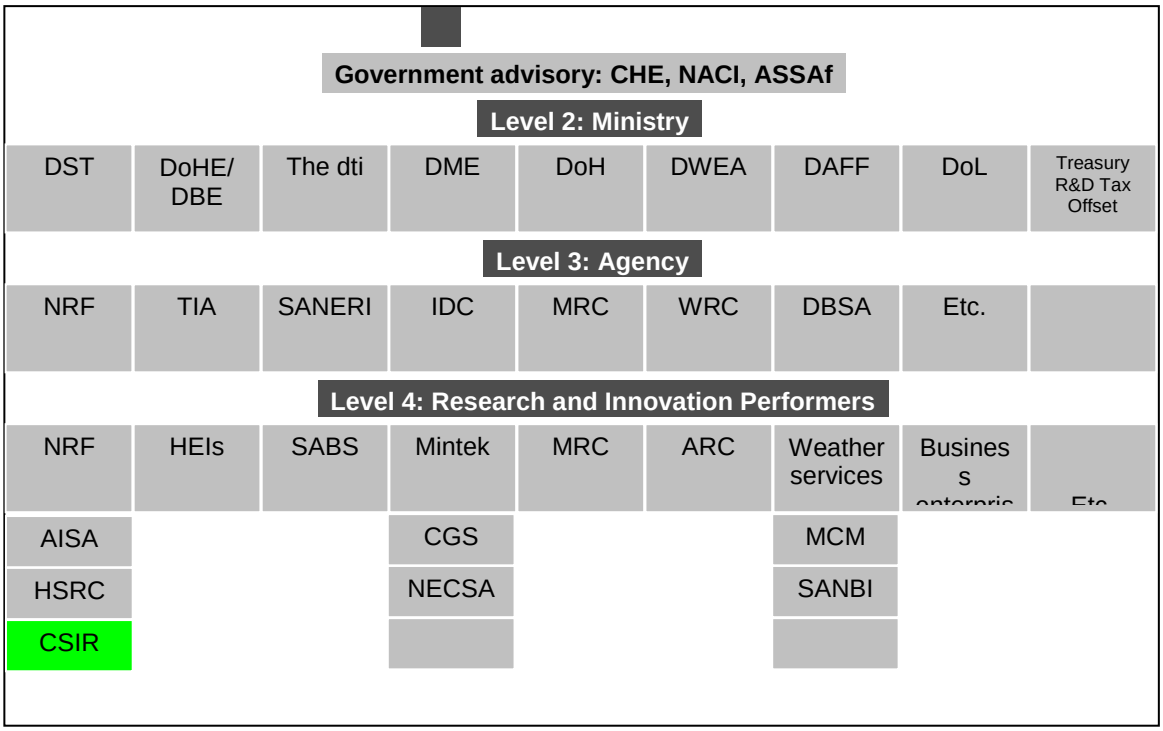
Figure 1 - South African Science landscape[46]



Themes of research

- *Biosciences:* biotechnology, chemistry, agro-processing, food science and engineering. This is translated into innovations and solutions towards the improvement of health, food security and energy provision.

- *Built environment:* solutions are developed through research with impact on different areas: provision of housing and improved human habitats, provision of infrastructure, such as roads and ports, increased access and mobility, rural development of infrastructure (with a specific focus on poverty reduction and job creation), human resource development of professionals in the built environment , safety and personal security, environmental sustainability, better public buildings (including health facilities and schools), improved service delivery in the public sector.

- *Defence, safety and security-related fields:* CSIR provides a national defence S&T capability by supplying knowledge, advice and solutions in defence and matters of national security.

- *Information and communication Technologies (ICT)*: Research on ICT is developed by the Meraka Institute, an operating unit of the CSIR focused on Information and communication technology (ICT) and the largest group in South Africa dedicated to ICT research. Main research activities are related to: earth observation science and information technology, human language technologies and knowledge technologies, networks and media, integrative systems, platforms and technologies, cyberinfrastructure.

[46] Key Performance Indicators Report 2008/2009, National Research Fondation.

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- *Laser:* Laser Research at the CSIR is applied to improve laser technology in manufacturing; to develop novel laser sources; to develop light activated bio-nanodevices and to improve various therapeutic and diagnostic medical applications of lasers.

- *Materials science and manufacturing:* Research and innovation in the field of materials science and manufacturing by the CSIR is related to aerospace, automotive, bio-based buildings, energy, health and micro-manufacturing.

- *Natural Resources and the Environment*: ecosystems, environmental decision-making, forestry, Global change, interface between people and the environment, Water resources

- *Mineral resources*: Lasers, environment, logistics and operations, advanced metals.

- *Space technolo*gy: earth observation, satellite applications

- *Modelling and Digital Science*: Advanced mathematical modelling and simulation, information security, mobile intelligent autonomous systems.

New research fields:

- Mobile intelligent autonomous systems (MIAS)
- Nanotechnology
- Synthetic biology

Others and Modalities of work

i) Research activity across the R&D value chain

The CSIR develop activities in different phases of the development and innovation chain:

- Directed basic or applied research;
- Experimental development that typically results in a new prototype, which captures new knowledge into a product, service or policy;
- Technology transfer, first step of knowledge application[47].

The CSIR has strong links with private sector stakeholders. Given the tax incentives and the fact that more than 45% of the South African GERD is funded by the private sector, contract with companies represent an attractive activity for the CSIR. According to the CISR institutional presentation[48] "*The aim of the contract R&D partnerships is to move towards more strategic multi-year collaborative R&D across basic and experimental research and experimental research programmes. These include Sasol, Boeing and Syngent*".

j) Technology transfer

The CSIR ensure the effective protection of intellectual property (IP), technology transfer, knowledge dissemination and the assessment of the impact of the results of scientific research for the benefit of society and the economy[49].

[47] http://www.csir.co.za/research_and_development/research_development.html
[48] http://www.csir.co.za/research_and_development/International_RD_collaboration.html
[49] http://www.csir.co.za/technology_transfer/technology_transfer.html

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International cooperation policy and openness towards EU researchers

As mentioned before, the CSIR is a Research Council working across the research and innovation value chain. For this characteristic, the CSIR has built a diversity of international partnerships including European institutions.

Among the international initiatives in which CSIR has been involved:

- New Programme for Africa's Development (NEPAD).
- World Association of Industrial and Technological Research Organizations (WAITRO). The CSIR is the focal point for WAITRO in the African region.
- Science and Technology-Europe Africa Project (ST-EAP) aimed at improving cooperation between African scientists but also between European and African researchers.
- The Global Research Alliance (GRA), international network bringing together about 50 000 researchers through a global partnership for development. This alliance is particularly committed to supporting the Millennium Development Goals.
- The Regional Research Alliance (RRA) whose membership comprises three major knowledge intensive organizations from the southern African region: Botswana Technology Centre (BOTEC), CSIR South Africa and Scientific and Industrial Research and Development Center (SIRDC) in Zimbabwe.

In addition, the CSIR participates in European Union Framework Programmes and have signed several Memoranda of Understanding with foreign Universities (University of Regina, the Stockholm Water Institute and the LCVU Amsterdam). The latter is part of the institutional policy for developing strategic partnership in specific areas of mutual interest.

In this context, like most of universities, the CSIR is open to support European Post-doctorates interested in doing research in South Africa. CSIR Units and Centres have budget that can be used to attract international researchers. However, most opportunities will be related to scarce skills for which foreign competency is required.

The accommodation of international researcher is easier in cases where their organization is willing to cover financial cost.

Opportunities, calls and guidelines

A wide range of opportunities, mostly for Post-doctorates, are open by the CSIR through the vacancies website. Most of these opportunities are aimed to develop capacities in South Africa but international researchers are also encouraged to apply.

Besides programmes described below which the greater part is aimed at the mobility -from the point of view of European researchers- Units and laboratories also published calls independently through the vacancies website:
http://www.csir.co.za/recruitment/vacancy.php

Researchers can access the generic application form (and attaches CV) at: *http://www.csir.co.za/recruitment/recruitment_application_form.php*

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Programmes

a) Post-doctorate programme

This programme offers to researchers the opportunity of work with recognized researchers and platforms during a 12-month cycle, subject to annual renewal depending on the availability of funding.

Post-doctorate's opportunities are open to international researchers and advertised throughout the year. See vacancies: *http://www.csir.co.za/recruitment/vacancy.php*

b) CSIR Internships

Through this programme new graduates are allowed to work 12 months in a research environment at the CSIR. New graduates in science, engineering and technology fields interested in acquirement of work experience are invited to apply.
Internship opportunities are advertised throughout the year through the vacancies site of CSIR

Studentship
This programme targets graduates studying full-time at a tertiary education institution at Masters or PhD level. Candidate's qualification must be in line with scarce skills: science, engineering and technology.

As the bursary programme, studentship calls are launched depending on the CSIR Unit's needs and funding and. See: *http://www.csir.co.za/recruitment/csirstu.php*

c) Scholarship

Postgraduate students, including post-doctorates enrolled full-time at the University of Cape Town, at the Witwatersrand University or at the University of Johannesburg can apply to the CSIR scholarship programmes.

Applications must be done through the universities as the CSIR does not facilitate the scholarship application process:

University of Cape Town
Postgraduate Funding Office
Tel: (021) 650 5065

University of Witwatersrand
The CUPS Office
Tel: (011) 717 9735

University of Johannesburg (UJ)
The Research Office
Tel: (011) 559 3780
For information related to all CSIR vacancies, the CSIR Recruitment Centre can be contacted: recruitmentqueries@csir.co.za
Tel: +27 12 841-4774 ● Fax: +27 12 841-3951

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The Hermanus Magnetic Observatory (HMO)

www.hmo.ac.za

Date visit: 22 November 2010, 14h
City: Hermanus

Contact details representatives interviewed

- Dr. Lee-Anne McKinnell, **Acting Managing Director**
  lmckinnell@hmo.ac.za
  +27 28 312 1196
  +27 83 328 3048
- Dr. Petrus Benjamin Kotzé, Researcher
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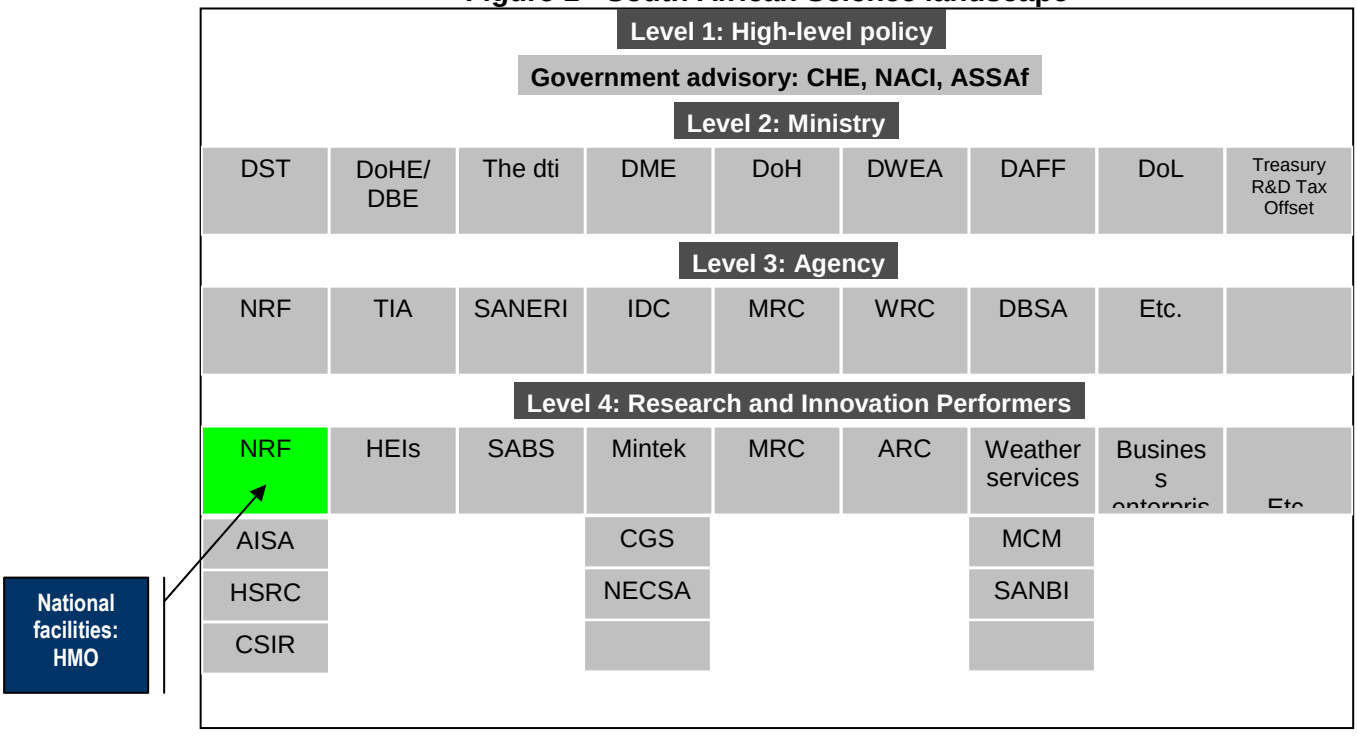
- Dr. Danie Gouws, Researcher
  dgouws@@hmo.ac.za

HartRAO within the South African S&T system

The HMO is a National Research Facility funded by the Department of Science and Technology (DST) through the National Research Foundation (NRF). As presented in the figure 1, the National Research Facilities are among the *Research and Innovation Performers* of the National Research and Innovation System. See the HMO among the National Research Facilities in the Figure 2.

Figure 1 - South African Science landscape[50]



[50] Key Performance Indicators Report 2008/2009, National Research Fondation.

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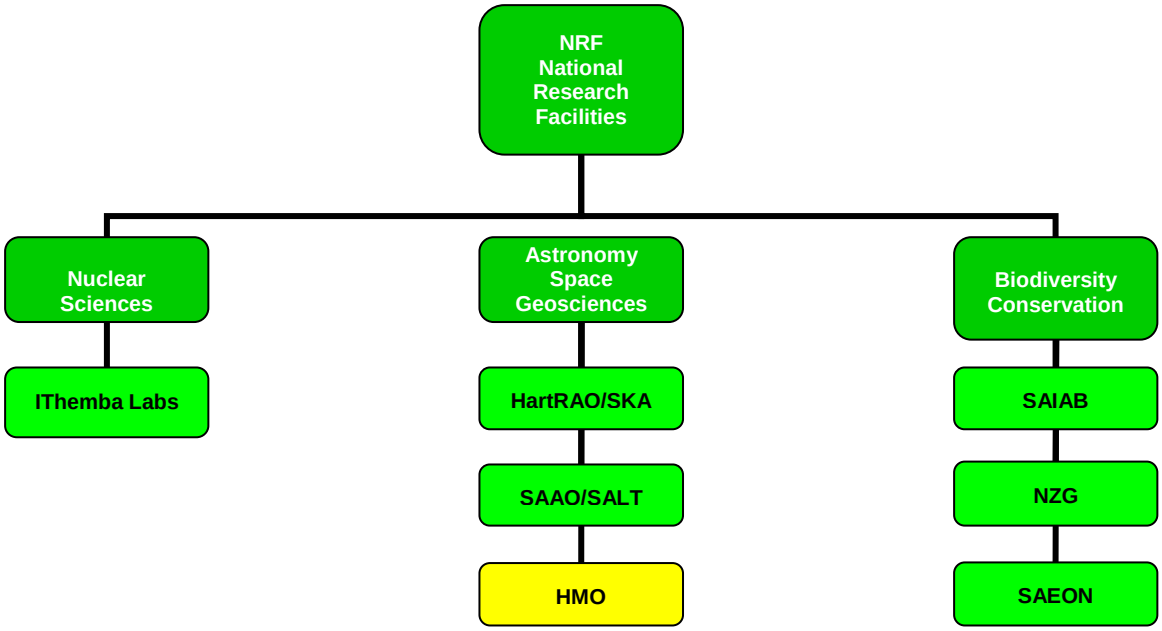
Figure 2 – Structure of the National Research Facilities[51]



Themes of research

Earth-Space system

Within this field the HMO performs research in Space Physics including the Space Weather as well as in the Earth Geomagnetic field and its application to navigation. Research is also related to the ionospheric characterisation and on the propagation of waves in the regions of the space environment, their effects and diagnostic information on the propagation media.

The HMO functions as an active participant in the worldwide network of magnetic observatories (INTERMAGNET), which monitor and model variations of the Earth's magnetic field. The HMO is also one of twelve global Regional Warning Centres which form part of the ISES (International Space Environment Service) Regional Warning Centre network. Specifically, the HMO is appointed as the Regional Warning Centre for Africa[52].

Modalities of work

Research

The HMO owns several earth-space observational and monitoring instrumentations located in various sites including South Africa, Namibia, Marion Island, Gough Island and the South African Antarctic base SANAE-IV.

Through this geographically and multi-functional observational network, the HMO contributes earth and space data to various global networks including:

[51] NRF, Business Plan 2010 – 2013.
[52] In bleu, text from the D2-2

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- the International Real-time Magnetic Observatory Network (INTERMAGNET),
- Digital Ionogram DataBase (DIDBase),
- Global Assimilative Ionospheric Model (GAIM),
- Super Dual Auroral Radar Network (SuperDARN),
- World Wide Lightning Location Network (WWLLN) and
- International Polar Year Data and Information Service (IPYDIS).

This data is used for research but also for applications as the determination of key space weather parameters and the simulation, modelling and forecasting of the earth-space environment.

Geomagnetic related technology

The HMO also offers technological and innovative services to clients in the defense and aerospace sectors. These services include air navigation and navigation ground support, naval system support, magnetic system control and navigation.

Science Advancement

The HMO promotes awareness and interest in science and technology to a broad audience including young people, educators, the general public and policy-makers. The activities are generally hosted at the Science Centre at the HMO with emphasis on informal learning.

International cooperation policy and openness towards EU researchers

The HMO has collaborations with several international partners. Most of these partnerships started under bilateral programmes that have given rise to other cooperation modalities including the host of European researchers at the HMO premises and scientific support and accommodation for European researchers in the HMO facilities.

In some cases, the bilateral programmes have been the first step toward a long-term partnership. This is the case of the cooperation with German, Check Republic and French institutions.

- In the case of the cooperation with Germany, the project Inkaba yeAfrica (http://www.inkaba.org/) involved more than 150 German and South African researchers in research linked to the Earth sciences: Sustainable resources (energy, clean water, soil), Manageable risks (mine safety, climate change, tsunami early warning) , Earth observation and monitoring (satellite systems, magnetic field, geo-history). This programme includes a Human capacity building programme in which the HMO is very active.
- The HMO also participates to the! KHURE (http://khure.ipgp.fr) South African-French research programme on Earth and Life sciences and their links to tectonics and climate change. In addition, the HMO participates in the *International Master of Science programme in Electronic Engineering* of the French South African Technology Institute (F'SATI). The F'SATI is hosted by the Cape Peninsula University of Technology with the support and has the support of the French ESIEE (*Ecole Supérieure d'Ingénieurs en Electrotechnique et Electronique*).

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Besides the bilateral and institution-to-institution programmes, the HMO is keen to attract and host European researchers at the HMO depending on the accommodation capacities and the available funding –both restricted.

To attract European researchers, HMO is negotiating with the NRF the allocation of Post Doctorate salaries for European researchers to be hosted at the HMO. Where possible, the HMO uses their own budget to invite European researchers with a status of Post Doctorate.

In the other hand, the HMO encourages the African researchers linked to the HMO to involve European researchers in the projects that are submitted to the NRF.

Finally, the HMO encourages its researchers to participate in international conferences during which contacts could be established with European scientist working on the specific research fields of the HMO.

Calls, opportunities and guidelines

The HMO does not have especial funding dedicated to host European researches but several efforts are being done to attract international scientist:

Post Doctorate positions

Post Doctorate positions can be offered to European researchers specialised in fields related to the research themes of the HMO. The European researchers can contact at any moment the staff of the HMO in charge of the targeted HMO research theme.

To apply, researchers are expected to send a CV describing their scientific background and the list of publications. The proposals are submitted to peer-review only when required by the funding source.

However, the calls are not the main tool used by the HMO to diffuse information on Post Doctorate positions. Informal and direct exchanges between researchers (through conferences, research networks, bilateral cooperation, etc.) allow identifying scientists whose profiles are suitable for the HMO research. Consequently, European researchers interested should not hesitate to contact the HMO where a common research interest is raised.

Non systematic use of tenders is linked to the limited funds for European researchers available to the HMO: If numerous candidatures are received only a small part of them could be granted.

When calls are launched, they are normally published during one month at the vacancies section of the HMO website:
http://www.hmo.ac.za/index.php/vacancies-mainmenu-102

Accommodation and scientific support

European researchers, who have already obtained a financial support from other funding source, can be granted with accommodation, access to the laboratories and scientific support at the HMO.

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Open calls

Postdoctoral researcher in the area of Geomagnetism

The Hermanus Magnetic Observatory (HMO), located in Hermanus, South Africa, is seeking a postdoctoral researcher in the area of Geomagnetism, starting from 1 February 2011 or as soon as possible thereafter, for a period of 12 months.

The work will include the following:

- Geomagnetic field and indices modeling;
- analysis and interpretation of Geomagnetic data;
- Geomagnetic studies towards Space Weather forecasting and prediction.

The successful candidate will also have the opportunity to pursue his/her own project within the field of Geomagnetism.

Candidates will also be expected to assist with the supervision of honours, MSc and PhD students, organize research seminars and contribute to the development of Earth and Space Physics Research in South Africa.

Candidates must hold a PhD in the area of physics, and should have at least some of the following:

- good or at least basic knowledge of ionospheric and magnetospheric physics;
- good knowledge of data analysis techniques;
- good abilities in programming and handling of large data sets;
- experience in the geomagnetism field will be an advantage;
- ability to work and publish independently.

Applications for the position should include a CV, list of publications, PhD thesis abstract, and a short statement of scientific interests. The closing date for Applications is **15 January 2011**, and applications should be emailed to HMO at info@hmo.ac.za with the subject title "Postdoc in Geomagnetism".

Upcoming calls

Three similar calls should be launched during the next year, funded by the NRF and the HMO budget. The launch of these programs will depend on funds that will be made available by the NRF and the HMO.

For information on calls, European researchers can consult the vacancies section of the HMO: http://www.hmo.ac.za/index.php/vacancies-mainmenu-102

Contact details
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Fax Number: +27 28 312 2039
info@hmo.ac.za

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The Hartebeesthoek Radio Astronomy Observatory (HartRAO)

www.hartrao.ac.za

Date visit: 18 November 19

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- Dr. Ludwig COMBRINCK, **Associate Director; Programme Leader: Space Geodesy**
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HartRAO within the South African S&T system

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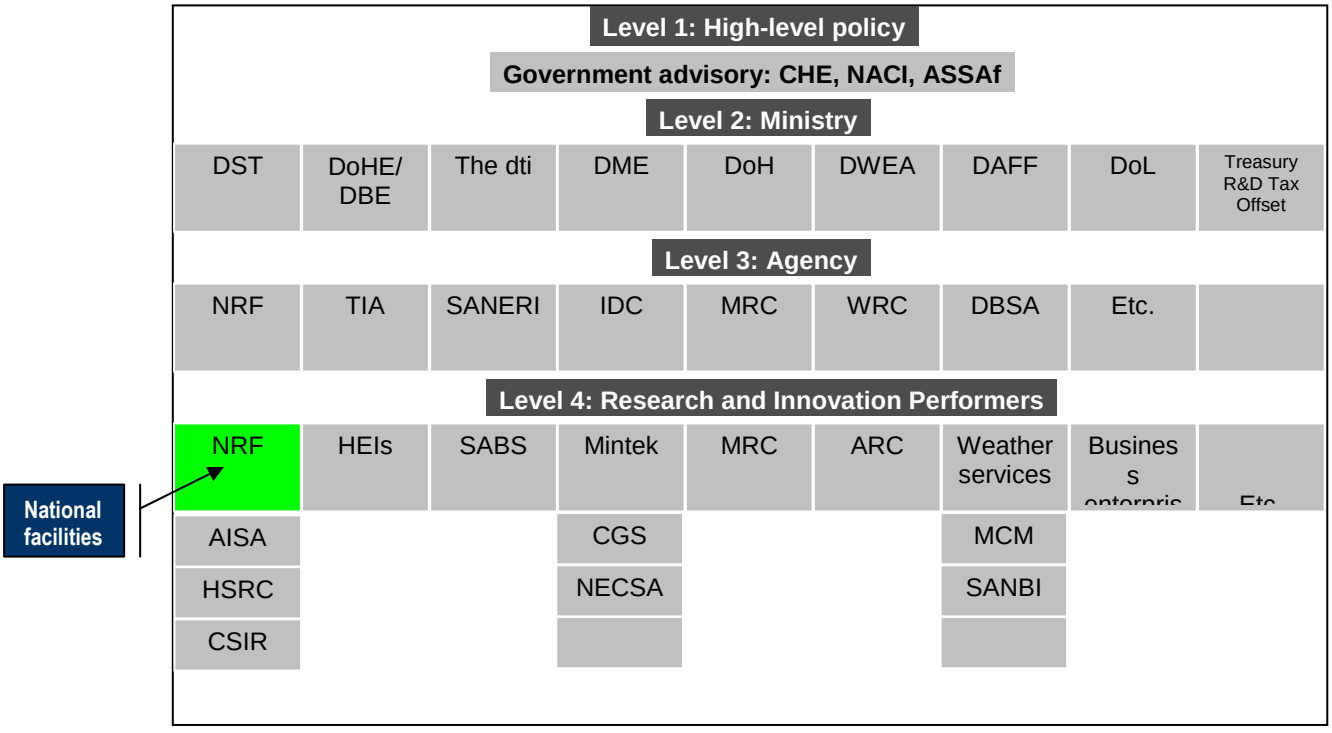
Figure 1 - South African Science landscape[53]



[53] Key Performance Indicators Report 2008/2009, National Research Fondation.

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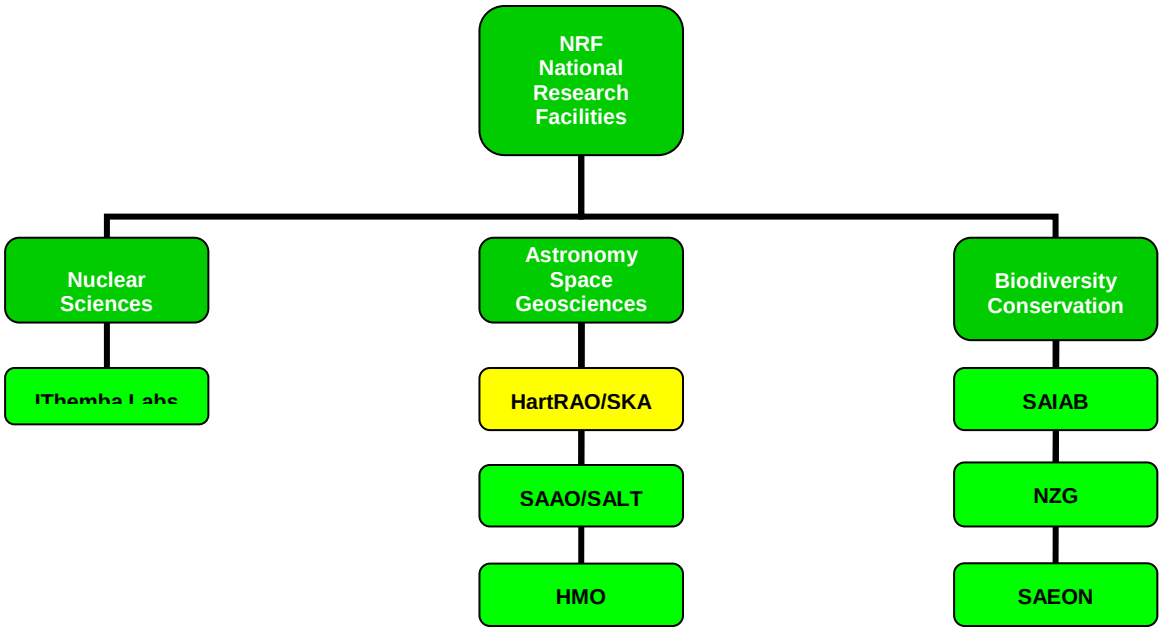
Figure 2 – Structure of the National Research Facilities[54]



Themes of research

The HartRAO performs research in two main fields:

Radio Astronomy

HartRAO[55] is mainly used for continuum radiometry, spectroscopy, pulsar timing and interferometry but also works together with radio telescopes on other continents as well as the orbiting radio telescope HALCA in order to perform Very Long Baseline Interferometry (VLBI).

HartRAO is an associate member of the European VLBI Network, but also operates with the Australia Telescope Long Baseline Array, the Asia-Pacific Telescope, the United States Very Long Baseline Array and the Global Array.

Space Geodesy

HartRAO also runs a Space Geodesy programme using three techniques: VLBI, Satellite laser ranging and the Global Positioning System. As a result, HartRAO is part of the the *International VLBI Service for Geodesy and Astrometry* (IVS) collaboration. It is also part of the *International Laser Ranging Service* (ILRS) and a *Regional Data Center of the International GPS Service* (IGS). Data from all three techniques are used by the *International*

[54] NRF, Business Plan 2010 – 2013.
[55] In blue, information taken from the D2-2 prepared by the DST.

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Earth Rotation Service (IERS) to measure the Earth's rotation and orientation and hence the time of the Earth clock (UT1).

Modalities of work

Beyond the research activity on themes above depicted which is implemented by a staff of around 20 researchers, the HartRAO perfoms the following activities:

k) Training and capacity building

- Practicals: for physics students at third and fourth year level from several South African universities.
- Radio Astronomy Projects for Honours, Masters and PhD Students: in a range of topics for undergraduate level up to PhD level students. A staff member of HartRAO acts as supervisor or a co-supervisor.
- Participation in the National Astrophysics and Space Science Programme (NASSP): a graduate programme, hosted at the University of Cape Town where South African students and students from around Africa and the rest of the World can study under the guidance of South Africa's scientists. Scientists of the HartRAO participate as lecturers. Students are expected to have a practical component that can be developed at the HartRAO premises.
- Science awareness programme: which includes workshops for educators to understand and teach astronomy in colleges and Universities.

l) *Skill transfer*: training of employees from the private sector.

Until 2010, HartRAO was the only radio astronomy observatory in Africa. He have played a key role on the development of the Astronomy in SA and in the African continent. The participation of the HartRAO to ambitious projects, as the Square Kilometer Array (SKA), is a way to continue contributing to the radio astronomy capacities in Africa.

Consequently, the cooperation with South African astronomy researchers is also an opportunity for EU researchers to built links with the future astronomy research community in Africa.

International cooperation policy and openness towards EU researchers

Originally built by NASA in 1961 to support several missions including the Apollo project, the international cooperation is inherent dimension in the activity of the HartRAO.

Par example, as a member of the *European VLBI Network* (EVN), the HartRAO team is continuously collaborating with astronomers of the Institutes which are part of the Network, namely: Effelsberg and Wettzell (both from Germany), Jodrell Bank & Cambridge (UK), Medicina (Italy), Metsähovi (Finland), Noto (Italy), Onsala (Sweden), Robledo/DSN and OAN-Yebes (Spain), Shanghai (China), Torun (Poland), Urumqi (China), Westerbork (Netherlands), Arecibo (Puerto Rico), KVAZAR stations Sv,Zc,Bd (Russia). The JIVE in Dwingeloo (Netherlands), The MPIfR in Bonn (Germany) and the VLBA in Socorro (USA) also works with the EVN as correlators for observations.

Although there are larger telescopes in Germany and in the United States, The HartRAO attractiveness is based on its location: it is positioned in the Southern Hemisphere and has a privileged point of observation of the galaxy.

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The international cooperation policy of the HartRAO has been described as very open to the EU researcher's participation in the HartRAO programmes. "The participation of EU researchers is promoted" pointed out the HartRAO staff.

Two level of collaboration are implemented by the HartRAO with international partners:

- *Technical collaboration* related to data exchange and data processing.
- *Research projects* in topics related to the activity of the HartRAO.

The HartRAO team is also involved in the preparation of international conferences which allow to strength links with a very specialized scientific community.

During the interview with programme managers of the HartRAO, several international collaborations were highlighted:

- With France, through the International Earth Rotation and Reference Systems Service (IERS) whose objectives are to serve the astronomical, geodetic and geophysical communities by providing data and standards related to Earth rotation and reference frames.
- With Germany collaborations applied to the oceanography have been developed.
- With USA and UK numerous and durable partnerships have been implemented.

From the European side, the applications to collaborate with the HartRAO are increasing. Unfortunately, updated statistics on this cooperation are not available at the HartRAO. The last time the number of international cooperation was calculated (2 or 3 years ago) 50 international collaborations were identified.

Given the nature of the work, researchers can collaborate with the HartRAO from their own countries. Data produced by the HartRAO can be accessed and processed from other countries. So that, most of the European researches that have stay in the HartRAO were students.

It was also emphasized during the interview that many South African University professors are natives from Europe.

Calls, opportunities and guidelines

European researchers are welcome to participate in all the working modalities of the HartRAO. While EU researchers can not be allocated with financial support, time of observation and scientific support can be granted to EU researchers of international standing.

In addition to the scientific excellence, an important condition to EU participation in HartRAO programmes is the need to involve South African scientists as an essential component of the research project. The support of the HartRAO facility and its staff has also to be pointed out in the results and outputs of the project.

Although other telescopes launch calls 3 times per year, proposals are received by the HartRAO at any moment.

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The application form is available on the website (http://www.hartrao.ac.za/proposal.txt) and has to be sent to info@hartrao.ac.za.

Applications are reviewed on a case by case basis and are subject to a formal peer review process. The decision on the projects supported is taken by the HartRAO managing staff.

Proposals are specially received when specific phenomena are detected and an observation action is immediately required.

Concerning the Geodesy programme, the development of the Lunar Laser Ranger will be based partially on post-graduate student projects. Several projects are available for suitably qualified applicants (http://geodesy.hartrao.ac.za →News and events). Students who are interested should have a background in subjects such as physics, electronics, mathematics, computer science, photonics, optics, astronomy, geodesy, digital control systems, hardware architectures, software development and related fields.

It was also stressed during the interview, the importance of the informal contacts between researchers of different countries that often lead to execute research projects. Indeed, for the case of the HartRAO, the call for proposal is not the only or the main tool to implemented collaborations either at the national or the international level.

Other opportunities

An International conference on EVLB will be held on September 2011. Calls for communications could be launched to prepare this conference.

Information on this conference can be released through the SAccess website.

Enquiries

e-mail: info@hartrao.ac.za
phone: +27 12 301-3100 fax: +27 12 301-3300
post: HartRAO, PO Box 443, Krugersdorp 1740, South Africa.
http://www.hartrao.ac.za

Contextual factors and difficulties to the EU participation

Astronomy is a key research field in South Africa. Important equipments have been built and the country is now well integrated in international research networks. However, the need to develop human capacity and technical skills has been outlined.

Consequently, the national effort is mostly oriented to support the national students and researchers as well as those natives from other African countries. The NASSP programme is one of the responses to this challenge.

As a result, financial funding for EU researchers is not normally foreseen.

Nonetheless, European researchers interested in cooperate with the HartRAO can obtain financial support from the European VLBI Network (EVN). See related information below.

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The European VLBI Network (EVN)
The European VLBI Network (EVN) is an interferometric array of radio telescopes spread throughout Europe (and beyond) that conducts unique, high resolution, radio astronomical observations of cosmic radio sources. It is the most sensitive VLBI array in the world, thanks to the collection of extremely large telescopes that contribute to the network.

Call for proposals: http://www.ira.inaf.it/evn_doc/call.txt

A Call for proposals is launched three times per year with submission deadlines of Feb 1, June 1 and October 1.

All proposals to the EVN should be made using the Web-based Proposal Submission Tool, NorthStar.

The EVN also welcomes Target of Opportunity (ToO) proposals for rare and/or unpredictable events where there is limited opportunity to make scientifically important observations. The EVN Target of Opportunity Policy document describes the procedures for applying for such ToO observations.

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The South African Astronomical Observatory (SAAO) and the South African Large Telescope (SALT)

www.saao.ac.za, www.salt.ac.za

Date visit SALT: 23 November 2010
Date visit SAAO: 9 December 2010
City: Cape Town

Contact details

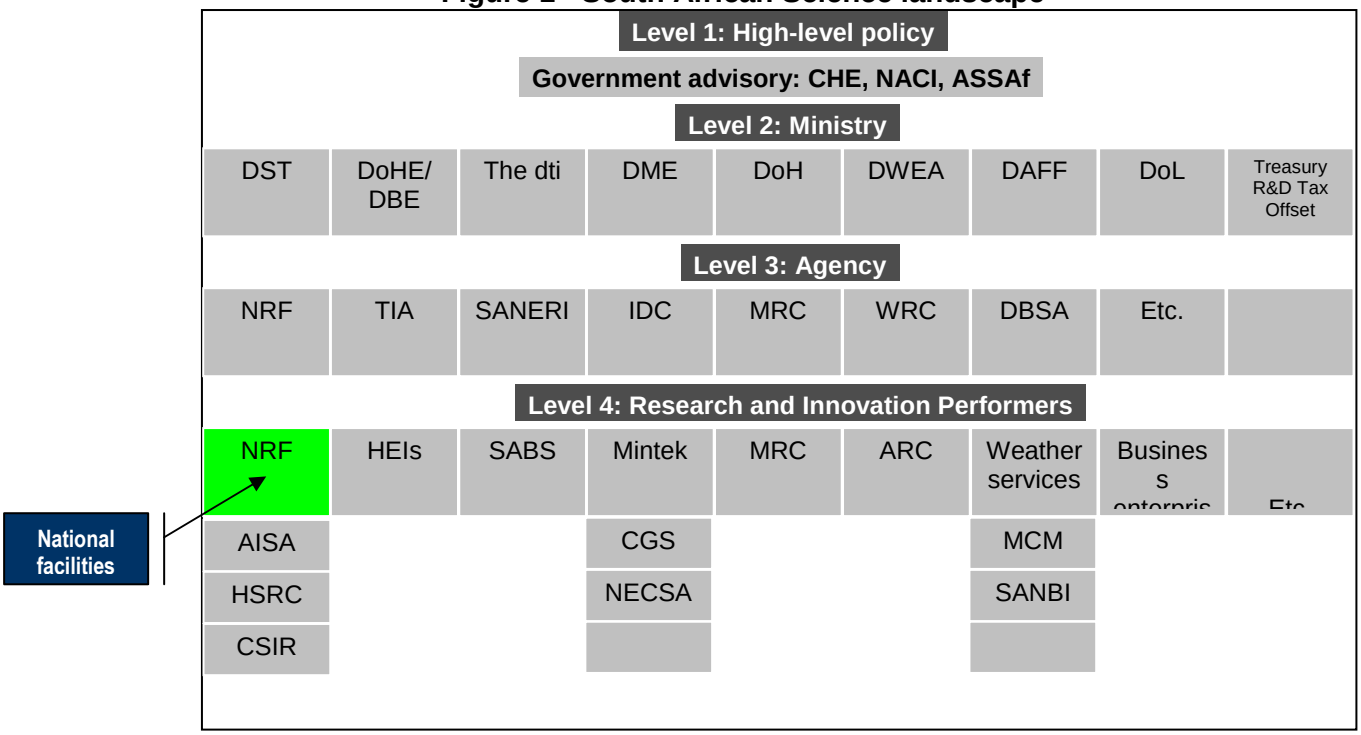
- Prof Phil Charles, *Director*
  pac@saao.ac.za
- Dr.David A H Bukley, **Scientist and Science Director**
  dibnob@saao.ac.za

SAAO WITHIN THE SOUTH AFRICAN S&T SYSTEM

SAAO is a National Research Facility funded by the Department of Science and Technology (DST) through the National Research Foundation (NRF). SAAO operates SALT on behalf of a globally distributed, 12-member consortium for which SAAO is the leading organization.

As presented in the figure 1, the National Research Facilities are among the *Research and Innovation Performers* of the National Research and Innovation System. See the SAAO and the SALT among the National Research Facilities in the Figure 2.

Figure 1 - South African Science landscape[56]



[56] Key Performance Indicators Report 2008/2009, National Research Fondation.

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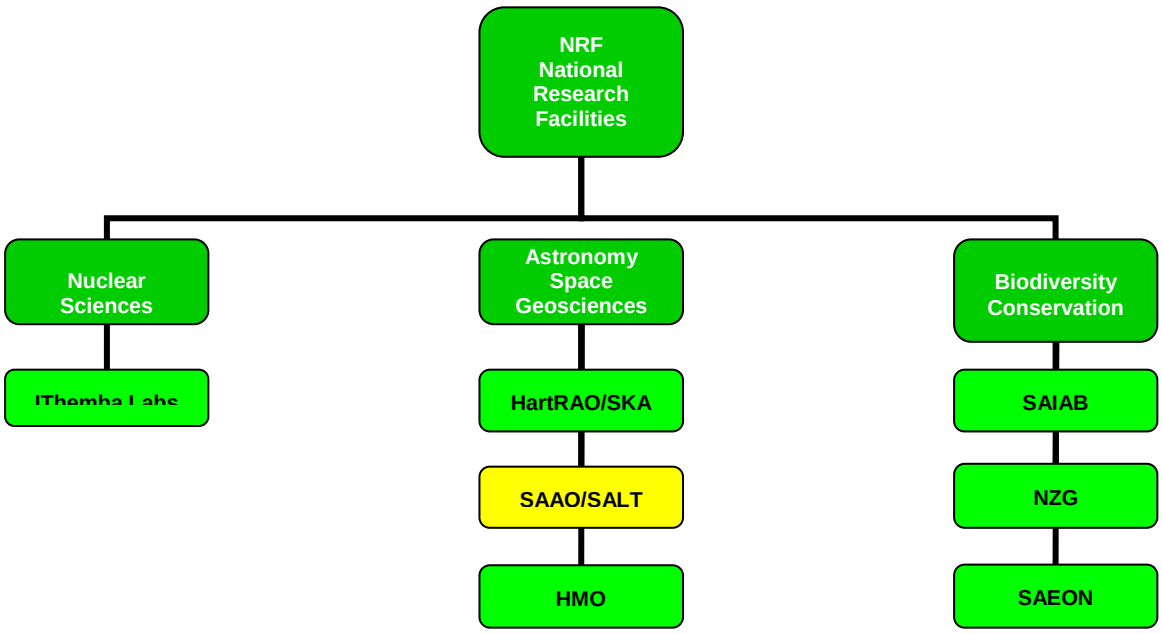
Figure 2 – Structure of the National Research Facilities[57]



THEMES OF RESEARCH

This National Facility is specifically in charge of research on:

- *Optical and infrared astronomy and astrophysics*

The primary research tool of the SAAO is the SALT, the largest single optical telescope on the Southern Hemisphere, able to record distant stars, galaxies and quasars a billions times too feint to be seen with the unaided eye. The SALT is located at the SAAO site in Sutherland (Cape Town). But the SAAO also owns other telescopes:

Telescopes for use by visiting observers:

- 1.9-m (Radcliffe) Telescope
- 1.0-m (Elizabeth) Telescope
- 0.75-m Telescope
- 0.5-m Telescope
- IRSF - Infrared Survey Facility, a joint Japanese/South African project

Robotic Telescopes, operated for the most part with or on behalf of international partners (Birmingham University –UK-, University of Gottingen -Germany-, Yonsei University - Korea).

- *Geophysics*

Research on this field is developed through:

[57] NRF, Business Plan 2010 – 2013.

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- SAGOS - South African Geodynamic Observatory: A co-operative agreement between the National Research Foundation (NRF), South Africa and the GeoForschungsZentrum Potsdam (GFZ), Germany.
- SUR - Sutherland station of Project IDA (International Deployment of Accelerometers).

The SAAO offers many resources through its website including Astronomical Data (http://www.saao.ac.za/resources/astronomical-data/) and a Virtual Observatory with VO-compatible applications, tools and data archives to do science.

It was pointed out during the interview that many of the research projects implemented at the SAAO/SALT are related to areas not covered by the European research.

MODALITIES OF WORK

a) Research

The schedule and description of research projects to be undertaken in 2010 and 2011 at the SAAO can be observed at: http://www.saao.ac.za/science/science-sutherland/science-sutherland-2011/. The first projects to be launched in 2011 are:

- Study of a slowly pulsating hot subdwarf star
- Study of structure of the inner spiral arms of our Galaxy
- Disentangling the nature of secondaries in low-mass eclipsing binaries from the WASP survey
- Ionized gas in E/S0 galaxies with dust lanes
- Optical Light Curves of Low-Mass Eclipsing Binaries: Constraining the Mass-Radius-Temperature Relation in the Low-Mass Regime
- Binary and multiple stellar systems
- Searching for planets at pulsating white dwarfs

b) Instrumentation development and installation of ICT infrastructures

c) Operation of the SALT

INTERNATIONAL COOPERATION POLICY AND OPENNESS TOWARDS EU RESEARCHERS

SALT performs important cooperation with universities and through international consortiums.

In fact, the construction of SALT was funded by a consortium of international partners (Approximately one third of the funding for SALT has come from the South African government), using both private and public funds, namely:

- National Research Foundation (RSA)
- Nicolaus Copernicus Astronomical Center (Poland)
- Hobby-Eberly Telescope Board (International)
- Rutgers University (USA)
- Georg-August-Universität Göttingen (Germany)
- University of Wisconsin - Madison (USA)
- Carnegie Mellon University (USA)

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- University of Canterbury (New Zealand)
- Consortium of UK Universities and Institutions
- University of North Carolina - Chapel Hill (USA)
- Dartmouth College (USA)
- Inter-University Centre for Astronomy and Astrophysics (India)
- American Museum of Natural History (USA)

The international cooperation dimension of the SAAO/SALT is developed both in the research and technical aspect (Instrumentation). As the construction of the SALT is now completed, the current phase aimed at developing a new generation of instrumentation could involve opportunities for European researchers.

Currently, the staff of SALT includes 5 European researchers (2 from Germany, 1 from UK, 1 from Spain and 1 from Finland).

OPPORTUITIES, CALLS AND GUIDELINES

European researchers can be allocated with SAAO telescopes time. Each observing run for visiting observers is supported by an SAAO staff astronomer, who is familiar with the instrumentation to be used, and is responsible for assisting visitors in making an efficient start.

European researchers can be also recruited under a contract when a specific skill is needed. This calls published through the SAAO and SALT websites as well as through the American Astronomical Society website (A key source for worlwide job opportunities in the Astronomy field): http://members.aas.org/JobReg/JobRegister.cfm

SAAO - Telescope Time Applications

A certain percentage of SAAO telescope time is granted to astronomers from around the world, to promote scientific and technological collaboration and to promote the exchange of ideas and information. Availability of observing time is advertised at: http://www.saao.ac.za/observing/rota/.

Conditions, guidelines

- Time allocations are made on the basis of scientific merit and feasibility. Applicants should consult the pages for the telescope(s) and instrument(s) they may need to use. See http://www.saao.ac.za/facilities/telescopes/ . The operating manuals are available: http://www.saao.ac.za/observing/operating-manuals/.

- Application Form can be downloaded at http://www.saao.ac.za/observing/telescope-time-applications/. Applications have to be submitted as a PDF file and sent to observer@saao.ac.za.

- Deadlines for applications are as follows:
  01 Oct for Jan/Mar observing;
  01 Jan for Apr/Jun observing;
  01 Apr for Jul/Sep observing; and
  01 Jul for Oct/Dec observing.

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- Night assistants are no available. Applicants should state in the application form if they will require a support astronomer on the first night of run.

- Given the limited capacities on accommodation and transport to and from Sutherland, visitors are requested to plan for only one observer for each run. Exceptional cases can be discussed with Ramotholo Sefako well before the run.

- Reports on Research done at SAAO should include a note in the acknowledgements section of each paper with the words *'This paper uses observations made at the South African Astronomical Observatory (SAAO)'*. This information should be passed on to anyone to whom observations made at SAAO may be supplied.

- Authors are requested to notify the librarian at SAAO Cape Town of any paper they publish using data obtained at SAAO.

Logistics aspects are informed on the SAAO website:
http://www.saao.ac.za/observing/observer-notes/sutherland/.

Constraints

Some telescopes are not normally made available to outside users but special arrangements can be made. See: http://www.saao.ac.za/facilities/facilities-in-cape-town/telescopes/ .

A variety of measuring machines are available for use with photographic plates and spectra. None of these machines is of modern computerized design, and potential users are expected to consult the SAAO Director concerning their availability and performance.

SALT Telescope time applications

Information on how to create and submit a proposal for SALT telescope time is located at: http://www.salt.ac.za/proposing/

Technical observing constraints are described at: http://www.salt.ac.za/proposing/observing-constraints/

Other opportunities
SAAO will host the International Astronomical Congress en 2011. Calls for communications could be launched to prepare this conference.
The second Middle-East and Africa IAU Regional Meeting (MEARIM II), will be held in Cape Town, on April 10 to 15, 2011.

Contact details
Tel: + 27 +27 21 447-0025 / 447-0026/7/8/9
Postal address: South African Astronomical Observatory, P.O. Box 9, Observatory 7935, South Africa / **Street address:** South African Astronomical Observatory, Observatory Road Observatory, Cape Town, 7925, South Africa

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iThemba Laboratory for Accelerator Based Sciences

http://www.tlabs.ac.za/

Date visit: 9 December 2010

Contact details
Malek Maaza
Chairman NANOAFNET
Nanosciences Laboratories,
Materials Research Department
Maaza@tlabs.ac.za

iTHEMBA WITHIN THE SOUTH AFRICAN S&T SYSTEM

Based at two sites in the Western Cape and Gauteng, IThema is a National Research Facility, managed by the NRF (Figure 1) within the cluster of Nuclear Sciences (Figure 2).

As explained in the D2.2, iThemba LABS is the only producer of accelerator-based radionuclides in South Africa. Some of the products (so-called short-lived isotopes) are produced to address the needs of the local medical fraternity, whilst the longer-lived isotopes are exported, thereby generating valuable income. iThemba produces 25% of the world supply on strontium (82Sr) and is the sole world supplier of the Isotope 22Na with application of the treatment of the cancer.

Figure 1 - South African Science landscape

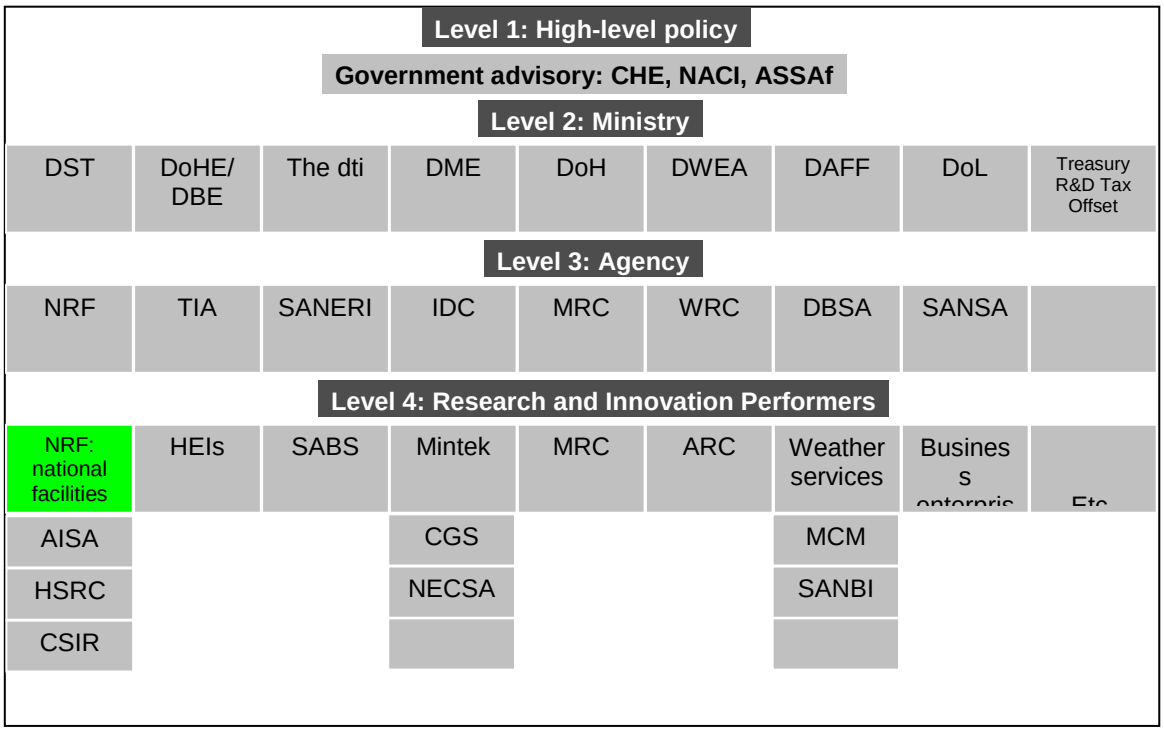

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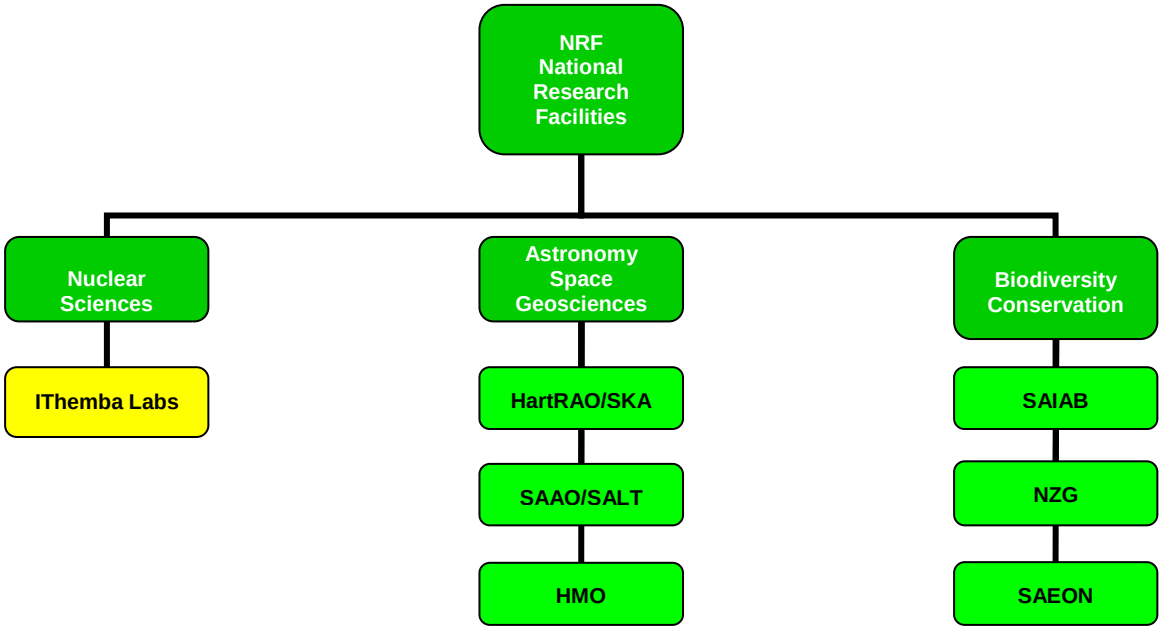
Figure 2 – Structure of the National Research Facilities[58]



THEMES OF RESEARCH

Research at iThemba includes a large range of projects and applications related to different fields:

- Basic and applied Research on Nuclear Physics: Basic research activity is aimed at expanding knowledge about nuclear reaction mechanisms and nuclear structure. Applied research is conducted mainly in the Environmental Radioactivity Laboratory (ERL), into natural and anthropogenic radioactivity in the environment (soils, sediment, water, biological material). The ERL also performs routine measurements of environmental samples for the Radiation Safety Division.

- Material Research: with a core competence of the laboratory in characterisation of materials using ion beams. This group has strong expertise in ion-beam microprobe applications and has become the world leader in biological applications. The activity is divide in broad themes:

    - Nanotechnology and thin film physics using material characterization and modification with ion beams,
    - X-rays and neutrons,
    - Biological systems with a focus on elemental distribution and transport,
    - Geological and environmental studies using ion beams,
    - Innovation in instrumentation and electronics.

- Radiation Biophysics: clinical therapy beams (photons, protons and neutrons) as well as cellular damage by radionuclides (Auger electron emitting isotopes). The radiobiology

[58] NRF, Business Plan 2010 – 2013.

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laboratory also supports users in other fields of applied radiation sciences including those in industrial radiation and applications in agriculture.

In addition, the iThemba Laboratory at Gauteng develops research activity related to several topics:

- Accelerator Mass Spectroscopy (AMS): This technique will be the only one of its kind on the African continent. Research will be applied to areas such as Biomedicine, Diagnostics, Agriculture and Minerals, Materials and Chemicals. Specific outputs are expected is relevant areas for South Africa, namely:

    - Climatic Studies
    - Characterisation of Regional Groundwater Systems
    - Anthropology, Archaeology, History and Preservation Technology
    - Biomedical Dosimetry
    - Therapeutic Drugs
    - Geosciences
    - Ultra-sensitive Trace Element AMS (TEAMS) Applications in Materials Science

- Environmental Isotopes: Environmental isotope studies have been applied in the Earth, Life, and Medical sciences, and the growth potential of this cross-discipline work is being enhanced. Activities of the Environmental Isotopes Laboratory (EIL) include water resources management, recharge estimates, groundwater / surface water interrelationships, urban hydrology, pollution tracing, dam leakage and safety and wetland studies.

- Nuclear Physics related to Geology and Geophysics:

    - Exploration and elucidation of heavy-ion interactions and reaction mechanisms at low and medium energies using Nuclear Reaction Analysis (NRA) methods
    - Proton and electron induced medium-energy reactions allowing comparative studies to be made using hadronic and leptonic probes*

- Experimental Ion Beam techniques: use of PIXE (Particle Induced X-ray Emission), Channelling ERDA (Elastic Recoil Detection Analysis) and RBS (Rutherford Backscattering Spectroscopy).
- Ion Implantation and Nanotechnology Research: modifications to the structural and optical properties of a variety of materials are analysed by optical methods including optical absorption, photo-luminescence and thermo-luminescence, Raman and Brillouin light scattering spectroscopy.

Plans for extending research and teaching at iThemba Laboratories are being developed.

MODALITIES OF WORK

Three kinds of activities are developed by iThemba.

- *Research activity:* in fields mentioned below and involving nearly 200 scientists and students from many disciplines and from institutions within South Africa, from Africa and overseas.

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- *Education and Training*: iThemba offers a range of Masters Programmes and postgraduate opportunities to meet the increasing demand of skilled personnel in nuclear and related sciences. In addition, IThemba offers training in areas related to its activity:

    - Materials research
    - Particle therapy and research
    - Electronics and Information Technology, including a postgraduate programme.
    - Apprenticeship
    - Radiation BioPhysics
    - Radio-chemistry

- *Services and supply*

    - *Radio pharmaceuticals:* As presented by iThemba, it is the "leading supplier of high quality accelerator-based radionuclides and radiopharmaceuticals for both the national and international arena since the 1980's". These radionucleides are used for diagnostic purposes and/or therapeutic purposes in nuclear medicine (Cancer). iThemba remains the only supplier in the world of 22Na positron sources.

      Given the risk inherent to the distribution of radionucleides (short life of products, to many security controls), its supply and distribution is made through international companies: MDS Nordion (Canada), Department of Energy (USA), IDB-Holland, Nulitec Inc., QS Instruments, etc.

    - *Clinical treatment*: iThemba manages at the Cape site a clinic with 30 beds which is the unique worldwide hospital with high energy neutrons and high energy protons to treat the cancer. European patients have been treated in this clinic.

    - *Environmental Isotopes Laboratory (EIL)*: EIL's analytical services are offered to clients from the private and the public sector.

INTERNATIONAL COOPERATION POLICY AND OPENNESS TOWARDS EU RESEARCHERS

iThemba is actively involved in international networks and projects, especially through bilateral and multilateral cooperation.

Bilateral cooperation

Within the frame of bilateral agreements signed by the NRF, iThema has developed cooperation programmes with France, Russia, Hungary, Germany, Italy, UK, Sweden and Poland.

This kind of collaborations has frequently started with scientist-to-scientist exchanges which are later supported by funding from bilateral programmes. In most bilateral programmes, European institutions covers travels expenses while iThemba covers accommodation, local transport and expenses related to research activity.

As some iThemba equipments have been installed with European collaboration, they have opened positions targeting especially European researchers. In general, there is a tendency

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to have more European applicants when a high degree of expertise is required. Research fields related to iThemba activity are among those with very scarce skilled human capital.

In case of bilateral cooperation with France, iThemba host 5 to 6 French researchers every year.

Multilateral cooperation

Multilateral cooperation has been developed through several networks and international agencies. Among them, the Centre for Theoretical Physics (ICTP), the Academy of Science for the Developing World (TWAS-UNESCO) and the International Centre for Science and High Technology of the United Nations Industrial Development Organization (ICS-UNIDO).

iThemba is the contact point ICS-UNIDO for Southern Africa (SADEC). iThemba also participates to the CERN (European Organisation for Nuclear Resarch) as an “Non-Member State with co-operation agreement”.

In different cases, funding form multilateral cooperation has enabled iThemba to attract and fund international researchers.

Cooperation within the FP7

IThemba has participated in several FP7 projects but some difficulties have been pointed out. First, they do no have a critical mass enabling to take part in many projects. This is particularly complex in case of FP7 where cumbersome procedures require a supplementary involvement from the institution.

Also given to the limited number of researchers and Post Docs at iThemba (20 students at Master and PhD level), it is difficult for them to response, as quick as European counterparts, to requirements of the preparation of projects’ applications. As a result, iThemba is not enough involved in the preparation phase of proposals.

CALLS, OPPORTUNITIES AND GUIDELINES

iThemba is open to host European Post-Docs. They can offer support for accommodation, local transport and for expenses related to research activity. However, besides bilateral cooperation, neither programmes nor calls target European researchers. For this reason, potential collaboration should be explored in a case-by-case basis.

CONTEXTUAL FACTORS AND DIFFICULTIES TO THE EU PARTICIPATION

In case of positions to be filled by European researchers, the Human Resources department has to demonstrate that the expertise required is not available in South Africa. This is the condition to obtain a working permit. Sometimes, researchers can start working with a temporary permit. The process to obtain a final permit to work may take 2 years.

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South African Environmental Observation Network - SAEON

http://www.saeon.ac.za/

Date visit: 6 December 2010

Contact details
Johan Pauw
Managing Director
johan@saeon.ac.za

SAEON WITHIN THE SOUTH AFRICAN S&T SYSTEM

SAEON, established in 2002, is one of the National Research Facilities (Figure 1) managed by the NRF under the Biodiversity/Conservation cluster (See figure 2). SAEON operates as a Network of Universities, Sciences Councils, Biodiversity Institutes and Industry partners, providing infrastructure, in-situ observation and delivering long-term reliable data for scientific research and decision-making. List of strategic partner in Appendix.

Figure 1 - South African Science landscape

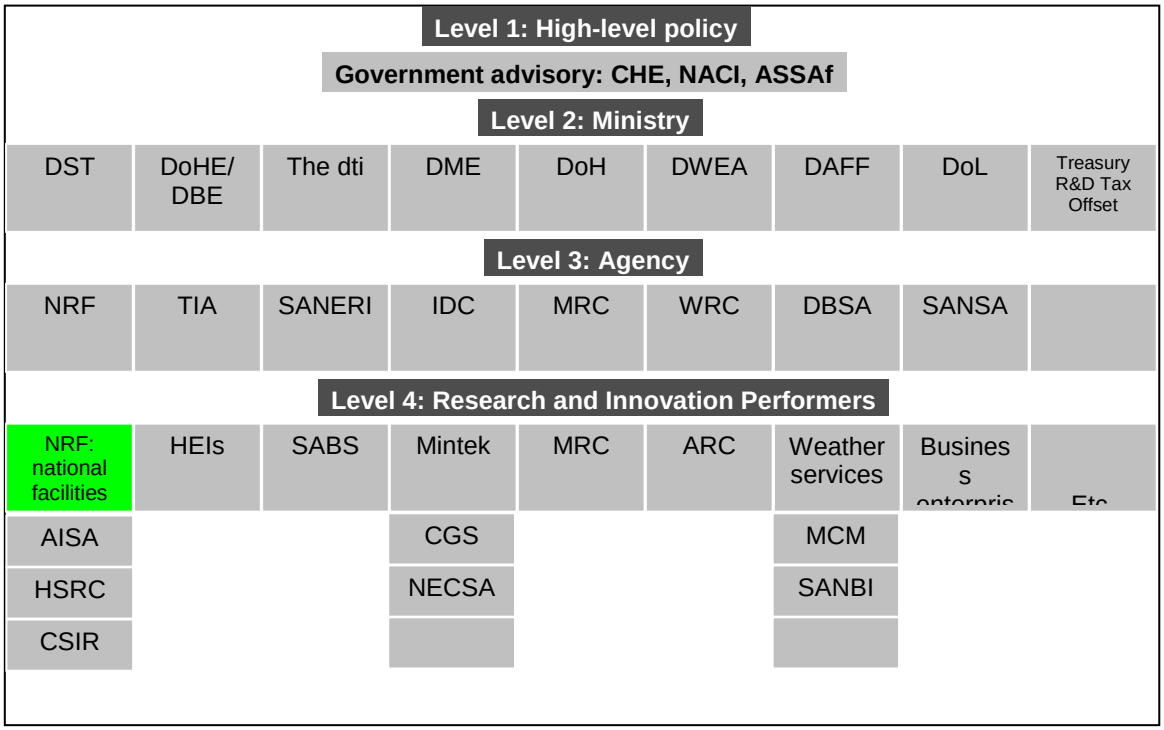

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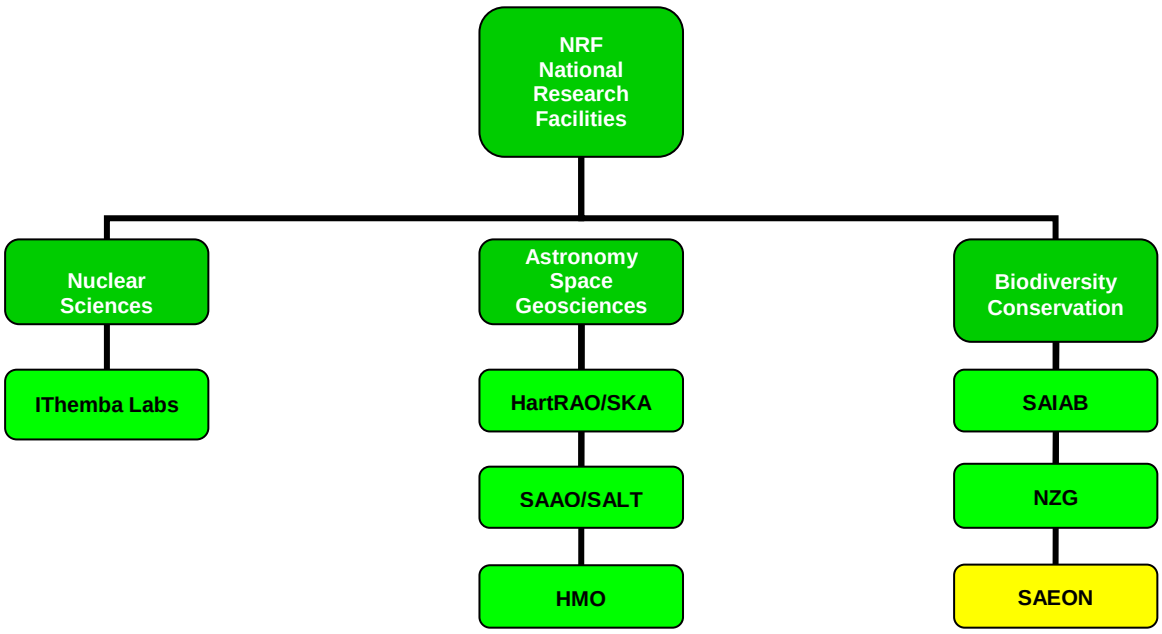
Figure 2 – Structure of the National Research Facilities[59]



THEMES OF RESEARCH

SAEON activity is related to Ecosystems research.

Following the DPSIR model (From the words: **D**riving forces, **P**ressures, **S**tates, **I**mpacts, **R**esponses), SAEON implement long term observations in-situ, trying to distinguish between drivers and responses (from the ecosystems).

According to its *Core Science Framework*[60], SAEON's key research themes are as follows:

- Water
- Carbon/nutrient cycles (including primary and secondary productivity, nutrient loading and deposition)
- Soils and sediments
- Biodiversity
- Disturbance regimes and their outcomes (including large, infrequent events)
- Climate/atmosphere

Additional cross-cutting themes are also part of SAEON activity:

- Degradation of rangelands and other systems
- Sustainable productivity of harvested systems
- Special case studies including, for example a) development of a bio-fuels industry and its impact on land transformation, biodiversity, and ecosystem services; b) pressure for increased power generation and its environmental consequences such as acid mine drainage, soil acidification, and acid deposition.

[59] NRF, Business Plan 2010 – 2013.
[60] TG O'Connor, *Understanding Environmental Change in Complex Systems: SAEON Core Science Framework*, SAEON, 2010

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MODALITIES OF WORK

SAEON has three main activities:

Observation Science

SAEON manage 6 field stations -called SAEON nodes: 4 terrestrial, 1 in the costal zone (divided into three bio-geographic regions) and 1 offshore-marine system (divided into three Large Marine Ecosystems).

SAEON Nodes coordinate the observation and information systems through the different sites. In facts, the SAEON nodes are geographically spread as follows:

- SAEON Elwandle Node (Coastal-inshore) hosted by the South African Institute for Aquatic Biodiversity (SAIAB) in Grahamstown;
- SAEON Egagasini Node (Marine-offshore) hosted by the Department of Environmental Affairs in Cape Town;
- SAEON Ndlovu Node (Savanna) hosted by SANParks at Phalaborwa;
- SAEON Arid Lands Node hosted by SANParks in Kimberley;
- SAEON Fynbos Node hosted by the South African National Biodiversity Institute (SANBI) at the Kirstenbosch Research Centre, Cape Town;
- SAEON Grassland-Forests-Wetlands Node hosted by Ezemvelo KZN Wildlife in Pietermaritzburg

Currently SAEON has 60 ongoing projects through all the sites. A list of SAEON flagship projects is available at: http://www.saeon.ac.za/specialised-products-services/saeon-flagship-projects

Information Management

SAEON is in charge of developing governance measures, processes, capacity building programs and other supporting initiatives to increase cooperation between its stakeholders. The SAEON Data Portal is, for example, a public platform to share information on earth and environmental observation data: http://data.saeon.ac.za/.

SAEON also produce reports to support the decision-making related to themes of its core science framework.

Education outreach

SAEON has developed a programme for science education outreach and capacity development. Improve the quality of science teaching and integrate graduate students and scientists into the science education outreach programme are among its objectives.

INTERNATIONAL COOPERATION POLICY AND OPENNESS TOWARDS EU RESEARCHERS

As the climate change is a global concern, international cooperation seems to be a condition for the advancement of science in this field. Considering this, SAEON is involved in

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international networks and initiatives aimed at improving the exchange of information and observational data from long-term, site-based research.

Thus, SAEON's international stakeholders include organisations as the European Joint Research Centre (JRC) and networks such as the Global Earth Observation System of Systems (GEOSS) or the International Long Term Ecological Research (ILTER).

SAEON is willing to reinforce its international dimension where 4 conditions are met:

- No funding for external partners is provided;
- Collaborations are established with other initiative which are already running;
- Data produced has to be shared;
- Collaborations must fit within the mandate of SAEON.

SAEON is part of other international initiatives such as the Scientific Committee on Oceanographic Research (SCOR), a non-governmental organization for the promotion and coordination of international oceanographic activities.

CALLS, OPPORTUNITIES AND GUIDELINES

Although no funding is offered for international researchers or institutions, SAEON can offer very interesting opportunities for European researchers working in the field of Ecosystems research and climate change:

- Access to field sites with different ecosystems, including National parks as well as to private sites managed by SAEON;
- SAEON can also provide field support for observations in dangerous contexts with a possibility of accommodation in remote sites.
- Access to historical data on a large range of fields related to ecosystems. Part of this data is available through the SAEON Data Portal at http://data.saeon.ac.za/.
- SAEON can also facilitate the access to laboratories through the network of universities and help international researchers to obtain scientific supervision for their studies in South Africa.

European Researchers interested in explore these possibilities should contact the SAEON's Managing Director, Johan Pauw: johan@saeon.ac.za

Contextual factors and difficulties to the EU participation

South Africa, with its diverse and rich ecosystems, represents an advantageous ground to develop research related to Climate Change. Facilitate the access to data and in-situ observation is a very interesting opportunity offered by SAEON. However, European researchers should ensure by other means the necessary funding for research projects developed in cooperation with SAEON.

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South Africa's National Energy Research Institute (SANERI)

http://www.saneri.org.za/

Date visit: 13December 2010

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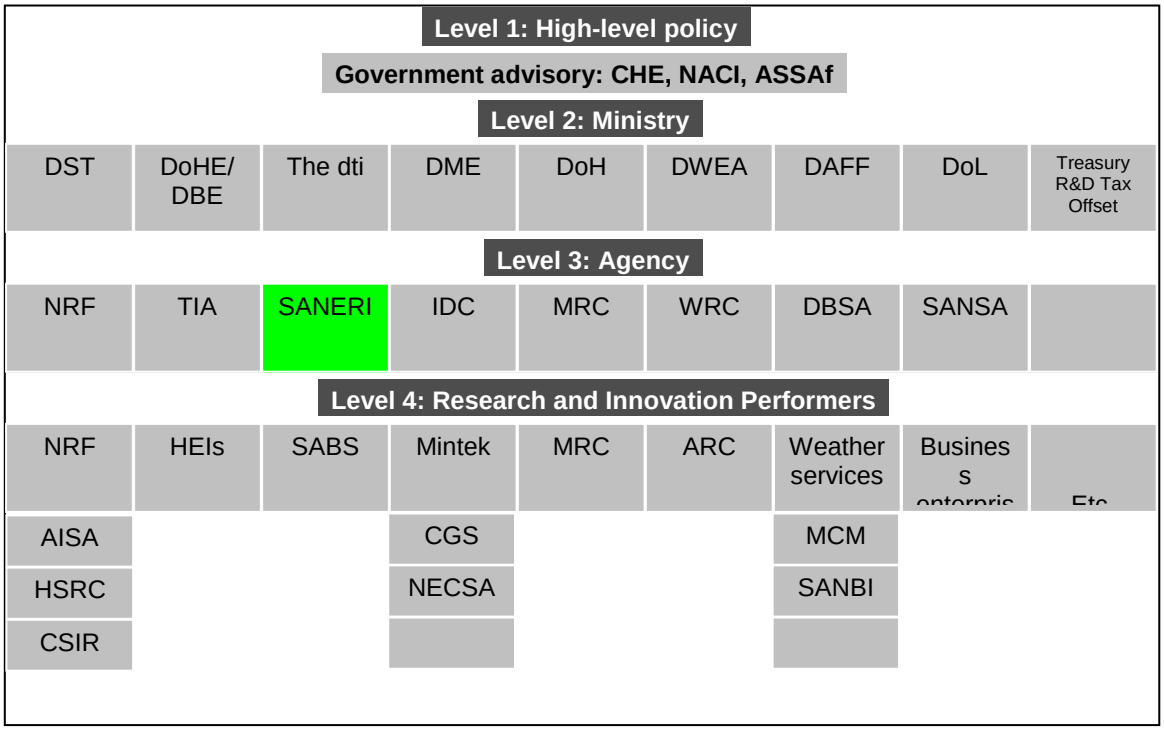
THE SANERI WITHIN THE SOUTH AFRICAN S&T SYSTEM

Established in October 2004, the SANEDI is a public agency in charge of the coordination of research in the energy field in South Africa. This institution will be merged with the National Energy Efficiency Agency (NEEA) within the new South African National Energy Development Institute (SANEDI).

Figure 1 - South African Science landscape



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THEMES OF RESEARCH

With the creation of the SANEDI, changes in research priorities could be defined and a stronger support to the Energy Industry seems to be among SANEDI's objectives.

Regarding activity of SANEDI until 2010, key areas of research are as follows:

- Energy Infrastructure Optimisation.
- Energy Efficiency and Demand Side Management.
- Impact of Energy Use on the Environment.
- Use of Energy to Stimulate Socio-Economic Development.
- Cleaner Fossil Fuel Use (including clean coal).
- Renewable Energy.
- Alternative Energy Sources (including fuel cells and hydrogen).
- Energy Planning and Modelling.
- Energy Policy Research.

MODALITIES OF WORK

As presented by the Annual Report 2009/2010, the principal activities of SANERI are as outlined below:

- undertake research and technology development;
- register patents and intellectual property in its name resulting from its activities;
- issue licenses to other persons to use its patents and intellectual property;
- utilise its technological expertise in its possession or make such expertise specifically or generally available
- provide bursaries and educational loans for the development of knowledge in the energy sector;
- commission energy related research, development and innovation programmes in any other research institutions;
- establish facilities for the collection and dissemination of information in connection with research, development and innovation;
- establish and control facilities in those fields of research that the Board may from time to time approve;
- promote cooperation between South Africa and other countries in matters relating to energy research, development and innovation.

With the creation of the SANEDI, this agency will be mandated to develop a rage of activities of the innovation value chain including demonstration and demonstration.

Funding

SANERI funds research projects contracted with mostly with universities. Until now, calls for proposals were "demand driven". Through this modality the SANERI looked to identify players and the state to the art in energy research in South Africa. Once research landscape and Energy priorities were defined, 6 research centres will be launched. Three of then have been already established:

- Centre for Carbon Capture and Storage (CCS)
- Green Transports Centre

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- Centre for Energy Systems Analysis and Research (CESAR)

The financial model to allocate resources to these centres is being built and the role of industry partners has not been established. Thus, the level of autonomy of universities contracted and the way in which resources could be use are undecided aspects so far.

Human Capacity development

- Bursaries: Since 2007 SANERI made available for this programme 1.5 Millions Rands but no additional students have been supported in 2010 du to the reduction of the SANERI's budget by R7 million. Bursaries are only awarded to South African Nationals.

- Research Chairs: Through this programmes six research PhDs and 19 Research MSc have been trained with one PhD and two MSc already graduated. This initiative also target South African Citizens.

INTERNATIONAL COOPERATION POLICY AND OPENNESS TOWARDS EU RESEARCHERS

The SANERI is involved in international initiatives such as the Energy Technology Data Exchange (ETDE), an international energy information exchange agreement formed in 1987 under the International Energy Agency (IEA).

SANERI have also launched the South African Centre for Carbon Capture and Storage, established in March 2009, initiative in which also participate Sasol, British High Commission, Norwegian, Embassy, Eskom, French Developpement Agency, Anglo Coal, Exxaro, PetroSA, Schlumberger, Total Coal, Xstrata.

SANERI is also the FP7 PCN for Energy. However, representatives of this agency consider that offer of funding by the FP7 is disconnected of South African specifics needs.

CALLS, OPPORTUNITIES AND GUIDELINES

There is not clear openness of SANERI programmes to European researchers. As the financial model of the agency is being reviewed, as well as its priorities and research policy, it was difficult for interviewees to give a definitive response with this regard.

However, given the modalities and autonomy of South African universities, it seems that contacts with universities' departments involved in SANERI Research Centres will be the best way to access to future opportunities. Thus, European researchers could be involved in task which required skills not available in South Africa.

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The Technology Innovation Agency (TIA)

http://www.amts.co.za/

Date visit: 8 December 2010

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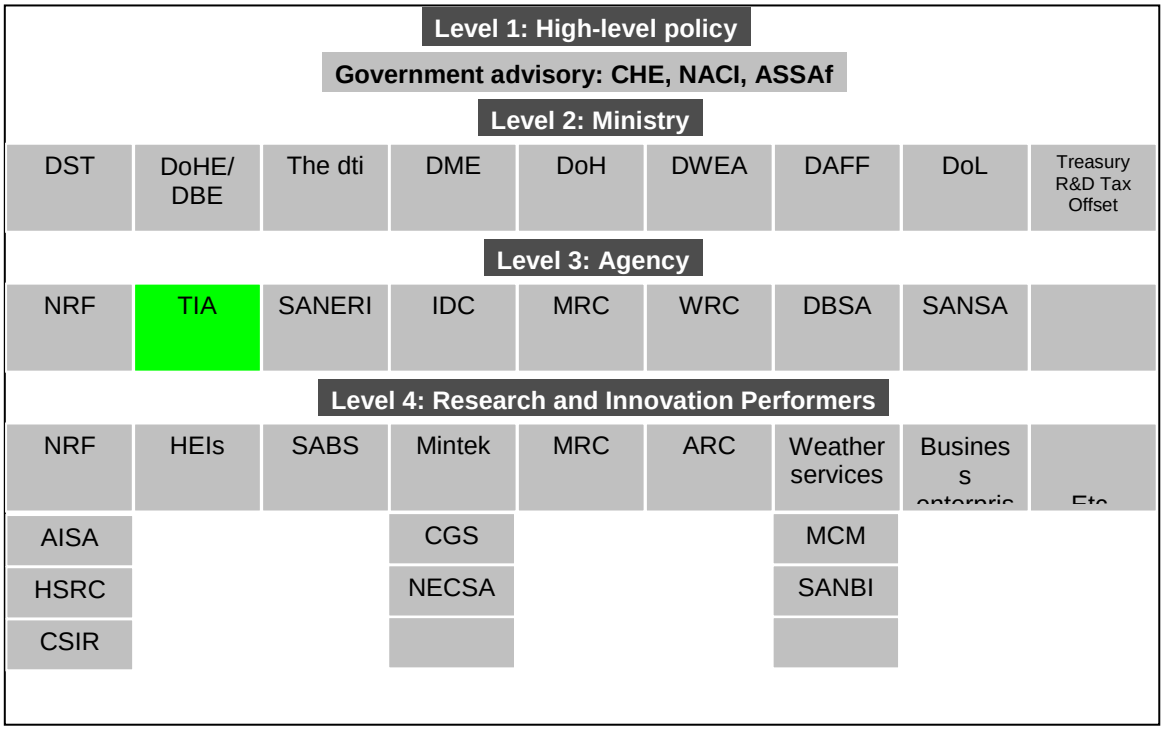
THE TECHNOLOGY INNOVATION AGENCY WITHIN THE SOUTH AFRICAN S&T SYSTEM

The TIA, along with the SANSA (South African National Space Agency), is the most recent agency in the South African S&T landscape. This agency is aimed at "Stimulating and intensifying technological innovation in order to improve economic growth and the quality of life of all South Africans by developing and exploiting technological innovations". Thus, "*TIA's core business objective is to support the development and commercialisation of competitive technology-based services and products*"[61].

Figure 1 - South African Science landscape



[61] TIA, Funding Application, General Guidelines, December 2010

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THEMES OF RESEARCH

Projects granted by TIA are in different fields but has the common characteristic of being oriented towards innovation.

TIA is also expected to contribute to the challenges of the Ten Year Innovation Plan. In addition, TIA has made available its infrastructures to support national priorities, namely: diagnosis of human diseases; diagnosis of animal, crop and food pathogens; the treatment of human diseases through the development of commercial pharmaceutical drug delivery technologies for communicable and non-communicable diseases, assistance with DNA fingerprinting for a variety of purposes, etc.

In addition, the launch of the TIA involved a restructuration in different institutions, including the DST and NRF, as some of their programmes linked directly to innovation were related to the new Agency, namely: the Biotechnology Regional Innovation Centres (BRICs), Advanced Manufacturing Technology Strategy (AMTS) the Innovation Fund and the Tshumisano Trust. Two of them have a theme orientation:

- The Advanced Manufacturing Technology Strategy (AMTS) currently focuses on the automotive and aerospace industries;
- Four BRICS have been established so far and are specialized in human and animal health, biopharmaceuticals, industrial bio-processing, mining biotechnology, bioinformatics and plant biotechnology.

These programmes have been described in the D2.2.

MODALITIES OF WORK

The TIA not only acts as a funding agency but also offers non financial support to enhance the innovation dimensiont of the South African S&T landscape.

Financial Support

TIA has four funds aimed at funding projects related to several stages of technology innovation. According to the *Funding application General Guidelines* published in December 2010, these funds have specific mandates:

- The **Industry Matching Fund** will invest in small, medium and large companies (where partnerships with small companies and HEI's and SC's will be incentivised) to drive technology innovations. Funding is typically provided as matched funding for a royalty or matching loans or preference shares.
- The **Equity Fund** will invest in fledgling companies driving technology innovations which do not have either the capital to match the TIA's investment or the track record and balance sheet to secure loan finance. Funding is typically provided for equity, or equity in combination with convertible preference shares.
- The **Technology Development Fund** will invest in a select number of high potential projects undertaken by institutions like Science Councils and Higher Education Institutions for pre-competitive end stage research and technology development, where the TIA considers the merits of the projects to warrant support without necessarily

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partnering with industry, though preferable. At least 20% funding will be required to be contributed by the Applicant, and the financial instrument will typically be royalty.
- The **Idea Development Fund** will provide modest amounts of funding to entrepreneurs and small companies to assist with patenting costs or enable development of a fundable proposal/business plan.

Non-financial support

- Commercialisation : Provide support to South African generated intellectual property and capacity to compliment such intellectual property with third party intellectual property in order to broaden the IP base and enhance South Africa's competitiveness;
- Strategic partnerships: TIA pursues relationships with industry, government, academia and development agencies locally and internationally to effectively deliver value to society through skills transfer to the National System of Innovation, technology development and commercialisation.
- Infrastructures: Technology platforms, technology stations and Centres of Competences (CoCs) are equipped with state-of-the-art technologies and they are made available for private and public institutions according to a planning established by the TIA.
- Engineering division: Provides to Universities (of Technology) and Small and Medium Enterprises (SMEs) Technology Solutions, Training Services and skills development and support for tehcnical innovationa s well as for Research and Development

In addition, the TIA has developed with the support of the GTZ support, a search tool to identify, by theme, research platforms that can be accessed by other partners: http://www.heda.co.za/satnsearchengine/formsa/.

INTERNATIONAL COOPERATION POLICY AND OPENNESS TOWARDS EU RESEARCHERS

The international dimension of the agency is implemented through the Strategic partnerships Division. This aspect is being developed in order to build strategic partnerships with similar agencies mandated to fund technological development and commercialization. Thus, partnerships and benchmarking have been launch with OSEO (France), FINEP (Brazil), for example.

CALLS, OPPORTUNITIES AND GUIDELINES

Opportunities and calls launched by the TIA are clearly oriented to reinforce national innovation capacity in South Africa. So far, there is no programme targeting international researchers or international companies.

In general, TIA provides funding to "public institutions such as Science Councils (SC) and Higher Education Institutions (HEI), Small, Medium and Microo sized Enterprises (SMMEs) and large private companies, as well as fledgling companies – all of whom are engaged in activities that fall within the technology innovation value chain" [62].

[62] http://www.amts.co.za/?q=node/64

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Nevertheless, technologies developed "*in collaboration with foreigners where a win-win partnership can be forged*" could be supported[63].

During the interview with the responsible for Strategic Partnerships it was noted that European researchers or companies can be subcontracted by Consortiums funded by the TIA with the condition that Intellectual Property Rights can not be exploited by such subcontractors.

Contextual factors and difficulties to the EU participation

Funding policy at the TIA is being currently developed and a clear focus in reinforcement of national capacities has been defined so far.

In addition, questions related to Intellectual Property Rights are central preoccupations of the Agency. For this reason, European researchers interested in cooperation with Consortiums funded by the TIA should made clear the way in which results will be shared in a win-win strategy.

[63] http://www.amts.co.za/?q=node/64

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SASOL

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Date visit: 15 December 2010

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SASOL within the South African S&T system

SASOl is an energy and chemicals company based in South Africa but also present in about 30 countries. As presented in the company profile, *SASOL mine coal in South Africa and produce gas in Mozambique and oil in Gabon*. It also refines imported crude oil and retail liquid fuels through a network of retail centres and supplies fuels to other distributors in the region and gas to industrial customers in South Africa.

SASOL has a Technology cluster for Research and Development activities with around 700 employees. Nearly 50% are scientists and engineers; other 50% is part of the support staff. Research and Development staff is located mostly in South Africa (more than 600 employees in Sasolburg and Secunda) but also in Europe (Nearly 31 employees in Netherlands and Scotland). SASOL has 34 000 people total employees.

This company plays an important role within the South African innovation system with near 3% of the GERD in the Country. In 2010/2011 its operating Research and Development budget represented 785 million Rands capital and a cash flow of 270 million Rands.

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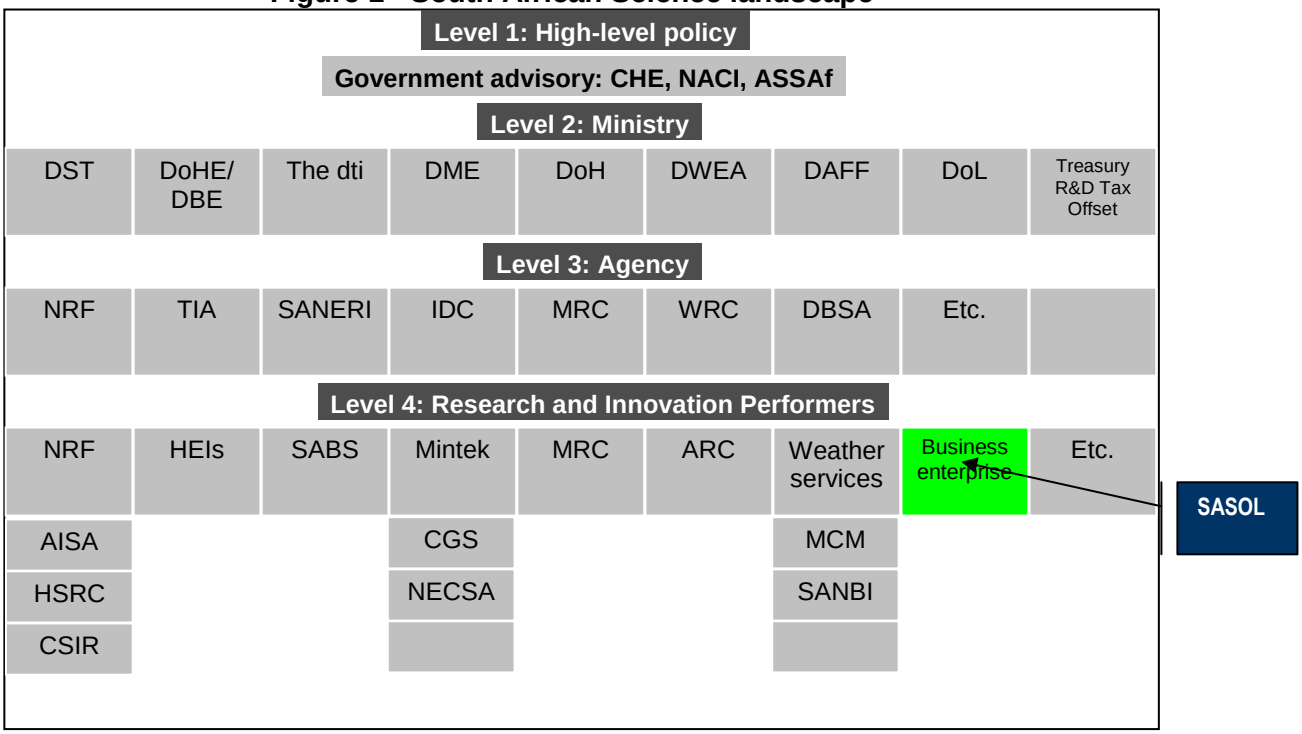
Figure 1 - South African Science landscape[64]



Themes of research

SASOL Research and Development's vision is to become "*Leaders in clean technologies to sustainably convert coal, gas and renewable resources into energy and chemical products*". With this perspective, R&D activities are implemented in 6 themes:

Coal and Gas Processing Technologies

- Coal Characterisation: Physical and chemical properties, Coal management and gasification selection.
- Gasification Technologies: Sasol Fixed Bed Dry Bottom Technology, Underground Coal Gasification, High Temperature Gasification.
- Synthesis gas treatment: Gas cooling and cleaning, Synthesis Gas Conditioning, Trace element removal, Tar filtration.
- By-product Processing: Tar, Sulphur, Aqueous chemicals.
- Supporting**:** Direct Coal Liquefaction, Pyrolysis, Coal Combustion, Natural Gas Reforming.

Fischer-Tropsch Catalysis and Engineering Research

- Iron Fischer Tropsch: High Temperature - Fluidised Bed, Low Temperature - Slurry Bed, Fixed Bed,
- Cobalt Fischer Tropsch: *Low Temperature - Slurry Bed.*

[64] Key Performance Indicators Report 2008/2009, National Research Fondation.

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- Integrating Catalyst Science and Engineering: Selectivity, Activity, Stability, Deactivation, Catalyst Management, Regeneration, Catalyst Manufacturing Protocols, Catalyst production support, Catalyst modelling and performance evaluation, Catalyst handling and reclamation.
- Gas Loop Modelling and Optimisation
- Reactor Design: Piloting, Modelling and Optimisation, Hydrodynamics, Heat and Mass Transfer, Solid handling, Commercial Reactor Specification

Refinery Technologies

- Fischer Tropsch Refinery Catalysis: Hydrogenation, Hydrotreating, Hydrocracking, Isomerisation and Hydroisomerisation, Catalytic Polymerisation, Platforming.
- Tar Refining.
- Cracking Technologies.
- Reactor Design, Flowsheet Integration.
- Operations Support: Catalyst Optimisation, Side Reactions, Contaminations, Catalyst Recovery, Corrosion Chemistry.

Chemical Technologies

- Extracting and Purifying Chemicals from Fischer Tropsch streams:
- Olefin Manipulation: Oligomerisation, Metathesis, Hydroformylation, Homogeneous Catalysis and Ligand Synthesis.
- Assorted Chemical Transformations: Hydrogenation, Dehydratio, Etherification.
- Syngas to Chemicals Options
- Separation Technology: Distillation (Conventional, Extractive and Azeotropic), Liquid-Liquid Extraction, Catalytic Distillation, Membranes and Adsorbents.
- Renewable Chemicals

Environmental Sciences and Engineering

- Water Management Research: Treatment and upgrading wastewaters for reuse or discharge, Water efficiency optimization, Residue (salt) management and disposal, Characterization of wastewaters.
- Solid Waste Management: Minimization, reuse, recycling, safe disposal.
- Atmospheric Impact Research: Quantification and analysis of emissions, Atmospheric pollution modelling and impact assessment, Atmospheric chemistry.
- Ecotoxicology.
- Bio-systems evaluation and Biomonitoring.

Alternative Energy

- Looking beyond fossil fuels
- Solar: Photovoltaics, Concentrated Solar Power
- Energy Storage: Thermal Storage, Batteries, Alternative Concepts
- Integration of low carbon energy: Biomass, Nuclear, Hydroelectric
- Efficiency and energy recovery

Others and Modalities of work

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Beyond the research activity in themes above described, other activities are developed as follows:

Training and capacity building

SASOL has established a graduate development programme providing students with practical experience, especially for engineers: 145 graduated from the programme in 2009.

The company has also developed a partnership with centres of Excellence such as the Gordon Institute of Business Science in Johannesburg, the University of the Free State in Bloemfontein and the University of Stellenbosch.

During more than 6 years, SASOL have worked closely with universities providing research grants and bursary funds and supporting the upgrading of university facilities. In 2009, 25 million Rands were invested in Universities. This investment targets the previously disadvantage universities as well as major South African universities. Universities granted with SASOL funds have a considerable autonomy to manage this budget since SASOL only defines an area of work –chemistry and chemical engineering are more targeted- but not return on investment is expected and modalities of work are entirely decided at the universities. European post-docs can be funded through this fund when a specific competency is required.

Other activities of SASOL are related to ”Skill development” but they concern only SASOL employees. The company has in fact developed a programme to enhance internal skills and competency. Through this programme experienced employees are invited to South Africa for a period of two or three years who will act as trainers in their home countries after the formation period.

International cooperation policy and openness towards EU researchers

Different SASOL R&D activities involve European researchers, institutions and companies from 13 European countries (Germany, UK, Sweden, Spain, Poland, Netherlands, Italy, Greece, Germany, France, Finland, Denmark and Belgium). In fact, a total of 56 European researchers cooperate currently with this company in all the above mentioned research themes.

A large range of research institutions in Europe are concerned by these collaborations. Among them:

- University of Leuven in Belgium,
- University of Helsinki in Finland,
- University of Toulouse and the European Synchrotron Radiation Facility - Grenoble in France,
- University of Aachen, Freiberg University, Karhlsruhe University, University of Erlangen and Rostock University in Germany,
- University of Patras in Greece,
- Vrije Universitiet, Utrecht University and Technical University Eindhoven in Netherlands,
- Czestochowa University of Technology and AGH University of Science and Technology in Poland,
- Valencia University in Spain,
- Lund University in Sweden

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- St Andrews University, Sheffield University, Cardiff University, Aberdeen University, Imperial College, Liverpool University, Loughborough University in UK.

Three modalities with openness to European partners have been pointed out:

- SASOL technology centres in Netherlands and Scotland. 10% of the SASOL R&D budget is invested through these centres where European researchers are involved.
- R&D international advisory committee. SASOL R&D brings together a set of internationally recognized researchers in areas of interest for SASOL in order to obtain high level advice for R&D activities. European researchers are often invited to this committee which meets twice a year. During the interview with SASOL R&D representatives, they emphasised that European researchers have played an important role within this committee.
- Finally, 4 SASOL production sites have been established in Europe: 3 in Germany and 1 in Italy. According to the Annual Report 2010, European sites total turn over is the more important among the external sites of SASOL (Ahead North American, African and Asian sites)[65]. These European sites also involve European researchers and engineers.

It was also observed that while some research themes such as “Chemical Technologies” are subject to strict confidentiality rules, other themes are particularly open to international cooperation such as “Environmental Sciences and Engineering” and “Alternative Energy”.

Interviewees indicated that most of this cooperation is established in a project basis according to the specific needs of SASOL. New research partners are often identified through recommendations of the international R&D advisory committee but also through international conferences and publications.

It is noteworthy to mention that intellectual property aspects are also subject to strict rules established by SASOL. In the same way, communications about R&D activities of SASOL are extremely controlled and it is too difficult, for example, to access to information on the kind of research developed in the European centers.

Opportunities, calls and guidelines

SASOL welcome European and international researchers to work and develop research in South Africa. However, SASOL R&D activity with European participation is not normally established through calls for proposals. As mentioned before, contacts are often facilitated by the international R&D advisory committee, through conferences or bibliography references. In some themes, partnerships were built long time ago, so new European collaborators are not required.

Nonetheless, direct contact with SASOL R&D staff (see above) can be established in order to:

- Submit proposals concerning R&D activity on “Environmental Sciences and Engineering” and “Alternative Energy”, the new themes of SASOL R&D and those with more potential openness,

[65] SASOL Annual Report 2010, Page 98, URL : http://www.sasol.com/sasol_internet/downloads/sasol_ar_2010_1288354306904.pdf

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- Explore opportunities for Post-doctorates. It was noted that many European students and post-doctorates have been already welcomed in SASOL R&D activities.

When specific skills are required they are well advertised through different websites and networks.

Vacancies for “learners” with different levels of academic background can be founded at: http://www.sasol.com/sasol_internet/frontend/navigation.jsp?navid=16000010&rootid=7

Contextual factors and difficulties to the EU participation

Given the confidential aspects of SASOL activity, communication on R&D programmes is extremely controlled. Scarcity on information can be explained by the link between SASOL production processes and impact on the environment. It is noteworthy to mention that no information –or very scarce- is available about the European SASOL sites.

Therefore, to relay information on SASOL opportunities would need an especial agreement with SASOL R&D representatives to obtain relevant information on time.

However, SASOL has already in Europe an important network of technology centres, production sites and researchers through which potential new collaborators are identified. The added value of SAccess dissemination activities can be perceived as limited.

Nevertheless, two suggestions have been made by SASOL R&D responsible:

- To develop a SAccess platform to establish direct contact with researchers through the SAccess website.
- To help identify how a part of funds invested in universities can be used to leverage European funds.

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5. TOWARDS ENHANCED RECIPROCITY: RECOMMENDATIONS

Through deliverable D2.2 and the present document -D2.3 - SAccess has accomplished the phase of the project aimed at analysing the context of research and innovation in South Africa (R&D profile and research capacities in the South African Innovation System) and identifying opportunities for European researchers within this context.

It has been shown in D2.2, that cooperation with Europe –in terms of co-publications and patents- has not stopped increasing. And a variety of opportunities for European researchers has been identified through the present report.

However, first results of WP2 should also help SAccess and the European Commission to increase their understanding of historical and social aspects that determine the current shape of the National Innovation System as well as its priorities. It is a fact that priority is now given to reinforce the national research capacities –especially among previously disadvantaged groups. In addition, as well as other emerging economies, South Africa is engaged in a South-South diplomacy including research and innovation aspects. Therefore, in South Africa, priority is given to cooperation with other African countries, particularly those of the SADEC, at the same time as efforts are made to confirm its place in the group of BRIC (Brazil, Russia, India and China), also called BRICS, when South Africa is included.

SAccess can not ignore these facts and should direct the second phase of the project towards the specific characteristics of the South African Innovation System. To this end, general recommendations, as well as notes for follow-up addressing challenges in specific institutions, have been developed below.

Beyond calls, beyond SAccess

Calls for proposals are not the main means for European researchers to access opportunities in South Africa. Key partners for Europe – such as SASOL- do not use calls to identify European partners. This finding makes more complex the role of SAccess.

In fact, a considerable number of scientific collaborations has evolved through informal contacts between researchers. Direct and informal scientific exchanges frequently lead European researchers to an increased interest in South African institutions and helps to South African partners to identify how to facilitate the access of their European counterparts to South African support. Calls launched by South African institutions –with national, bilateral or foreign funding- come in general to support pre-existing collaborations.

Thus, SAccess communication strategy should also focus on presenting, by field, information on scientific results of key institutions in South Africa, on the content of large research programmes and the description of state-of-the-art facilities and available databases.

SAccess should also build a list of South African partners having successfully cooperated with European partners. CORDIS and CORDA information can be used to this end. Researchers ranked by the NRF under the first 2 categories (Leading international researcher, internationally acclaimed researcher) should be also included in this list of

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potential partners and targeted by the dissemination activities of SAccess. This is a task to be developed jointly with ESASTAP.

Help European researcher's understand South Africa's specificities

During the interviews in South Africa, it was frequently pointed out the lack of understanding by European researchers of the South African research context –including its positive and complex aspects.

For this reason, information on contextual factors has been developed in this report in Section 2. This information should be presented through fact sheets and diffused in dissemination activities.

Target European researchers who are already based in South Africa and those who have already participated in South African research programmes

European researchers based in South Africa represent a source of reference for European researchers interested in developing cooperation with South African partners.

They should be also targeted by the dissemination strategy. Thus, the list of European researchers included in the database of contacts (See file Excel attached) should be targeted by dissemination tools and completed jointly by all Consortium partners.

Work closer with Universities' Research Offices

As in the case of the UCT, the universities' Research Offices manage a significant amount of information related to opportunities for European researchers. In addition, these offices have strategic information on research priorities and can give appropriate information on programmes in which openness to European researchers can be deepen.

A list of responsible of research offices should be built and included in the list of contacts targeted by the dissemination strategy. Some contacts have already included in the database attached to this report.

Update mapping of opportunities

This task, to be developed by the DST, with the support of other partners, will be facilitated with the matrix of potential programmes owners that has been prepared with this report. This table includes links to pages of websites which can normally publish information on opportunities for European researchers.

In the future, opportunities offered by other Departments (Minerals for example) should be also explored.

It is also important to ensure the follow-up of the evolution on opportunities offered by the National Research Facilities, especially those linked to the SKA project through its very complete Newsletter.

Follow-up the evolution in terms of visa and working permits

Procedures related to the visa and working permit represent one of obstacles pointed out during interviews. Recently, the Ministry of Interior announced upcoming improvements. The

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DST should ensure the follow-up of such evolutions and diffuse this information through the SAccess consortium.

SAccess INFODAYS

According to results of this report, information days should:

- Target researchers in countries with strong cooperation and participation in South African research programmes: UK, Germany, France, Netherlands and Norway.
- Be linked to open fields of research: astronomy, climate change, biodiversity, nuclear sciences.
- According to the field concerned, representation of European SARCHis holders can be promoted: this can have an immediate networking effect as SARCHis holders are well recognized and they normally involve other researches to the chair through post-doc opportunities.

Bring closer ESASTAP and SAccess

Besides the information needed for the purposes of the present report, interviews conducted allowed DST collecting information on the needs of different institutions concerning their participation in FP7 projects.

It was observed that some problems related to the participation of South Africans in European programmes are the same difficulties to open South African programmes to international researchers (i.e. weaknesses in the critical mass).

Therefore, the present report should be reviewed from the ESASTAP perspective to help improving complementarities between ESASTAP and SAccess. Point of view of ESASTAP responsible is welcome to move forward with analysis presented in this report.

Notes for Follow-up

National Research Foundation (NRF)

- In the case of THRIP, an agreement can be established with the NRF administrator to obtain the list of granted projects and project leaders who can be contacted –after the approval phase- by European researchers interested in consultancies or other modalities of cooperation under THRIP projects. Contact details could be provided by SAccess to European researchers on demand.

- SAccess should also take contact with the Executive Directorate for Human and Institutional Capacity Development (HIDC), in charge of the SARChi programme. This would enable the project to obtain opportune information on chairs granted to Universities (78 chairs have been granted but a total of 210 have been foreseen by the programme). In this way, SAccess will ensure a better follow-up of calls launched by Universities to nominate the Chair Holders and their teams.

- As well, with the agreement of the NRF, the list of SARChi holders could be updated and published on the SAccess website. Where possible, SARChi websites should have a link to SAcess website.

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- The dissemination activities of SAccess must target researchers rated by the NRF – particularly researchers rated A and B.

University of Cape Town (UCT)

Being the first South African university, SAccess should maintain a regular communication with the Research Office of the UCT and with the IAPO. Identified contacts are in the attached database.

Water Research Commission - WRC

- SAccess should ensure the follow-up of the launch and content of Terms of Reference of the next call (for solicited and non-solicited projects) in Mai or June. The website. In addition, consultancies and other opportunities can be published at any moment at: http://www.wrc.org.za/Pages/Research_Opportunities.aspx.

Council for Scientific and Industrial Research (CSIR)

- The CSIR vacancies website should be reviewed in a regularly basis. Most Post-doctoral opportunities are open to all nationalities.
- As well, the Human Capital Development office of the CSIR should be included to the list of key contacts of SAccess. This office is able to facilitate detailed information on the opportunities opened by this institution.

iThemba Labs

iThemba is a National Research Facility with high level research activity which can be attractive for European researchers. Although there are not open calls to disseminate, iThemba is able to host international researchers and positions can be opened in specific cases. In case of information days related to Health, their expertise in Radionucleides and Cancer treatment could be diffused.

South African Environmental Observation Network - SAEON

- During the interview with the managing director, he informed that SAEON can not entertain all the sites of its network. Therefore, they want to select few sites to continue observations on the field. But Interesting sites that will not be exploited by SAEON may be subject to cooperation projects linking EU-SA funding and researchers. This potential opportunity could be analysed by SAccess.
- SAEON is expecting to access to the Lidar technology (Light Detection And Ranging) -an optical remote sensing technology for observation from the air. This is a theme in which they are particularly open to explore new international cooperation.
- The SAEON Newsletter gives a very good overview on the research projects developed by SAEON. This is good source of information on ongoing Ecosystems research in South Africa that can be exploited by SAccess. To access to SAEON Newsletters: http://www.saeon.ac.za/enewsletter/latest-issue/indexpage

South Africa's National Energy Research Institute (SANERI) and SASOL

- In the opinion of interviewees, the public budget allowed in South Africa to research on the energy field is being reduced. However, South Africa has two important

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enterprises in this field: SASOL and Eskom, the latter being a state-owned enterprise. SAccess should ensure the follow-up of evolutions of this field in South Africa and try to identify emerging opportunities.

- SAccess should be attentive to research policy of the new agency, The SANEDI.
- SASOL R&D can be involved in dissemination activities in Europe even if specific opportunities open by SASOL are not identified so far. This will allow expanding the number of European researchers being in contact with this enterprise.

The Technology Innovation Agency (TIA)

- TIA possesses a search tool to identify -by theme – research platforms in South Africa that can be accessed by other partners (http://www.heda.co.za/satnsearchengine/formsa/). With the agreement of TIA, this tool could be disseminated through the SAccess website.

- SAccess should ensure the follow-up of next calls launched by the TIA. As the policy aspects of the Agency are being developed, windows of opportunities could be open in the near future. Modalities of subcontracting can be also identified.

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APPENDIX

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APPENDIX 1
LIST OF INSTITUTIONS AND PERSONS INTERVIEWED

In red, persons who were contacted by could not attend meetings

Institution	Contact Person	Contact details	City	Date Meeting
Harteebesthoel Radio Astronomy Observatory - HartRAO	Dr.Michael GAYLARD, **Acting Managing Director** Dr. Jonathan Quick, *VLBI Manager; Programme Leader (Instrumentation, Computing)* Dr. Ludwig COMBRINCK, *Associate Director; Programme Leader: Space Geodesy*	mike@hartrao.ac.za +27 12 326 0742 jon@hartrao.ac.za ludwig@hartrao.ac.za Postal address : HarTRAO PO BOX 443 Krugersdorp South Africa	Pretoria	18 nov 2010 10h
National Zoological Garden (NZO)	Dr Clifford Nxomani **Managing Director**	Clifford@nzg.ac.za +27 12 339 2708 +27 82 838 0905 Postal address : National Zoological Garden 232 Boom Street Pretoria Guateng PO Box 754 Pretoria 0001 South Africa	Pretoria	19 nov 2010 14H
Hermanus Magnetic Observatory - HMO	Dr. Lee-Anne McKinnell **Acting Managing Director**	lmckinnell@hmo.ac.ca +27 28 312 1196 +27 83 328 3048	Hermanus	22 Nov, 14h00

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Institution	Contact Person	Contact details	City	Date Meeting
	Dr. Petrus Benjamin Kotzé *Researcher* Pkotzé@@hmo.ac.za Dr. Danie Gouws *Researcher* dgouws@@hmo.ac.za	Postal address : HMO P.O Box 32 Hermanus 7200 South Africa		
South African Large Telescope - SALT	Dr. David A H Buckley *Scientist Director*	dibnob@saao.ac.za +27 21 447 0025 Postal address : SALT PO Box 9 Observatory 7935 South Africa	Cape Town	23 Nov, 14h00
National Research Foundation - NRF	Dr. Albert S. Van Jaarsveld *President & CEO*	Albert@nrf.ac.za Postal address : National Research Foundation Mering Naude Road Brummeria PO Box 2600 Pretoria 0001 South Africa	Pretoria	25 Nov, 10h00
National Research Foundation - NRF	Gatsha Mazithulela Vice-President: Research Infrastructure and National Research Facilities	gatsha.mazithulela@nrf.ac.za Postal address : National Research Foundation Mering Naude Road Brummeria PO Box 2600 Pretoria 0001 South Africa	Pretoria	25 Nov, 11h00
National Research Foundation - NRF	Dr Dorsamy Gansen Pillay *Vice-President & Managing*	gansen.pillay@nrf.ac.za	Pretoria	25 Nov, 12h00

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Institution	Contact Person	Contact details	City	Date Meeting
	Director: RISA	Postal address : National Research Foundation Mering Naude Road Brummeria PO Box 2600 Pretoria 0001 South Africa		
National Research Foundation - NRF	Robert Drennan *Executive Director: Corporate Governance*	RDrennan@nrf.ac.za +27 12 481 42 26 Postal address : National Research Foundation Mering Naude Road Brummeria PO Box 2600 Pretoria 0001 South Africa	Pretoria	Nov 30, 9h
National Research Foundation - NRF	Robert Kriger *Executive Director: International Relations & Cooperations*	rskriguer@ nrf.ac.za +27 12 481 41 41 Postal address : National Research Foundation Mering Naude Road Brummeria PO Box 2600 Pretoria 0001 South Africa	Pretoria	Nov 30, 12h
Council for Scientific and Industrial Research - CSIR	Berenice Lue Marais *Group Manager: contract research and develpment* Mamoelesti Mosia	BLue@csir.co.za mmosia@csir.co.za	Pretoria	Dec 2, 9h30

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Institution	Contact Person	Contact details	City	Date Meeting
	Human Capital Development	Postal address : CSIR PO Box 395 Pretoria 0001 South Africa		
South African Environmental Observation Network - SAEON	Johan Pauw *Managing Director*	johan@saeon.ac.za Tel: (+27) 12 349 7722 ; Fax: (2712) 12 349 7719 Postal address : SAEON 41 De Havilland Cres Block C, The Woods Persequor Technopark P.O. Box 2600 Pretoria 0001 South Africa	Pretoria	Dec 6, 9h
South African Institut for Aquatic Biodiversity - SAIAB	Prof Paul Skelton	p.skelton@saiab .ac.za +27 46 603 58 00 +27 46 603 58 16 South African Institute for Aquatic Biodiversity Private Bag 1015 Grahamstown, 6140 South Africa	Cape Town	Dec 6, 14h15
National Research Foundation - NRF	Zolani Z. Dyosi *Programme director: THRIP*	zolani@nrf.ac.za Postal address : National Research Foundation Mering Naude Road Brummeria PO Box 2600 Pretoria 0001	Pretoria	Dec 6, 15h30

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Institution	Contact Person	Contact details	City	Date Meeting
		South Africa		
National Research Foundation - NRF	Ndanduleni B. Nthambeleni *Executive director: Grant Management System and Administration* Raven Jimmy *Grants Director*	bernard@nrf.ac.za 012 481 4182 Raven@nrf.ac.za Grant director: International research grants Postal address : National Research Foundation Mering Naude Road Brummeria PO Box 2600 Pretoria 0001 South Africa	Pretoria	Dec 7, 15h
Technology Innovation Agency - TIA	Patrick Krappie *General Manager: Strategic Partnerships*	Patrick.krappie@tia.org.za +27 73 908 9581 Postal address : P.O. Box 23, Innovation Hub, 0087, South Africa	Pretoria	Dec 8, 10h
MINTEK – Mineral and Metallurgy technology	Elma van der Lingen *Manager: Division Advanced Materials* Erik Kriel *Researcher*	Elma.vanderLingen@mintek.co.za +27 11 707 44 71 +27 82 824 28 00 erikk@mintek.co.za Postal address : 200 Malibongwe Drive, Randburg, Private Bag X3015, Randburg 2125 South Africa	Johannesburg	Dec 8, 14h

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Institution	Contact Person	Contact details	City	Date Meeting
Laboratory for Accelerator Based Scieces - iTHEMBA	Malek Maaza Chairman NANOAFNET Nanosciences Laboratories, Materials Research Department Dr Zeblon Vilakazi *Managing director*	Maaza@tlabs.ac.za +27 21 8431149/45/46 +27 78 485 4726 director@tlabs.ac.az Africa-International Desk, iThemba LABS-NRF Postal address : Old Faure Road, POBox 722, Somerset West 7129, PO Box 722 Western Cape Province South Africa	Cape Town	December 9, 12h
South African Astronomical Observatory - SAAO	Prof Phil Charles *Managing Director* Carolina Oaman *Poland researcher*	pac@saao.ac.za +27 21460 93 03 +27 83 298 14 61 Observatory Road, Observatory Carolina@saoo.ac.za Postal address : SALT PO Box 9 Observatory 7935 South Africa	Cape Town	December 9, 15h
University of Cap Town - UCT	Wilna Venter Research Office University of Cape Town	wilna.venter@uct.ac.za http://www.researchoffice.uct.ac.za Tel: (+27) 21-650-4380 | Fax: (+27) 21-650-5768 *	Cape Town	December 10, 9h

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Institution	Contact Person	Contact details	City	Date Meeting
	Mr. Emlyn Balarin Manager Marine Research (MA-RE) Institute	Postal address : Research Office University of Cape Town 02 Rhodes Avenue (cnr. Rodhes Ave. and Main Road) Mowbray 7700 Cape Town South Africa Emlyn.Balarin@uct.ac.za University of Cape Town Tel: +27 21 650 3283 Fax: +27 21 650 3283/3979 Postal address : MA-RE Institute University of Cape Town Private Bag X3 Rondebosch 7701 South Africa		
South African Medical Research Council - MRC	Carole Roberts *Office of International Affairs* Dr Sandile EJ Williams Senior Research Manager	Carole.Roberts@mrc.ac.za +27-21-938 0359 Sandile.williams@mrc.ac.za Postal address : P.O. Box 19070, Tygergerg 7505, South Africa	Cape Town	December 10, 13h
Human Sciences Research Council -	Professor D Labadarios MB ChB, PhD, FACN	Tel:+27 21- 466 7802 Fax:+27 21- 461 1255	Cape Town	December 10, 16h

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Institution	Contact Person	Contact details	City	Date Meeting
HSRC	Executive Director Population Health, Health Systems and Innovation (PHHSI) Dr Neo Molotja *Center For Science, Technology & Innovation Indicators*	Email: dlabadarios@hsrc.ac.za Web: www.hsrc.ac.za Private Bag X9182 Cape Town, 8000 Tel: 021 466 7818 Fax: 021 461 1255 Cell: 084 268 4493 nmolotja@hsrc.ac.za Postal address : Private Bag X9182 Cape Town, 8000 12h Floor, Plein Park Building,69-83 Plein Street, Cape Town,8001		
National Research Foundation - NRF	Dr Romilla Maharaj Human and Institutional Capacity Development (HICD) Dr Linda Mtwisha *Programme Director: South African Research Chairs and Rated Researchers Incentive Funding Programmes* Selelo Matimolane *Programme Officer South African Research Chairs and Incentive Funding for Rated Researchers*	romilla@nrf.ac.za chrisna@nrf.ac.za Linda.mtwisha@nrf.ca.za Tel: +27 (0) 12 481 4014 Fax: +27 86 666 8073 Tel: +27 (0) 12 481 4397 selelo.matimolane@nrf.ac.za Tel: +27 (0) 12 481 4397 Postal address :	Pretoria	Dec 13, 10h00

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Institution	Contact Person	Contact details	City	Date Meeting
	Programmes	National Research Foundation Meiring Naude Road Brummeria PO Box 2600 Pretoria, 0001 South Africa		
South African National Energy Research Institut - SANERI	Thembakazi Mali Senior Manager Clean Energy Solutions Dr Minnesh B ipath Senior Manager End Use and Infrastructure Management	ThembakaziM@saneri.org.za Minnesh.bipath@sdaneri.org.za Postal address : SANERI CEF House, Block C, Strathavon, PO Box 786141 Sandton, 2146 South Africa	Johannesburg	Dec 13, 13h
Water Research Commission - WRC	Wandile Nomquphu Research Manager Dr Kfir Chris Moseki Resarch Manager	wandilen@wrc.org.ca nakkie@wrc.org.za Postal address : Water Research Commission Marumatin Building c/o Frederika Street and 18th Avenue Private Bag X03, Gezina 0031, South Africa	Pretoria	Dec 13, 15h30

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Institution	Contact Person	Contact details	City	Date Meeting
		+27 12 331 2565 +27 83 290 72 43		
SASOL	Dr. Sven Godorr Manager Research & Development Sasol Technology (PTY) Ltd Dr Tracy Bromfield Research & Development Department Sasol Technology (PTY) Ltd John T Dixon Manager Fuels Research Bafana R Mothogane Government Liason Manager	Sven.godorr@sasol.com Tracy.Bromfield@sasol.com Johntho.dixon@sasol.com Bafana.motheogane@sasol.com Postal Address: 1Klasie Havenga Road Sasolburg R&D Building, B-Floor, Room NaB21 Tel: +27(0)16 960 2902 Fax +27(0)11 522 9386	Johannesburg	Dec 15, 11h
French Embassy	Vincent Baron Vice Counsellor, Attaché for Science and Technology Embassy of France in South Africa	Vincent.BARON@diplomatie.gouv.fr Postal Address: 250 Melk Street, New Muckleneuk, 0181 Pretoria Tel. +27 12 425 1713 Fax +27 12 425 1719	Pretoria	Dec 15, 16h

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Researchers

Institution	Contact Person	Contact details	City	Date Meeting
Univesity of the Western Cape	Dr. Oystein Ulleberg South African Institute for Advanced materials Chemistry	oulleberg@@uwc.ac.za +27 21 959 9319 +27 82 959 52 87	Cape Town	23 Nov, 10h00
UCT, Centre for Transport Studies	Marianne Vanderschuren **Associate professor: Department of Civil Engineering**	marianne.vanderschuren@uct.ac.za +27 21 650 25 93 +27 83 444 45 30	Cape Town	23 Nov 2010, 18h00
University of Cape Town - IRD	Dr Francis MARSAC IRD-UMR 212 EME (Exploited Marine Ecosystems) *Research Coordinator* - Department of Oceanography	Francis.Marsac@ird.fr +27 (0)21 650 3279 +27 (0)21 650 3277 +27 (0)78 786 1861	Cape Town	24 Nov, 14h00
University of Cape Town - IRD	Eric Machu	Eric.Machu@ird.fr	Cape Town	24 november 2010
University of Cape Town - IRD	Eva Bucciarelli Pierrick Penven	Eva.Bucciarelli@univ-brest.fr pierrick.penven@ird.fr	Cape Town	10 december 2010
THRIP grant holder	Prof Florian Bauer Stellenbosch university	Work telephone number : 021 8084346 Work fax number code : 021 Work fax number : 8083771 Mobile number: 0845884346 Website address: http://www.sun.ac.za/wine_biotechnology E-mail address: fb2@sun.ac.za	Cape Town	December 9, 18h

Other meetings attended

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Meeting	Institution organizing	Date	City
INCONTACT Meeting of the African NCP network	DST	3 december 2010	Johannesburg
National System of Innovation Partnership Forum	DST	7 december 2010	Pretoria

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APPENDIX 2

QUESTIONNAIRE: SOUTH AFRICAN RESEARCH AND INNOVATION PROGRAMMES OPEN TO EUROPEAN RESEARCHER

Purpose:

- To identify, measure and describe the participation of EU researchers in South African S&T programmes.
- To identify existing SA-funded research and innovation programmes involving EU researchers and if possible projects (in-progress) that will allow their access.

1. Full contact details of your institution:

2. Does your institution currently run any South African-funded programmes that are open to international/European researchers?

3. If yes please provide names and managers of these programme(s).

4. Are there any of the programmes mentioned above that are specifically targeted for European - South African collaboration?

5. What are the funding arrangements for European researcher's participation in the programmes referred to above?

6. What are the rules for international/EU researchers' participation in the programmes?

7. Please specify constraints limiting EU researchers participating in your institutions/South African research and innovation programme(s)?

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8. What is the average duration of the programmes?

9. Are you aware of any current or future calls for proposals managed by your organisation or another South African organisation that you can encourage European researchers to respond to? Please provide details.

10. What is your organisation's position on opening up your programmes to European researchers? Is this desirable?

11. Can we contact you for more information?

12. Designation and contact details of respondent:

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APPENDIX 3
SOUTH AFRICAN UNIVERSITIES

Traditional universities

University of Cape Town: http://www.uct.ac.za/
University of Fort Hare: http://www.ufh.ac.za/
University of the Free State: http://www.ufs.ac.za/
University of KwaZulu-Natal: http://www.ukzn.ac.za/Homepage.aspx
University of Limpopo: http://www.ul.ac.za/
North-West University: http://www.nwu.ac.za/
University of Pretoria: http://web.up.ac.za/
Rhodes University: http://www.ru.ac.za/
University of Stellenbosch: http://www.sun.ac.za/
University of the Western Cape: http://www.uct.ac.za/
University of the Witwatersrand: http://web.wits.ac.za/

Comprehensive universities

University of Johannesburg: http://www.uj.ac.za/EN/Pages/home.aspx
University of South Africa: http://www.unisa.ac.za/
Nelson Mandela Metropolitan University:
http://www.nmmu.ac.za/Default.asp?bhcp=1
University of Venda: http://www.univen.ac.za/
Walter Sisulu University for Technology and Science: http://www.wsu.ac.za/
University of Zululand: http://www.uzulu.ac.za/

Universities of technology

Cape Peninsula University of Technology: http://www.cput.ac.za/
Central University of Technology: http://www.cut.ac.za/
Durban University of Technology: http://www.dut.ac.za/site/default.asp
Mangosuthu University of Technology: http://www.mut.ac.za/
Tshwane University of Technology: http://www.tut.ac.za/
Vaal University of Technology: http://www.vut.ac.za/new/

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APPENDIX 3
SOUTH AFRICAN RESEARCH CHAIRS BY UNIVERSITY

Title	Name	Name of Research Chair
University of Fort Hare		
Professor	Minkley, GA	Social Change
Nelson Mandela Metropolitan University		
Professor	Botha, JR	Nanophotonics
North-West University		
Professor	Bettinger, HF	Applied Molecular Modelling
Professor	De Jager, OC	Astrophysics & Space Physics
Professor	Greyvenstein, GP	Pebble Bed Modular Reactor
Rhodes University		
Professor	McQuaid, CD	Marine Ecosystems & Resources
Professor	Nyokong, T	Medicinal Chemistry and Nanotechnology
Professor	Schäfer, M	Mathematics Education
Stellembosch University		
Professor	Barbour, LJ	Functional Nanostructural Materials
Professor	Klumperman, L	Advanced Macromolecular Architectures
Professor	Kossmann, JM	Genetic Tailoring of Biopolymers
Professor	Opara, LU	Postharvest Technology
Dr	Schwoerer, H	Photonics, Ultrafast and Ultra-intense Laser Science
Professor	Seedat, S	Post-traumatic Stress Disorder
Professor	Stevens, G	Experimental Petrology
Professor	Van der Berg, S	Economics of Social Policy
Professor	Vvan der Walt, AJ	Property Law
Tshwane University of Technology		
Professor	Dakora, FD	Agrochemurgy & Plant Symbioses
Professor	Muchie, MM	Innovation Studies
University of Cape Town		
Professor	Bhorat, H	Econometric Modelling
Professor	Blackburn, JM	Functional Proteomics
Professor	Brombacher, F	Immunology of Infectious Diseases in Africa
Professor	Chibale, K	Drug Discovery

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Title	Name	Name of Research Chair
Professor	Combrinck, MI	Clinical Neurosciences Research
Professor	Cornell, DLC	Customary Law, Indigenous Values, and Dignity Jurisprudence
Dr	De Blok, WJG	Astrophysics & Space Physics
Professor	Dheda, K	Lung Infection & Immunity in Poverty Related Diseases
Professor	Franzidis, JP	Minerals Beneficiation
Professor	Hamilton, CA	Archive & Public Culture
Professor	Harrison, STL	Bioprocess Engineering
Professor	Hewitson, BC	Climate Change
Professor	Jacobs, DS	Animal Evolution & Systematics
Professor	Jarre, A	Marine Ecology & Fisheries
Professor	Leibbrandt, M	Poverty & Inequality Research
Professor	McIntyre, DE	Health & Wealth in SA
Professor	Meintjies, EM	Brain Imaging
Professor	Mesthrie, R	Migration, Language & Social Change
Professor	Naidoo, KJ	Scientific Computing
Professor	Ntsebeza, L	Land Reform & Democracy in SA: State & Civil Society Dynamics
Professor	Parker, MI	Cancer Biology
Professor	Philander, SGH	Modeling of the Coupled Ocean-Land-Atmosphere Phenomena related to climate
Professor	Pieterse, EAP	Urban Policy
Professor	Reddy, BD	Computational Mechanics
Professor	Shearing, CD	Security and Justice
Professor	Tayob, AI	Islam, African Publics & Religious Values
Professor	Williamson, AL	Vaccinology
University of Johannesburg		
Professor	Alexander, P	Social Change
Professor	Viljoen, F	Geometallurgy
University of KwaZulu-Natal		
Professor	Gqaleni, N	Indigenous Health Care Systems Research
Professor	Johnson, SD	Evolutionary Biology
Professor	Maharaj, HM	Gravitating systems
Professor	May, J	Development Economics
Professor	Ndung'u, T	Systems Biology of HIV/AIDS

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Title	Name	Name of Research Chair
Professor	Petruccione, F	Quantum Information Processing & Communication
Professor	Posel, DR	Economic Development
Professor	Ramjugernath, D	Fluorine Process Engineering & Separations Technology
University of Limpopo		
Professor	Ngoepe, PE	Computational Modeling of Materials
University of South Africa		
Dr	Hoppers, CAO	Development Education
University of Pretoria		
Professor	Bennett, NC	Mammal Behavioural Ecology & Physiology
Professor	Bradlow, D	International Development & African Economic Relations
Professor	Chakraborti, S	Statistics
Professor	Crouse, PL	Fluoro-material Science & Process Integration
Professor	Engelbrecht, AP	Artificial Intelligence
Professor	Klevansky, SP	Complex Systems
Professor	Rand, B	Carbon Technology and Material
University of Western Cape		
Professor	Bajic, V	Bioinformatics & Human Health
Professor	Cousins, B	Development Economics
University of Zululand		
Professor	Revaprasadu, N	Nanotechnology
University of Wistwatersrand		
Professor	Adler, J	Mathematics Education
Professor	Coetzee, M	Medical Entomology & Vector Control
Professor	De Mello Koch, R	Fundamental Physics & String Theory
Professor	Dirr, HW	Protein Biochemistry & Structural Biology
Professor	Durrheim, RJ	Exploration, Earthquakes and Mining Seismology
Professor	Harrison, P	Development Planning and Modelling
Professor	Henshilwood, CS	The Origins of Modern Human Behaviour
Professor	Hildebrandt, D	Sustainable Process Engineering

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Title	Name	Name of Research Chair
Dr	Madhi, SA	Vaccine Preventable Diseases
Professor	Marques, SD	Bio-inorganic Chemistry
Professor	Marwala, T	Intelligent Systems
Professor	Pillay, V	Pharmaceutical Biomaterials & Polymer-Engineered Drug Delivery Technologies
Walter Sisulu University		
Professor	Goduka, NI	Indigenous Knowledge Systems

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