



CSIR STRATEGIC RESEARCH RELATIONSHIPS REPORT – NOVEMBER 2006

1. PURPOSE

This document reports on the progress that has been made in the management of strategic research relationships between July and October 2006 and outlines the activities that are planned during the remainder of the financial year.

2. BACKGROUND

The CSIR has bilateral and multi-lateral relationships with tertiary education institutions, research institutions and private sector R&D units, both nationally and internationally. Relations have in most cases been formalised through MoUs, which typically identify possible areas of collaboration in research. The relationships are developed and managed in the context of the CSIR mandate, which emphasises partnerships and alliances, and the CSIR strategic objectives, particularly strengthening the science and technology base of the organisation.

3. COLLABORATION WITH TERTIARY EDUCATION INSTITUTIONS

Since July 2006, the priority with regard to research relationships with TEIs has been to implement existing agreements and to initiate new relationships with previously-disadvantaged institutions.

3.1 Implementation of Existing Agreements

CSIR has MoUs on research collaboration with (i) University of Cape Town, (ii) University of Stellenbosch, (iii) University of Johannesburg, (iv) Wits University, and (v) University of Pretoria. The MoUs have been implemented by initiating new research projects and monitoring ongoing projects through steering committee meetings.

University of Cape Town

CSIR's MoU with University of Cape Town expired on 31 December 2005. A revised MoU will shortly be signed and will become effective retroactively from 1 January 2006. The revised MoU is likely to cover the same research areas that were the subject of the first MoU, but also deals with matters of intellectual property. The areas of collaboration that are specified in the MoU, ongoing research and CSIR champions are shown in Table 1.

Table 1: Current research collaboration with UCT

<i>Research Areas</i>	<i>Ongoing Research Projects</i>	<i>CSIR Champion</i>
Information and communication technology	High Performance Computing (HPC)	Johan Eksteen
Energy	-	-
Environment and coastal zone management	African Centre for Coordinated Earth Stewardship Science (AC-CESS)	Laurie Barwell

Progress in implementing ongoing projects was reviewed by the Steering Committee on 19 September. The main issues and decisions were that:

- The Centre for High Performance Computing Management Board will soon decide the preferred HPC vendor. Two key appointments in the CHPC will be joint UCT-CSIR appointments.
- UCT and the CSIR have applied for a joint chair in the field of modelling of climate change phenomena, under the banner of ACCESS. The nominee for this Chair is Prof George Philander. The Chair will be allocated in time for Prof Philander to assume this position on 1 Jan 2007.
- A seminar will be held as part of next year's UCT/CSIR open day to improve awareness of the objectives of the CSIR and opportunities for prospective bursars.

New projects that are being considered are on:

- Nanostructured materials and nanocomposites.
- Flow validation and characterisation.

The CSIR/UCT scholarship agreement has been extended by one year from 1 January 2006. The next agreement, which will take effect from 1 January 2007, will address issues of intellectual property arising from the work of the students. Both CSIR and UCT contribute R300,000 to the scholarship programme annually. Ten students are currently sponsored. Five of them will complete their studies at the end of 2006, four at the end of 2007 and one in 2008. Of the students supported by CSIR:

- Seven are black and three are white.
- Four are male and six are female.

Table 2 shows the students sponsored under the agreement by field of study and level of training.

Table 2: Students Sponsored under the Agreement

<i>Field of Study</i>	<i>Sub-Field</i>	<i>Hons</i>	<i>MSc</i>	<i>PhD</i>
Computer Science	Applied Computing	1		
Biosciences	Molecular Biology	1	1	2
	Chemistry		1	1
Materials Science	Applied Material Science		1	
Physical sciences	Physical Oceanography			1
Integrated Planning	Construction & Economics			1
Total		2	3	5

University of Stellenbosch

CSIR's MoU with University of Stellenbosch covers the period from 7 October 2004 to 6 October 2007. The areas of research interest to the CSIR that are specified in the MoU are information and communication technology, environment, human resource development, space and earth observation and logistics.

Prior to the first Steering Committee meeting that was held on 18 September, there had been no deliberate effort to implement the MoU. The main decisions of the meeting of 18 September were that:

- A workshop should be held in February 2007 to review areas of collaboration in light of the changes that have taken place at US and CSIR since the MoU was signed.
- A presentation should be made at Stellenbosch University on the new CSIR and research areas of priority to CSIR.

Despite the lack of implementation of the MoU some collaboration that is specified in Table 3, is taking place between CSIR and University of Stellenbosch.

Table 3: Current Research Collaboration with University of Stellenbosch

<i>Ongoing Research Projects</i>	<i>CSIR Champion</i>
Water chemistry	Mike Louw
Dryland salinity	John Bean
Invasion biology	Brian Van Wilgen
Multi-sensor Microsatellite Imaging	Bob Scholes

University of Johannesburg

CSIR's MoU with University of Johannesburg covers the period from 28 March 2006 to 27 March 2008. The areas of collaboration, ongoing research and CSIR champions are shown in Table 4.

Table 4: Current Research Collaboration with University of Johannesburg

Research Areas	Ongoing Research projects	CSIR champion
Laser-based applications in health	-	Dr Thulani Dlamini
Laser-based applications in materials science and manufacturing	-	Dr Thulani Dlamini; Hardus Greyling
Security of information and communications technologies	-	Envir Fraser
Sustainability and climate change studies	<p>Earth observation by remote sensing</p> <p>Applications of Earth Observation by Remote Sensing</p> <p>Air quality management urban and regional: Regional passive deposition; implementation of air quality act</p> <p>Updating of National state of the atmosphere report</p>	<p>Andrew Tehorst</p> <p>Philip Frost</p> <p>Mark Zunckel; Greg Scott</p>
Metals casting technologies	Metals & Metals Processes work - Institute for Sustainability Studies	Henning Viljoen

At the Steering Committee meeting of 2nd October 2006, it was reported that new projects that are being considered are:

- Establishment of a sustainability science institute, in collaboration with Billiton.
- The establishment of a joint chair in nanotechnology.
- Collaborative research opportunities between UJ and National Laser Centre and Meraka.
- Research information management project, which has been initiated by several South African universities.

With regard to human capacity development:

- Two CSIR students have obtained Masters degrees in laser-based applications in health and are now studying towards PhDs. CSIR and UJ are considering making joint appointments.
- CSIR staff are being trained in remote sensing.

The establishment of a scholarship agreement between CSIR and UJ will shortly be discussed.

University of the Witwatersrand

The current CSIR/University of Witwatersrand MoU was signed on 3 April 2006. The areas of collaboration are: Aerospace, light metals development, environmental science, geoscience, software engineering, systems modelling, landwards science and genetics.

Research collaboration is currently taking place through the African Centre for Gene Technologies. There is also a project on the generation and propagation of vortices in aerodynamic applications, which is being done jointly by DPSS and Wits Department of Aeronautical Engineering.

Currently CSIR staff are involved in teaching and supervising students studying environmental science and geology.

Meraka, on behalf of the DST, is engaged in developing a proposal for the establishment of a large-scale data sets research facility at Wits.

With regard to research collaboration, the focus since July 2006 has been on:

- Holding a workshop to discuss joint research projects.
- Convening a meeting of the Steering Committee to monitor progress.

The CSIR/Wits scholarship agreement was renewed 24 February 2006. Both CSIR and Wits contribute R300,000 to the scholarship programme annually. Currently, three students, all of whom are studying nanotechnology at PhD level, are supported. All three students will complete their studies at the end of 2006. Of the students enrolled at Wits, two are male and one is female, and all three are black.

University of Pretoria

Collaboration with University of Pretoria largely takes place through SERA. Task teams have been established to further research in specific areas. The most active task teams and examples of ongoing research are shown in Table 5.

Table 5: Current Research Collaboration with University of Pretoria

Research Areas	Ongoing Research	CSIR Champion
African Centre for Gene Technology	South Africa Malaria Initiative	Jane Morris
Bio-artificial Liver Support System	Development of a support system for patients suffering from acute liver failure	Sean Moolman
Digital@SERA	Human language technologies	Johan Eksteen
	Information security	
Food science and technology	Development of a novel, edible sorghum protein coating to extend the shelf life of pears	Corinda Erasmus
Food security	Identification of indigenous food crops that grow in water-poor environments but still yield sufficient nutrients to combat food insecurity	Tshidi Moroka
Plant propagation and cultivation technologies	Bio-diesels research	Lenie Venter
Sustainable rural development	Greater Giyani Rural Development Project (commercialisation of various projects)	Sibongile Pefile
Centre for Applied Mycological Studies	Cancer causing fungi in South African maize crops	-
	Natural fungal-based flavourants	
Water	Biological control of cyanobacteria	Pete Ashton
	Eco-sanitation	
	Rhizomediation	
	Cholera	

Several expressions of interest on cereals, legumes and cassava have been submitted under the ACGT programme, including one on the developing of genomics resources for molecular breeding of drought tolerant cassava.

Potential collaboration in the area of plant biotechnology has also been discussed with institutions in the United Kingdom.

A recent review of the BALSS project which looked at results to date and the future of the project was very positive. Discussions will shortly be initiated with Georgia Institute of Technology to discuss potential for commercialisation.

A review of the task teams will be undertaken with a view to retaining only those that are active and relevant.

Table 6 shows CSIR staff and non-CSIR bursars who are funded by the CSIR at the University of Pretoria. A total of 20 CSIR-supported students are enrolled at University of Pretoria. Of the number supported:

- Five are black and 15 are white.
- Thirteen are male and seven are female.

Table 6: CSIR-funded Students at University of Pretoria

<i>Field of Study</i>	<i>Sub-Field</i>	<i>Hons</i>	<i>MSc</i>	<i>PhD</i>
Computer Engineering	-	1	2	
Environmental Science	-	1		1
Biosciences	Microbiology			1
	Chemistry	1	2	2
Security Studies	-		1	
Chemical Engineering	-		1	
Civil engineering				1
	-			
Transportation	-	1		
Mechanical engineering	-	2		
Electronics and Electrical	-	2		
Mining engineering	-	1		
TOTAL		9	6	5

3.2 Initiating and Expanding Relationships with TEIs

Relationships with several TEIs are either being initiated or are being expanded. These initiatives are summarised in Table 7, with respect to University of KwaZulu-Natal, Walter Sisulu University of Technology, University of Venda, University of Limpopo, University of Fort Hare and Tshwane University of Technology.

Table 7: New Relationships with Tertiary Education Institutions

<i>Institution</i>	<i>Current Initiatives</i>
University of KwaZulu-Natal	A workshop was held with the University of KwaZulu Natal earlier this year to discuss how to broaden the relationship with the university beyond the area of natural resources and environment. A follow-up meeting is planned. It is anticipated that an MoU covering new areas of collaboration will be agreed upon during this financial year.
Walter Sisulu University of Technology	<p>CSIR was represented at the Walter Sisulu University Annual Rural Development conference in September with the purpose of finding out possibilities for collaboration with university in the context of the CSIR strategic relationship.</p> <p>The relationship that has been initiated with the WSU through participation in the conference will be enhanced through collaborative projects that are expected to be initiated by CSIR and WSU researchers in response to a recent call for proposals by the CSIR.</p> <p>In addition, strategic partnerships should be pursued between the Technology Transfer for Social Impact office and the Rural Development Centre (WSU), Independent Development Trust and Eastern Cape Appropriate Technology Unit. (Detailed report is in Attachment A).</p>
University of Venda	University of Venda researchers are expected to collaborate with CSIR through the support of the Cooperation Fund.
University of Limpopo	University of Limpopo has been invited to discuss with CSIR how to expand current collaboration. University of Limpopo researchers are, however, expected to collaborate with CSIR through the support of the Cooperation Fund.
University of Fort Hare	University of Fort Hare researchers are expected to collaborate with CSIR through the support of the Cooperation Fund.
Tshwane University of Technology	Possible research collaboration with TUT is being explored. Dates for a workshop to explore specific areas of collaboration are being discussed. Tshwane University of Technology researchers are also expected to collaborate with CSIR through the support of the Cooperation Fund.

3.3 Cooperation Fund

The purpose of the Cooperation Fund is to facilitate the relationship between the CSIR and TEIs in South Africa by enabling researchers to pursue initial collaborative projects within the themes identified in the MoUs. A call for proposals for the Cooperation Fund was issued on 6 October and is aimed specifically at strengthening relations with the following institutions with which the CSIR either has a formal relationship or seeks to establish a formal relationship: (i) University of Cape Town, (ii) University of Stellenbosch, (iii) University of Johannesburg, (iv) Wits University, (v) Walter Sisulu University of Technology, (vi) University of Venda, (vii) University of Limpopo, (viii) University of Fort Hare and (ix) Tshwane University of Technology. Up to 25 projects will be supported, each with a maximum grant of R75,000. It is expected that decisions on the proposals to be funded will be made by 30 November 2006.

4. Private Sector

Close interaction has been maintained with Boeing and Sasol in order to explore possibilities for research collaboration. With regard to Boeing, possible research areas that will be explored through MSM include development of natural fibres for use in aircraft and titanium beneficiation. A document that outlines the intention of the relationship was prepared in March.

The MoU with Sasol covers the period 7 September 2006 to 7 September 2009. The areas of collaboration are nanoscience and nanotechnology, photonics; and coating, composites and catalysts. The first steering committee meeting will be convened during this quarter. Sasol will convene a workshop for several partners, including CSIR, on October 27 on human capital development.

5. Research Institutions

CSIR, through the Materials Science and Manufacturing operating unit, is considering expanding current collaboration with NIMS in Japan. The areas of interest are advanced metals, nanoscience and human capital development. Discussions will be held with DST to establish its possible support and to understand how the planned initiatives could be linked to national programmes and DST bilateral agreements. This will be followed by a CSIR visit to NIMS to secure agreements on specific projects.

6. Research Alliances

6.1 Global Research Alliance

CSIR staff collaborate with researchers from other member organisation of the GRA through the development of joint papers, implementation of research projects, as well as through exchange programmes (See Attachment A).

Two important events that will take place next year are:

- *World Bank Global Forum*: The World Bank proposes to convene a Global Forum in Washington, DC on February 2007 to discuss strategies, programmes, and policies for building science, technology and innovation capacity in developing countries for sustainable growth and poverty reduction. The principal theme of the Global Forum is that in today's increasingly competitive, global economy, STI capacity building is essential for all countries. The World Bank has emphasised the importance of the participation of all the member organisations. It is recommended that the CSIR should be represented and the Global Forum and present a paper on experiences in S&T and human capacity development in South Africa.
- *Annual Meeting of Principals, Helsinki*: The 6th Annual Meeting of GRA Principals will be held in Helsinki in May 2007 and will mark the end of the first five years of the alliance. The meeting is expected to review the strategic direction of the alliance, consider new members and discuss supporting self-funded research work amongst the partners. The meeting will be chaired by the new President Dr Mashelkar. It is recommended that the CSIR should be represented at the meeting.

A detailed report of the CSIR collaboration with other GRA partners is included as Attachment B.

6.2 Regional Research Alliance

The Regional Research Alliance Board met in July. The main concerns were:

- the absence of collaborative projects among the partners which was exacerbated by the difficult economic situation in Zimbabwe,
- the impending merger of Botswana Technology Centre with another organisation which made future commitment by the new organisation difficult to predict, and
- inadequate interaction of researchers within the various theme groups.

Since the meeting, three proposals on infrastructure and biofuels have been developed. One has not been successful and decisions on the other two have not yet been announced. Table 8 shows the thematic areas of the alliance and the CSIR champions.

Table 8: Regional Research Alliance Thematic areas

<i>Thematic Areas</i>	<i>CSIR Champions</i>
Water	Joy Leaner
Building Construction and Infrastructure	Theuns Knotze
Energy	Maxwell Mapako

The next meeting of the Board will be held in February 2007 in Botswana.

7. Performance Management Framework

During two of the steering committee meetings, the importance of monitoring the impact of relationships was emphasized. Table 9 presents a framework for measuring the performance of the MoUs.

Table 9: Framework for Measuring Implementation of Memoranda of Understanding

		<i>Year 1</i>	<i>Year 2</i>
Research collaboration productive and has impact	<ul style="list-style-type: none">• Number of large scale strategic research programmes initiated and implemented• Number of researchers in each institution collaborating on joint projects		
HCD Objectives of CSIR and of South Africa advanced	<ul style="list-style-type: none">• Number of full-time post graduate students financially supported through the Mou• Number of full time students graduating• Number of researchers participating in exchange programmes• Number of CSIR researchers lecturing/ supervising students in collaborating TEIs		

ATTACHMENT A: TRIP REPORT: 2ND ANNUAL RURAL DEVELOPMENT CONFERENCE, WALTER SISULU UNIVERSITY

1. Background

Walter Sisulu University is seeking to establish itself as a developmental institution in association with several partners, including Independent Development Trust, Development Bank of Southern Africa and Konrad Adenauer Foundation. As part of this approach, the university organised a conference from 27 to 29 September in Mthatha to assess progress made since last year's conference and to discuss how the conference can contribute better to the implementation of various policies within the province.

CSIR was represented by Khungeka Njobe, Boyse Pillay and Kagiso Keatimilwe with the purpose of finding out possibilities for collaboration with the university in the context of the CSIR's strategic relationships initiative, and to share information on CSIR's experience in science and technology for social impact. (The presentation is attached).

The conference was also attended by representatives of TEIs, local government departments, community organisations and development organisations.

2. Issues and Discussions

The presentations that were made covered:

- Major socio-economic challenges in the province.
- How higher education can impact on communities. This involved a presentation of experiences from India and Australia of TEIs that support rural development by working closely with communities and designing curriculum in response to community needs.
- Public-private partnerships in support of community development (E.g. WSU's collaboration with Metropolitan).
- Possibilities for advancing plans for an Eastern Cape plough-back movement.
- Business opportunities for communities in the context of the 2010 Soccer World Cup.
- Opportunities for using history and culture to advance rural development.

Discussions were organised in the following groups (Commissions):

- Preparing and empowering communities for integrated community development.
- Entrepreneurship, diversification and generating revenue in villages and small towns.
- National programme for training community development workers to support communities to access available opportunities.
- Environmental management, responsible tourism, promotion and protection of rural heritage.
- Rural development, people's health and well-being.
- Rural settlements renewal programmes.
- Human settlements.
- Applying appropriate technologies.

The main themes that emerged from the presentations and discussions were that:

- The major challenges in the province include poverty, AIDS, inadequate social services and the shortage of skills.

- People should have a voice in development because they have a vast knowledge of the issues that affect them.
- TEIs and research institutions can be relevant only if they address the needs of communities by becoming resources for the areas in which they are located.
- The participation of national institutions is important in addressing the issues identified.
- It is crucial for development to occur within cultural contexts.

The full recommendations of the group discussions will be communicated through the conference proceedings.

3. Conclusions

The conference provided an opportunity for the CSIR to:

- Communicate its contribution to national development and experience in technology transfer.
- Explain envisaged opportunities for research collaboration with other TEIs, including Walter Sisulu University.
- Consider possible future partnerships with other organisations that were represented.

4. Way Forward

The relationship that has been initiated with the WSU through participation in the conference will be enhanced through collaborative projects that are expected to be initiated by CSIR and WSU researchers in response to a recent call for proposals by the CSIR.

In addition, strategic partnerships should be pursued between the Technology Transfer for Social Impact office and the Rural Development Centre (WSU), Independent Development Trust and Eastern Cape Appropriate Technology Unit.

ATTACHMENT B: CSIR COLLABORATION WITH GLOBAL RESEARCH ALLIANCE PARTNERS

- Dr Marthinus Horak and Dr Vinesh Maharaj are participating in the pilot project to undertake the early clinical validation of an herbal mixture being used in Tanzania to treat the opportunistic infections of people living with HIV/AIDS. This project is being done in association with the World Bank and the National Medical Research Institute of Tanzania.
- Mr Steve Szewczuk co-authored the recently-published World Bank/GEF report entitled *Assessment of the World Bank/GEF Strategy for the Market Development of Concentrating Solar Thermal Power*, a GRA project that was done for the World Bank in India, Egypt, Morocco and Mexico.
- Dr Marius Claassen, Dr Peter Ashton, Dr Joy Leaner and others participated and contributed to the GRA booklet entitled *Science and Technology-based Water Scenarios for sub-Saharan Africa* that was published recently.
- The Meraka Institute is participating in a GRA project entitled *Can Low-cost Networking provide a solution to wider ICT Network Access in Developing Countries*. This work is being conducted in Zambia under the leadership of the TNO.
- Dr Sharon Biermann and Dr Marius Claassen are involved in a GRA project to develop integrated technology solutions for megacities.
- The CSIR is a member of a GRA-led research consortium that has just made a submission to the UK Department for International Development (DFID) on energy efficiency in several countries in the developing world.
- Mr Steve Szewczuk is leading a GRA team to develop a high-impact, integrated project on using energy as a catalyst for development.
- Mr Rob Hounsome is leading a GRA team to develop a project to study the impact of climate change on sub-Saharan Africa.
- Mr Rob Hounsome participated in site visits and preparation of submissions for the environmental and social impact assessment of the Kalpasar project in India.
- Dr Uwe Lommatzsch of the Fraunhofer-Gesellschaft at on the Research Advisory Panel of CSIR MSM recently.
- Dr Mongameli Mehlwana spent some time at Battelle in the USA to work on his doctorate.
- Dr Mongameli Mehlwana read a paper at an international conference in Germany on renewable energy, following an invitation organised by the GRA.
- Mr Hans Ittmann spent some time in Australia on an invitation from CSIRO.
- Several small-scale benchmarking initiatives have been undertaken.
- Ms Madeleine van Heerden and a young black professional will be visiting CSIR in India and CSIRO in Australia shortly to study their information practices.
- The CSIR is involved with the Grassroots Innovation Initiative of the GRA, which is being conducted in association with the World Bank and Prof Anil Gupta of India.
- The CSIR will be involved in a proposed project with NEPAD OST to showcase African grassroots innovations at the African Union Summit in January 2007.
- Prof Jan van der Greef, one of the world's leading systems biology experts, will be coming to the CSIR in December 2006