



ANNUAL REVIEW 2002



VISION

The SERA parties share a vision for a world-class, innovative and market responsive business that delivers appropriate information, facilitates knowledge connectivity through knowledge workers, finds the best minds and connects them to a global network of minds, and protects intellectual property.

The cooperation between the alliance parties is aimed at fostering a non-exclusive academic, scientific and technological environment that will benefit all participants and the country as a whole.

The alliance implements its objectives through joint projects and through SERA (Pty) Ltd, which operate across a broad range of activities directly related to technology transfer. SERA (Pty) Ltd deals specifically with intellectual property and commercialisation matters.



VALUES

- Excellence and international competitiveness
- An overriding commitment to performance, outputs and results
- A culture of innovation, creativity and entrepreneurship
- Engaging relevance to South Africa's needs and priorities, in all facets of the alliance
- People and their development, being at the centre of everything we do

The Southern Education and Research Alliance (SERA) is the formal embodiment of a strategic alliance between the University of Pretoria (UP) and the CSIR.

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Through alliancing and partnering, SERA is striving to sow the seeds for a better tomorrow, by creating value through people, knowledge, innovation and solutions that will lead all South Africans to brighter horizons.

Some highlights and achievements

Since its inception in 1999, SERA has made considerable progress in fostering an academic, scientific and technical environment that benefits and enhances learning, development and innovation.

Employees in the partner organisations have been given access to new domains of facilities and opportunities, and joint task teams have been exploring synergies, built relationships and worked together to achieve objectives.

The selection of highlights profiled here give some indication of how SERA activities, underpinned by partnerships, joint ventures and employee achievements, have supported the key pillars of the National System of Innovation and enhanced collaboration to stimulate competitiveness and sustainable development.

Commercialising intellectual property

SERA [Pty] Ltd has been established as a private company to serve as the intellectual property exploitation arm of the alliance. Its main objective is to identify, protect, value and exploit the intellectual property of the CSIR and the University of Pretoria, while focusing on pursuing the best and most profitable means of bringing technologies to market.

The company is also responsible for the quality of contracting in respect of intellectual property matters and for creating awareness about the value of intellectual property.

International award for local invention

A local innovation for the effective treatment of tuberculosis received international recognition when Dr Namrita Lall, a researcher at the University of Pretoria, was awarded a UNESCO fellowship for an outstanding contribution to the life sciences. SERA (Pty) Ltd advised on the patent strategy and assisted with patent filing.

African Centre for Gene Technologies

The African Centre for Gene Technologies has been established with a particular focus on gene and genome analysis and application. The aim of this national centre of expertise in biotechnology is to meet the needs of an emerging biotechnology industry in South Africa and contribute to important national issues such as vaccines, HIV/AIDS, malaria and crop production.

International recognition for Dr Namrita Lall of the University of Pretoria for an outstanding contribution to the treatment of tuberculosis, where SERA (Pty) Ltd assisted with patent strategy and filing.



Creating empowerment opportunities for the people of the African continent

CSIR and University of Pretoria researchers are involved in an European Union-funded project aimed at enhancing southern Africa's fruits and nuts export industries. The project focuses on developing and manufacturing novel high value edible coatings and films to improve shelf-life quality.

SERA (Pty) Ltd assisted in preparing the Consortium Agreement and dealing with the complexities of the related Intellectual Property.

Breakthrough with bio-artificial liver support system

A group of dedicated CSIR and University of Pretoria researchers made a breakthrough in the development of a novel bio-artificial liver support system for acute liver failure. The support system successfully performs essential liver functions to bridge severe liver failure patients to a liver transplant or recovery.

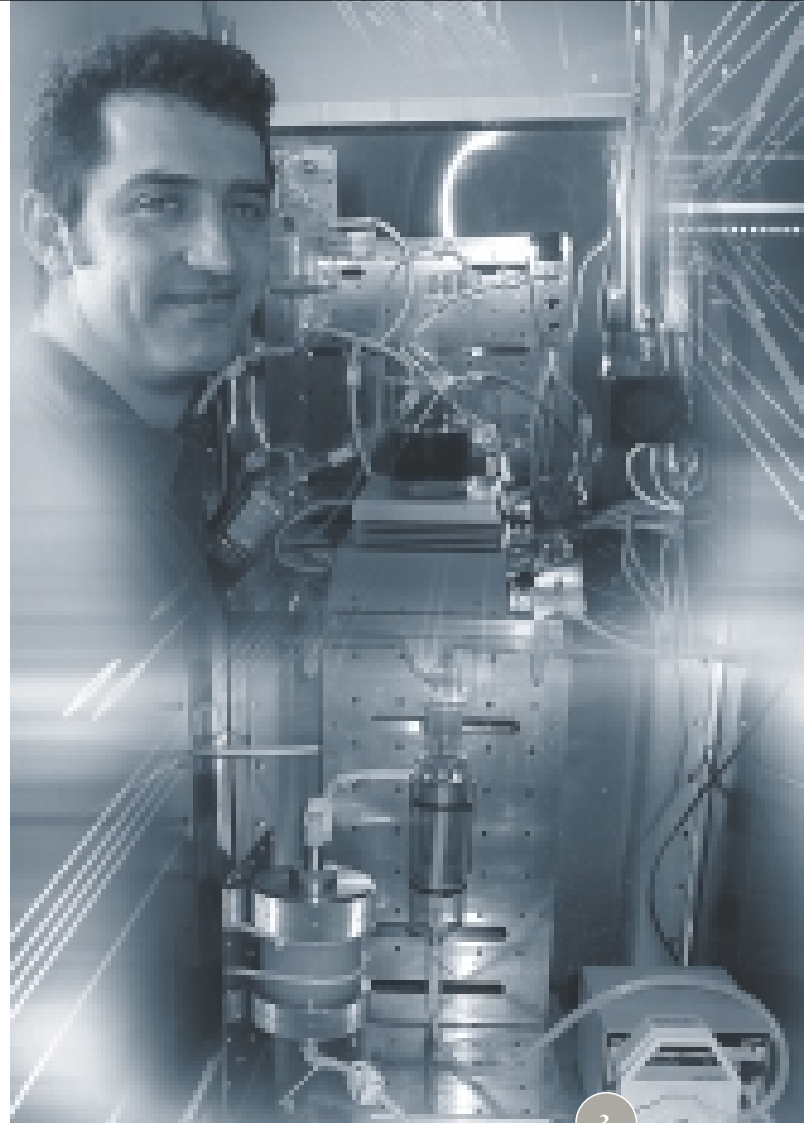
SERA supported the team with funding, while SERA [Pty] Ltd registered the provisional patent and dealt with the related intellectual property matters for the invention.

Increasing performance levels

Backed by experience and the latest in technology research, SERA's Sports Technology Centre can assist athletes and sports teams in increasing performance levels. The Centre, based at the CSIR, has formalised close working relationships between the CSIR, University of Pretoria and TuksSport, with a view to jointly promote a "Sports Village and Techno Park" in the Pretoria area.

Unique concept enhances commercial forestry

SERA provided funding for research that led to the development of an innovative concept for the mass production of hybrid seed for commercial forestry purposes. The concept is labour intensive and promises to create numerous sustainable job opportunities and empower rural communities. The Government's Poverty Alleviation Fund will fund implementation.



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A group of dedicated CSIR and University of Pretoria researchers have made a breakthrough in the development of a bio-artificial liver support system (BALSS) for acute liver failure. Seen here with a prototype of the BALSS is one of the team members, Kobus van Wyk of the Department of Mechanical Engineering at the University of Pretoria.

Creating opportunities for students in a business environment

The SERA Academic Initiatives Postgraduate Incentive Scheme has, over the last year, offered a number of postgraduate students exposure to a business environment while doing research for their postgraduate studies. Working at the CSIR on their research projects, the students received mentoring and an allowance and had access to facilities to do their research.

Enhancing intellectual capital

As a result of the partnership between the CSIR and University of Pretoria, SERA now has significant intellectual capital and critical mass in the field of water resource management that is internationally competitive and locally relevant. Globally recognised for their expertise in water resource management, SERA representatives have been involved in the activities of international associations and policy formulation. Invitations have been received to participate in international meetings on water resource management.

Creating a knowledge economy environment

Partnered by the Gauteng Provincial Government's Blue IQ initiative to establish The Innovation Hub, SERA has made 60 ha of prime agricultural land available for this development. Situated on the knowledge axis between the CSIR and the University, The Innovation Hub will create a unique environment for knowledge intensive industries, entrepreneurs, educators and researchers to meet, network and explore business opportunities.

Fast deployment of relevant South African skills

The CoachLab™ concept, where tertiary education, the private sector and The Innovation Hub partner to rapidly develop world-class human capital for the knowledge intensive industry, has been successfully launched with the establishment of an ITCoachLab. The first postgraduate students from the University of Pretoria enrolled in the ITCoachLab have confirmed the value of working on real-time projects for industry and gaining experience under the watchful eyes of mentors from the international software consulting company EPI-USE Systems. Partnerships

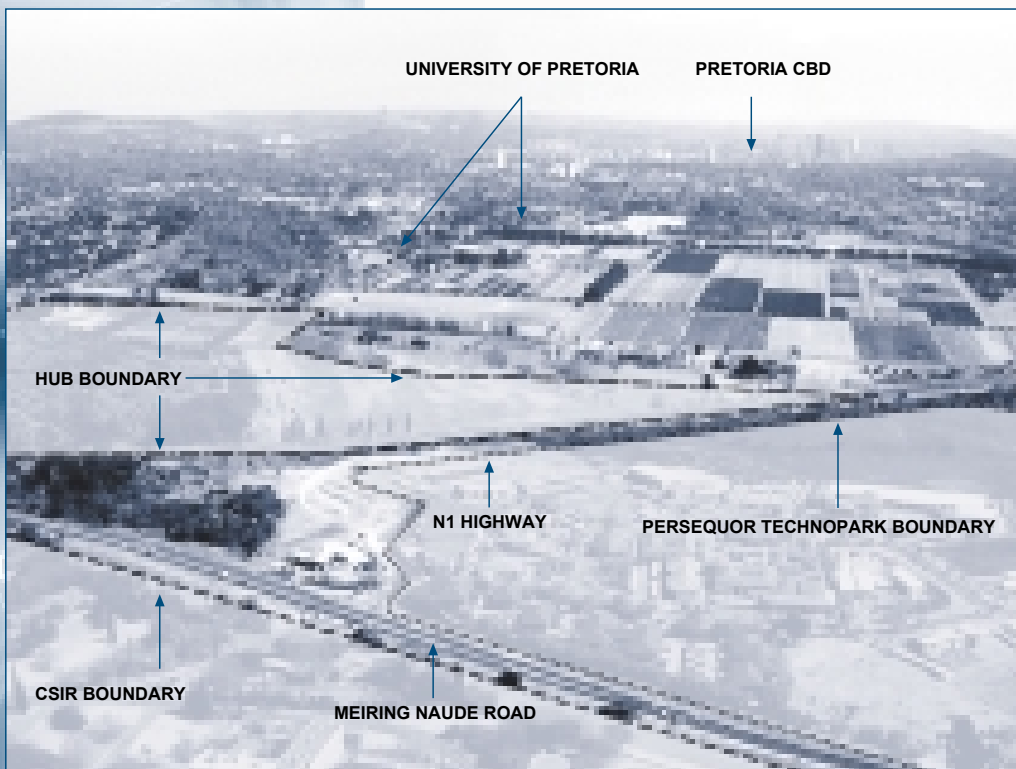
for this programme will focus on technology areas where a need exists for the fast development and deployment of relevant South African skills.

Supporting creators of the future

As part of the pilot activities of The Innovation Hub, a pilot Business Incubator is operational, with six resident start-up companies currently employing about 20 people. These young companies, operating in the areas of electronics, virtual reality and visualisation, communications networks, and secure information technology, have already recorded a number of successes, including local and international contracts, partnerships and shareholding.

The proposed 60 ha site for The Innovation Hub is located in Pretoria, Gauteng. It is situated on a unique research/education knowledge axis between the CSIR and the University of Pretoria, immediately west of and adjacent to the N1 highway and in close proximity to the corridor to Johannesburg and the Johannesburg International Airport.

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A showcase for innovation

The announcement by The Innovation Hub of a concept to create a permanent showcase for local and international technology has been met with positive reactions and a great deal of interest from both private and public sectors.

The Switch, planned for location at the core of The Innovation Hub site, will create a living exhibition to showcase global and local technology-rich innovations that will boost the early exposure of next generation technology and market opportunities. This initiative can contribute significantly to a visible 'smart' identity for South Africa. The project will commence with a feasibility study. A number of workshops have been held with industry and government role players to refine the concept.

Indigenous technology helps develop rural communities

A Centre for Indigenous Knowledge and Appropriate Technology (CINDEK), one of the first SERA projects, has been established to conduct informal training, research and development in the communal rural communities of southern Africa. CINDEK activities will be based on the diverse cultural heritage and indigenous knowledge systems of the peoples of southern Africa.

Strengthening expertise in technology management

In line with SERA's strategic objective of increasing the international competitiveness and local relevance of its teaching and research activities, the University of Pretoria has established a Chair in Life Cycle Engineering in its Department of Engineering and Technology Management in the Faculty of Engineering, Built Environment and Information Technology. The Chair has been established with the financial assistance of the Automotive Industry Development Centre (AIDC) to contribute to the establishment of a viable South African automotive industry, which is competitive locally and internationally, and capable of achieving both continuous growth and sustainable job creation. The AIDC is a private company associated with the Gauteng Automotive Cluster, one of the 11 Blue IQ projects aimed at stimulating the South African Automotive Industry. The AIDC shareholders are the Gauteng Provincial Government and the CSIR.

Developing human resources for the automotive manufacturing industry

SERA, in partnership with the AIDC, has launched an Automotive Focus Group that will respond to the needs of the automotive industry for knowledge and technology transfer to build world-class capacity in Gauteng.

CINDEK PICS - awaiting



Mr Roger Jardine



Mr Ben Alberts

“Encouraging progress has been made over the past year with the strategic alliance between the CSIR and the University of Pretoria, now branded as the Southern Education and Research Alliance (SERA). SERA will continue to add value to and complement the activities of its members, and in collaboration with peer institutions and other organisations, through exploiting synergies and reducing overlaps and potential conflicts of interest.” - joint statement by Mr Roger Jardine, CSIR Board Chairman and Mr Ben Alberts, University of Pretoria Council Chairman.

Introduction

The global challenge of a rapidly growing knowledge economy is a compelling reality of the 21st century. In responding to the imperatives of this challenge, countries and organisations are becoming globally more competitive. As a result, highly skilled people, particularly knowledge workers, have become an increasingly scarce resource, critical to success. The consequence is that South Africa’s prime sources of competition for talent are no longer just local, but have become international.



Concurrently, a number of authoritative world competitiveness reports have confirmed that as a country, South Africa lags behind in the competitiveness race. Little time can be lost, therefore, in addressing these issues at both national and institutional level.

Essence of the Alliance

The White Papers on Higher Education and Science and Technology, in framing the National System of Innovation (NSI), have clearly delineated the requirement for substantially enhanced collaboration between the various science, engineering and technology institutions to stimulate national competitiveness and sustainable development. This, coupled with the need for a quantum leap in enhancing South Africa's competitiveness and attracting and retaining scarce and valuable human resources, demands the creative consideration of new ways for institutions to work much more closely together.

While the CSIR and the University of Pretoria face similar challenges, constraints and competition in local and global markets, the geographic proximity and existing close co-operation between the two organisations provide the ideal opportunity to pioneer new and powerful collaborations within the NSI.

In response to these imperatives and opportunities, a decision was taken in 1999 to establish a non-exclusive strategic alliance between the CSIR and the University of Pretoria. Creating such a world-class, world-scale consortium with significant education, research and technology transfer infrastructure and competence strengthens the ability of the CSIR and the University of Pretoria to contribute to national priorities in science and technology and effectively address their respective constraints and challenges.

Strategic priorities 2001/2002

The Memorandum of Understanding signed between the alliance parties in 2001 provides the foundation for its strategic trajectory and clarifies the strategic framework for SERA priorities and joint initiatives as reflected in Table 1 below. An overview of performance against strategic objectives for the period reviewed is reflected in Table 2.

TABLE 1: SERA strategic framework: priorities and joint initiatives

Priorities 2001'2002	Joint Initiatives
<ul style="list-style-type: none"> • Increase the number of top students in science and technology (S&T) • Improve the ability to attract and retain top academic and research staff • Increase the number of research projects • Increase market-facing business activities and opportunities • Promote and develop a business and entrepreneurial spirit • Establish greater networking opportunities • Accelerate transformation • Enhance the positioning of the partners as leaders in their respective fields 	<ul style="list-style-type: none"> • Academic initiatives including bursary and benefit schemes in relevant science and engineering areas, new and enhanced career opportunities and new post-graduate courses in important areas of science • Joint investment in S&T projects and platforms to improve research capacity and outputs, and exploit new market opportunities • Joint ventures to manage/exploit intellectual property, venturing and incubation • Increased collaboration with other tertiary education and research institutions • SERA communication strategy

From these strategic priorities a number of strategic objectives for the 2001/2002 financial year were formulated to guide the implementation of SERA activities and enable the measurement of performance against the longer-term priorities.

“With our abundant collective resources of human skills in science and technology, we can help to address poverty and underdevelopment in Africa, and place our continent on a path of sustainable growth and development. Working across disciplines and across boundaries allows us to find holistic solutions to a variety of challenges.”

- Dr Sibusiso Sibisi, CEO and President of the CSIR.



TABLE 2: Overview of performance against strategic objectives 2001'2002

2001'2002 Strategic Objectives	Performance against Objectives
Explore areas for continued joint strategic and business planning at institutional level	<ul style="list-style-type: none"> • 26 areas of synergy initially identified (21 market-facing themes and 5 internally directed topics) • 20 task teams identified • 11 task teams reported good progress • CSIR concrete laboratory transferred to UP
Build the SERA brand to give it an identify as an unique entity	<ul style="list-style-type: none"> • SERA brand and corporate identity developed • Brand positioned through CSIR and UP Intranet sites internally and in promotional material and at events externally
Target, enhance and expand collaborative ventures and partnerships with other Tertiary Education Institutions	<p>Alliance has reinforced cross-boundary collaboration of both partners:</p> <ul style="list-style-type: none"> • CSIR involved in more than 200 joint projects with tertiary education • UP involved in collaborative initiatives with over 60 institutions and organisations • CSIR Divisional Fellows tasked to champion links with tertiary education through a student mentorship programme
Implement The Innovation Hub project (in partnership with the Gauteng Provincial Government)	<ul style="list-style-type: none"> • The Innovation Hub Management Company (Pty) Ltd was registered in November 2001 and a Board of Directors appointed • Project infrastructure development on track • The Innovation Hub Board is overseeing the implementation
Undertake joint strategic planning, resulting in substantial joint investment to establish sustainable and globally competitive SERA competencies	<ul style="list-style-type: none"> • Joint business proposals and initiatives included: <ul style="list-style-type: none"> - Biotechnology platform created and ACGT established - Establishment of an Information and Communications Technology (ICT) platform under investigation - Internationally recognised expertise in water resource management established • Partnership with GPG's Blue IQ initiative to establish The Innovation Hub
Implement academic initiatives that include "opening of the student pipeline" through exploring new ways to expand collaboration	<ul style="list-style-type: none"> • Prestige undergraduate bursary launched 13 bursaries awarded • Post-graduate (MSc) course in Water Resource Management launched and other joint courses developed • Study rebate scheme for CSIR employees launched • 4 extraordinary professors appointed • CSIR employees lecturing at UP and assisting with curricula development • UP students involved in integrative projects at CSIR
Establish joint processes and infrastructure to protect and exploit intellectual property and to establish and incubate ventures where appropriate	<ul style="list-style-type: none"> • Joint investment in a Venture Fund approved in principle to support commercialisation objectives • SERA (Pty) Ltd, a private company established to exploit intellectual property through commercialisation and the licensing of patents in the CSIR and UP
Identify ways to integrate support structures to optimise effectiveness and efficiency	<ul style="list-style-type: none"> • Shared vision of effective support of knowledge management to benefit students and knowledge workers • Reinforced long-standing resource sharing agreements • Shared library management system • Joint strategic innovation projects undertaken • Combined influence used in negotiations with suppliers and consortia.

Increasing competence through collaboration and investment in people

The Alliance is aimed at fostering an inclusive academic, scientific and technological environment that will benefit all participants and the country as a whole. While the CSIR and the University of Pretoria remain separate operationally, joint strategy development and resource allocation in identified areas of synergy have been undertaken in an increasingly integrated manner.

During the year under review SERA activities have moved from the design phase to implementation. Structures have been established and good progress made in maximising synergies and utilising opportunities to work together. The performance of the alliance against its strategic objectives is summarised in the Table 2 on page 8 of this Review.

Collaboration develops capacity and spurs international recognition

Task teams established in a wide range of technology fields have explored common interests, abilities and capacity in the key focus areas of education (to produce informed, creative and responsible citizens), research (to generate knowledge), market-facing activities (technology development and transfer), intellectual property and venturing.

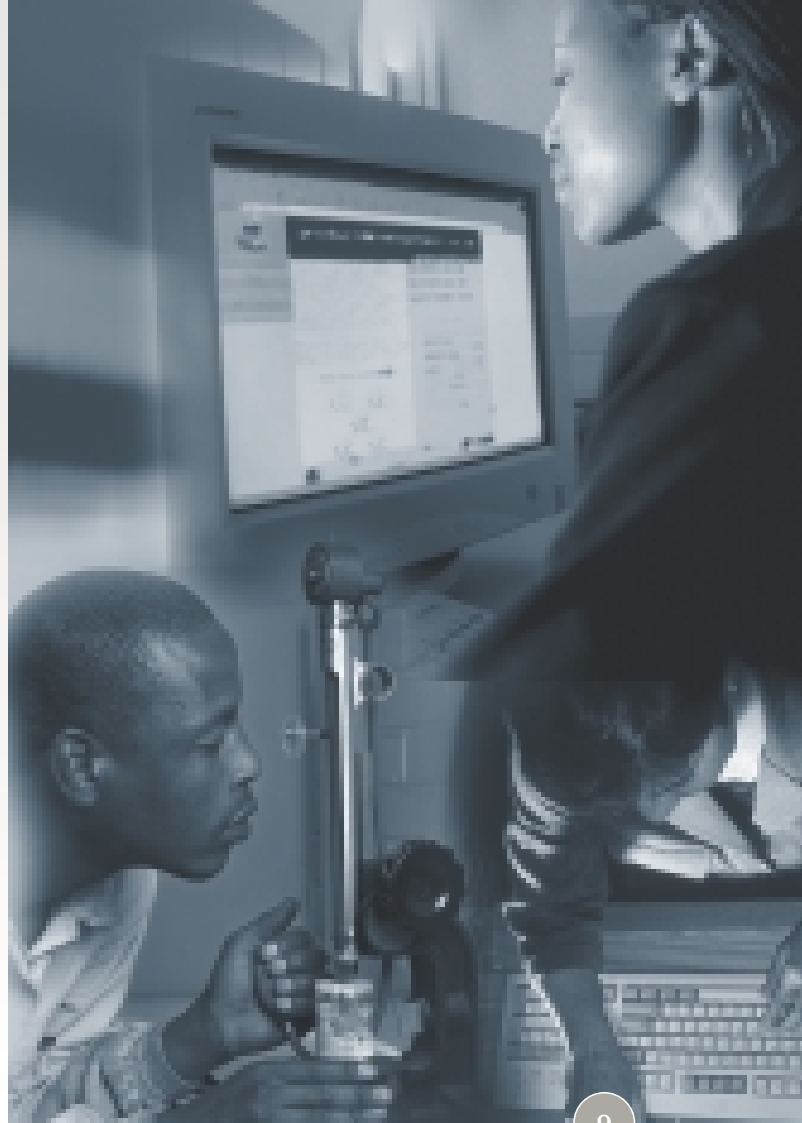
In each of these domains, the task teams have examined current reality and market opportunities, and have developed proposals and implemented a variety of activities. These include, inter alia, the joint offering of graduate programmes, the development of joint institutes or centres of expertise, and the delivery of research projects.

As a result of this collaboration, for example, SERA now has significant intellectual capital and capacity in the field of water resource management that is internationally competitive and locally relevant. Income from research projects in this area exceeded R2 million during the year under review and included a water supply and sanitation study in rural areas that was funded by the Netherlands.

Creating a “smart” partnership and capitalising on venturing opportunities

SERA has partnered with the Gauteng Provincial Government’s Blue IQ initiative to establish The Innovation Hub. Blue IQ is a multi billion Rand initiative by the province to invest in the economic infrastructure development of 11 mega projects in tourism, smart industries and high value-added manufacturing to create a truly “smart” province.

The Innovation Hub Management Company [Pty] Ltd has been registered and a Board of Directors appointed. Blue IQ is investing R258 million in the infrastructure of the Hub, while SERA is contributing 60 ha of land situated on a unique knowledge axis between the CSIR and the University of Pretoria.



“SERA is a prime example of the kind of innovation that is necessary to catapult South Africa into the competitive economic position that is required to survive and prosper. Through SERA we have created a machine that is greater than the sum of its parts. It can contribute largely to the establishment of the innovative industries South Africa needs to become a competitive nation in the global economy.” - Prof Calie Pistorius, Vice Chancellor and Principal of the University of Pretoria.

This partnership creates a new dimension for combining the strengths of the alliance with those of business and government to stimulate economic activity and provide opportunities for local innovative technologies to be commercialised.

SERA's venturing opportunities have been referred to SERA [Pty] Ltd, a company that has been established to serve as the technology exploitation arm of the alliance. Its primary focus is the pursuit of the best and most profitable means of bringing technologies to market through venturing, commercialisation and the protection and exploitation of intellectual property. The CSIR and the University of Pretoria have each contributed start-up funding to a Venture Fund and managers have been appointed to raise additional funds from industry. The Venture Fund will have preferential access to technologies developed within the CSIR and the University of Pretoria.

Investing in people competence and expertise

A strategic decision was taken for SERA to substantially invest in a number of technology platforms to create significant capabilities and the visibility to become internationally competitive. These platforms are not exclusive to participation by the alliance parties only, and are open to others who are willing to contribute appropriate resources. During the year under review the first of these, a biotechnology platform, was created as a centre for the development of biotechnology between the partners. From this platform, the African Centre for Gene Technologies has been established with a focus on making a significant contribution to the health and agriculture issues that face the country.

"In the amazing pace of the knowledge economy, partnering will give SERA the ability to maximise its impact in the global science and technology domain. Working together and with other partners will optimise SERA's contribution to making South Africa the global winner it can be." - joint statement by the SERA relationship managers,

Dr Anthos Yannakou, Executive Vice President: Operations at the CSIR and Prof Jan Malherbe, Vice Principal at the University of Pretoria.

Mutual benefits and increased student value

The continual quest for mutual benefit from the alliance for the SERA partners has resulted in a number of benefit schemes. University of Pretoria employees have been given access to sophisticated facilities and equipment at the CSIR to support their research programmes, while CSIR employees are increasingly supporting education activities at the University through curriculum development, student mentoring and lecturing.

Additional benefits include an employee study rebate scheme, career enhancement through extra-ordinary professorships, the appointment of Fellows, and continuing education benefits.

The SERA partners invested equally in a prestige undergraduate bursary scheme launched in January 2001. The first 13 Prestige Undergraduate Bursaries were awarded to top South African students in the fields of science, engineering and technology. The choice of study fields was based on national and organisational capacity needs. The good performance of these bursars saw the full bursary re-awarded to 12 of 13 students for 2002.

A further five new Prestige Undergraduate Bursaries have been awarded to black students for the 2002 academic year in the fields of computer, electronic and mechanical engineering.



Dr Anthos Yannakou



Prof Jan Malherbe

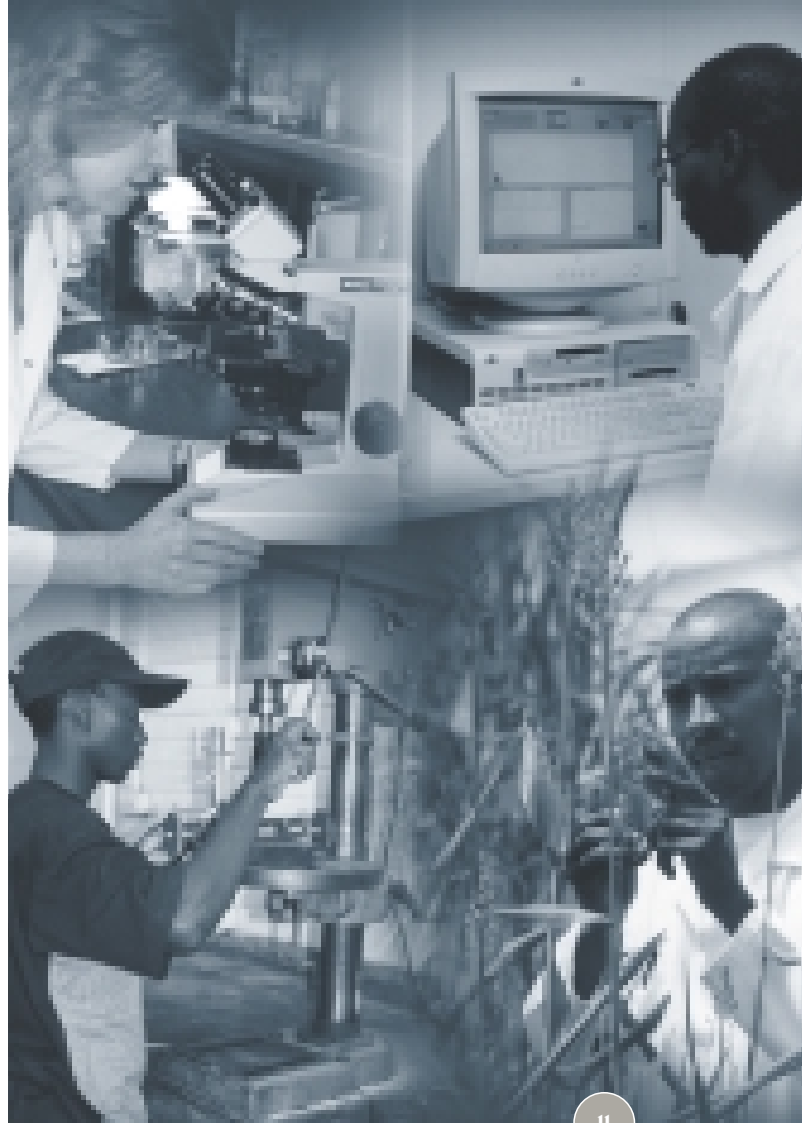
Building critical mass across boundaries

By its nature, SERA is not an exclusive partnership. While building on the significant goodwill and geographic proximity between its partners. In a "Team South Africa" spirit it seeks to reinforce the collaboration and consortium-based initiatives which the CSIR and the University of Pretoria already have with other institutions and organisations in this country and overseas.

The CSIR for instance is involved in more than 200 joint projects with South African universities and Technikons and will be strengthening these relationships. Similarly, the University of Pretoria is involved in many wide-ranging collaborative initiatives with over 60 institutions and organisations, with activities ranging from closer collaboration to a joint PhD-degree.

At the same time, Divisional Fellows at the CSIR have taken responsibility for championing the development of closer science and technology links with tertiary education institutions through identifying students to work on CSIR and other joint venture projects.

The emphasis that the alliance places on inclusive collaboration is also evident in the many co-operative agreements with leading foreign organisations and universities, and the accreditation of professional qualifications by bodies of international standing. Indeed, in a world increasingly responsive to a wide variety of alliancing, partnering and collaboration modalities, the strategy for this alliance is to build critical mass across boundaries to maximise synergies and reduce overlaps.



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Researchers and students at the University of Pretoria and the CSIR are involved in many collaborative initiatives ranging from project joint ventures to presenting joint degrees.

Expanding the frontiers of knowledge, shaping our future through the power of collaboration in science and technology, to build a better world for all



Prof Calie Pistorius



Dr Sibusiso Sibisi

“SERA represents innovation at work. Its early successes provide conclusive proof of the value that innovation adds and the direction in which we should channel our resources. Through SERA we have created a machine greater than the sum of its parts. It can contribute largely to the establishment of innovative industries necessary for South Africa to become a competitive nation and a role player in the global economy.” - joint statement by Prof Calie Pistorius, Vice Chancellor and Rector, University of Pretoria and Dr Sibusiso Sibisi, CEO and President, CSIR

i n n o v a t i o n a t w o r k

Introduction

The impact of science and technology on economic growth and quality of life is well known. As such, innovation in science and technology are important drivers of competitiveness. In fact, innovation can be viewed as the process through which science and technology must be leveraged to attain the goal of competitiveness.

SERA is a prime example of the kind of innovation that is necessary to catapult South Africa into the competitive economic position that is required for the country to survive and prosper. Its strength as an alliance, supported by some of the foremost research competence and capacity in Africa, mirrors the strength of our nation: a wide diversity of skills, cultures and perspectives, supported by a proven ability to pool our energies and work together in pursuit of greater excellence and innovation.

The branding of the alliance as SERA, the Southern Education and Research Alliance, embodies the essence of this partnership (education and research), its location in a global context, and its collaboration to create a world-class and globally visible flagship for South Africa.

The section that follows provides highlights of some key initiatives undertaken during the period under review.

Bringing technologies to market

SERA (Pty) Ltd has been established as a private company under the SERA banner, to serve as the intellectual property exploitation arm of the alliance. Its main objective is to identify, protect, value and exploit the intellectual property of the CSIR and the University of Pretoria, while focusing on pursuing the best and most profitable means of bringing technologies to market.

The SERA (Pty) Ltd Board consists of the Chief Executive Officers and Executives from each of the Alliance partners. The Company has a number of subsidiaries whose activities complement its technology exploitation mandate.

The commercialisation role of SERA (Pty) Ltd is to:

- facilitate the transfer of intellectual property to newly created or existing businesses and industry
- develop and manage a high quality portfolio of diverse technologies
- ensure intellectual property rights, and
- negotiate and execute technology transfer, venturing and licensing agreements.

Creating awareness about the value of intellectual property

The company is also responsible for the quality of contracting in intellectual property matters and for creating awareness about the value of intellectual property. The induction and employee development programmes of the alliance parties include information as well as presentations on the activities of SERA (Pty) Ltd, to ensure that employees understand the critical aspects of intellectual property. The company does not take ownership of the formal intellectual property - such ownership remains with the institution from where the invention is sourced. Its role is to assess and advise on the commercialisation plans with the relevant inventor and management teams.

Services provided by SERA (Pty) Ltd include:

- Linking inventions to market opportunities.
- Facilitating the technology development process.
- Choosing an appropriate business formula.
- Promoting the product or process to potential customers.
- Assisting with the preparation of business plans.
- Assisting in obtaining finance to take the invention to market.



The SERA (Pty) Ltd team in the foyer of their building on the CSIR campus in Pretoria. Back standing: CEO Johan Hattingh and Annatjie Orsmond, and front Itr Steyn du Plessis and Gerrie Mostert.

Creating benefit from a diverse portfolio

The intellectual property portfolio of SERA (Pty) Ltd includes more than 60 projects where CSIR and University of Pretoria inventions have been advanced in collaboration with the inventors.

Examples of these have included:

- Assistance to the bio-artificial liver support system (BALSS) team to keep track of expenditure against budget, and advising on a patenting strategy and collaboration with other research institutions, while also facilitating the introduction of the project to venture capitalists.
- Assistance with concept clarification of a software-based decision tool in a strategic management system for saw mills, facilitating non-disclosure agreements with international collaborators and the process to reach in principle agreement with these parties.
- Patenting a potential new pharmaceutical drug isolated from an indigenous plant by the University of Pretoria in several countries, facilitating the patenting strategy of selecting the countries in which the patent applications have been lodged, and supporting continued collaboration with the Medical Research Council in this field.
- Facilitation of a process to conclude a Memorandum of Understanding with a JSE-listed company to commercialise existing and new CSIR intellectual property in harbour and coastal structure management.
- Assistance with a patenting strategy for a process developed at the University of Pretoria to produce zirconium chemicals from zircon, and negotiating with prospective operating partners and investors to form a new venture to exploit the technology.

Investments to support innovation

SERA [Pty] Ltd provides the funding for provisional patents that meet basic criteria in terms of technical and commercial value and inventor commitment. In exceptional cases funding is provided for the later stages of patenting. The company also provided bridging commercialisation funds for legal and domain specialist costs (such as tax advice and market studies) associated with the commercialisation of intellectual property. It has a mandate to facilitate and monitor the intellectual property reward system of the alliance organisations.

Creating a framework, networks and protocols

During the year under review, key personnel have been appointed and an infrastructure and approval framework and related governance processes established. A venture fund to support the commercialisation initiatives is being finalised, and as part of an ongoing process, a number of networks have been created with potential funding sources and professional service suppliers with the necessary domain expertise. Activities have also included the review of contracts in areas such as venture creation, joint intellectual property development, technology acquisition and Innovation Fund consortium proposals.

The CEO of SERA (Pty) Ltd was a founding member of the Southern Africa Research and Innovation Management Association (SARIMA), a body formed to advance the objectives of technology transfer interests of all players in South Africa and the region. Inaugerated in Cape Town In February 2002, SARIMA aims to strenghten the research and innovation system in Southern Africa by helping to improve quality of life and wealth creation through the flow of new knowledge and inventions to the market place. The intellectual property of the SERA parties has been reviewed, and negotiations with third parties and due diligence on the preparation of major technology transactions

undertaken. Company representatives have also facilitated working relationships between experts at the University of Pretoria and the expertise resident at the CSIR in fields such as the controlled release of drugs, the synthesis of new chemical compounds and mineral beneficiation.

Invention disclosures, standards and procedures

SERA [Pty] Ltd has also established procedures for invention disclosures, protocols for communicating between the alliance parties, and standardised documentation for dealing with intellectual property and commercialisation matters. A number of initiatives related to the awareness of intellectual property and its control and management have been initiated, such as an intellectual property database, training and awareness sessions, and standardised contract conditions.

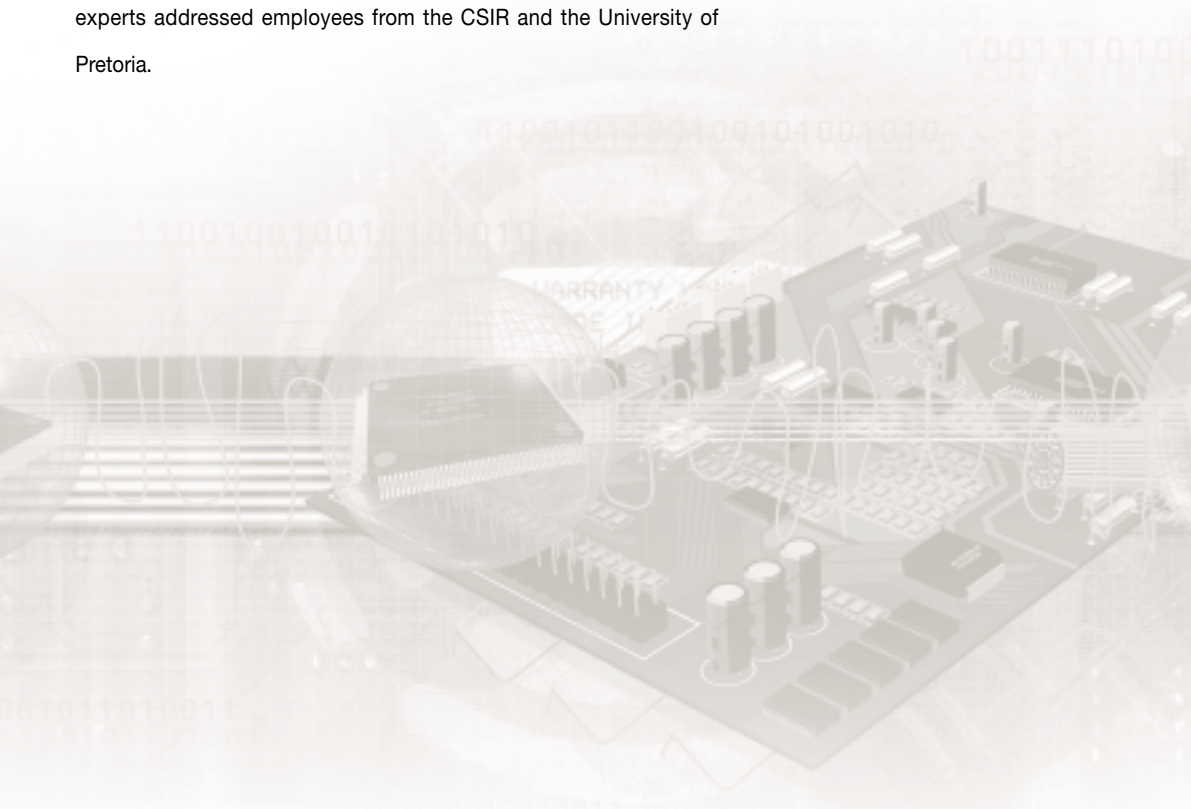
The purpose for the intellectual property database is to record information related to inventions, patents and contracts for licensing or commercialisation. The database is being piloted in the CSIR. Discussions have been held with the President of SARIMA about the possibility of making the database available to all member organisations who develop intellectual property.

Course material for different career levels in respect of intellectual property is being developed in conjunction with the CSIR Innovation, Leadership and Learning Academy (CILLA), while a number of seminars on intellectual property have been held where patent attorneys and other domain experts addressed employees from the CSIR and the University of Pretoria.

? Sera Pty projects

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The intellectual property portfolio of SERA (Pty) Ltd includes many projects where inventions have been advanced in collaboration with the inventors.



Participants in the pilot Incubator at The Innovation Hub include: Electrosoft cc, Expertron Group (Pty) Ltd, Spline Technologies (Pty) Ltd, The Naledi 3D Factory (Pty) Ltd and VAS-Tech (Pty) Ltd. Their activities cover a range of products and services, including consumer electronics with specialisation in wireless applications and neural network technology, interactive 3D content in the form of virtual reality (VR) and visualisation models, network-based recording and value-added services on communication networks to telephone users, secure information technology and network communication applications, and systems and products using general electronics with expertise in systems engineering processes and embedded systems.



Ushering in a new era of collaboration

The signing of a Memorandum of Understanding (MoU) between the Gauteng Provincial Government (GPG) and SERA to establish The Innovation Hub heralds a new era of collaboration, and marked one of the first steps in placing the alliance firmly in the public eye. Through this agreement, GPG's Blue IQ initiative and SERA are investing in the economic infrastructure of The Innovation Hub, one of 11 mega projects aimed at positioning Gauteng as a truly "smart" province.

The proposed location for The Innovation Hub is a 60 ha site of land that forms part of the experimental farm of the University of Pretoria. Situated on a "knowledge axis" between the University and the CSIR, the Hub will create an enabling environment for technology-led businesses and high-tech entrepreneurs. As a catalyst for growth, the Hub aims to attract different levels of tenants, stimulate research and development, provide incubators for start-up businesses and attract entrepreneurs and innovators from previously disadvantaged backgrounds to the Hub's pilot pre-incubation programme.

The conceptualisation of The Innovation Hub is based on extensive international benchmarking adapted to meet local conditions. The Innovation Hub Management Company [Pty] Ltd was registered in November 2001, while pilot activities have been established in temporary premises on the CSIR campus in Pretoria. A pilot business incubator forms part of these activities, where six start-up companies employing about 20 people, have started operating. Discussions with potential additional entrants are underway.

The activities of the Hub Management Company, responsible for the establishment of the project, have moved to the detailed design and implementation stage. The Master Plan has been completed and a record of decision on the Environmental Impact Assessment received. A comprehensive market research study has been commissioned to gain a better understanding of the needs of potential tenants, especially those in small, medium and micro enterprises in the high-tech industry. Evaluation of all aspects of this development by The Innovation Hub Board is ongoing.

The CoachLab™ concept has been launched as an entrepreneur development programme. Each CoachLab™ will be a partnership between tertiary education, the private sector and the Hub to fast-track the development of world-class human resources for the knowledge economy. A pilot ITCoachLab has been established at the Hub's temporary premises in Pretoria, where post-graduate students from the University of Pretoria have been working on industry projects under the mentorship of experts from the industry partner, EPI-USE [Pty] Ltd, a company that develops IT programs.

The evaluation of empowerment initiatives is ongoing to support the government's Black Economic Empowerment (BEE) drive have been evaluated for implementation, while The Innovation Hub has also been participating in a number of the working groups of the Gauteng Information and Communications Technology (ICT) Cluster Study in its strategic role as a catalyst to help spur "smart" economic growth in Gauteng.

Creating Capacity that is Globally Competitive

The necessary competencies and skills to be globally competitive are usually not available in one organisation. Capabilities and infrastructure across business boundaries need to be utilised efficiently and effectively, to enhance learning and build research and development capacity that benefits the SERA partners, the National System of Innovation and the country as a whole.

A number of activities have been launched to explore business opportunities, These include joint strategic planning and investments to establish sustainable competencies, such as the strategic decision taken in 2001 to create technology platforms with significant capabilities and the necessary visibility to become internationally competitive. The first of these, an integrated Biotechnology platform, has been established with the aim of creating sustainable, globally competitive competencies in third-generation biotechnology with a particular focus on gene and genome analysis and their applications.



To achieve this goal the African Centre for Gene Technologies (ACGT) has been established to create a national centre of excellence in biotechnology to meet the needs of the developing biotechnology industry in South Africa. The Centre will integrate activities in genomics, proteomics, structural biology and bio-informatics and will undertake projects from conception to commercialisation, and will aim to make a significant contribution to the health and agriculture issues that face the country, such as vaccines, HIV/AIDS, malaria and crop production. Outputs will include students trained in the most modern technologies, top quality research publications, international patents with commercialisation potential, and biotechnology start-up companies.

As all research and development undertaken by the Centre will be novel in nature, there is significant potential for the generation of intellectual property. The ACGT will link with other key role players in the implementation of the government's National Biotechnology Strategy, which involves the creation of Biotechnology Regional Innovation Centres, and a National Bioinformatics facility.

SERA has sponsored equipment, software and human resources for the Centre. Microarray technology is now being introduced as a service to the SERA partners and other external customers. A proteomics facility will be established with funding from SERA and the Department of Arts, Culture, Science and Technology. Joint research projects are under way in the areas of rational drug design, HIV inhibitors, and biotic and a-biotic stress tolerance in plants. A number of CSIR employees have also registered for higher degrees in biotechnology at the University of Pretoria.

Partners in the ACGT include the CSIR and the University of Pretoria, while activities involve liaison with scientists active in biotechnology-related fields at a number of South African universities and research institutes. The University of Pretoria already acts as a local node of the South African National Bioinformatics Institute (SANBI), which is primarily based at the University of the Western Cape.



A technology platform consists of

- a group of technologies that can be applied to a variety of applications,
- the capability to create intellectual property, solve problems and transfer technology, and
- infrastructure consisting of organised knowledge workers, systems, processes and equipment

and is a long-term investment to

- develop people competence and expertise,
- create new businesses, products, processes, services, and
- create scientific outputs such as trained researchers and publications.

The aim of the ACGT is to make a significant contribution to the health and agriculture issues that face South Africa, including vaccines, HIV/AIDS, malaria and crop production.

Successful collaboration delivers tangible results

In June 1999, three task teams in the areas of mining, forest and forestry products and food and food technology were launched as pilot activities on joint projects and ventures. Resulting from the successful collaboration between the members of these teams, a further 16 task teams were formed during the course of 2000 and 2001. The task teams focused on project activities and lecturing, and in some cases established Centres of Excellence. New relationships were formed and a new dimension brought to bear on existing and potential collaboration.

The effective interaction in these task teams resulted from a shared vision, early successes to demonstrate direct benefits, activities aligned with national and organisational goals, striving for the highest standard of technical and scientific work, and a suitable “mix” of short-term and long-term activities.

Progress and performance by task teams during the year under review included the following:

Globally recognised competence in water resource management

In the area of water resource management, a water pasteurisation technology was successfully developed and published, and a workshop on bio-fouling and bio-corrosion developed and presented. Research projects awarded in 2001 included a cholera project for the Water Research Commission, a rhizoremediation project for the National Research Foundation, and a contract with the South African Water Research Fund to study aspects of potable water supply, while a project involving the use of a membrane bioreactor for treating pulp and paper effluent is being planned with a local industry.

A R250 000 contract, funded by the Netherlands, involved the study of water supply and sanitation in rural areas. A Biotechnology Centre of Excellence with a focus on water is being established with Eskom, while the CSIR's Dr Pete Ashton has been appointed Extraordinary Professor in Water Research at the University of Pretoria. The first MSc in Water Resource Management offered by the University during 2001 attracted 6 PhD, 6 full-time MSc and 4 part-time MSc students.

Globally recognised for their expertise in water resource management, this task team is involved in the International Water Association (IWA) Management and Policy Council and the IWA National Committee. Invitations have been received to present one of eight Linacre lectures at Oxford University, prepare a book chapter on African water resources for the Swedish International Water Institute, and participate in the “Universities Partnership for Transboundary Waters” and the Global Mining Initiative (GMI) meetings in the US.

This task teams support for “partnership” research resulted in the submission of a PhD on a multi-criteria decision-making model for integrated catchment management, while one on the optimisation of surface water monitoring networks is in process. Courses planned for 2002 include water quality management, bio-fouling and bio-corrosion, water conservation and demand management, and water supply and sanitation.



SERA Water Task Team leaders, left, Dr Pete Ashton of the CSIR and right, Prof Eugene Cloete of the University of Pretoria.



A novel biodegradable product and regional participation

In the area of food and food technology, a European Commission funded project in post-harvest technology was secured to develop a novel biodegradable film. The project aims to improve the shelf life of South African export fruit. This is a joint venture with SIK in Sweden, an Italian Company, the Eduardo Mondlane University in Mozambique and the University of Mauritius. The task team also completed the first phase of a FAO/Namibian government project to enhance food security and help generate rural income through the improvement of pearl millet post-harvest technologies in Namibia.

Some CSIR employees participated in teaching a regional MSc Food Science and Technology programme, and served as external examiners for the Blnst Agrar Food Production (rural development) course. Dr Ingrid Weinert of the CSIR has been appointed extra-ordinary Professor in the Department of Food Science at the University of Pretoria to take responsibility for international involvement in training regional post-graduate students.

Ongoing projects include advising on malting quality to the Sorghum Trust, while a joint International Atomic Energy Agency research proposal on the use of food irradiation to improve the safety and sensory quality of prepared meals has been submitted.

Short courses to increase competencies for the mining industry

Members of the mining task team developed and presented a joint short course on combustible gases in hard rock mines. Task team members have also lectured on backfilling in the undergraduate course at the University of Pretoria and a course for the Rock Engineering Certificate, and participated in a short course series on Coal Mining Rock Engineering for suppliers of roof support material.

Research collaboration has taken place in the areas of heat stress rock engineering aspects in deep level gold mining, coal pillar strength and longevity, and coal mine closure considerations and roof rating. The University of Pretoria is represented on the Boards of Coaltech and Futuremine and ongoing collaboration has taken place with these consortia.

Post-graduate studies to improve knowledge in transportation

The purpose of the transportation task team has been to co-operate and explore synergistic opportunities in the field of transportation. A post-graduate programme in transportation is well established and CSIR employees are currently involved in Masters level studies at the University of Pretoria. One doctorate was delivered in 2001.

Innovation interests local and international financiers

The telecommunications task team has focused on developing innovative ideas in cellular wireless telecommunication systems. Activities included the development of a Multi-Dimensional Spread-Spectrum Modem from intellectual property held by the University of Pretoria. Since October 2000 SERA [Pty] Ltd facilitated input from venture capitalists and industry experts regarding opportunities for commercialisation and the application of the technology.

Establishing a carbon technology laboratory

Collaboration in the process industry task team has aimed at attracting industrial partners to invest in and expand existing capabilities. A Carbon Technology Laboratory to develop nuclear grade graphites for the pebble-bed reactor at Eskom, supported by the SERA partners, Eskom-PBMR, Suprachem and Afriore, has been successfully established. Five post-graduate students have been involved with the activities of this task team.

Automotive industry benefits

The Manufacturing Task Team has focused on the establishment of two Chairs in the School of Engineering, sponsored by the Automotive Industry Development Centre (AIDC). Feasibility studies on the establishment of a Chair in Automotive Manufacturing (Department of Industrial Engineering) and a Chair of Life Cycle Engineering (Department of Engineering and Technology Management) were completed in December 2001.

Alan Brent, previously a CSIR expert in Life Cycle Engineering, was appointed as the Chair in Life Cycle Engineering and Prof Rolf Steinhilper from the Bayreuth University in Germany visited the University of Pretoria twice during the year under review as an advisor for the Chair in Life Cycle Engineering. Workshops and a seminar were held with industry to promote the Chairs and their activities. Based on feedback from industry, concept course designs are being prepared for both formal and continuous education programmes. An Automotive Focus Group was established to coordinate all the automotive related activities at the University of Pretoria. Two post-graduate bursaries were allocated to students for 2002.

Combining technologies innovatively

Funding by the SERA parties facilitated the development of a Bio-Artificial Liver Support System (BALSS) for acute liver failure by members of this project team. Previously, delivery of sufficient oxygen to liver cells was an insurmountable obstacle. The BALSS innovators succeeded in combining various technologies from different disciplines in a unique way to overcome this problem. Sponge-like foam provides a cell growth medium while a synthetic oxygen carrier delivers sufficient oxygen to the cells and removes carbon dioxide on a micro-scale. A provisional patent for the BALSS has been registered by SERA [Pty] Ltd and the company has been directly involved with the project team in the commercialisation of the technology.

Forestry benefits from databank

During the year under review the Forestry and Forest Products Task Team saw the establishment of a *Eucalyptus grandis* orchard at the experimental farm of the University of Pretoria and the *Eucalyptus* databank extended to include important data for future hybrid productions for industry. The task team has also been involved in establishing seed orchards for rural communities.

In addition the task team undertook the first-ever conjoint analysis evaluation to estimate prices for a new eucalypt nursery product (with no existing market), which yielded excellent results. The results were published and presented at the International Forum for Economics and the Environment Conference early in 2002.

Window for offerings in sports technology

The sports task team has been facilitating the establishment of a 'satellite' facility of the CSIR Sports Technology Centre at the University of Pretoria Sports Centre. The aim is to exploit business opportunities and research and development potential for the CSIR and the University respectively. This facility will also serve as a window for CSIR offerings and capabilities, and add value to and enhance offerings by the University, as well as undertake training and educational initiatives.

Research assistants testing the production of hybrid seeds in support of the community orchards projects.



Creating new dimensions in intellectual capital

In addition to technological innovation, SERA has created new dimensions in the development of intellectual capital.

Increasing student value

The SERA Academic Initiatives Task Team has investigated an undergraduate bursary scheme and an employee study rebate scheme, while plans for a postgraduate incentive scheme are underway.

The SERA Prestige Undergraduate Bursary scheme

This bursary scheme became operational in 2001 in response to national and organisational needs for an integrated knowledge management system to establish and maintain a diverse pool of high quality competencies in the science, engineering and technology (SET) fields.

The focus is on providing career opportunities to outstanding undergraduate students while addressing demographic issues of race and gender and promoting the National Human Resources Development Plan for South Africa. The programme is also a major step in the direction of joint ventures and collaboration with higher education institutions and has produced a workable undergraduate funding and management model.

The bursary scheme makes provision for 15 bursars per year for five years commencing 2001, with a bursary cash value of R40 000 per student per year. The selection criteria place a high premium on academic excellence. In January 2001, the first 13 Prestige Undergraduate Bursaries (3 black and 4 white males and 5 black and 1 white female) were awarded to top South African students in the field of SET.

The choice of study fields was based on national and organisational capacity needs. A demographic breakdown of the recipients is given in Table 3.

TABLE 3: A demographic breakdown of the first recipients in 2001 of the SERA Prestige Undergraduate Bursary Scheme

Category	No	%	Study field	No.
Black males	3	23	B.Engineering Mechanical	2
			B.Engineering Electronic	1
Black females	5	38	B.Sc Information Technology	4
			B.Engineering Mechanical	1
White males	4	31	B.Engineering Computer	3
			B.Sc Information Technology	1
White females	1	8	B.Sc Biochemistry	1
Total no. of students	13	100		13

The good performance of these bursars saw the full bursary re-awarded to 12 of the 13 students for 2002. A further five new Prestige Undergraduate Bursaries has been awarded to black students for the 2002 academic year in the fields of Computer, Electronic and Mechanical Engineering.

Study Rebate Scheme

The CSIR has sophisticated facilities and equipment that can benefit the research programmes at the University of Pretoria, while CSIR staff can assist with the University's education activities through curriculum development, student mentoring and lecturing. In return, the University assists CSIR staff and their children through a SERA staff study rebate scheme to study for a degree or diploma at reduced tuition fees. The scheme was implemented in 2000 for the first time, when 99 people made use of it (40 CSIR employees and 59 children of CSIR employees). During the 2001 academic year 75 CSIR employees and 87 of their dependents (total of 162 students) made use of the rebate scheme, while employees and dependents are registered at the University of Pretoria for the current academic year.

Postgraduate study enrolments totalled 42 CSIR employees. A centralised e-Human Resources system, which will become operational during the second half of the 2002/2003 business cycle, will assist with the efficient management of this scheme.

Extra-ordinary Appointments

In the spirit of SERA's vision of creating a world-class Alliance that will attract and retain the best people, an initiative between the CSIR and the University of Pretoria has been launched to create extra-ordinary professorships. These positions are awarded on merit to CSIR staff to help bridge the research education interactions between the CSIR and the University, support mentorship programmes, and provide senior employees with alternative career path opportunities.

Optimising internal capacity

The objective of the academic and information services task team has been to look at optimising the information resources of the SERA partners. The result has been a significant alignment between the Academic Information Services of the University of Pretoria and the CSIR's Information Services to develop effective and efficient information services and support knowledge management practices. During the past year a marketing survey for joint external client servicing was undertaken and a shared catalogue for inter library loans created. Workshops and symposia were attended to develop knowledge management skills and competencies.

Creative collaboration, multidisciplinary problem solving, an inclusive and consultative approach, and the advancement of knowledge, are the goals the White Paper sets for the science, engineering and technology community - goals that have inspired SERA's activities and its people.

We would like to thank the CSIR Board and the Council of the University of Pretoria for their strategic contribution to the establishment of the alliance, and the employees in both organisations for embracing the SERA concept, supporting SERA initiatives and participating in its activities.

Nothing is more important for SERA in the 21st century than enhancing its network of partnerships and alliances. As a knowledge producer and a provider of solutions, SERA's activities have to remain at the cutting edge of global developments in science and technology. Not only to build the competence of its people, but also because only an inclusive partnership drawing on local and global knowledge in science and technology can help address the challenges of the knowledge economy as they impact on our nation.

The challenges for SERA now are to further consolidate its strengths, address shortcomings, partner across boundaries, encourage innovation and build on achievements. In the spirit of aligning activities to the requirements of the National System of Innovation through substantially enhanced national and global collaboration, SERA will continue to harness resources to ensure maximum benefits in the transfer of knowledge, skills and technology to help create a better, bolder, more profitable tomorrow in a changing South Africa.



Prof Calie Pistorius
Vice Chancellor and Rector
University of Pretoria

SIGNATURE

Dr Sibusiso Sibisi
Chief Executive Officer and President
CSIR

August 2002

Our challenge, embodied in our vision,

is to develop and apply scientific
and technological competencies that
ensure sustainable development
and stimulate economic growth



The Southern Education and Research Alliance (SERA)
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Production co-ordinated by o'Brien Hunter & Associates.

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