

# cimera

CIMERA – DST-NRF  
Centre of Excellence for  
Integrated Mineral and Energy  
Resource Analysis

DST-NRF Centre of Excellence (CoE) for Integrated Mineral and Energy Resource Analysis (CIMERA) is hosted by the Department of Geology at the University of Johannesburg (UJ), and co-hosted by the School of Geosciences at the University of the Witwatersrand (Wits).

DST-NRF CIMERA was launched on 24 April 2014 by the National Research Foundation (NRF), a division of the South African Department of Science and Technology (DST).

A CoE, as defined by the NRF, is a virtual centre of research that concentrates existing research excellence, capacity, and resources, to enable researchers to collaborate across disciplines and institutions on long-term projects that are locally relevant and internationally competitive.

## DST-NRF CIMERA GOAL

To serve as a central hub for research and human resource development in mineral and energy resource analysis in Africa.



UNIVERSITY OF THE  
WITWATERSRAND,  
JOHANNESBURG

## DST-NRF CIMERA IS A PARTNERSHIP

Collaborating scientists are based at the Universities of Cape Town, Fort Hare, Free State, Johannesburg, KwaZulu-Natal, Limpopo, Nelson Mandela, Pretoria, Rhodes, Stellenbosch, Venda, Western Cape and Witwatersrand, as well as the Helmholtz Freiberg Institute for Resource Technology, Germany.

A diverse, collaborating, enabling environment for mineral and energy resource studies has been established. Access to globally competent facilities for geoscience research, and close co-operation between universities and other geoscience research institutions in South Africa and internationally, enable the participants under the DST-NRF CIMERA umbrella to actively pursue world-class research. Further academic and industrial partners are actively being sought and welcomed.

## PRIMARY FOCUS OF DST-NRF CIMERA

To perform high-quality, world-leading basic and applied research on the vast mineral and fossil fuel resources of, not only South Africa, but Africa as a whole.

Much emphasis is placed on funding postgraduate student bursaries and running costs for student research projects in economic geology, in order to ensure the supply of properly qualified human resources for the future of the mineral and energy resource industries on the continent and abroad.

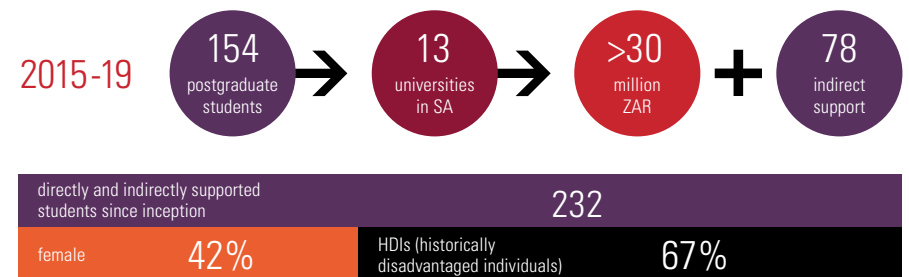
The knowledge so obtained ensures optimum and sustainable extraction and utilisation of the natural resources. This is in alignment with one of the South African Government's national strategies, recognizing that mineral and fossil energy resources represent cornerstones of the country's economy.

## OUR RESEARCH EXPERTISE

Via the extensive expertise of the collaborating scientists, research associates, postgraduate students and post-doctoral research fellows, DST-NRF CIMERA is proudly the most active geoscience research 'centre' in Africa. Expertise is available in: iron and manganese mineral deposits; kimberlite diamonds; early Earth mineral systems; geometallogeny and paleogeographic continental reconstructions (paleomagnetic studies); Bushveld Complex; Witwatersrand gold; geophysics; critical metals (including rare earth elements (REE)); and base metal deposits; coal, shale gas, oil; advanced analytical equipment. Specialists in geometallogeny and geophysics cross-cut many geological disciplines.

DST-NRF CIMERA scientists initiated and successfully executed the Karoo Research Initiative (KARIN), and are actively involved in the Agouron GOE and Biomarker drilling project.

## CAPACITY DEVELOPMENT



The fastest growing cohort of students are classified as black females.



## RESEARCH FOCUS AREAS

- 1. Early Earth Mineral Systems and Metallogeny**  
Research leader: Prof Axel Hofmann
- 2. Metallogeny and Paleogeographic Implications of Layered Igneous Complexes (LICs) and Large Igneous Provinces (LIPs)**  
Research leader: Prof Judith Kinnaird
- 3. Diamonds, Kimberlites and Deep Crustal Processes**  
Research leader: Prof Sebastian Tappe
- 4. Metallogeny of the greater Witwatersrand-Pongola Basin**  
Research leader: Prof Nic Beukes
- 5. Manganese and Iron Ore Deposits**  
Research leader: Prof Bertus Smith
- 6. Base, Critical Metals, Gold, and Other Deposits**  
Research leader: Prof Paul Nex
- 7. Energy Resources of Karoo-aged Basins**  
Research leader: Prof Nikki Wagner
- 8. Environmental and Groundwater Geology**  
Research leader: Prof Jason Ogala

**Geometallogeny** (South African Research Chair (SARChI) in Geometallurgy held by Prof Fanus Viljoen), **geophysics**, (SARChI Chair in Exploration, Earthquake and Mining Seismology held by Prof Ray Durrheim), **analytical development**, and **small scale mining opportunities** cross cut these focus areas.

Research is guided by the Steering Committee and the Scientific Advisory Committee, with input from collaborating partners, industry, parastatals, Government, and international organisations.

[www.cimera.co.za](http://www.cimera.co.za)





## DST-NRF CIMERA RELEVANCE

356  
peer reviewed  
publications

491  
conference  
presentations

76  
qualified  
postgrads

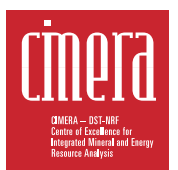
Many significant outcomes have been generated over the years (refer to [www.cimera.co.za](http://www.cimera.co.za) for further information) ■ Research into the nature and timing of the Great Oxidation Event (GOE) ■ Diamonds from the auriferous conglomerate beds in the Mesoarchean Witwatersrand Supergroup were most probably sourced from lamprophyres associated with craton-margin volcanic arcs in the Eoarchean ■ 3D seismic analysis and underground mapping resulted in major advances in the understanding of the nature and distribution of the so-called potholes in the Merensky Reef ■ 3D seismic analyses also identified controls on methane seeps and their distribution in some of the very deep gold mines; this assisted with major mine-planning and safety applications ■ Mineralisation associated with the recently discovered probable extension of the Northern Limb of the Bushveld Complex under cover of the Waterberg red beds ■ The so-called 'buckshot' pyrite in the Wits reefs is actually of early sedimentary or early diagenetic endogenous origin ■ Studies in the Kalahari Copper Belt of Botswana and Namibia, gold deposits of the Barberton Greenstone Belt, and the West African Craton and Ashanti Belt in Ghana ■ Desorbed gas assessment of carbonaceous shales in the Karoo sediments ■ Development of new analytical laboratories and infrastructure.

We host an Annual Colloquium towards the end of each year, providing a platform for the presentation of results, as well as networking opportunities between academics and industry.

## SERVICE TO SOCIETY

Modern societies and economies are underpinned by applied geosciences. DST-NRF CIMERA provides an enabling platform in assisting South Africa in the expansion of a scientifically literate population. The research undertaken by various collaborating partners includes energy exploration to increase energy security, exploration for high demand critical metals and minerals, and in-depth geochemical and geophysical analyses to enhance our understanding of South Africa's mineral wealth. A few examples of public outreach include:

- Involvement in and organisation of large international and local conferences, such as the 35th International Geological Conference (2016), Geocongress (2018), and the 13th International Platinum Symposium and the Wager and Brown International Workshop (2018).
- Raising funds for and supporting the establishment of modern, advanced analytical facilities for sophisticated geochemical and radiogenic age dating analyses.
- Construction of the Preschool classroom at Matjiesrivier in the Western Cape during the KARIN project.



## STRUCTURE AND CONTACT

### Directorate

Prof NJ Wagner (UJ) – Director  
Prof JA Kinnaird (Wits) – Co-Director

### Administrative Staff

Dr G Henry – Administration Manager (UJ)  
Ms V Koti – Administrative Assistant (UJ)  
Mrs D Duarte – Administrative Assistant (Wits)

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