



DSI-NRF Centre of Excellence in Palaeosciences

2020 Directors Report

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science & innovation

Department:
Science and Innovation
REPUBLIC OF SOUTH AFRICA



National
Research
Foundation

CENTRE OF EXCELLENCE
PALAEOSCIENCES



UNIVERSITY OF THE
WITWATERSRAND,
JOHANNESBURG

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1 Executive Summary

The enabling research environment created by the DSI-NRF Centre of Excellence in Palaeosciences (CoE Palaeo) builds on opportunities provided by the temporally diverse southern African fossil and archaeological record, enabling the Centre to support higher levels of research accomplishments.

The research initially envisaged for the CoE Palaeo is established amongst participating institutions. Of importance is our proactive effort to encourage research on areas of the southern African fossil and archaeological record, which are of international significance. These include the origins of life, invertebrate and vertebrate palaeontology, palaeobotany and human evolution, and material culture. Additionally, the fossil record is continuously applied in groundbreaking transdisciplinary earth system studies.

The CoE-Palaeo is proud of our members' productivity, and quality reflected in the large number of researchers who have National Research Foundation (NRF) ratings: five 5 A-rated, nine B-rated, ten C-rated, four Y-rated, and 1 P-rated.

Knowledge brokerage and service rendering are an essential part of the CoE Palaeo. All researchers and students participate in science communication or public awareness as part of our grants' conditions. Our public engagements extend from education programmes, writing for popular online magazines to multimedia engagements.

Apart from supervising more than 57 postgraduate students and hosting ten postdoctoral fellows, members of the CoE Palaeo also teach in undergraduate and Honours programmes in the archaeology, geosciences, and biological Science and geological curricula of Rhodes University, University of Cape Town, University of Pretoria, University of the Free State, Nelson Mandela University, and the University of the Witwatersrand.

The CoE Palaeo recognises the uniqueness and importance of the South African fossil and archaeological heritage and its significance to South Africa and cognisant of its global status. To maintain the momentum built up by the CoE Palaeo to fulfil its mandate, the CoE Palaeo has developed a future planning strategy document. This document builds on our strengths, finds solutions for areas of challenges, and promotes the rich fossil heritage of South Africa while continually maintaining the highest international ranking. This strategy primes the CoE to move into a National Institute for Palaeosciences at the end of the next five-year cycle in 2023.

In summary, the South African fossil and archaeological record is of great international importance and plays a pivotal role in the palaeoscience output of South Africa, and indeed in Africa, in a wide variety of spheres that facilitates research; expansion and custodianship of SA fossil collections; palaeoscience training at various levels (tourism guides, technicians, schools, undergraduate students, postgraduate students, postdoctoral fellows, emerging researchers); science communication and developing sites for palaeotourism. By international standards, it is a leader in supporting research in the palaeosciences. The researchers that we support are some of the world's leading palaeoscientists. They maintain a vast network of national and international collaboration. These collaborations provide access to research, fieldwork, facilities, and equipment for SA students to access and build their expertise.

It is self-evident that the far-sighted vision of the DSI and NRF to establish a Centre of Excellence in Palaeosciences has paid off in many different spheres. It has dramatically enhanced the palaeoscience research output of South Africa, resulting in numerous local and international research collaborations. It has significantly increased the cohort of postgraduate graduations.

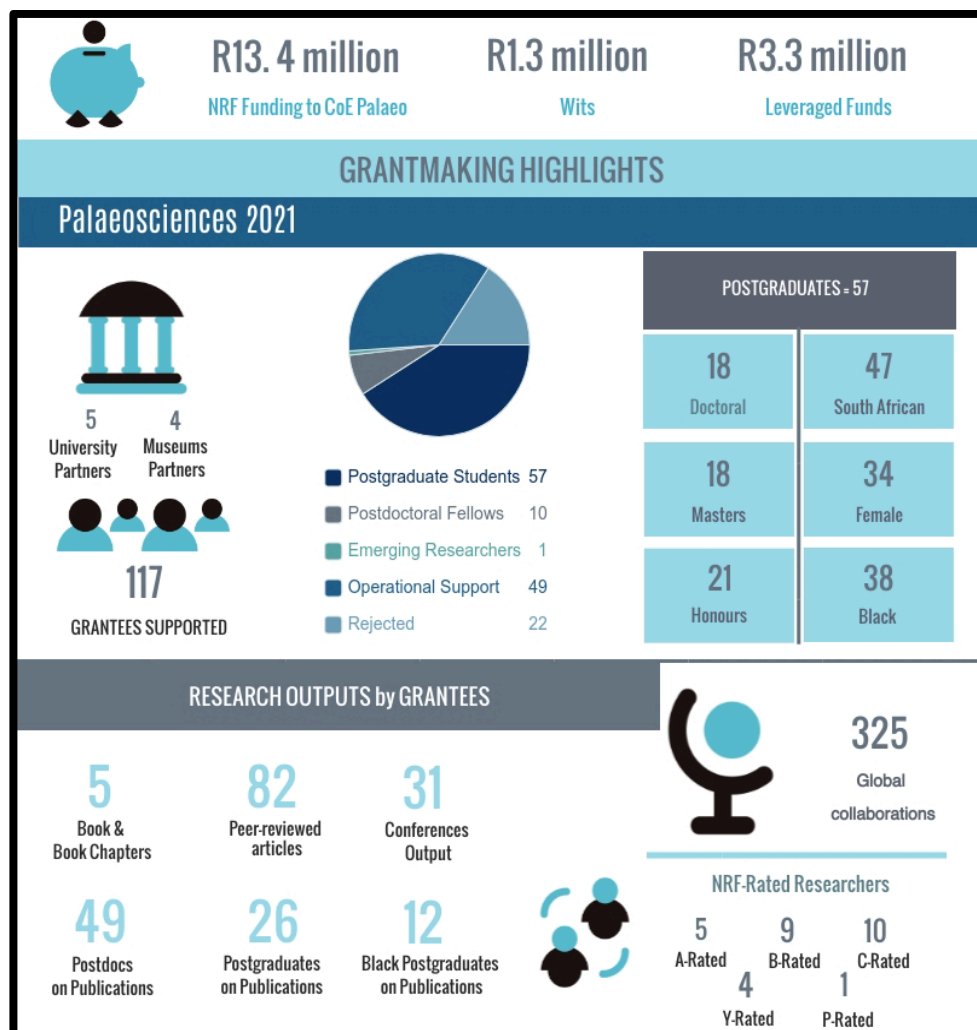
Moreover, it is addressing the STEM skills shortage of South Africa. The extensive Science Engagement Programme of the CoE Palaeo has led to much greater science awareness by the public and resulted in more young people considering science as a profession. Now that the foundation is firm, future phases of the CoE in Palaeosciences will achieve even greater success.

2 Our Network of Partners and Collaborators

2.1 Our Strategic Partners

Key strategic university partners	Key strategic museum of natural history partners	Key strategic research collaborators
Wits, UCT, Rhodes U 2021 New Partners: UP, UFS, NMU	Iziko Museum, Ditsong Museum, National Museum, Albany Museum	SapienCE Council of Geosciences

3 Palaeoscience Highlights



3.1 Research Highlights

Hot off the press

1. NRF A1-rating to Professor Christopher Henshilwood, Evolutionary Studies Institute, University of the Witwatersrand, SARCHI chair, and Director of SFF Centre of Excellence for Early Sapiens Behaviour, University of Bergen
2. In science - **200 000-year-old grass bedding at Border Cave**. This study was led by Professor Lyn Wadley and Dr Lucinda Backwell, Evolutionary Studies Institute, University of the Witwatersrand. <http://www.sci-news.com/archaeology/border-cave-beds-08750.html>
3. In Science - Cooked starchy rhizomes in Africa 170 thousand years ago. This study was led by Professor Lyn Wadley and Dr Lucinda Backwell, Evolutionary Studies Institute, University of the Witwatersrand.
4. In Scientific Reports - **How does inner ear morphology relate to biological traits like head posture?** Dr Julien Benoit led this research from Evolutionary Studies Institute, University of the Witwatersrand. <https://www.nature.com/articles/s41598-020-76757-0>
5. In the Proceeding of the Royal Society B - **Sensing good vibrations: a remarkable sensory organ in ancient fossil birds' beaks**. This research was led by Doctoral candidate Carla Du Toit and Professor Anusuya Chinsamy-Turan, Dept. of Biological Sciences, University of Cape Town. <https://www.nytimes.com/.../science/bird-beaks-touch.html>.
6. New Book - **The Evolutionary Origins of Life and Death** by Dr Pierre Durand, Evolutionary Studies Institute, University of the Witwatersrand.

Spotlight ON Postgraduates and Postdoctoral Fellows

1. Dr Kimi Chapelle, Next Generation Palaeoscientist Grantee, Evolutionary Studies Institute, University of the Witwatersrand
 - Mail and Guardian 200 Young South Africans (Science and Technology)
 - The Conversation competition, 2nd Prize winner
2. Nomawethu Hlazo, Doctoral Grantee, Dept of Archaeology, University of the Witwatersrand
 - Inspiring Fifty South Africa Winner, Consulate of the Netherlands in South Africa
3. Kimberleigh Tommy, Doctoral Grantee, School of Anatomical Sciences, University of the Witwatersrand
 - Mail and Guardian 200 Young South Africans, Science and Technology
 - Inspiring Fifty South Africa Winner, Consulate of the Netherlands in South Africa
 - The Conversation competition, 1st Prize Winner
4. Bongekile Zwane, Doctoral grantee, Evolutionary Studies Institutes, University of the Witwatersrand
 - FameLab 2020 South Africa Regional Heat finalist

3.2 The Value of CoE Palaeo

Recently the Centre for Research on Evaluation, Science and Technology (CREST), Stellenbosch University assessed the DSI Palaeoscience Strategy document and all key programmes initiated by the DSI-NRF in supporting Palaeosciences (Centre of Excellence in Palaeosciences, African Origins Platform, SAASTA, other university programmes, other government depts and NGOs). CREST highlighted the significant role that the CoE Palaeo played in enhancing the productivity and human development in palaeosciences.

'... the CoE has proven successful in driving research and building human capacity in the

palaeosciences.' Further, '.. serious consideration be given to expanding the CoE to become something akin to a National Institute which functions across the entire country. For the funds provided to the CoE by the NRF, much value was added. Providing a greater amount of funding for a new Palaeoscience' National Institute' with a broader mandate would add value to the palaeocommunity and to a broader public audience. The CoE/National Institute would also be able to extend its reach.'

4 Service Level Agreement Achievements

The challenges of 2020 have spurred the CoE Palaeo to reimagine our future and the role we play within the palaeosciences. Several new initiatives were implemented last year and will bear fruit this year. Below is a quick look into what has been developed and implemented.

Research							
The CoE for Palaeosciences aims to support and drive the highest quality research.							
Fossil Microbes	Fossil Plants	Devonian Animals & Plants	Karoo Therapsids	Dinosaurs	Human Evolution Middle Stone Age	Earth Systems	Major Research Themes: Evolutionary Processes; Cultural and Behavioural Evolution; Palaeoenvironments and Palaeoclimates

Human Capacity Development					
The Centre focuses on Postgraduate Students' support (Honours, Masters, & Doctoral), Postdoctoral Fellows, Researchers, and Support Staff. The CoE Palaeo is committed to building a diverse, equitable, and inclusive palaeoscience landscape.					
Next Generation Palaeoscientist Grant (Black, Women, LGBTQ+)	Bursaries & Fellowships to redress diversity and equity Operational Research Support Grants	Facebook Group for Palaeo-community Grantee Lecture Series Conferences	Dino Tracker (Palaeo-Accelerator) Field School Heritage Impact Assessment Field Course	Upskilling Workshops PalaeoLink: Museum Technical Education and Communications Courses	Courageous Conversations: Digging for the Truth Workshop

Science Engagement

We are finding innovative new ways of engaging the public on the fossil wealth of southern Africa.

Virtual Exhibits (Origins Centre)	The Conversation Workshops & Competitions	Quarterly Newsletters	The Fossil Café Webinars	Tourism Courses	Thandi's Dino Adventure: Puppet Theatre Play Africa: I am a scientist	Website Social Media
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Knowledge Transfer

Knowledge and expertise are shared with our grantees, Palaeocommunity, and the public.

Quarterly Newsletters	Media Releases	LinkedIn, Facebook, Twitter, Instagram	Videos - YouTube	New Website	Webinars	Campaign
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Networking

Active research collaborations are already in place and expanding as these activities will continue.

Strategic Partnerships Collaborative Agreements	Build strong relationships with local and global research institutes	Build relationships with other Funding Organisations
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Service & Operations

The CoE in Palaeoscience grantees are recognised as global leaders. Palaeoscience's future is embedded in our geographic advantage and brings value to multiple sectors of society and the economy.

New Positions: Director	Future Planning Proposal	Professional Societies Editorial boards	Code of Ethics	Multifaceted Fundraising Strategy
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Growing Team Spirit





Team spirit provides a sense of purpose and value by delivering effective communication, active listening to stakeholders' needs, and supporting the palaeoscience community.



















































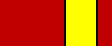

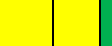













Grantee Welcome Webinar: Student, Researchers, Support staff	Roadshows Partners: University & Museums	Private Facebook Group for Palaeocommunity: grant opportunities, mentorship, news and updates	Team activity: Lecture Series	Palaeocommunity engagement: Courageous conversations- Digging for the Truth
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4.1 Continuing from the DSI CoE Five Year Review Assessment

Assessment of the activities for each strategic goal is assessed below. Though we have made continued proactive strides in achieving our goals, there is always an opportunity to improve. Implementation of our strategic goals and aligned with the modified Service Level Agreement.

The following 'achievement rating' legend is applied:

	Achieved
	Partially achieved
	Not achieved at all
	Not possible to make a judgement

Topic	5-year review	2019	2020	2021	2022	2023
Human capacity development						
Intentional transformation strategy and implementation						
Enabling research environment			 Covid			
Changing our committees to be more diverse						
Carry out the research proposed						
Transdisciplinary research approach						
Increase research productivity at universities			 Covid			
Increase research productivity at museums						
Extensive local and international collaborators						
Knowledge brokerage						
A future sustainable strategy for Palaeoscience						

5 Solutions to our Pressing Challenges

5.1 Covid-19

Challenges

Our grantees faced many challenges in 2020 that continue into 2021:

- Social distancing
- The strain on physical and mental health
- Death of a family member or friend
- Readjusting to online teaching and learning
- Distractions working from home
- Limited access and funds for data for research at museums
- Intermittent internet in rural areas
- Load shedding
- Restrictions and access to collections and labs
- Fieldwork restricted setting back field-based research
- Unemployment for students working part-time
- Supporting families from bursaries
- At home learning, especial for young children. This limited productivity especial for the primary caregiver

Solutions

The CoE Palaeo is continually evolving our solutions to meet these challenges.

1. Open door policy by making the CoE Palaeo staff accessible by providing all our contact details
2. Checking in with our grantees to see how they are doing
3. Giving bursary and research grant extensions
4. Prevention of transmission by moving our committee meetings, roadshows, conferences, courses, and workshops online
5. Making available data to technicians and students at museums to attend the Courageous Conversations: Digging for the Truth Workshop

5.2 Museums

Challenges

Palaeoscience research at Natural History Museums is not at the same productivity as universities. Several key factors led to a decrease in research productivity at Natural History Museums:

1. Reduction in budgets given to museums to operate, preserve, and conserve national fossil and archaeological heritage
2. Lack of hiring Curators with advance postgraduate degrees with a willingness to conduct research
3. Insufficient industry-based salaries centred on education level, experience, and skillsets
4. The decrease in positions and descent salaries to employ lab & exhibition technicians, and science communication staff

5. Demotivation of CEOs and staff to build sustainable research programmes at their institutions
6. Lack of resources and equipment

Solutions

Museums house priceless fossils and artefacts from South Africa; however, a staggering number of fossils and other scientifically significant finds go unstudied and is vulnerable to lose as budgets for the museum are decreasing. In 2021, the CoE Palaeo will initiate a research grant that allows researchers and students to quantify the dark data in museum fossil collections ushering in large-scale fossil records analysis.

In addition, the CoE Palaeo supplies postdoctoral fellowships specifically for museums partners to enhance their research productivity. The CoE Palaeo made strategic partnerships with universities near museums to build and increase research collaborations and productivity between the institutions. These include the University of the Free State and the University of Pretoria aligned with the National Museum, Bloemfontein and Ditsong National Museum of Natural History respectively.

In terms of salaries and positions, museums' current situation requires intervention that may be beyond the scope of the CoE Palaeo. It requires a higher level of engagement between the Dept of Sport, Arts & Culture, the Dept of Science & Innovation and the DSI National Science Collections Facility to implement long-lasting changes.

The CoE Palaeo will help improve the museum research environment through the initiatives as mentioned above. Because the Natural History Museums hold important fossil and archaeological collections of National Heritage and global relevance, the CoE in Palaeoscience will continue to assist and lobby for museums.

5.3 A Transformative Landscape

Challenges

The downturn of the economic climate at universities and museums are the biggest challenges facing palaeosciences. Many African scholars seek positions elsewhere because of the lack of posts and low salaries. In addition, many African students and researchers feel the progress of transforming academic spaces has been too slow.

Solutions

Our Centre has established several initiatives to address this imbalance:

1. Continues to promote representativity (race, gender and disability) through our grantmaking processes. A strong application is one that that actively commits to a strategy that builds a diverse, equitable, and inclusive palaeoscience landscape
2. Providing two Next Generation Palaeoscientist Grants for Black females and LGBTQ+. This grant has a value that is equivalent to an emerging researcher salary
3. Continuation of the Courageous Conversation: Digging for the Truth Workshop. This workshop is available to everyone in SA palaeoscience
4. Provide upskilling to grantees to increase employment success in academy or industry

5.4 Digital Inclusion

Challenges

As science and our daily life due to the pandemic are moving exponential faster into the technology and innovations space, the CoE Palaeo realised that digital access is not available for our whole community. Universities quickly rolled out online teaching and learning, promoted free online courses for soft skills to their staff, and made access to data and equipment available to students. However, our museum partners face continued financial constraints, and access to data and equipment were limited as museums hold a wealth of palaeoscience fossils and data. As the CoE Palaeo strives to support a transformative palaeoscience landscape, digital inclusion must be a priority.

Solutions

Taking a page from the NRF and universities, the CoE Palaeo would make available as part of our budget access to equipment and data to our museum partners. These funds would be made available to successful Operational Research Support grantees and technical staff working on those projects.

**We want to discuss this point with our Steering Committee to look for procurement and data access solutions as we navigate this space.*

5.4 Future Planning and Funding

Challenges

Successive DST Ministers realising the South African palaeoscience global significance and the international scientific community's considerable interest have recommended establishing a *Smithsonian type institute*. In turn, the DSI has suggested that a National Institute would ensure the longevity of productivity Palaeosciences.

The existence the CoE-Palaeo has demonstrated the capacity of the discipline to catapult South Africa as an essential and significant player in the forefront of the international scientific arena. Thus, establishing a multidisciplinary National Institute for the palaeosciences is a logical follow-on to enhance the high level of productivity achieved so far.

The challenges we face are two-fold:

1. Although CoE-Palaeo have been able to raise additional funding, this is not an easy task in the current climate
2. The support of the palaeocommunity that includes our partner institutions and other institutions that are not currently partnered with the CoE Palaeo to move forward
3. The support of the Department of Science and Innovations

Solutions

1. Develop a multifaceted funding strategy
2. A campaign that highlights palaeosciences to all stakeholders
3. Continue workshopping the Future Planning Strategy Document with the Palaeocommunity
4. Lobby government for continued support for palaeosciences that is of global significance and strategically advantageous for South Africa

6 Cash Flow

2020 Description of Revenue & Expenses	NRF	Wits 10%	Total
Revenue	R13 400 957	R1 340 096	R14 741 053
Balance Brought Forward	R1 169 140	0	R1 169 140
Human Cap Dev	R4 795 339	0	R4 795 339
Conferences & Travel	R136 000	R143 520	R279 520
Salaries	R5 476 352	0	R5 476 352
Equipment	R40 007	0	R40 007
OPEX and Research Grants	R2 937 873	R1 184 974.88	R4 122 847
Total	R13 385 571	R 1 328 494	R14 714 066.67
^{1,2} Net Surplus	R1 184 525	R11 600	R1 196 126

¹Unspent NRF funds requested rolled over.

²Unspent Wits Council funds not carried over in 2021.

The net surplus will be used for the educational, workshop, and new grant initiatives, as shown in section 4.