



GENUS

DSI-NRF CoE Palaeo

Directors Report

2023

Director: Professor Jennifer Botha

We are GENUS.

Knowledge centre. Network leader. Explorer.

GENUS is a collective knowledge hub and inclusive network for Palaeosciences in Africa. Dedicated to studying the origins of species, we see beyond the science to inspire researchers and citizens to find meaning in the past and inform our decisions for a better future.

With South Africa's unmatched fossil and archaeological record at our feet, we enable ground-breaking discoveries that move Palaeosciences forward, encourage cross-discipline collaboration, and make knowledge accessible to all.

We provide access to a valuable repository of tools, information, funding, technology, and support through our broad international and local network. This empowers emerging researchers, postdoctoral fellows, and postgraduate students to further their research, grow their network and contribute to discovering sustainable solutions for society and the environment.

We are making a **BOUNDLESS IMPACT** for now and the future.

Our ambition

To transform Palaeosciences in South Africa by creating value for all stakeholders and undertaking a comprehensive study of the evolution of life on Earth.

Our vision

To be the **network leader** of an **inclusive and thriving palaeoscience community** that **enriches our world** and **preserves our future**.

Network leader – We are network leaders who are at the centre of creating collaborative partnerships beyond our discipline. Where we embrace the power of sharing, cooperating and collaborating. Where we break down barriers, encourage diversity, and share demonstrable, critical thinking that contributes to a hopeful future—becoming the storytellers of our generation and inviting the world to join us in building a future worth preserving.

Inclusive and thriving Palaeocommunity – Building a dynamic network of research experts collaborating from around the world, in the heart of Africa, where we have an unmatched geographical advantage. We invest in people, programmes and research to discover our ancient past while guiding and nurturing our network to turn knowledge into practical solutions. We do all this from South Africa, a nation with an unmatched fossil heritage and a land endowed with evidence of the planet's evolution. With a fossil heritage that will ignite even the wildest of imaginations. We are setting a new standard in research excellence.

Enrich our world – Enabling us to instill national pride, where citizens have the potential to become a custodian of their heritage.

Preserve our future – Connecting the story of life to the future of humanity. Wherewith every discovery, prediction, and resolve, we can impact solutions and contribute towards a future fit for generations to come.

Our mission

We invest in people, research, and programmes that move Palaeosciences forward that impacts South Africa and the global community.

Our values

We believe in a world where everyone has a role to play in preserving the future of our planet. From researchers, collaborators and partner institutions to ordinary citizens, aspiring students and young children. We aim to break down barriers and make a real contribution to a more hopeful future by:

Igniting Wonder - We capture imaginations and spark curiosity, opening minds to the limitless world that still needs to be explored.

Fuelling Discovery - We support our network with the resources and partners required to make ground-breaking discoveries.

Driving Inclusivity - We create an open culture of collaboration that represents the rich diversity of South Africa.

Enabling Real Impact - We empower our network to make a boundless impact – not only in the world of science, but the bigger story of life itself.

Where to find us

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1. Executive Summary

The year 2023 stood out as a significant and successful period for GENUS, the DSI-NRF Centre of Excellence in Palaeosciences. Our strides reached greater heights as we expanded our network of partner institutions and collaborations while fostering a growing community of grantees. This steadfast momentum has propelled our footprint to new dimensions.

Fuelling our mission, GENUS provided crucial support to 77 Palaeoscientists in 2023, a testament to our commitment to diversity and inclusion. Notably, more than half of our grantees were female across all academic tiers, a statistic reflecting our unwavering dedication to equitable opportunities. The We Dig Fossil Grant, established in 2022, continued its legacy with two exceptional female researchers.

Moreover, we witnessed a significant increase in the representation of black Honours, Masters and Doctoral students, soaring to 69% in 2023 from 56% previously—a tangible stride towards fostering diversity and representation in our field. Our support extended to 12 researchers through the New Generation Palaeoscientist Postdoctoral Fellowship Grant, with notable increases in black and female postdoctoral recipients, affirming our commitment to empowerment and equity.

Yet, amidst our triumphs, challenges persist. While Masters and Doctoral students adeptly navigate the NRF online system for GENUS applications, awareness among GENUS Honours students remains low—a gap we aim to bridge through heightened outreach efforts in 2024.

In the pursuit of excellence, GENUS forged new alliances, welcoming North-West University into our fold and initiating promising discussions with the University of Johannesburg, the Pietermaritzburg Museum and other university partnerships. These partnerships herald expanded horizons for aspiring researchers and students seeking bursaries and research funding.

Embracing the richness of palaeosciences, our grantees explore a diverse spectrum of subjects—from the origins of life to human evolution and beyond—underscoring South Africa's unparalleled natural heritage on the global stage.

At the heart of our success lies the exceptional productivity and quality of our members, reflected in the accolades of the National Research Foundation (NRF): five A-rated, nine B-rated, seven C-rated, and four Y-rated researchers. Such recognition amplifies the esteem with which the international community regards our contributions.

Beyond scholarly pursuits, GENUS grantees champion science communication and public engagement, disseminating research discoveries through press releases, social media platforms, and outreach initiatives that enrich public understanding of palaeoscience in South Africa and beyond.

As stewards of knowledge, the CoE and the palaeoscientists we support are nurturing the next generation of palaeoscientists, supervising postgraduate students and hosting postdoctoral fellows while actively contributing to undergraduate and Honours programs across prominent universities.

GENUS stands as a beacon of excellence, elevating the South African palaeoscience

community onto the global stage. Our dedication to fostering groundbreaking research, fostering inclusivity, and empowering scholars resonates in every facet of our work, ensuring that GENUS grantees are primed for success in the international arena.

2023 GENUS Palaeoscience Highlights in a Snapshot



Further Highlights

1. Seven media releases on grantee research ranging from invertebrates from the Cape Supergroup to growth in crocodilians. For each of the following media releases GENUS contributed to drafting, editing and finalising the releases, compiled multimedia and images, distributed the releases to local and international media outlets and social media, published the items on the GENUS website and posted them on the international science news platform Eurekalert! These releases reached a total of 25 news sites, including local and international platforms.

1.1 Reddy, C., Thuy, B., Reid, M., & Gess, R. (2023).

1.2 Penn-Clarke, C. R., & Harper, D. A. (2023).

1.3. Jodder, J., Hofmann, A., Xie, H., Elburg, M. A., & Wilson, A. (2023). Geochronology of the Daitari Greenstone Belt, Singhbhum Craton, India. *Precambrian Research*, 388, 106997.

1.4. Tarduno, J.A., Cottrell, R.D., Bono, R.K., Rayner, N., Davis, W.J., Zhou, T., Nimmo, F., Hofmann, A., Jodder, J., Ibañez-Mejia, M. & Watkeys, M.K.. (2023).

1.5. Botha, J., Weiss, B. M., Dollman, K., Barrett, P. M., Benson, R. B., & Choiniere, J. N. (2023).

1.6. Kammerer, C. F., Viglietti, P. A., Butler, E., & Botha, J. (2023).

1.7. Van den Brandt, M. J., Day, M. O., Manucci, F., Viglietti, P. A., Angielczyk, K. D., & Romano, M. (2023).

***Special Note:* One of GENUS' postdoctoral fellows, Dr Jaganmoy Jodder, co-authored two especially high impact articles, one of which was in the journal *Nature*. He has since completed his fellowship and has obtained a position in Norway. Dr Jodder's research is excellent in both quality and quantity and represents one of our many successes who will be able to continue his research as an emerging researcher. The media campaigns on Dr Jodder's research in 2023 did extremely well and attracted local and international coverage in news media to the value of over R380 000 (advertising value equivalent) as reported by the Wits marketing department. Dr Jodder will continue to collaborate with researchers at the University of the Witwatersrand in South Africa, thus maintain this important link with GENUS.**

2. 16 popular articles

3. Two videos

- Exploring the Fossils of the Free State (<https://youtu.be/7Pzk8dfYxaw>)
- The evolution of the human foot, and how our choice of footwear shapes our future (<https://www.youtube.com/watch?v=iPrKH76Ltwk&t=2s>)

4. The SAASC's Student Development Workshop in Johannesburg, Held at Hominin House at Maropeng (7– 10 December 2023): offered an enriching four-day experience for aspiring

archaeologists and palaeontologists. Highlights included expert-led sessions in palaeontology, heritage management, and effective science communication, fostering the next generation of scientists and communicators in a dynamic and engaging environment. (<https://www.genus.africa/explore-article/fostering-future-scientists-saacs-student-development-workshop-2023/>)

5. The revamped state-of-the-art **Micro CT scanner** equipped with advanced 3D imaging technology, was unveiled in the Evolutionary Studies Institute (29 November). Partly funded by GENUS, the scanner allows scientists to examine the interior of fossil-bearing rock samples non-invasively. This approach not only preserves the integrity of invaluable fossils, but also streamlines the research process significantly. (<https://www.wits.ac.za/news/latest-news/research-news/2023/2023-12/upgraded-micro-ct-scanner-to-advance-research.html#:~:text=The%20revamped%20state%20of%2Dthe,bearing%20rock%20samples%20non%2Dinvasively.>)

6. The **Genus Student Conference** (31 October - 2 November 2023) offered a friendly environment for students to present their research to their peers, with prizes on offer for the best presentation. Professors Jennifer Botha and Jennifer Fitchett led informative workshops on how to present at scientific conferences and to the public. The conference also had many fun activities, including drumming hosted by Drumcafe and a student quiz night. (<https://www.facebook.com/photo/?fbid=719208577054162&set=pcb.719208633720823>)

7. Iziko Museums and HERI at UCT launched the '**HUMANITY**' exhibition at the Iziko South African Museum (27 September 2023), reimagining human evolution through diversity and creativity. The exhibition, blending art and science, showcases Africa's role in human history and encourages visitors to explore and reflect on our shared heritage. (<https://www.genus.africa/explore-article/humanity-reimagining-the-story-of-human-evolution/>)

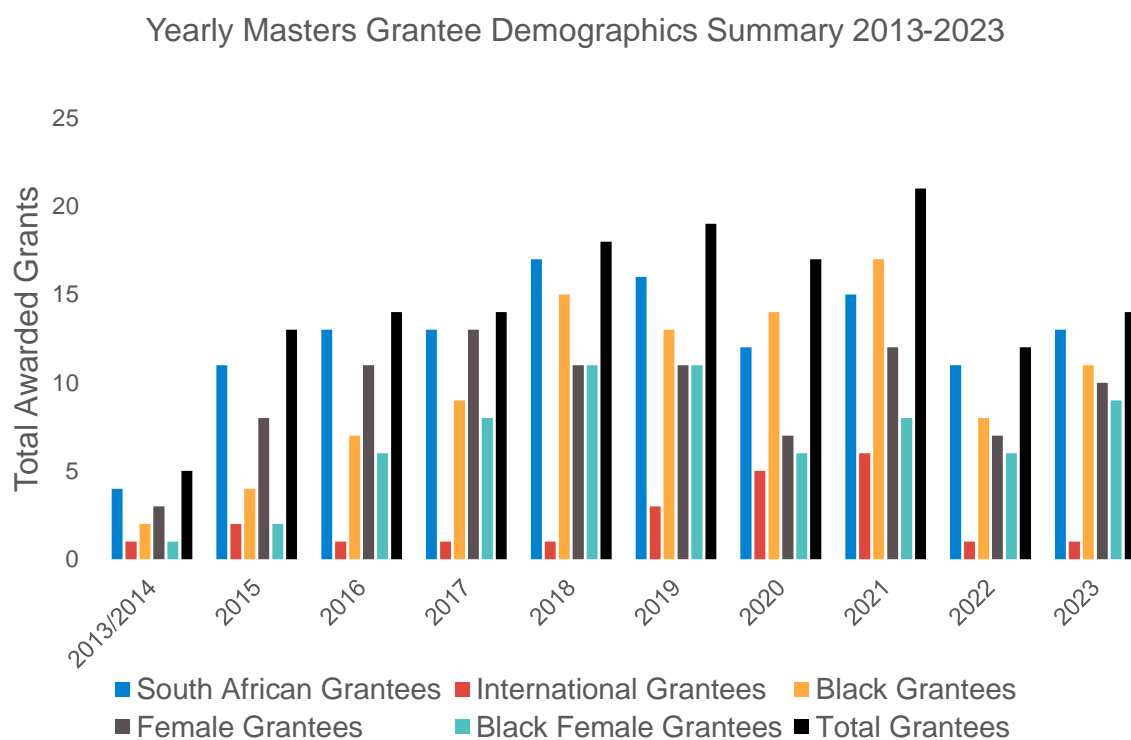
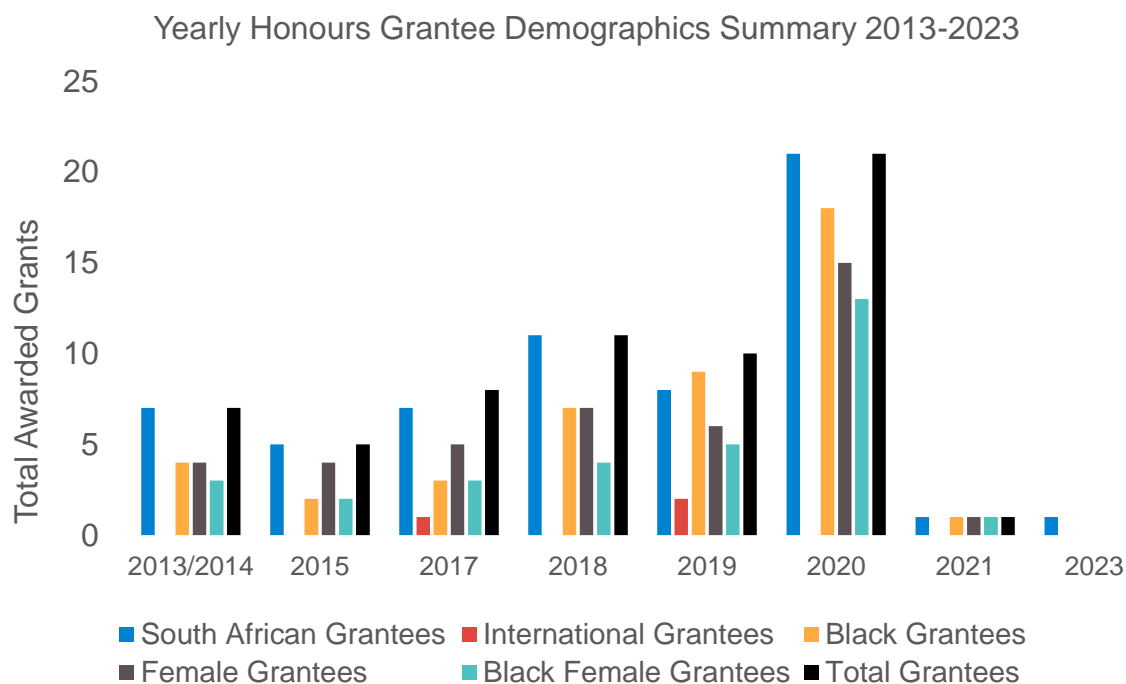
8. Seven **public lectures** and activity days at Origins Centre throughout 2023.

9. Professor Jonah Choiniere (Wits) was inducted as a **Fellow of the Royal Society of South Africa** at a ceremony held in Pretoria on 4 November 2023.

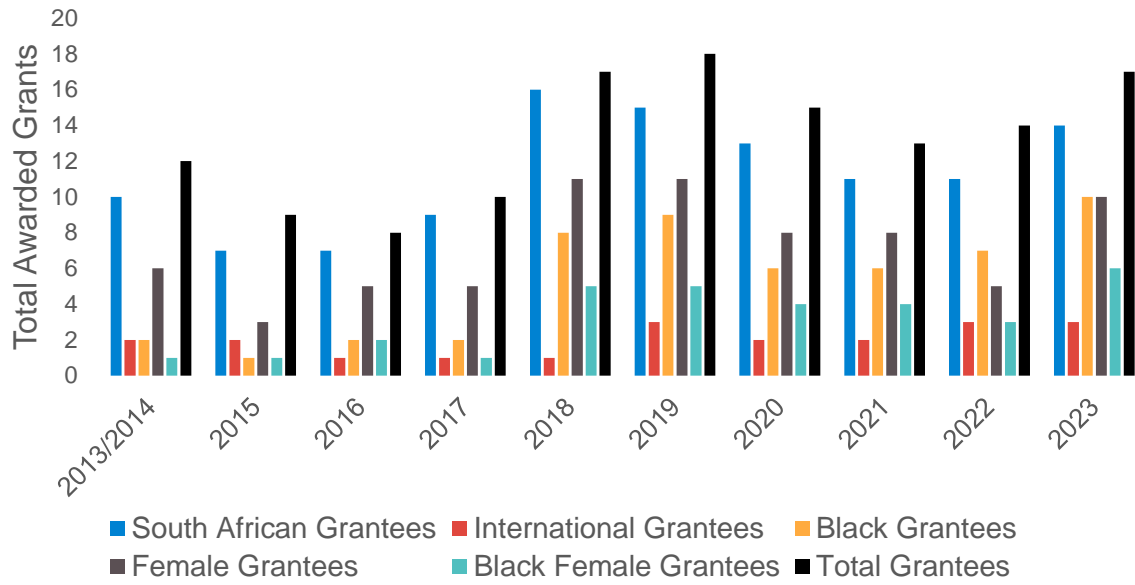
10. The Society also awarded Professor Jennifer Fitchett (Wits) its 2023 **Meiring Naudé Medal**, which recognises outstanding early career scientists (under 35-years-old) who have already made a mark in their field and who are poised to become scientific leaders.

11. On 24th July 2023, a community engagement event was led by Aviwe Matiwane, attracting **120 Grade 12 science students** from Milton Mbekela Senior Secondary School. The two-day event commenced on Friday with a Career Day, showcasing a range of scientific fields including Palaeoscience, Botany, Geology, Invasion Biology, Computer Science and Information Systems, Physics, and Chemistry. The following day, Saturday, was dedicated to educational sessions, offering tutoring and lectures in Physics and Human Evolution, providing an enriching and informative experience for the students (<https://www.facebook.com/Genus.Palaeosciences/posts/pfbid02atxwfm7geXDYSjiefTYAXkACVHaMLdCo3iFMc7foiMEFFaSQPgP9gvtJTFDXg1qZl>)

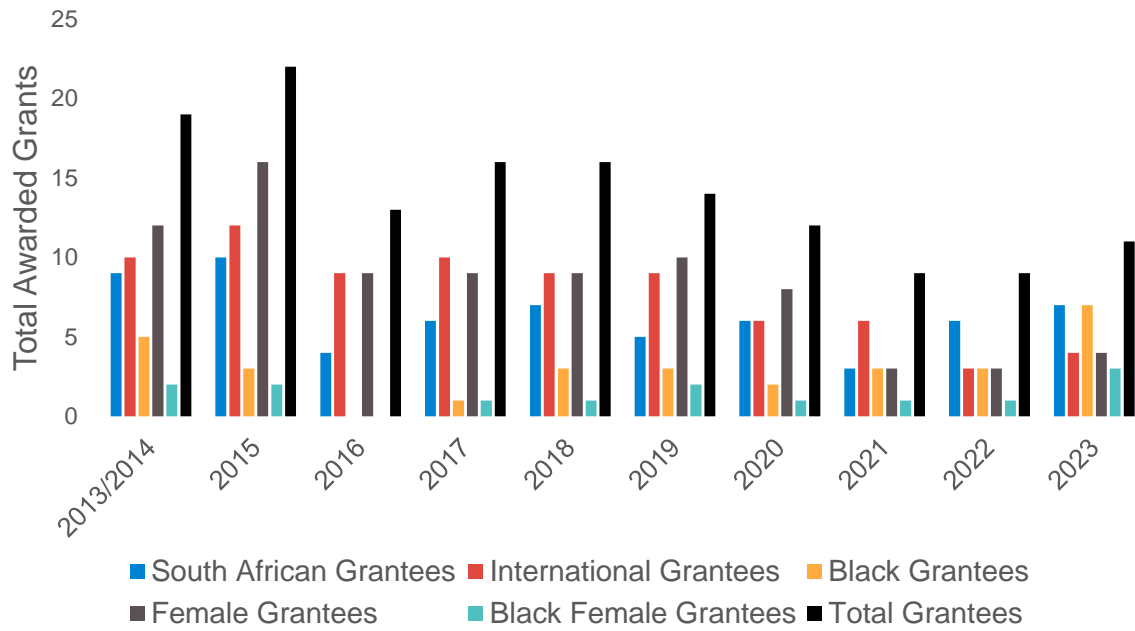
Postgraduate Student and Postdoctoral Fellowship Demographics



Yearly Doctoral Grantee Demographics Summary 2013-2023



Yearly Postdoctoral Fellow Demographics Summary 2013-2023



2. Our Networks

GENUS is distinctive in aligning its value system with visibly committed palaeoscience researchers that are research productive and socially engaged. It depends on its academic and museum partnerships to reach excellence through its research programmes, education and training, human capital development, and science engagement initiatives.

Date of formation	SLA stage	Host University	
2013	4	University of the Witwatersrand, Johannesburg	

CoE Academic Partnerships	CoE Natural Science Museum Partnerships	CoE Funding Partnerships	Seeking Out New Partnerships for 2024
The University of the Witwatersrand, Cape Town, Pretoria, Free State, Rhodes University, Nelson Mandela University, North-West University	Iziko South African Museums, Ditsong National Museum of Natural History, National Museum, Bloemfontein & Albany Museum	DSI, NRF, University of the Witwatersrand, Millennium Trust Foundation, Centre National de la Recherche Scientifique (CNRS) Institut Francis d’Afrique du Sud Research (IFAS)	University of Johannesburg, Pietermaritzburg Museum
Collaborators Council for Geosciences			

In 2023, GENUS initiated a partnership with North-West University. Three palaeoscientists are already actively engaged there, with successful applications received from them. Simultaneously, our efforts to collaborate with the University of Johannesburg (UJ) have intensified. We have established a partnership with a UJ palaeoscientist who is enthusiastic about advancing the collaboration, enabling researchers and students from UJ to seek support. Currently, our progress awaits the appointment of the new Deputy Vice-Chancellor.

Additionally, the Centre of Excellence maintains several informal partnerships with researchers from both national and international organisations. These collaborations significantly contribute to the CoE's research output, spanning research publications and access to laboratory facilities. Our network of collaborators encompasses over 400 researchers from across the globe and the nation.

The NRF’s RCCE (Research Chairs and Centre of Excellence) has notified GENUS about an upcoming meeting aimed at fostering collaboration between Historically Disadvantaged Institutions (HDIs) and Centres of Excellence, including GENUS. The objective is to generate innovative ideas on how centres like ours can forge closer ties and collaborate effectively with HDIs. This initiative holds promise for exploring novel avenues to extend support to these institutions.

3. Effective Funding

3.1 2023 Cash Flow

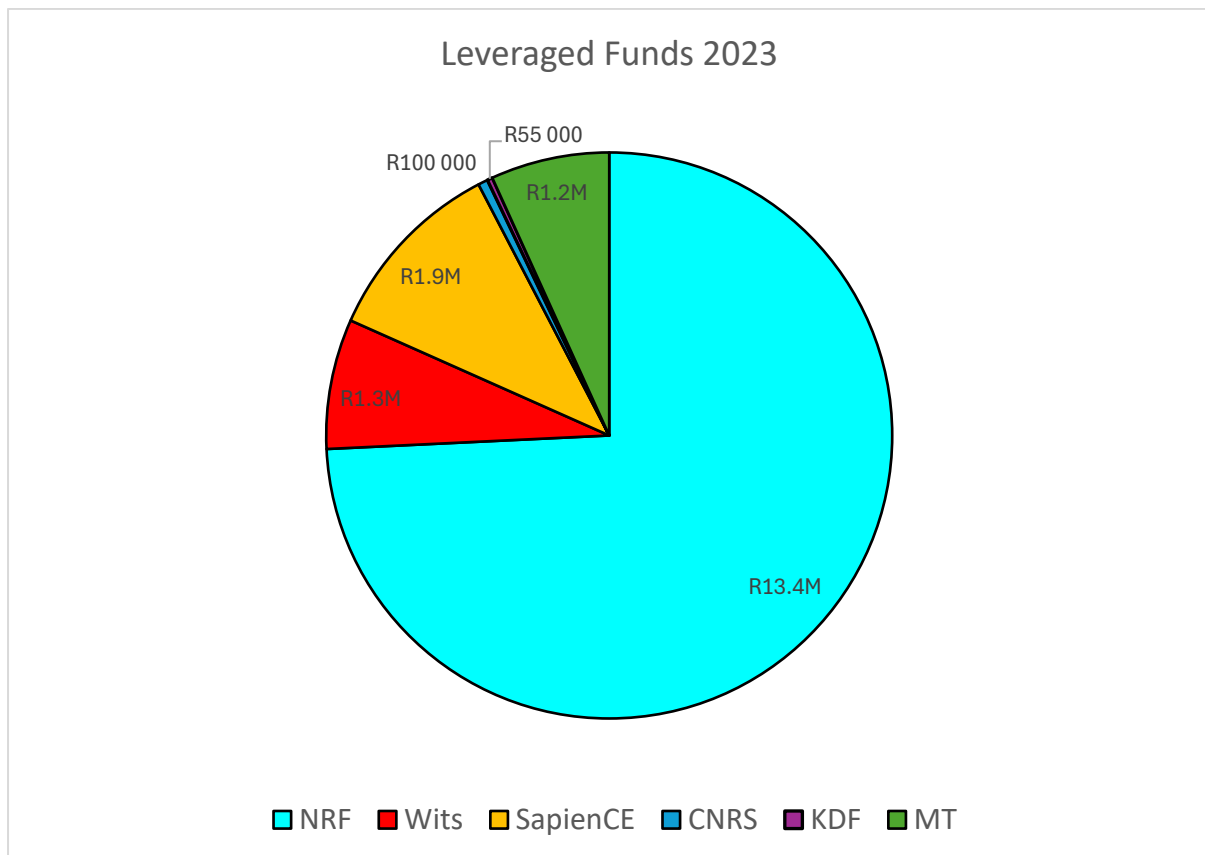
Of the R13 400 957 that GENUS received, the NRF gave us R9 232 358 directly and the balance

went to bursaries.

2023 Description of Revenue & Expenses	NRF	Wits Council 10%	Total
Revenue 2023	R9 232 358	R1 340 096	R10 572 454
Balance Brought Forward 2022	-R85 015	R0	
Total	R9 147 343	R 1 340 096	R10 487 439
Human Cap Dev	R2 947 499	R18 810	R2 966 309
Conferences & Travel	R161 946	R786 086	R948 032
Salaries	R4 480 462	R253 667	R4 734 129
Equipment	R198 198	R0	R198 198
OPEX & Research Grants	-R362 850	R401 916	R39 067
Total	R7 425 255	R1 460 480	R8 885 735
Surplus	R1 722 088	-R120 384	R1 601 704
¹ Revenue 2023	R1 722 088	-R120 384	R1 601 704
¹ Net Surplus		R0	R1 601 704

3.2 Leveraging Funds

The total funding provided by the DSI-NRF from 2013 to 2023 is R 131.1 million. R34.6 million has come from leveraged funds.



Our CoE actively explores opportunities to support various research and science engagement initiatives. GENUS has leveraged funding from the University of the Witwatersrand, the Norwegian Centre of Excellence in Modern Human Behaviour (SapienCE), the Centre National de la Recherche Scientifique (CNRS), the Karoo Development Fund (KDF), the Millennium Trust (MT), and crowdfunding. Most of these funds are linked to specific research projects. In addition, our grantees are encouraged to use their CoE funds as leverage to source additional funds.

Our two significant research projects that leverage funding support are:

The Norwegian Centre of Excellence in Modern Human Behaviour (SapienCE): Professor Christopher Henshilwood is associated with the University of Bergen and has leveraged funds from 2018 to 2027. R16.9 million has been given to support SapienCE personnel, research and excavations at Blombos Cave, Klipdrift Cave and Klasies River Cave. These caves have yielded significant Middle Stone Age finds that have pushed back the dates of novel human innovations such as art, ornamentation, production of tools, and hunting strategies. This project collaborates with colleagues from the University of the Witwatersrand at the School for Geography, Archaeology and Environmental Sciences and the Evolutionary Studies Institute.

Origin of Land Ecosystems Project: The Millennium Trust provides funding for this project to Dr Gess who is based at the Albany Museum, Makanda. This funding provides salaries for Dr Gess and a technical assistant, as well as operational research funding. Dr Gess continually makes ground-breaking discoveries of plant, early fish, and basal tetrapod fauna from the Devonian-aged Witteberg Group. Several of his findings are published in prestigious journals such as *Nature*.

A large portion of GENUS grants fund:

- Postgraduate Bursaries (Honours, Masters, & Doctoral)
- Postdoctoral Fellowships
- Next Generation Palaeoscientist Postdoctoral Fellowships
- We Dig Fossils Grant – open to Black Principal Investigators who identify as women
- Research Grants

4. Key Performance Areas

4.1 Research and Knowledge Production

South Africa boasts an abundant natural heritage and holds a distinctive geographical advantage for exploring fossil records. Through collaborative efforts, GENUS and its partners persist in generating and sharing fresh insights into our exceptional fossil and archaeological legacy. This commitment ensures that valuable information enters the public sphere and contributes to the broader scientific community. The research produced by GENUS grantees finds applications across diverse disciplines, including geology, biology, ecology, and climate change, extending beyond the realm of palaeoscience.

Plan of Action: Research and Knowledge Production

GENUS aims to continue to produce research of the highest quality.

Origin of Life & Multicellularity	Fossil Plants	Devonian Animals & Plants	Karoo Therapsids	Early Dinosaurs	Human Evolution & Middle Stone Age	Earth Systems
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Due to the diverse nature of palaeoscience, there are three broad themes:

- **Evolutionary Processes** - This theme includes increasing knowledge of South African palaeobiodiversity, studying the timing of evolutionary events in major clades and climatic events, characterising the global geographic distribution of fossil taxa, and investigating the nature of functional morphology and key innovations in morphological evolution.
- **Cultural and Behavioural Evolution** - This theme explains key long-term hominid behaviour transitions and how they led to modern human behaviour.
- **Palaeo-environments and Palaeoclimates** - This theme explains how earth systems change dynamically and when stretched beyond thresholds, leading to changes (and potentially collapses) in ecosystems and biodiversity.

We have modified the third theme, Palaeo-environments and Palaeoclimates, to read:

- **Palaeo-environments and Palaeoclimates** - Earth systems change dynamically, and when stretched beyond certain thresholds, leading to changes (and potentially collapses) in ecosystems and biodiversity. This theme uncovers the variability in the resilience of past ecosystems to fluxes through space and time.

This was done to include more climate change studies, which are becoming ever more prevalent and in need of support.

Discontinued

- **Application and Innovations** - This theme focuses on applying technologies to pursue new, innovative means of information extraction and analysis. The Executive Committee felt that current research implements new techniques to address questions. It was decided to remove this theme, which the Steering Committee approved.
- **Palaeosciences and its Publics** - Palaeoscience adds a sense of value and prestige. To redefine how we communicate, we need to acknowledge, understand, and be attentive to society's different sectors and their attitudes towards and understanding the deep past. All researchers and students receiving funding from the CoE are expected to participate in science engagement. The Executive Committee felt that this theme should be incorporated as part of the grant application, and thus, this theme has been removed and approved by the Steering Committee.

The themes pertain to areas where the palaeoscience record of South Africa gives us an advantage, particularly with the Cape and Karoo Supergroups, the Tertiary and Quaternary fossil record, including cultural and behavioural evolution of *Australopithecus* and *Homo* and the development of Oldowan, Acheulean, and Middle Stone Age industries.

GENUS continues to have an excellent record of transforming raw research data into scientific publications. Many articles are published in high-impact journals for palaeosciences with an impact factor of ≥ 3 .

Despite the relatively few employed palaeoscience researchers, GENUS is exceptionally productive in publishing new knowledge, which is used by the international scientific community. The result is that South Africa’s fossil and archaeological record is increasingly featured in textbooks (most published overseas). Ultimately, this knowledge is used to update school and university curricula, palaeo-tourism sites and develop palaeo-tourism routes.

4.2 Education and Training

Education and training are a crucial component of GENUS activities. Human capital development focuses on support for Honours, Masters, Doctoral students, postdoctoral fellows, emerging researchers, interns, and technical staff.

Education and Training

GENUS is committed to building a diverse, equitable, and inclusive palaeoscience landscape.

Postgraduate Bursaries (Honours, Masters, Doctoral)

Internships in Research Assistance, Collection Management, Big Data Analysis, Science Communication

Next Generation Palaeoscientist Postdoctoral Fellowships

Upskilling Workshops

Student Participation in National competitions

GENUS Research Grant

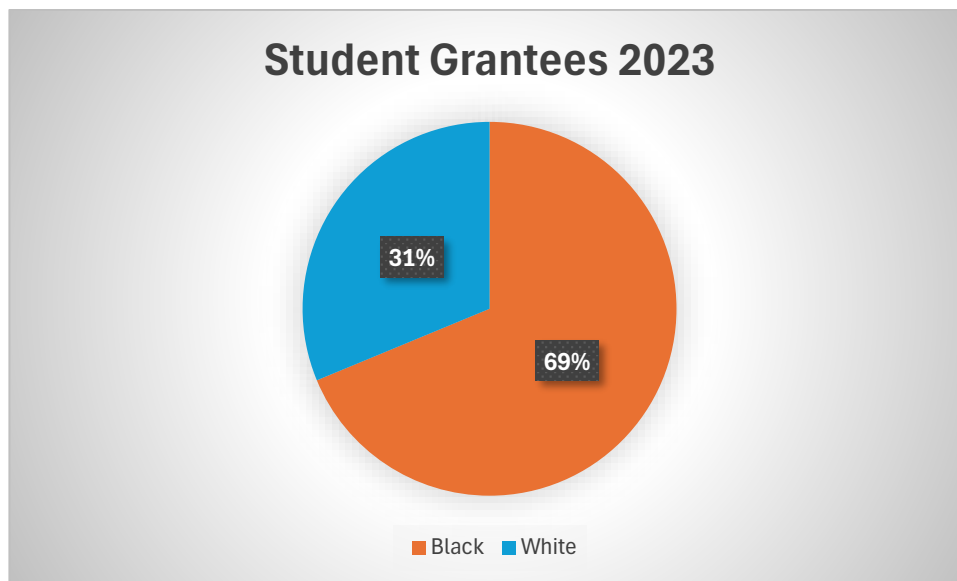
We Dig Fossils

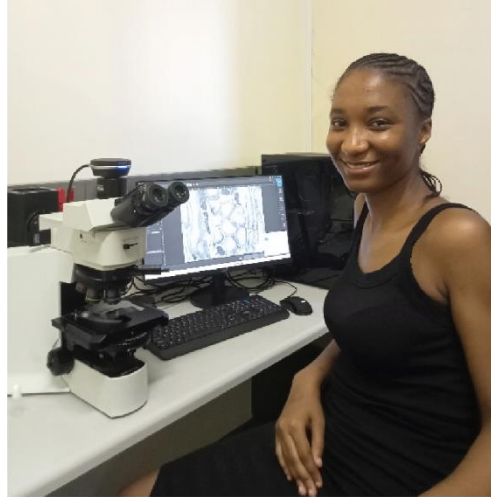
Emerging Research two-year salary

Technician Salaries

Over the past decade, GENUS has observed a rise in the enrolment of South African, black, and black female students. At the inception of the CoE, there was a noticeable surge in female students, marking a positive trend. In recent years, transitioning from Honours to Doctoral levels, there has been a notable increase in black student representation. While acknowledging the progress made since our establishment, we continue to be vigilant in enhancing the representativeness of the South African palaeoscience community. Our ongoing efforts include:

- **Internships:** Actively engaging and supporting black female postgraduates through participation in various internship programs. These programs offer exposure and experience in palaeosciences, spanning research assistance, collection management, big data analysis, and science communication.
- **We Dig Fossil Grant:** Facilitating the involvement of black women principal investigators (PI) through a two-year grant aimed at providing them with the necessary time and resources to realize their research objectives.
- **GEN(US) Upskilling Workshops:** Conduct workshops to equip grantees with essential skills for enhanced employability in academic or industrial settings. These workshops cover topics such as crafting an effective academic Curriculum Vitae, delivering compelling oral scientific presentations, and engaging the public through effective presentations. Additionally, new initiatives are being developed, including strategies for successful job interview performance, popular science writing, science engagement ideas, and a course on snake bite management.
- **Funding Support for Postgraduates:** Providing financial assistance to postgraduates to attend and participate in national competitions. Examples include the 3-Minute Thesis Competition (SAASTA), the SAASTA Young Communicators Competition, FameLab, and the Wits Science Slam.





Ryan Nel excavating a nodule containing a shark spine, in the Klipbokkop Formation, Bokkeveld Group during the Devonian Ecosystems Project field trip in November 2023. (top left), Busisiwe Hlophe analysing archaeological macrocharcoal samples in the lab as part of her MSc. (top right), Atashni Moopen having fun jackhammering away in a quarry (bottom left), Chiwara-Maenzanise excavating a Middle Stone Age site in Tswalu Kalahari, delving into her passion for modern human behaviour and stone tool technology (bottom right). Photos provided by students, compiled by Mariëtte van der Walt.

4.3 Information Brokerage

Informational brokerage is an essential function of GENUS, and our science engagement initiatives have expanded yearly. We remain active through our science communication via our website, social media platforms, and newsletters.

Plan of Action: Science Engagement

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

Website	Sterkfontein exhibit upgrade, Accelerator Programme, Geoddysey, School Curriculum, Colouring book, Travel Bugzz Go Digging
Social Media Platforms	Ancient Odyssey excavation tours, Opening of Dinosaur Interpretive Centre, Geocaching
Newsletters	FameLab, PSSA conference, Genus Student Conference

Ancient Odyssey Excavation Tours

GENUS and Ancient Odyssey have partnered to develop the “Rewind Time Fossil Finding Odyssey in the Karoo, South Africa” programme. This schedule will take guests on a journey back in time as we collaborate with renowned palaeontologists (Prof Bruce Rubidge, Prof Rob Gess and Dr Julien Benoit) in South Africa's Karoo region to investigate and unearth the fossilized remnants of ancient fish and early tetrapods from the Devonian period, dating back 420 million years. Guests will also have the opportunity to directly engage with the fossils that have made the Karoo famous, specifically the therapsids, which are the ancestors of living mammals. Additionally, an itinerary is being developed for a Cradle of Humankind tour, where guests will learn about human evolution, join active digs in the cradle (led by Profs Dominic Stratford and Jose Braga) and enjoy the tourism activities the area has to offer, including wildlife safaris, zipline tours and hot air balloon rides. Proceeds from these tours will benefit bursaries for black female palaeontologists applying for the We Dig Fossils grant.

Sterkfontein Upgrade

GENUS, in collaboration with PAST and MGG, has undertaken the enhancement of outdoor educational signage and information boards at the Sterkfontein Caves, alongside the development of educational materials and exhibitions for the research laboratory facility, all slated for launch later this year.



The research laboratory at Sterkfontein is currently still a blank slate, but will soon be filled with hands-on exhibitions and beautiful imagery on the walls. Photograph by Mariëtte van der Walt.

Accelerator Programmes ongoing at Wits, UFS and Rhodes Universities

Accelerator programmes, spearheaded by Prof Choiniere (Wits), Dr Muir (UFS), and Ms Matiwane (Rhodes), target undergraduate students displaying a keen interest and aptitude in palaeosciences. Participants are offered a comprehensive crash course in Palaeoscience, complete with field excursions, direct engagement with palaeoscientists, and in-depth discussions highlighting the significance of this field.

Opening of Dinosaur Interpretive Centre, Clarens

The new Dinosaur Interpretive Centre at the Golden Gate Highlands National Park in Clarens, Free State, is nearing completion and will soon welcome guests eager to delve into the region's rich dinosaur history. Architectural highlights include brickwork resembling dinosaur scales. Beyond serving as an interactive museum, the centre will double as a scientific research station, dedicated to preserving the archaeological site's invaluable remains. As part

of this initiative, GENUS is currently finalizing a full-size digital print of a *Massospondylus* dinosaur to enhance the centre's educational offerings.

FameLab 2024

Participating in FameLab offers students a unique opportunity to refine their science communication abilities. Through workshops, coaching sessions, and presentation opportunities, participants learn to distill complex scientific concepts into engaging narratives that captivate diverse audiences. This hands-on experience equips students with invaluable communication skills essential for effectively conveying scientific ideas and discoveries to broader audiences, fostering a new generation of articulate and engaging science communicators.

PSSA Conference 2024

GENUS is providing substantial funding towards the 22nd PSSA Conference, set to take place in Graaff-Reinet, South Africa, from 8-12 September 2024. This conference represents a pivotal gathering for the advancement of palaeoscience in southern Africa. At its core, the Society aims to propel the science of palaeoscience forward, fostering collaboration among individuals dedicated to the study of evolution, comparative anatomy, and taxonomy over vast expanses of time. Moreover, the Society places significant emphasis on the preservation and conservation of fossil sites, recognizing their invaluable contribution to our understanding of natural history. Through this conference, GENUS and its grantees will engage in discussions, presentations, and workshops aimed at furthering these critical objectives while promoting heritage awareness and stewardship of our rich palaeoscience legacy.

Dr C Steininger, Dr R Hanon and Dr A Val are applying for funding to host a special 'Bob Brain Dedication' at the 2024 PSSA.

School Curriculum

GENUS and PAST are collaborating to support high school Life Science educators by assisting in the updating and development of the existing Life Science curriculum, particularly the evolution module. This initiative entails conducting focus groups with educators from diverse school sectors, including both private and public institutions, to ascertain their specific needs in terms of materials and course content enhancements. The first meeting is set to be held 19 June 2024 at Wits University.

Geoddysey

Geodyssey, an interactive geoscience mobile app developed by Dr Penn-Clarke (Wits) for iOS and Android, along with its accompanying webmap, was launched in March 2022 through a partnership between the Geological Society of South Africa, Western Cape Branch (GSSA WC), and Forge SA. South Africa boasts a unique geological heritage spanning over 3.6 billion years, offering insights into the development of continents, lifeforms, and human origins. Despite the country's rich geological and paleontological significance, awareness among the general public remains low. The app aims to showcase South Africa's diverse landscapes and mineral wealth, emphasizing the importance of understanding the nation's geological history for both scientific and national pride reasons. GENUS is contributing financial support to aid in the development and implementation of the app.



Geodyssey: A locally developed interactive geoscience mobile app for iOS and Android, accompanied by a webmap, revolutionizing geological exploration and education.

Geocaching

GENUS is pleased to announce its partnership with Geocache South Africa, presenting an engaging palaeoscience-themed adventure. Participants are invited to seek out the concealed GENUS treasure strategically placed across selected sites throughout the country. By capturing a playful selfie with the discovered treasure, participants stand a chance to win prizes, simultaneously promoting GENUS and palaeoscience. This initiative is strategically crafted to enhance public enthusiasm and involvement in the field of palaeoscience, aligning with our mission to promote education and awareness in scientific endeavours.

Colouring Book

GENUS is teaming up with postgraduate grantees possessing artistic talents to create an illustrated colouring book aimed at igniting excitement about South African palaeoscience among young learners. This exclusive book will showcase South African prehistoric animals, offering children a glimpse into their national palaeoscience heritage, fostering a deeper understanding and appreciation for diverse ancient creatures.



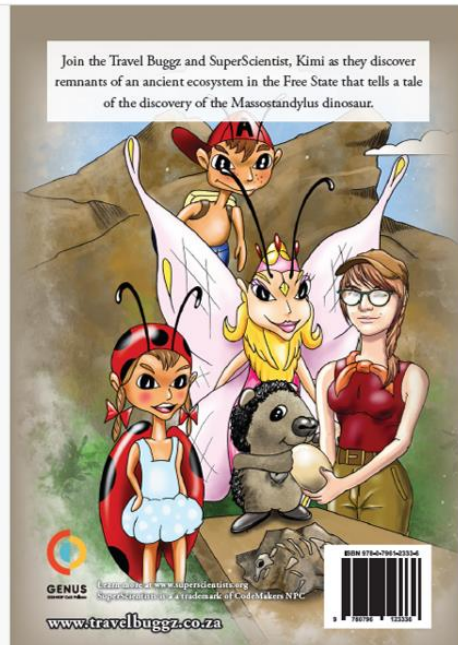
Megazostrodon. Illustrated by Genus PhD Candidate Atashni Moopen

Genus Student Conference 2024

The GENUS Student Conference serves as a highly anticipated and congenial platform for students to showcase their research findings to their peers. With prizes awarded for the most outstanding presentations, this annual event fosters scholarly exchange and collaboration. This year, the conference will be hosted in Cape Town, offering students an enriching opportunity to engage with fellow scholars and experts in their field in a beautiful setting.

Travel Buggz Go Digging children's Book

Embark on an exciting adventure with the Travel Buggz series! Join Sandy and her two children in "Travel Buggz Go Digging," as they visit Dr Kimi Chapelle to explore the world of *Massospondylus* dinosaurs in the Free State. This engaging book, funded by GENUS, is perfect for children aged 3-8 years, combines colourful illustrations and captivating storytelling to teach young readers about these fascinating dinosaurs and the work of palaeoscientists.



Introducing the latest Travel Buggz adventure in a series of 8 books. Join Dr Kimi Chapelle and the *Massospondylus* dinosaur on an exciting journey through time.

4.4 Networking

The Centre continues to expand its partnerships with universities, museums and industry. We assist our research in building networks to enhance the quality and scope of research projects and provide opportunities to train postgraduate students, postdoctoral fellows, and emerging researchers. These collaborations offer an additional funding stream and enable access to equipment and expertise not available in South Africa to students and researchers.

Through research collaborations of the CoE at various partner institutions, beneficial synergies and cooperation are actively encouraged. Many high-impact peer-reviewed publications have stemmed from this collaboration.

It is the policy of the CoE to develop and involve partnerships as the opportunity arises. The CoE members have an extensive network of over ~400 active collaborations, both national and international.

Existing Collaborations

- Olduvai Landscape and Palaeo-anthropology Project (OLAPP)
- Multinational team working at Laetoli, Tanzania.

- There are currently three separate projects running in Kenya at Koobi Fora, East Turkana Basin, Rusinga, Mfwangano and Lukeino. All the projects include local and international collaborators.
- Links exist between CoE and African museums, universities, and institutions, particularly in Angola, Botswana, Egypt, Ethiopia, Kenya, Mozambique, Mali, Namibia, Tanzania, Uganda, Zambia, and Zimbabwe.
- Continued international collaborations: e.g. MIT, University of Washington, SUNY at Stony Brook, Field Museum in Chicago, University of Chicago, Rutgers University, University of Georgia, Colby College, John Hopkins University, University of Milwaukee, University of Minnesota, Oxford University, George Washington University, University of North Carolina, American Museum of Natural History, University of Bergen, Natural History Museum in London, University of Toulouse, CNRS (Paris), University of Southern California, Palaeontological Institute in Moscow and Institute of Vertebrate Palaeontology and Palaeo-Anthropology (China).

Attendance at conferences and workshops, both locally and abroad, and the presentation of papers are encouraged and supported. Conferences and workshops allow emerging researchers to connect with others in similar fields and build future collaborations.

Developing a National Science Collections Facility and the PanAfrican curatorial network have increased curatorial efficiency. We are collaborating with the Southern African Association of Science and Technology Centres (SAASTEC), the South African Museums Association (SAMA), and the South African Heritage Resource Agency (SAHRA).

4.5 Service Rendering

Our CoE members provide academic services by serving as editors, participating on committees, undertaking reviews, and participating in mentorship to students, fellows, and emerging researchers.

The CoE has established itself as a source of information to its stakeholders and the broader scientific community using various approaches. Our members know and understand the importance of service to the South African public, governance, and academia.

The CoE and our partners have been providing guidance and comments on many government policies for the South African Heritage Resources Agency, Palaeontological Heritage in the Western Cape, and the Cradle of Humankind World Heritage Site's Integrated Management Plan.

5. Moving Forward

5.1 Intentional Transformation

Empowering the Next Generation

In its brief existence, GENUS has witnessed a remarkable increase in the enrolment of students from diverse backgrounds, a development crucial to fulfilling the CoE's vision in palaeosciences. Every endeavour is undertaken to ensure that the postgraduate student body reflects the demographic makeup of South Africa. Our strategic approach includes:

- Encouraging researchers from our partner institutions to deliver lectures in undergraduate courses. Many students are drawn to palaeosciences by the dynamic presentations of our researchers, who demonstrate viable career paths. These scholars cover a range of subjects, including biology, geology, climatology, botany, geography, and anatomy.
- Providing support to our postgraduate students in identifying additional sources of funding.
- Sustaining our extensive science engagement initiatives aimed at showcasing palaeosciences as a promising career choice.
- Actively engaging with students during their final undergraduate or honours years through roadshows that spotlight grant opportunities and potential career pathways.

Enabling Research Environments

Through collaborations with our partner institutions and committees, we are actively addressing imbalances in race and gender. While our partner institutions have limited capacity for staff recruitment, significant progress has been achieved in hiring previous CoE grantees from underrepresented groups in paleoscience roles. The journey from postgraduate to emerging researcher typically spans at least ten years. Throughout our existence, GENUS has observed encouraging trends among our past grantees. Many black female doctoral candidates have secured academic positions or prestigious international postdoctoral fellowships prior to graduation. In recent years, there has been a notable increase in black applicants' declining postdoctoral fellowship offers in favour of university academic positions, signalling positive developments. Additionally, more women are assuming leadership roles within university structures.

Enhancing the Palaeoscience Landscape

The CoE and its collaborators are championing inclusivity and pushing boundaries. Our unwavering commitment to fostering opportunities and facilitating access through collaborative and inclusive research initiatives remains steadfast.

- Foster inclusivity in grant allocation by emphasizing diversity, equity, and inclusion in research proposals seeking funding support.
- Facilitate the engagement of black women principal investigators (PIs) through a dedicated two-year We Dig Fossil Grant, enabling them to pursue their research objectives effectively.
- Empower black female postgraduates by actively involving them in palaeoscience through internship programs offered by GENUS, providing hands-on experience in research assistance, data analysis, and science communication.

- Sustain the momentum of increased representation of black women across evaluation panels, committees, and professional societies.
- Offer skill development opportunities to grant recipients to enhance their employability prospects in academia or industry.

5.2 Sustainability Strategy

5.2.1 The Next Three Years

GENUS has developed a strong network of excellent palaeoscience research across South Africa and beyond. The CoE, through a strong partnership with the University of the Witwatersrand, remains the network leader of palaeosciences in South Africa.

Our plan is dedicated to elevating Palaeosciences and creating a thriving environment for researchers and students to contribute to the future by pushing the boundaries of our CoE and ensuring that the Centre of Excellence in Palaeosciences continues into the future. This involves building a future planning document that closely allies with the Decadal Plan and DSI's recommendations stemming from the 2023 CoE evaluation.

To build on the capacity to implement transdisciplinary research

Transdisciplinary research requires cooperation across disciplines, big data, laboratory time and specialised equipment. In the last two decades, Palaeoscience research has required large teams to answer big questions with cross pollination between disciplines to support a new generation of Palaeoscientists. GENUS actively supports initiatives such as these.

To build human capacity for more representation in the field

GENUS continues to be actively committed to building a diverse, equitable, and inclusive palaeoscience landscape. We have kept our established initiatives such as the We Dig Fossil grant for African females, and we continue to support the Accelerator Programme, which is specifically for Africans and females (and has now expanded to include three provinces). We will continue to brainstorm new initiatives to encourage poorly represented groups into the discipline of Palaeoscience.

To promote South Africa's heritage to a broader audience by integrating Palaeosciences with education, tourism and citizen science

We have and continue to be highly active in general public education and engagement (as can be seen from our highlights and media coverage). GENUS has hired a full-time media officer, and together with our science engagement officer, new initiatives are continually being created all the time. We are actively testing the waters for interest in tours to heritage sites in South Africa. GENUS has also begun working with schools in collaboration with the Palaeontological Scientific Trust (PAST) to better explain palaeoscience and increase awareness in schools.

Promoting and transmitting heritage

Our extensive and rich fossil and archaeological heritage is unmatched in Africa and internationally. We can use it to deepen conversations about our shared humanity and instill pride in all citizens.

Improve Financial Sustainability

GENUS has developed an annual fundraising strategy for soliciting donations, scheduling events to raise money and targeted communication. Understanding the CoE's past successful fundraising efforts and repeating them is fundamental to the annual planning of the CoE's work.

Succession Planning for Directorship

Director, Professor Jennifer Botha, was appointed in 2023 to lead GENUS forward and maintain stability until a representative palaeoscience researcher from the next generation is prepared to lead South African palaeoscience into the future.

5.2.2 Future Planning

The Centre of Excellence in Palaeosciences has showcased South Africa's potential to become a prominent figure in the global scientific community. Therefore, the establishment of a more robust and transdisciplinary Centre for Palaeosciences is a logical step towards elevating productivity in a field where South Africa holds a competitive edge.

A future planning document has been devised to guide the implementation of the next phase of our Centre. The strategic aim of this document is to expand research programs, improve economies of scale, and uphold and strengthen global competitiveness.

Drawing from the successful model of the Centre of Excellence in Palaeosciences, our roadmap outlines innovative approaches to advancing high-impact research, training, and engagement. It comprises the following seven key points:

- Facilitating ground-breaking discoveries and research endeavours.
- Establishing a Centre to foster collaboration among existing and new partners, harnessing their expertise to develop joint initiatives into big bold research projects.
- Providing expertise that can inform broad national scientific policies and sustainability objectives.
- Promoting inclusive social development across all communities involved in palaeoscience through capacity building, skills transfer, partnership creation, and the facilitation of opportunities for previously disadvantaged communities, along with the development of palaeo-tourism.
- Sustaining through support of world-class laboratory facilities to drive transdisciplinary research and teaching in contemporary Palaeosciences.
- Preserving, curating, and expanding the country's collections to represent South Africa's fossil heritage accurately.

- Engaging in initiatives that encourage widespread public participation in and appreciation of South Africa's Palaeoscience legacy.

6. Conclusion

The geographic advantage offered by the extensive palaeoscience record of South Africa is worthy of a constant Centre of Excellence in Palaeosciences in this country. GENUS has successfully undertaken a diverse range of research projects where South Africa has good palaeoscience resources and a unique geographic advantage. These include the origin of life and multicellularity, invertebrate palaeobiology, palynology, palaeobotany of various ages, taxonomy, life history and palaeobiogeography of fishes, amphibians, parareptiles, therapsids and dinosaurs, origins of mammals and hominins. In addition, hominin morphology and behaviour, the earliest tools of hominins, the emergence of behavioural complexity, faunal analysis, bone taphonomy and the use of isotopes for understanding physiology, ecology, and palaeoenvironment. In ground-breaking broader multidisciplinary studies, palaeosciences are applied to understand climate and biodiversity change, stratigraphy, and basin development.

South African Palaeoscientists have proven themselves to be international leaders in palaeoscience research. With available and emerging technologies and sufficient investment, a step change is possible in discovering, understanding, protecting, and utilising our natural assets.

GENUS has been fundamental in keeping palaeoscience alive in South Africa by supporting students from Honours all the way to Postdoctoral level. The range of sub-disciplines allow palaeoscience to connect with numerous other science disciplines, providing South Africa with an ever-expanding science network. South Africa's heritage has the potential to become a significant eco-tourism asset to the country with support from the Department of Tourism. The current momentum needs to be maintained as there is so much more for the South African palaeocommunity to offer its nation and the world.

The Centre, its partners and its communities are looking forward to the future of palaeosciences and moving toward further promoting South African Palaeosciences to the highest international ranking.

In summary, GENUS continues to showcase the South African palaeoscience community to the international population. It plays a pivotal role in enabling palaeoscientists to broadcast their research nationally and internationally. The Centre provides fundamental support for globally excellent research and accordingly scientific publications in a wide range of subfields; custodianship of South African fossil collections; palaeoscience training at various levels (tourism guides, technicians, schools, undergraduate students, postgraduate students, postdoctoral fellows, emerging researchers); science engagement and palaeotourism initiatives. GENUS is unique in that it provides personal support to each and every grantee on a daily basis, ensuring that grantees receive the type of experience that leads them to reaping the rewards from the CoE's financial and mental support. In this way, GENUS grantees are built to succeed in an international space, whether they are applying for prestigious financial grants, postdoctoral fellowships or research positions.