

Our Ref:



an agency of the  
Department of Arts and Culture

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CaseID: 13381

Date: Wednesday February 06, 2019  
Page No: 1

## Letter

### In terms of Section 32(19) of the National Heritage Resources Act (Act 25 of 1999)

Attention: Dr Riaan F Rifkin

University of Pretoria - Department of Genetics

Department of Genetics, Center for Microbial Ecology and Genomics (CMEG), University of Pretoria,  
South Africa

This proposal forms part of a project which aims to cultivate the currently undeveloped southern African ancient DNA (aDNA) research niche and includes the establishment of a local aDNA analytical facility at the Department of Genetics, University of Pretoria. Following the metagenomic (and also microscopic and isotopic) analyses of an ancient (c. AD 1420) human faecal specimen recovered from the Iron Age levels at Bushman Rock Shelter (BRS), Limpopo Province, the resulting manuscript is currently under review at Science Advances. The results of this study indicate that the IM of the Iron Age (c. AD 1420) Bantu-speaking individual exhibits IM features characteristic of a transitional forager-agro-pastoralist diet. Comparison with the Tyrolean Iceman, Hadza hunter-gatherers, Malawian agro-pastoralists and contemporary Italians, reveals that the BRS IM precedes IM adaptation to 'Western' diets, including the consumption of coffee, tea, chocolate, citrus and soy, and the use of antibiotics, analgesics and exposure to toxic environmental pollutants. Our analyses elucidates the ways in which human IMs responded to recent dietary changes, prescription medications and environmental pollutants, providing insight into human IM evolution since the advent of the Neolithic c. 12,000 years ago. Problematically, these results are derived from only a single ancient sample. Five additional palaeo-faecal specimens have since been recovered, and the aim of this application is to also apply the recently-devised multi-proxy analytical protocol (including shotgun metagenome sequencing, SEM analyses, intestinal parasitic analyses, <sup>14</sup>C dating, and isotope analyses) to these ancient samples. The five palaeo-faecal specimens were recovered in situ from an exposed stratigraphic section at BRS. The occupation level from which the specimens derive comprises the two upper layers of the rock-shelter (i.e., Layers 1 and 2) and relates to the arrival of Bantu-speaking Iron Age agro-pastoralist communities in the region after c. 1,800 years ago (ya). This occupation reflects the advent of the Neolithic in South Africa, which entailed the introduction of domesticated taxa such as sorghum (*Sorghum bicolor*), cattle (*Bos taurus*) and various other Iron Age-related species and cultural practices (i.e., ceramic and iron-smelting technologies) into the region. All the preceding archaeological layers at BRS are representative of occupations by Holocene (i.e., the Oakhurst and Robberg techno-complexes ~10 kya) and Pleistocene (the Pietersburg techno-complex

**Multi-proxy analyses of Iron Age palaeo-faecal specimens from Bushman Rock Shelter, Limpopo Province, South Africa**

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**~70 kya) hunter-gatherers.**

Dear Dr Rifkin,

Thank you for your application to temporarily export palaeo-faecal specimens from Bushman Rock Shelter for multi-proxy analysis at the Centre for GeoGenetics (Natural History Museum in Copenhagen, Denmark).

SAHRA has reviewed the application and has decided to approve it.

We wish you every success with this project.

Should you have any further queries, please contact the designated official using the case number quoted above in the case header.

Yours faithfully

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Ragna Redelstorff  
Heritage Officer  
South African Heritage Resources Agency

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Phillip Hine  
Acting Manager: Archaeology, Palaeontology and Meteorites Unit  
South African Heritage Resources Agency

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# Multi-proxy analyses of Iron Age palaeo-faecal specimens from Bushman Rock Shelter, Limpopo Province, South Africa

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## ADMIN:

Direct URL to case: <http://www.sahra.org.za/node/520125>  
(, Ref: )

## Terms & Conditions:

1. This approval does not exonerate the applicant from obtaining local authority approval or any other necessary approval for proposed work.
2. If any heritage resources, including graves or human remains, are encountered they must be reported to SAHRA immediately.
3. SAHRA reserves the right to request additional information as required.