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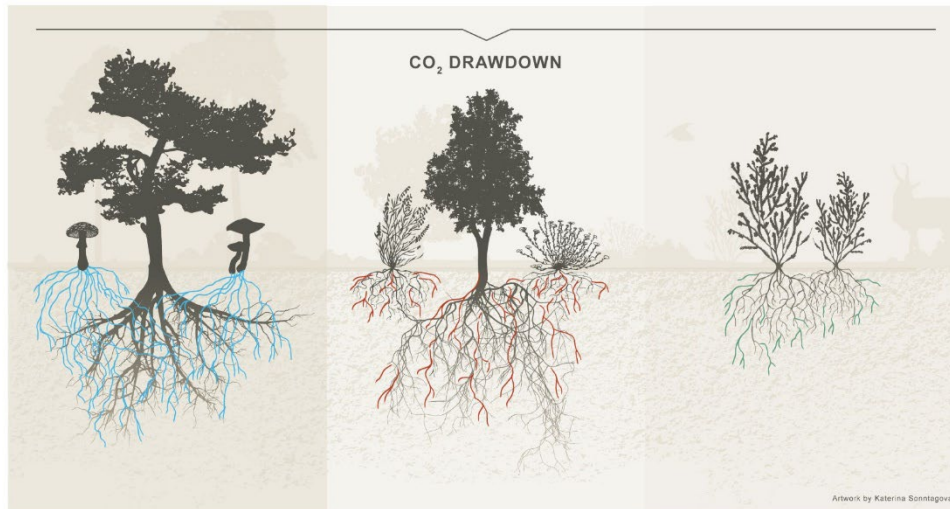


SPUN

## PhD opportunities for 2024

### AN OVERLOOKED CARBON SINK UNDERFOOT?

### THE ROLE OF MYCORRHIZAL FUNGI IN AFRICAN BIOMES



**CLOSING DATE: 20<sup>th</sup> June 2023**

We invite applications for 3 full-time PhD research scholarships (starting January 2024) offered jointly by the University of Cape Town and Stellenbosch University in collaboration with the University of Sheffield, and the Society for the Protection of Underground Networks. The overall aim of the research is to accurately assess the extent to which mycorrhizal fungi are carbon sinks in certain African biomes, the role of fungal diversity in this, and to communicate our findings to the wider scientific community as well as decision makers at both local and regional levels. The anticipated impact of this research and its subsequent communication is to enable decision makers to prioritize protected areas and climate-smart land uses that take mycorrhiza into account.

**Background:** There has been a recent focus on the protection, restoration, and sustainable use of natural lands (“Natural Climate Solutions”, NCS)) as one way to mitigate anthropogenic increases in atmospheric carbon dioxide, the major greenhouse gas responsible for global climate change. However, carbon sequestration via plant-soil pathways involves an important group of organisms called mycorrhizal fungi that have been largely overlooked in their potential role in NCS. These fungi form symbiotic relationships with the roots of most land plants, providing soil nutrients in exchange for plant-derived carbohydrates. By colonizing plant roots, the fungus effectively extends the volume of soil, as well as the type of nutrients available for plant nutrient uptake. This allowed early land plants to colonize land. In turn, the fungus is involved in the burial of carbon into soils via the allocation of photosynthate to its underground structures, and other mechanisms. Because

these fungi have been largely overlooked as a potential carbon sink, we recently provided the first global quantitative estimates of carbon allocation to the three main types of mycorrhizal fungi, namely arbuscular-, ecto-, and ericoid mycorrhiza (publishing 5<sup>th</sup> June, DOI:10.1016/j.cub.2023.02.027). However, there are still major gaps (notably, no data in Africa and incomplete accounting of carbon pools and dynamics globally) and uncertainties (e.g., the role of fungal diversity, variations with season), which we wish to address with this project.

Two candidates will focus on carbon ecophysiology via carbon tracer studies in the field and laboratory and be registered at the University of Cape Town (UCT) with **Prof. Michael Cramer** and **Dr Heidi Hawkins**. Another candidate will focus on mycorrhizal genetic and functional diversity at the same field sites and will be supervised by **Prof. Karin Jacobs** at Stellenbosch University (SU). Laboratory work will take place at the respective universities, with field work in fynbos shrublands, grasslands, savanna, and forest in South Africa, Botswana (or Kenya), and Madagascar. All PhDs are expected to collaborate concerning the implications of their findings for soil carbon stores, and to make them available to our various networks for mapping and awareness raising.

**Eligibility:** Applicants should have an excellent academic record and must have a valid driver's license. PhD candidates require an appropriate MSc degree with a minimum mark of 65% (preferably >75%), obtained no later than the end of 2023. Experience in field and laboratory techniques, statistical data analysis and scientific writing will be favoured. According to NRF policy, only South African (SA) citizens and permanent residents who obtained a MSc within the last 2 years with exceptional marks ( $\geq 75\%$ ), or those with  $\geq 65\%$  and in financial need/with disability are eligible for full cost bursaries. South African citizens, permanent residents, and non-SA residents (5% of bursaries) with  $\geq 65\%$  for their MSc (obtained within the last 2 years) but not in financial need/with a disability are eligible for partial cost bursaries. Funding will only be awarded to candidates selected and approved by the NRF, the outcome of which will be announced by the NRF in December 2023/January 2024. Project running costs are to be provided by the project, contingent on a successful NRF funding application.

**TO APPLY:** All applicants must

- Send a CV (including your academic record and names and contact details of two referees), a short motivation letter, transcripts of academic qualifications, and one example of written work (e.g., paper, report or thesis chapter) to Dr Heidi Hawkins at [heidi.hawkins@uct.ac.za](mailto:heidi.hawkins@uct.ac.za) (subject 'your surname' and 'mycorrhiza PhD') **by 20<sup>th</sup> June**
- Shortlisted candidates should then apply for bursaries directly to the NRF (National Research Foundation) by the internal deadline of **30<sup>th</sup> June**. Please see these links for more information:
  - o For the UCT PhDs (2): <https://uct.ac.za/students/current-students-funding-postgraduate-degree-funding/postgraduate-degree-funding-noticeboard>;
  - o For the SU PhD (1) <http://www.sun.ac.za/english/research-innovation/Research-Development/nrf-scholarships>
- Shortlisted candidates must provide the NRF reference number for this project (**CPRR23042697575**) on their NRF bursary application.