



## The Andrew W. Mellon Foundation

### **MMOTO LEONARD MASUBELELE**



I grew up in Bochum (Limpopo Province) living with my grandmother who taught me respect and discipline from a young age. My matric certificate was obtained from Phala Senior Secondary in Westphalia. The Bachelor of Science degree on Botany and Zoology as majors and the Bachelor of Science Honours degree in Botany were both obtained from University of Venda for Science and Technology. My Honours project was on *“The effect of Cattle, Donkey, Goat and Inorganic Manure on the productivity of Maize and Groundnuts”*. I am currently registered at the University of Cape Town for my Master of Science in Botany. This project deals with understanding nutrient cycling in savanna grasslands by studying litter decomposition and carryover. It is entitled *“Decomposition in savanna grasslands”*.

My interests in science are in the field of Botany, especially Nutrient cycling, Plant-herbivores interactions and Alien invasion. I am of the idea that it is about time that the first two fields are studied and investigated in relation to alien invasion. SANParks and Kruger National Park’s management goals focuses on fire, elephant and alien invasion impacts separately. I think a concerted effort is needed to manage these impacts together and to better monitor the beautiful landscapes and biodiversity in the park. I am a student member of SAAB, SAEON GSN, GSSA, SC, IGS, and IRC. My hobbies entail watching and playing sport, watching comedy movies, and reading and writing novels.

## PROJECT ABSTRACT

### Decomposition in Savanna Grasslands

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Tropical and subtropical grasslands ecologists have ignored decomposition, because of the important role it plays in nutrient cycling, in terms of understanding how grass litter gets to the soil during the dry season. The major flaw is in the methods employed to investigate decomposition. In the prairies and steppes, litterbag methods employed investigate decomposition when litter is on the soil, even though the importance of carryover from standing litter is recognized. Standing litter results in high carryover which slows down decomposition thereby hindering productivity in the next growing season. I therefore decided to extensively investigate the processes of photodegradation and microbial decomposition as well as carryover and also how these processes differ between mesic and semi-arid grasslands. Since tallgrass prairies experience more carryover and slower decomposition than shortgrass prairies, I therefore hypothesized in this thesis that mesic grasslands will experience more carryover and slower decomposition than semi-arid grasslands. Results from this thesis showed that standing litter decomposition was slower than surface soil decomposition; hence photodegradation was slower than microbial decomposition. Photodegradation was important in controlling the rate of decomposition among the different grass species standing litter. Different grass species decomposed at different rates. Different plant traits were responsible for decomposition rates of standing litter and surface soil litter. Tensile strength and polyphenolic content were important during initial and final decomposition of standing litter whereas for the surface soil litter the same factors together with C/N ratio and lignin were important. Carryover existed in mesic grasslands but not so much in semi-arid grasslands. This implies that mesic grasslands are phylogenetically designed to burn while semi-arid grasslands are controlled by herbivory.