



## Postgraduate positions in remote sensing (geology) at the University of the Free State, South Africa

The Merensky group for Airborne Geological Image Classification (MAGIC) is offering two funded postgraduate positions; one (1) Ph.D. and one (1) M.Sc. to begin in January 2022. The aim of the group is to develop remote sensing applications to better understand geological systems, and through that understanding, aid in how we access the natural resources of South Africa. Harnessed research technologies include satellites and unmanned aerial vehicles (UAVs) with several styles of sensor technologies. Research projects are described below.

*PhD Project: "Recurrent vegetation mapping using an integrated multispectral approach for groundwater exploration and management in the Karoo"*

Description: Availability of groundwater resources is key for the development of many areas in the Karoo where there is no available surface water. Since 2013, exploration and management strategies of groundwater resources have become a significant endeavor to ensure communities, farmers, and other water-dependent industries to recover from drought conditions and grow. This project aims to harness time-series multispectral datasets to track the variability in near-surface groundwater resources in selected areas in the Karoo. Key deliverables include: (1) discerning the variation of groundwater resources in relation to seasonal vegetation patterns, (2) testing the feasibility of an integrated management approach using satellite and UAV-borne multispectral sensors within the South African Context, and (3) establishing long-term monitoring solutions using UAV technologies.

This project will be co-supervised with Dr. Christian Mielke (Deutsche GeoForschungsZentrum, Germany).

*M.Sc. Project: "Discerning the 3-D fold geometry of the Eureka Syncline through unmanned aerial vehicle remote sensing and field mapping in the Barberton Greenstone Belt, Mpumalanga"*

Description: The Eureka Syncline of the Barberton Greenstone Belt (BGB), located directly northeast of the town of Barberton, is clearly visible from aerial photographs and can be readily traced from its geomorphic expression. Although there has been significant structural work done in the BGB, the 3-D geometry of this syncline remains poorly understood. This project aims to discern this geometry to ca. 400-500m depth through application of unmanned aerial vehicle remote sensing, photogrammetry, and field structural mapping. Results will be calibrated with depth profiles from adjacent mine operations and will contribute to our understanding of the depth of the structure, lithologic and facies changes within interbedded Moodies Group sandstones and shales, the structural evolution of part of the northern BGB, and the mineralized bodies at depth.

This project will be co-supervised with Prof. Dr. Christoph Heubeck (University of Jena, Germany).

Interested applicants should e-mail applications to Dr. Martin Clark ([clarkmd@ufs.ac.za](mailto:clarkmd@ufs.ac.za)). Applications must be in PDF format and include: (1) the applicant's CV with 3 references available for contact, (2) a cover letter, (3) a one-page motivation why the applicant is the right person to embark on the proposed research project.

Ideal applicants are independent self-starters with interest in resource acquisition and management within South Africa, have a driver's license, and can travel internationally. Applicants will be awarded positions taking due cognizance of the South African national imperative for transformation of race and gender demographics.

Application deadline is the 15<sup>th</sup> of November, 2021.

