Earth Stewardship Science Research Institute

NELSON MANDELA UNIVERSITY

2025 POSTGRADUATE BURSARIES AT AEON
Closing date for application: 31 January 2025

The Africa Earth Observatory Network is offering 1x Postdoc, 2x PhD, and 2x Masters Bursaries in 2025. Interested students are encouraged to send a short motivation letter and CV to bastien.linol@mandela.ac.za and emily.bosire@mandela.ac.za

Project 1: Earth and Planetary Sciences (Postdoc/PhD)
The Nqweba Meteorite is a rock from space that fell on 25 August 2024. A number of fragments have been found and need to be analysed. This requires the application of a vast array of techniques, including X-Ray CT scan, SEM, EPMA, and CT-PXRD synchrotron analysis, as well as developing methods and protocols for stable isotopes and noble gas isotopes mass spectrometry. The work will provide new insights into early solar system and develop the field of Earth and Planetary Sciences at Nelson Mandela University. The candidate must have a PhD/Masters degree with working knowledge of power diffraction and isotope geochemistry.

Project 2: Hydrochemistry of surface and groundwater (PhD)
As climate change exacerbates water pollution and creates conditions more conducive to cholera, typhoid, and to the growth of malaria mosquito larvae in stagnant waters, the aim of this project is to investigate surface and groundwater chemistry in Africa. The work requires systematic sampling and hydrocensus within major drainage basins of the Eastern Cape Province of South Africa and laboratory analyses including ICP-MS, ion chromatography, and TOC. The results will be integrated into a geo-database and compared with other measured water samples from Ghana and Kenya. The findings will contribute to understanding hydrology of the African continent and waterborne diseases. The candidate must have a Masters degree and skills in chemical hydrology.

Project 3: Marine geosciences (PhD)
The Algoa and St Francis bays of southeastern Cape represent an excellent natural laboratory to learn more about links between tectonics, climate, and marine habitats. A first survey was completed in April 2024, including multi-beam bathymetry mapping, pinger and sparker seismic, magnetometry, and seawater and bottom sediments sampling using the RV Observer. A second survey is planned in May 2025. The goals of this project are to produce new geological maps and cross-sections with stacking pattern of the sediments and information on marine life, and to analyse the collected samples in the laboratory, including C, N, and S isotopes to trace the different sources. This will contribute to understanding marine ecosystems and their response to tectonic and climatic changes. The candidate must have a Masters degree and demonstrate interest for working at sea.

Project 4: Ambient seismic noise imaging (Master)
Several springs and earthquakes have been reported along the Coega Fault at the easternmost limit of the Cape Fold Belt of South Africa. The project focuses on collecting new ambient noise data to image this structure. The data processing requires filtering, cross-correlation between seismic stations, temporal stacking, and inversion to calculate 2D and 3D velocity models. This will increase understanding of seismic hazards and groundwater movements. The candidate must have an Honours degree with math and physic backgrounds.

Project 5: Analysis of vesicular basalts for determining paleo-elevations (Master)
Africa is one of the largest continents on Earth with a unique record of sea-level changes that is poorly quantify. The project aims to study the impressive pile of basaltic lavas in the Drakensberg-Lesotho Mountains to reconstruct the elevations during emplacement. This includes using high-resolution X-ray computed tomography to determine the size distribution of vesicles and X-ray powder diffraction for phase composition studies. The results will improve models of sea-level changes around southern Africa. The candidate must have an Honours degree with skills in geological mapping.