



SCIENCE | EYENZULULWAZI NGEZENDALO | NATUURWETENSKAPPE
Mathematics Division | ICandelo leMathematika | Wiskunde Afdeling

Postdoctoral Position – Stage-Structured Spatial Spread Modelling (2026/2027)

The Biomathematics Group led by Prof. C. Hui (<https://math.sun.ac.za/hui/>) invites applications for a 2-year postdoctoral research position on stage-dependent demography and dispersal in spatial spread models under environmental uncertainty. The project addresses biological spreading phenomena central to ecology, epidemiology, and global change biology, with applications to invasive species, range shifts, and disease spread.

Project Overview

Biological spread is driven by **recruitment** (population growth and interactions) and **dispersal** (movement across space). Traditional models often oversimplify key complexities: **Stage-structured populations**: Different life stages have distinct demographics (e.g., larvae vs. adults, latent vs. active infection); **Heterogeneous dispersal**: Movement patterns vary across stages and may be Gaussian or fat-tailed; **Environmental variability**: Spread occurs in fluctuating environments shaped by eco-evolutionary feedbacks, trade-offs, and species interactions. The project will develop **analytical and numerical approaches**, including stage-structured models, adaptive dynamics, stochastic methods, and fractional calculus, to explore dynamic stability, travelling waves, and links between individual and population-level processes.

Candidate Profile

- Ph.D. awarded in 2022 or later in ecology, biomathematics, or related fields.
- Strong skills in **dynamical systems modelling** and numerical implementation.
- Good publication record; knowledge of ecological modelling is desirable.

The successful candidate will join a collaborative team with local and international partnerships.

Application Process

Submit CV and one-page research statement (PDF) to **Mrs. Hanlie Swart (jer@sun.ac.za)** by **30 November 2025**. Shortlisted candidates will be interviewed in December; the position starts by **01 March 2026**.