



WORKING PROJECT TITLE	Remote sensing of invasive alien trees and ecosystem degradation in the Cape Floristic Region
CORE TEAM MEMBER	Prof. Tammy Robinson-Smythe (Stellenbosch University) Co-supervisors: Dr Jasper Slingsby (University of Cape Town) and Dr Glenn Moncrieff (South African Environmental Observation Network)
ACADEMIC LEVEL OF THE PROJECT	Post-doc
WHEN?	Preferred starting date: October 2022. Two years of funding is available.
PROJECT BACKGROUND	<p>Remotely sensed data of vegetation activity from satellite-based monitoring platforms offers an opportunity to observe changes in the state of the earth's land surface at spatial and temporal resolution fine enough to inform management action at local scales. Among a range of drivers of ecosystem degradation, mapping and monitoring alien plant invasions is a critical need for planning and managing control operations¹. Unfortunately, while satellite remote sensing of invasive alien trees in the Cape Floristic Region shows great promise^{2,3}, as yet there is no operational system providing frequent monitoring updates, and the methods used to date have not been able to deliver the level of detail required by managers. There is potential to extend the project to investigate other types of land degradation relevant to the Cape Floristic Region observable using remote sensing. This collaborative project between Stellenbosch University, the University of Cape Town and the South African Environmental Observation Network aims to build on ongoing research, such as the RReTool (https://fynbos.saeon.ac.za/project/rreetool/) and Ecosystem Monitoring for Management Application (www.emma.eco⁴) projects, and capitalise on the opportunity to explore new sensor technologies provided by the NASA BioSCape campaign (www.bioscape.io), to</p>



	improve our ability to map and monitor drivers of ecological degradation such as alien woody plant invasions in the Cape Floristic Region.
REQUIREMENTS	<ul style="list-style-type: none"> • PhD in Ecology, Remote Sensing, Data Science or another relevant field (graduated in the last 5 years) • Strong publication record • Strong analytical skills. Strong grounding in statistical ecology and/or experience using machine learning methods would be an advantage • Strong abilities in one or more of R, Python and JavaScript is essential • Good knowledge of and skills using reproducible research methods and tools (Git, Docker, etc.) • Experience with managing large datasets • A keen interest in promoting sustainable management of ecosystems
FURTHER READING	<p>The status of biological invasions and their management in South Africa in 2017. vol. 204 (South African National Biodiversity Institute, Kirstenbosch and DST-NRF Centre of Excellence for Invasion Biology, Stellenbosch, 2018).</p> <p>Forsyth, A. T. Identifying and mapping invasive alien plant individuals and stands from aerial photography and satellite images in the central Hawequa conservation area. (University of the Western Cape, 2012).</p> <p>Holden, P. B., Rebelo, A. J. & New, Mark G. Mapping invasive alien trees in water towers: A combined approach using satellite data fusion, drone technology and expert engagement. Remote Sensing Applications: Society and Environment 21, 100448 (2021).</p> <p>Slingsby, J. A., Moncrieff, G. R. & Wilson, A. M. Near-real time forecasting and change detection for an open ecosystem with complex natural dynamics. ISPRS J. Photogramm. Remote Sens. 166, 15-25 (2020).</p>
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CONTACT DETAILS
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