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Zander Myburg is a Professor in Genetics and the Director of the Forest Molecular Genetics (FMG) Programme in the Forestry and Agricultural Biotechnology Institute (FABI) at the University of Pretoria (UP). He also holds the Chair in Forest Genomics and Biotechnology at UP. His research team has pioneered the use of population genomics and systems genetics approaches to unravel the genetic control of growth and wood formation in *Eucalyptus* trees. His research has focused on the genetic dissection of wood cell wall chemistry in *Eucalyptus.* He also was the lead investigator of the US Department of Energy (DOE) funded international *Eucalyptus* Genome Project which generated the reference genome sequence for the genus (Myburg et al. 2014, *Nature*). His team is using genomics information to develop biotechnology applications for tree improvement with South African forestry companies including DNA fingerprinting, genome-assisted breeding approaches and genetic engineering towards enhancing tree growth and development for pulp, paper, timber and other bioeconomy applications. He has supervised 58 postgraduate (postdoc, MSc and PhD) students and is author of 94 ISI peer-reviewed papers and book chapters in the field of plant molecular genetics and genomics. <http://www.fabinet.up.ac.za/zmyburg>

**Position Statement**

Gene conservation can in future be digitized. High-throughput DNA marker analysis already allows genome-wide tagging of tree genetic diversity that we would like to conserve in South Africa. Soon, increasing throughput and decreasing cost will allow whole-genome resequencing of unimproved trees representing natural populations (e.g. ex situ conservation parks), as well as improved breeding material in South Africa. Genomic information will aid in identifying rare genetic diversity that should be conserved, as well as the effective management of ex situ conservation efforts by reducing redundancy and providing a molecular genetic link to provenance origins and to elite selected material. Furthermore, DNA information representing natural genetic variation will allow identification of alternative genotypes with similar genetic make-up in case conserved genotypes are lost e.g. through fire. The FMG Programme with support from the Forestry Sector Innovation Fund is currently developing a Genome Diversity Atlas of natural populations of *Eucalyptus* and pine species grown in South Africa. This is the first step towards establishing a *landscape genomics* platform in which the interaction of genotypes with environment can be studied at genome level and which may lead to better genotype by site matching in future. It is clear that genomic technologies can add great value to gene conservation efforts. It may in fact be essential to combine physical and digital conservation approaches for long term sustainability of gene conservation efforts.

**Questions**

1. What is the status of molecular genetic analysis of natural genetic diversity represented in South African breeding populations and ex situ conserved material.

2. How do you foresee that DNA or genomic information will be incorporated into gene conservation efforts?

3. How can this information be made available to tree breeders and managers of gene conservation efforts?