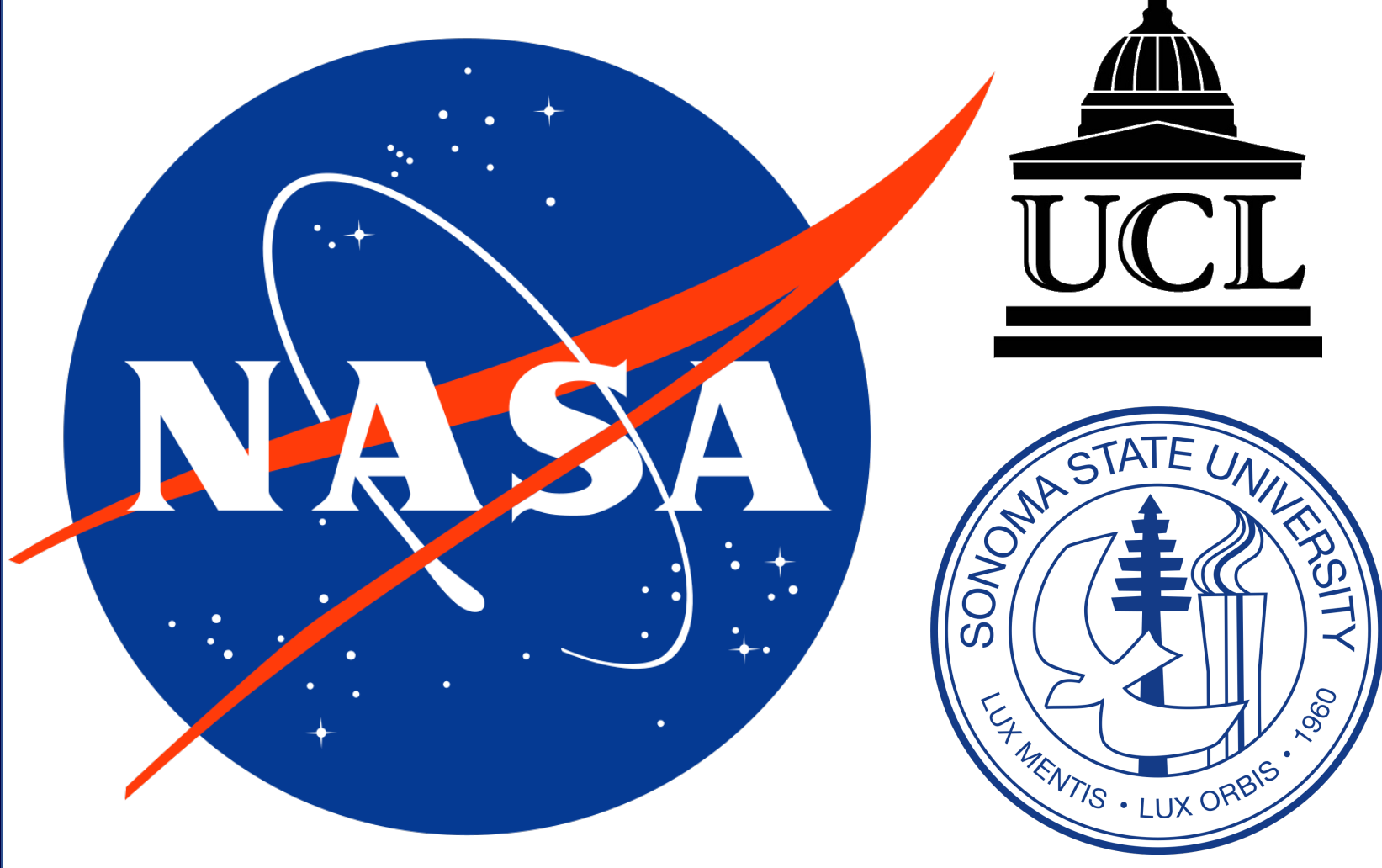


Understanding the Global 3D Signature of Tree Biodiversity

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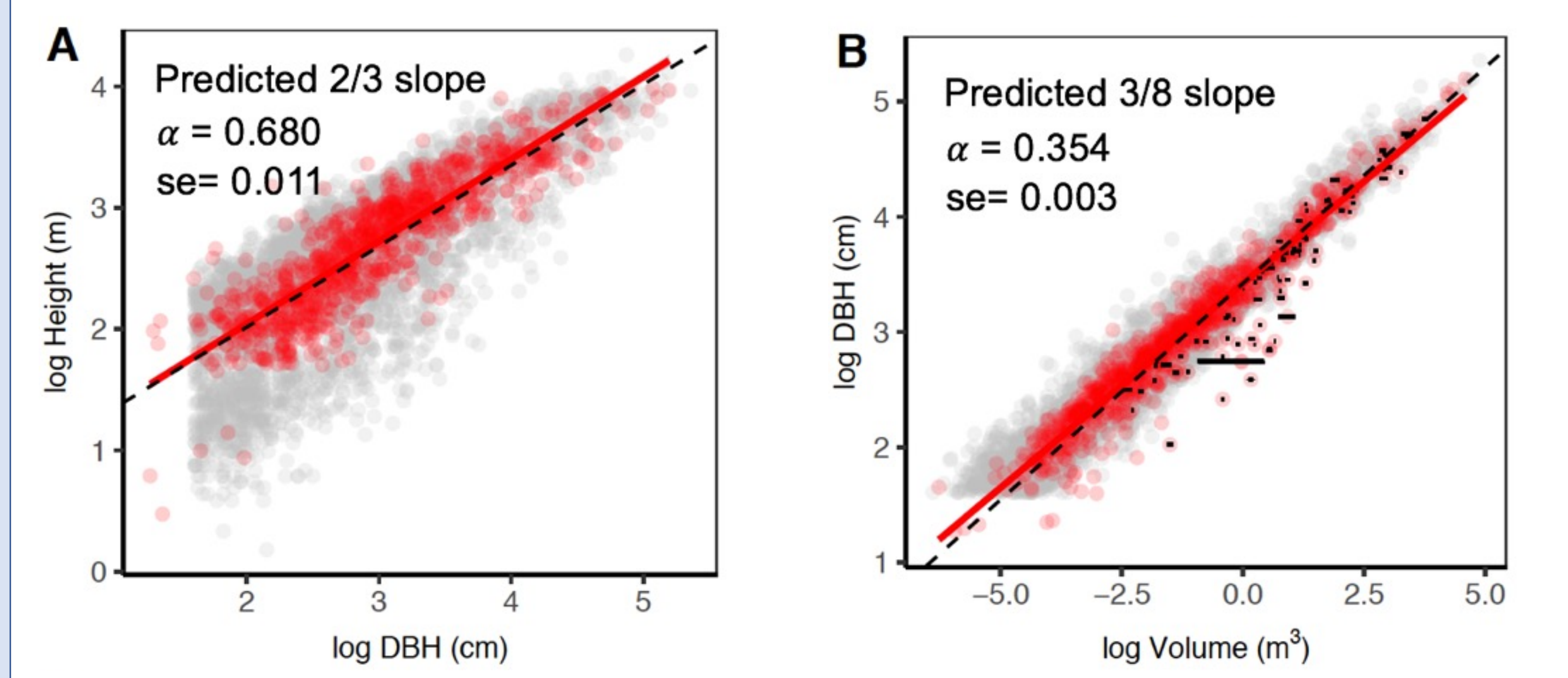
Leaves and wood are classified, and trees are prepared for extraction of 3D biodiversity traits.



Table 1: 3D architecture structural biodiversity traits we will investigate to improve scaling theory.

Structural Biodiversity Traits	Description
Top-heaviness	Ratio of total woody volume in the crown to the stem woody volume
Aspect ratio	Ratio of maximum crown width to crown height
Relative Crown Width	Ratio of maximum crown width to tree height
Crown Area	Maximum ground area covered by the crown viewed from above
Leaf Area	Total tree leaf area
Crown Density	Ratio of crown area to woody volume in the crown
Mass Taper Exponent	Exponent of a power law fit to the vertical profile of volume
Path Fraction	Ratio of mean to maximum base-to-twig path length
Crown Asymmetry	The ratio of maximum to mean of 8 angular crown segments
Branching Angle	The average angle between two cylinders at each branching point

3D biodiversity traits help us understand scaling in trees



How does environment control scaling relationships?

Trees are isolated with automatic extraction

▲ *Acer pseudoplatanus* from Wytham Woods, UK

▲ *Eucalyptus microcarpa* from Victoria, Australia

Contributions from international collaborators are making the TLS database grow!

Environmental Drivers

		Temperature	Water	Light	N & P	Competition
Architectural Traits	Height	☺	+	-	+	+
	Volume	☺	+	-	+	-
	Crown Area	+	+	+	+	-
	Leaf Area	☺	+	+	+	-
	Crown Density	+	+	☺	+	+

TLS Network

- NASA CMS 3D Change
- TERN / JRSRP
- Ghent University
- University College London
- University of Virginia
- Wageningen University
- University of Helsinki
- University of Maryland
- National University of Comahue

Campaign Planning

JOIN TODAY!

We have assembled a global terrestrial lidar database