Niche 2.0.0:

Can we predict vegetation structure, diversity, & function from ecological and evolutionary first principles?

THE CENTER FOR SUSTAINABLE ECOSYSTEM SOLUTIONS PRESENTS:

Dr Daniel Falster, UNSW, Australia

Date: Monday 9th April

Time: 16:00 – 17:00

Venue: Building 20 Theatre 5 (20.5)

Refreshments will be provided

ABSTRACT

Walking through any forest, one is struck by the variety of plant forms coexisting. To explain vegetation structure and diversity, models must allow for multiple species to coexist, and ultimately, predict the outcome of community assembly in different environments. In this talk I outline a new framework for predicting the mixtures of species traits that are favoured in vegetation and evaluate the challenges in scaling these predictions to the Australian continent. Predictions are generated by embedding trait-based coexistence and selection into models of forest dynamics, mapping from physiological trade-offs in plant function to individual-level outcomes such as growth rates, population demographics, and fitness. Results thus far show how i) how key trait-based trade-offs enable different strategies to coexist via successional niche differentiation; ii) how joint consideration of multiple traits can produce forests of higher diversity than was previously thought possible; and iii) how trait mixtures respond to environmental conditions. Current major challenges include expanding the variety of niches accounted for, parameterising models via diverse data, allowing competition for multiple resources, and amassing trait data to road-test predictions.

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BIOGRAPHY

Dr Daniel Falster is an ARC Future Fellow in the Evolution & Ecology Research Centre, and School of Biological, Earth, and Environmental Sciences, at the University of New South Wales, Sydney. Daniel uses a combination of maths, computer models, and large data sets to test fundamental ideas about the processes shaping forests. His current focus is on predicting the distribution of plant types found across the Australian continent. Daniel is passionate about science, open data, reproducible research, and teaching biologists to code.