

# RESEARCH DIRECTIONS

## Tree Architecture and Climate Change

**Professor David Ellsworth from the Centre for Plant and Food Science is collaborating with Dr Belinda Medlyn from Macquarie University, Professor Gabriel Katul from Duke University, USA, and Professor Reinhart Ceulemans from the University of Antwerpen, Belgium to explore how leaf and canopy growth in eucalypt growth will adapt to increasing carbon dioxide (CO<sub>2</sub>) levels and drought through a three-year ARC Discovery Project.**

'The principal way that plants interact with their above-ground environment is via leaf area and leaf display – for example, many European tree leaves are broad and perky capturing more light but in the sun rich environment of Australia eucalypt leaves hang downwards and offer a narrow face to the world', says Professor Ellsworth. 'This project will investigate how leaf area display, stem architecture, and tree growth rates are regulated by global climate change conditions such as increases in atmospheric CO<sub>2</sub>, global warming, and increased drought events'.

The project will utilise the Hawkesbury Forest Experiment, a national facility with whole tree chambers that allow a closed experimental system where a single tree can be isolated from the outside environment and be grown in conditions in which CO<sub>2</sub> levels and water supply can all be controlled. The research team will measure how tree growth is affected by different combinations of changing CO<sub>2</sub> levels and varying water supply. Various trees species with different drought tolerance will be compared under the same conditions.



A series of recent historic droughts in Australia has highlighted the importance of water limitations on tree growth. Rising CO<sub>2</sub> concentrations could potentially improve these water limitations with important implications for Australian forests. This knowledge will allow scientists to understand the broad significance of future climate change conditions, and give the Australian community vital information on what to expect of native bush-land and cultivated tree environments in future.

**Project Title:** How will eucalypt tree architecture and growth adapt to future atmospheric CO<sub>2</sub> and drought?

**Funding has been set at:** \$360,000

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