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Population phenomics in dynamic environments: capturing traits across scales

Wednesday 30 October 2013 1 – 2pm

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Slatyer seminar room R.N. Robertson Building (Bldg. 46), Linnaeus Way, ANU



As the climate changes and world food demands increases, a second green revolution is required. To enable this, high throughput phenotyping in the lab must meet high resolution monitoring of ecosystems in the field. While lab studies are challenged with limited translation to the field, the complexity of the outdoor world limits specific tests of genetic and environmental factors. The Borevitz Lab

is developing tools to address both of these issues. In the lab we have developed a high throughput software/hardware pipeline for quantifying growth in 300 plants in each of 7 climate chambers with multi-spectral LED lighting and dynamic diurnal and seasonal environments. Genome Wide Association Studies are then used to dissect several aspects of plant growth that are quantified with time-lapse imagery. In our fieldwork we are extending ecological monitoring by orders of magnitude through gigapixel imaging of plant phenology and mesh sensors recording microclimate variation. Landscape Genomics studies are then used to identify adaptive genetic variation guiding conservation and restoration. Enabling these efforts requires combining complex hardware and custom software into user-friendly turn-key systems with open standards. I will provide an overview of our current capacities and future directions for projects on *Arabidopsis*, *Brachypodium*, *Pelargonium*, and *Eucalyptus*.

Presented by

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