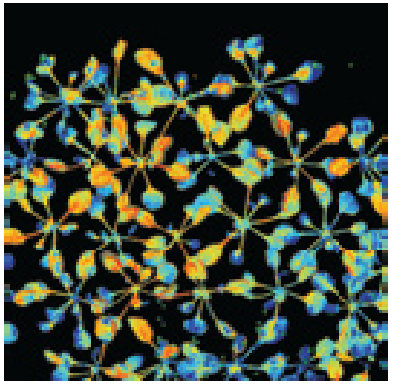
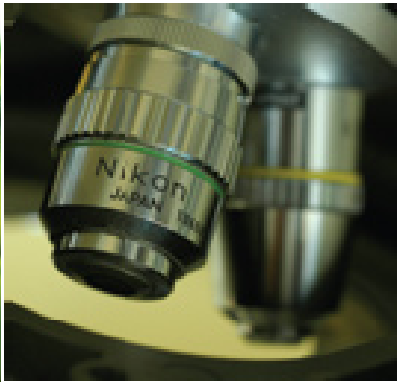
Australian Plant Phenomics Facility

The High Resolution Plant Phenomics Centre



www.plantphenomics.org.au

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CSIRO

ANU THE AUSTRALIAN NATIONAL UNIVERSITY

An Australian Government Initiative
National Collaborative Research Infrastructure Strategy

Government of South Australia

ACPFG

Data acquisition and management

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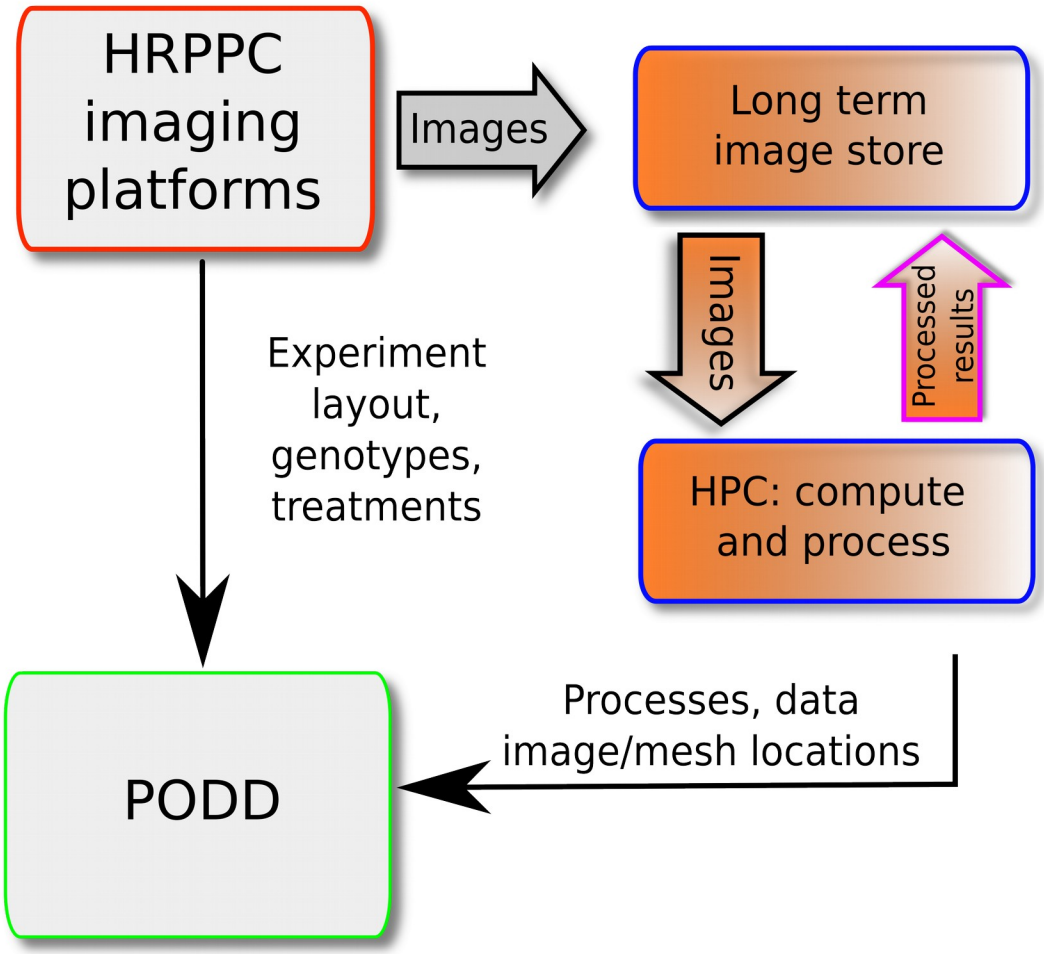
Overview



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Data acquisition

- **Experimental layouts agreed on and encoded before experiment begins**
- **Layout uploaded to machine databases and PODD**
- **PODD is our metadata store to enable systematic integration of all of our platforms**
- **Images and other measurements collected regularly using PlantScan, TrayScan, CabScan, Cropatron, etc.**
- **Images stored on disks, specific to each platform, and acquisition metadata initially stored in SQL databases for each platform**

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Data management and processing

- **Images are batched up and sent to the CSIRO Datastore**
- **CSIRO Datastore is backed up to a long term tape library**
- **Images are processed on the CSIRO Pearcey cluster and in the near future on the NCI node of the Nectar Research Cloud**
- **Results are sent to the CSIRO Datastore and backed up on tape**

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Data analysis

- **Results are aggregated based on the experimental layout that is found in PODD**
- **Categories include:**
  - **Genotype**
  - **Pot**
  - **Treatment**
  - **Replicate**
- **For each category, the average, maximum, minimum, standard deviation and count are computed for each day where data was acquired**

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Discussion

- **CSIRO Datastore capacity and a very large allocation to the HRPPC makes it possible to permanently store our very large datasets**
- **Experimenting with new technologies and new species**
- **Experimental layouts submitted to PODD and machine databases must be accurate for analysis to be useful**
- **All species need to be tested in each of the desired platforms before data and image analysts can say whether analysis is likely to be useful**

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Future work

- Further visualisation of data and results using Sapphire, including aggregation based on the experimental layout in PODD
- Integration with genomics through the experimental layout and PODD
- Acquire experimental layouts in a common form from experiments run on all platforms and store them in PODD
- Expand the number of platforms that use the CSIRO Datastore for permanent archival of data
- Expand the number of platforms that use fully automated cluster processing
- Define data standards to enable other scientists to send us their images and experimental layouts for us to attempt to process them, in particular, for Mini PlantScan replicas
- Reuse relevant specifications for dataset metadata, such as the W3C HCLS Dataset Description
- Have an integrated approach to data management and processing