

# AeRO Forum: Perspective from Astronomy

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# Australian astronomy in the next decade

## Australia in the era of global astronomy

The decadal plan for  
Australian astronomy  
2016–2025



Decadal Plan produced by  
Australian Academy of  
Science, National Committee  
for Astronomy, in consultation  
with the community.

[www.science.org.au](http://www.science.org.au)



# Big Data and Compute

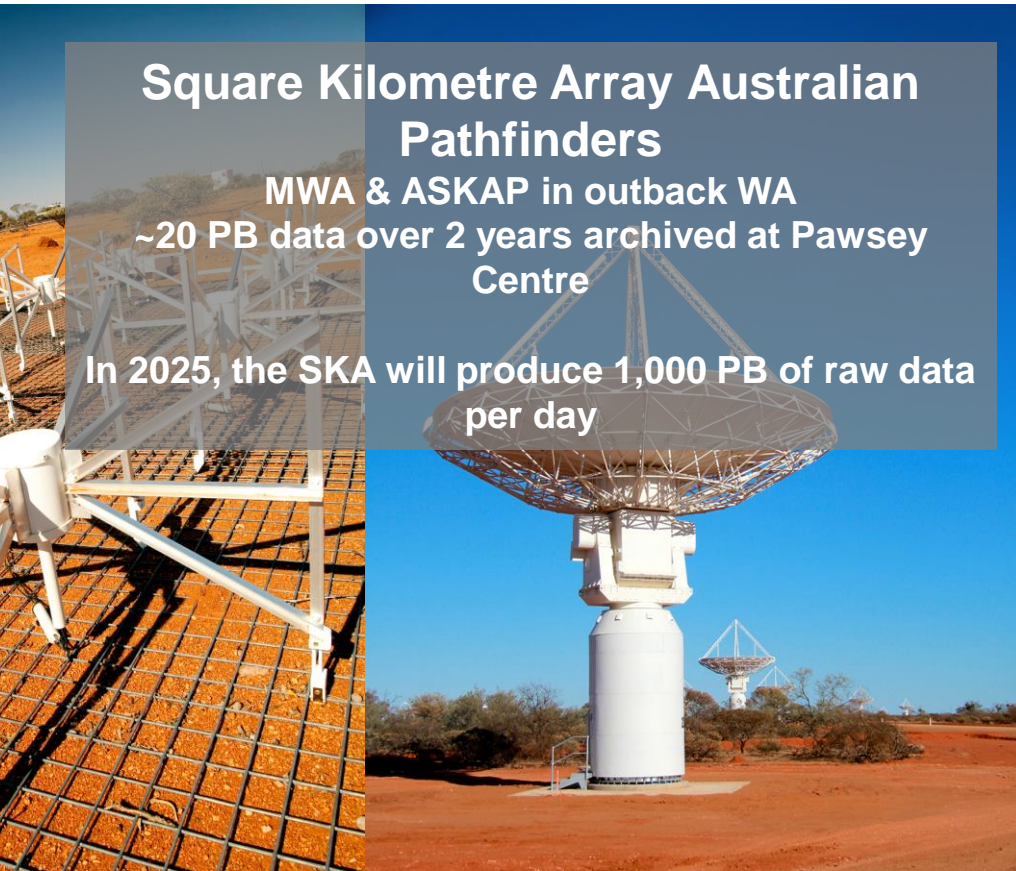
- Astronomers are becoming “data intensive scientists” rather than traditional observers or theorists
- The eResearch challenges are at least as big as the telescope/instrumentation challenges

## Square Kilometre Array Australian Pathfinders

MWA & ASKAP in outback WA

~20 PB data over 2 years archived at Pawsey Centre

In 2025, the SKA will produce 1,000 PB of raw data per day



## High-res cosmological simulations

Illustris simulation (2014) used 19M CPU hours

In Australia, astronomy uses ~40-50M CPU hours per year



## Gravitational waves

Advanced LIGO grav wave detection used ~50 M CPU hours

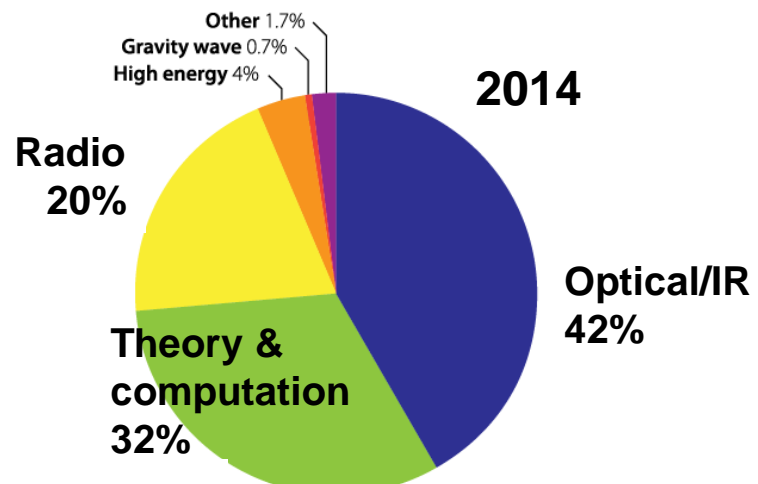
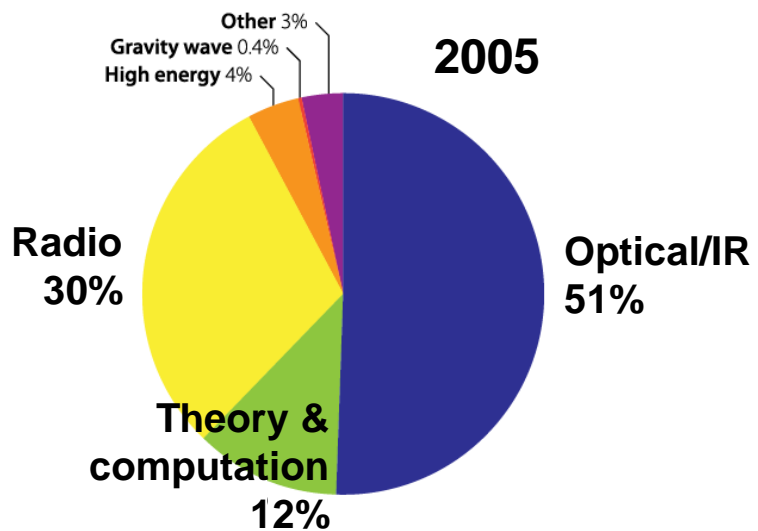
ARC CoE bid submitted for OzGrav







# Growth of theory and computation



*Citation-weighted impact by sub-field*

***“Theoretical and computational astrophysics has grown to become a focus across all areas of strength in Australian astronomy research”***

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# Challenges in the next decade

## Hardware/software:

- Data compression
- Trade-offs between data back-up vs re-observing
- Bringing the code to the data
- Data mining, machine learning algorithms
- Interoperability between datasets and services

## People/cultural:

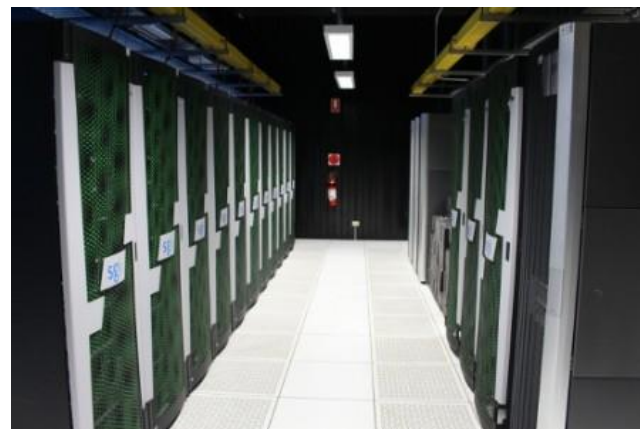
- Simplified/coordinated access to eResearch resources
- Adoption of best practice in data management
- Improving industry-academia collaboration and cross-over
- Support, training and upskilling the community to maximise RoI from the infrastructure



# Lessons from different approaches



Peak facilities



Mid-scale institutional facilities



Commercial services



Virtual labs