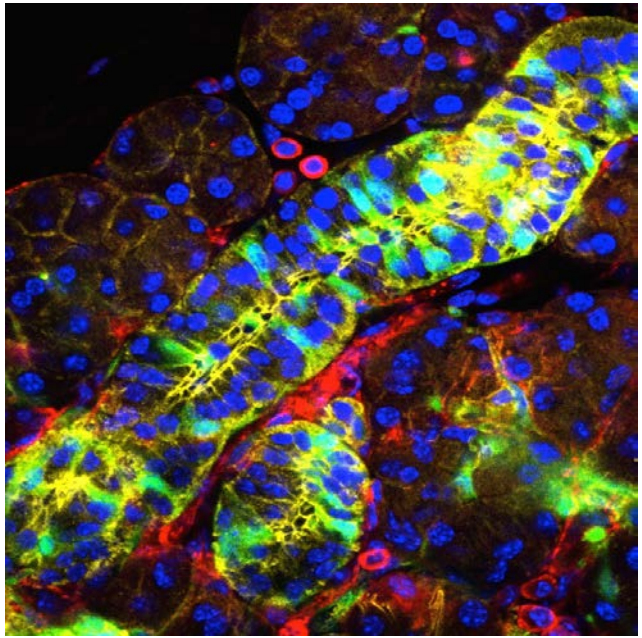
How should research needs drive the NRDC?

Or, how should NRDC respond to the needs of the research community?

Wojtek Goscinski
Monash eResearch Centre
MASSIVE

Imaging and Characterisation

Imaging as the future driver of HPC for the life sciences



Imaging as the future driver of HPC for the life sciences

New detectors and techniques

CryoEM, Lattice Light Sheet Microscopy, Super resolution

Significant: development of Magnetic Resolution Imaging (MRI), super-resolution microscopy, electron microscopy, the charged coupled device (CCD), and computer tomography (CT), have all been awarded the Nobel prize,

Large cohort and temporal experiments

MRI techniques in psychology

Realtime “in-experiment” imaging

Return on investment in equipment

Is my experiment any good?

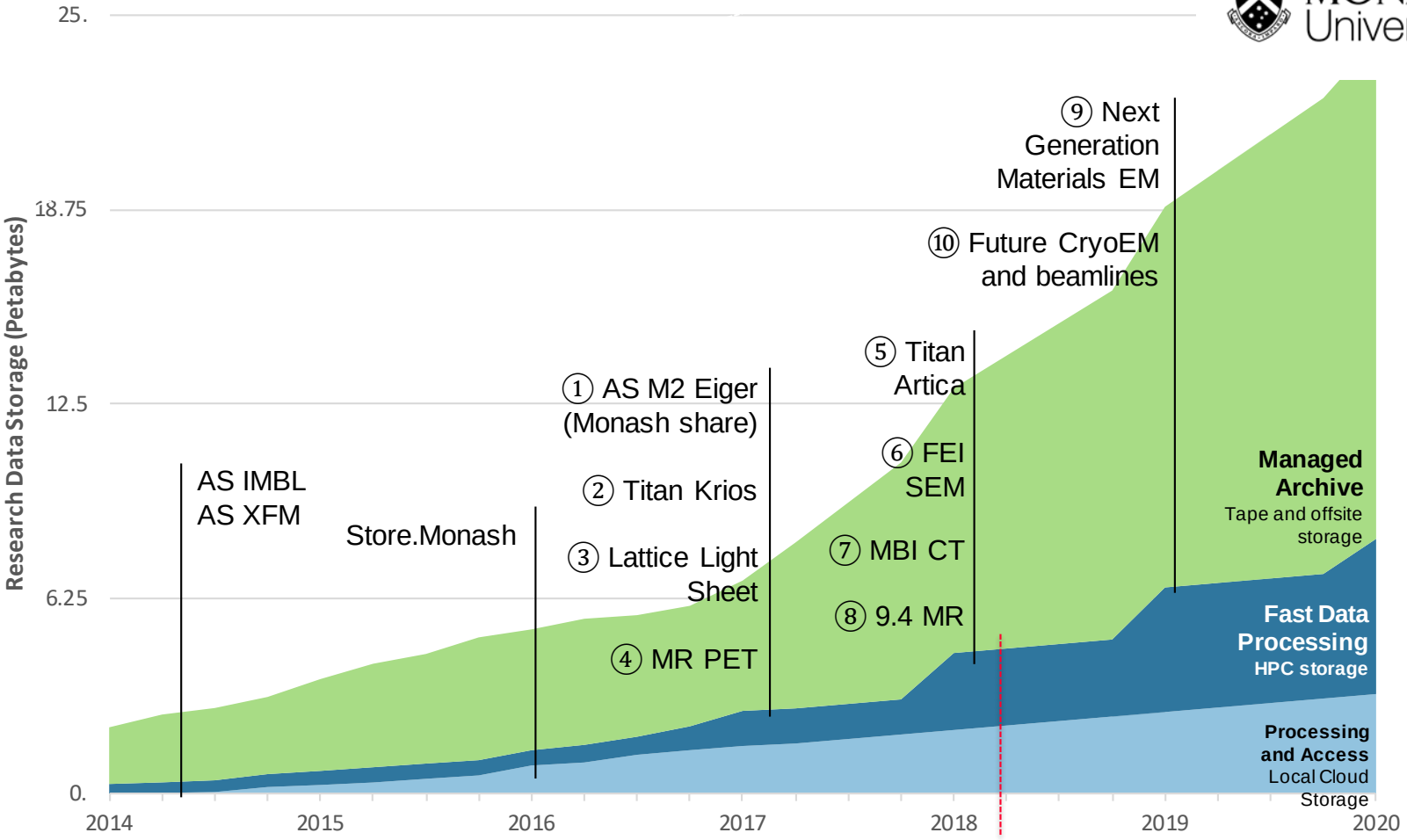
e.g. CT reconstruction

Challenging to generate quantitative results

Insight from images is hard

Significant potential for AI, DL, ML techniques

10+ Big Data and Big Collection Generating Instruments at Monash University



A Collaborative Australian Characterisation Informatics Strategy

Characterisation has become a capability where informatics infrastructure, expertise and best practice is essential to turning data into new discoveries.

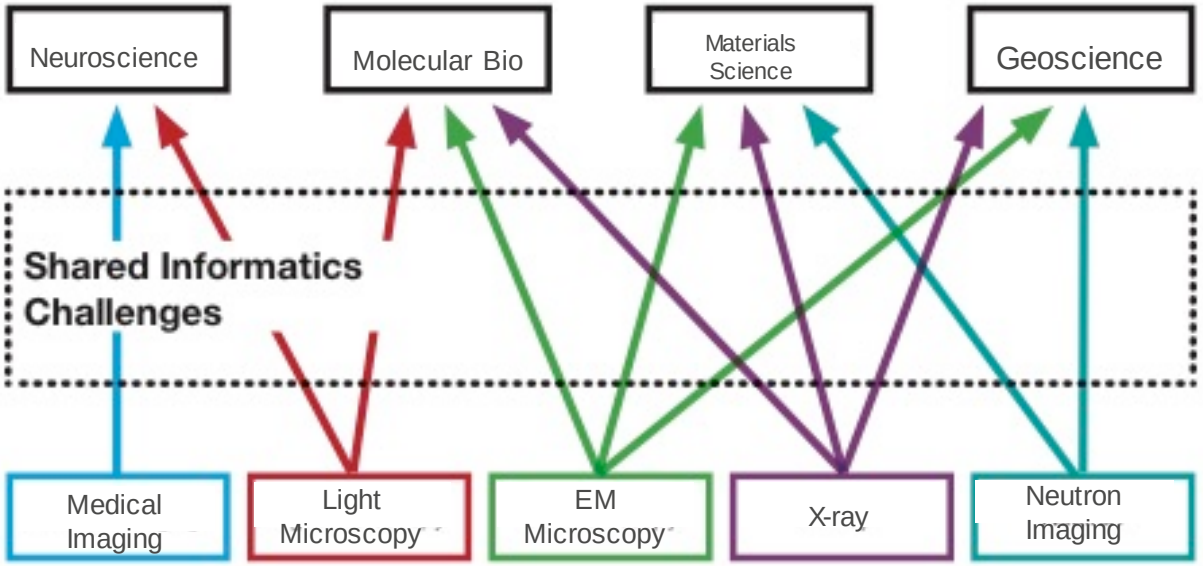
"Australian characterisation infrastructure encompasses a wide selection of instruments and capabilities that are united by the need to address common informatics challenges. The multi-modal and distributed nature of the research, science and supporting instruments is a challenge that has been united in the past by the Australian characterisation community being able to successfully coordinate across key informatics initiatives."

Has been produced by a writing group with representatives from Monash University, AMMRF, ANSTO and NIF, based on the outcomes of a series of open Characterisation Informatics workshops held on the 28th of February 2017, and the 12th May 2017, involving stakeholders from **AMMRF**, **ANDS**, **ANSTO**, BPA, **Monash**, **NeCTAR**, **NIF**, RDS, UMelbourne, UNSW, **UQ**, **UoW**, **UWA**, **USydney**, Agilent and NVIDIA.

A Collaborative Australian Characterisation Informatics Strategy

Geoscience

Characterisationhas become a capability where informatics infrastructure, expertise and best practice is essential to turning data into new discoveries.



The Australian characterisation community provides a wide range of techniques that are applied across a variety of scientific domains. Common across these are a set of shared informatics challenges.

Scale and complexity

A national infrastructure program:

- **Community driven instrument integration and data management initiatives** to capture data from the point of generation
- **Rich online environments for characterisation in the cloud and on HPC platforms**
- **Simple and seamless access across instruments, repositories and analysis environments**
- Programs for **specialised and big data producing instruments**

Working with digital objects

Making Characterisation digital objects Findable, Accessible, Interoperable, and Reusable (FAIR)

To achieve this requires:

- **Community** efforts to increase application of FAIR principles
- **Coordination** across Australia to provide leadership and organisation
- **Commitment** by data producers, in partnership with research communities and tools developers to increase uptake of FAIR principles

Expertise is rare

A national program to spread knowledge and underpin change, which includes:

- **National training** to uplift data skills across characterisation users
- A **national network of characterisation informatics experts** with expertise in research software engineering, and specialist skills in specific modalities, as part of an overarching Australian characterisation experts network

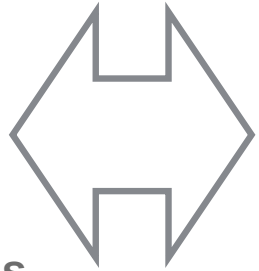
Quality

ISO9001 - Monash eResearch, MASSIVE

Certified System ™

Quality
ISO 9001
SAI GLOBAL

Governance and decision making
Measurement and feedback
Continual Improvement
Internal Communications
External Communications
Standard Operating Procedures



Researcher
Co-design

How should research needs drive the NRDC?

MONASH University

Need and impact
Engagement and Strategy
Quality & consistency
Co-design