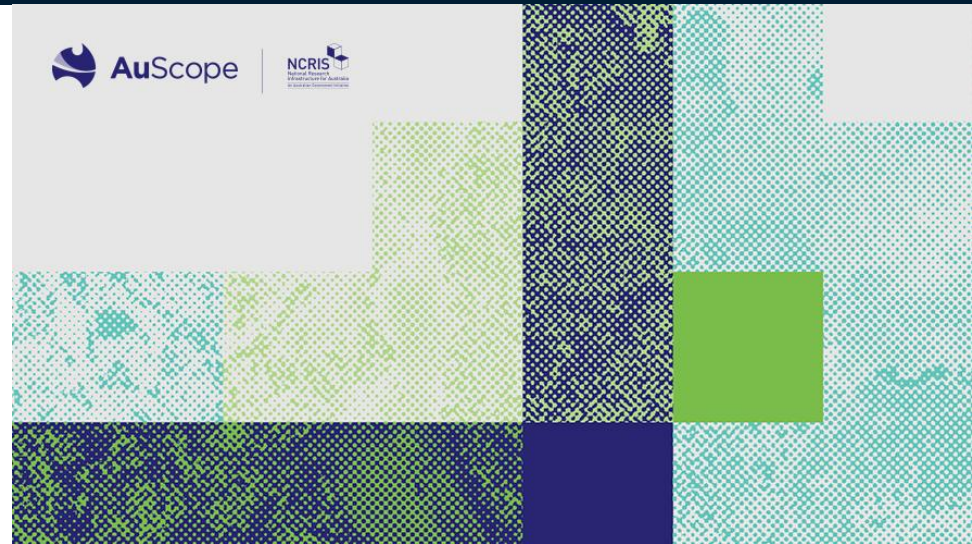




# AuScope Virtual Research Environment Build Program. Retrospective.

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I would like to begin by acknowledging the Turrbal and Yuggera peoples as the Traditional Owners of the land on which we're meeting today and paying my respects to their Elders, past and present.

'Eternal Wisdom, Infinite Innovation'  
artwork by Rachael Sarra, working with Gilimbaa.

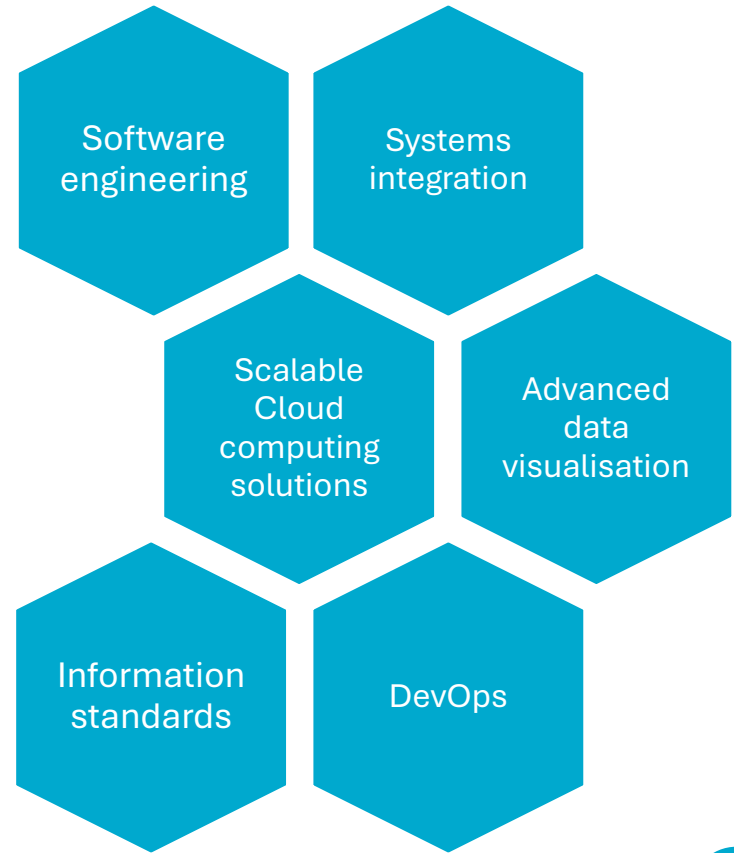


# AuScope Virtual Research Environment

- The AuScope Virtual Research Environment (AVRE) provides a unifying technological platform for AuScope Programs' data and analytical needs.
- AVRE's role is to ensure that other AuScope Program components can **find** and **deliver** data and analytics following the FAIR (Findable, Accessible, Interoperable, Reusable) principles.
- **Increase uptake of data-driven research through outreach** and embedding engineers within specific AuScope Programs that aid in data delivery and data analytical enrichment activities.

# AVRE Build Program

- Launched in 2020
- Aimed at:
  - Increasing collaboration between research institutions
  - Bridging the gap between geoscientific research needs and technology capabilities
- Collaborated with 6 organisations
- Delivered 10 projects



# Our Approach



Problem definition



Early vision of the solution



User-centred design



Iterations with direct user involvement



Relationship with users



Product management



Discipline



User ownership

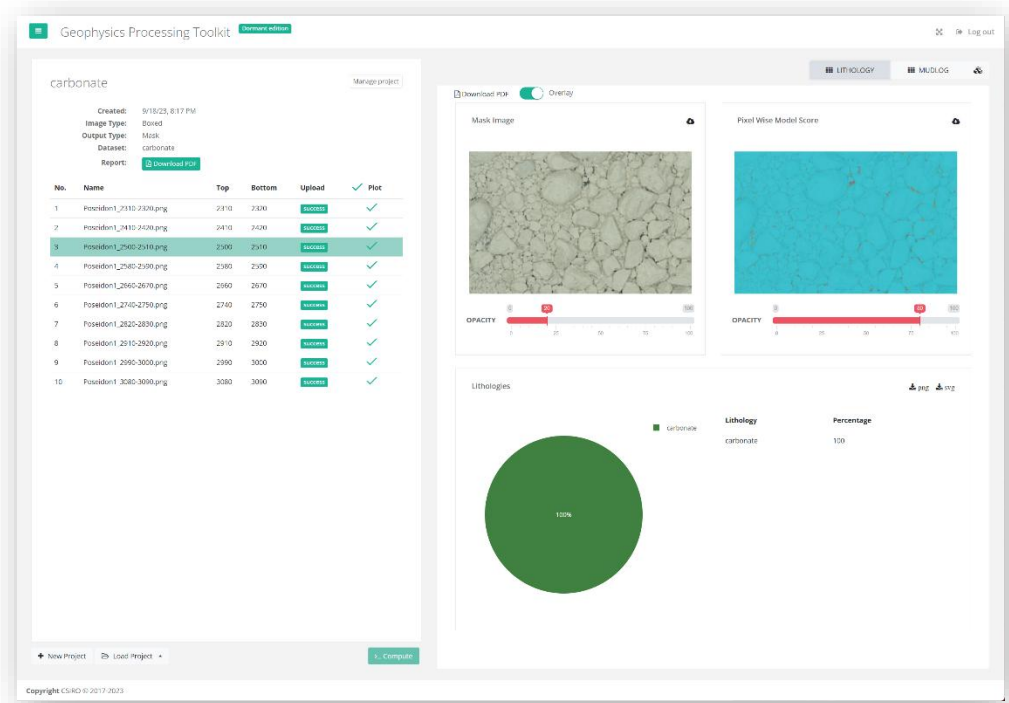
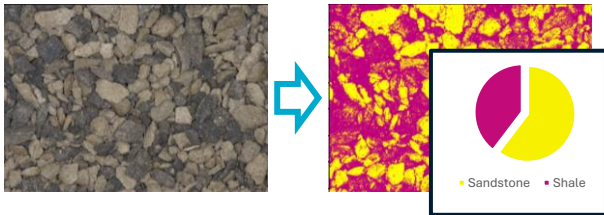


Celebration of success



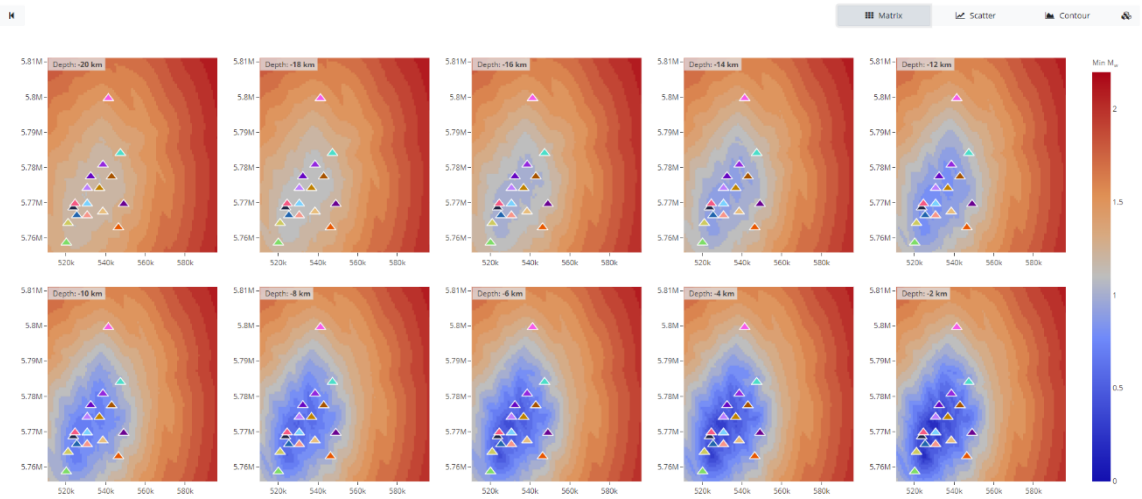
# ML-based classification of drill cuttings

- Facilitated deeper subsurface insights significant for advancing renewable energy projects and critical minerals exploration
- Integration with the AuScope National Virtual Core Library (NVCL) and reuse of the HyLogger™ imagery data
- Efficient lithology classification techniques at scale
- In collaboration with CSIRO and the Geological Survey of Western Australia
- Core concept:



# Interactive Seismic Network Modelling Tool

- Leveraged existing SENSi modelling algorithms and the Geophysical Processing Toolkit
- Cloud integration
- Parallelisation and scalability
- Interactive visualisation capability
- Human-computer interaction



# SEED-Vault

- A cross-platform, open-source seismic data management tool
- Leverages the Federation of Digital Seismograph Networks (FDSN)
- Built on open-source libraries for seismic data processing
- GUI and a command-line interface
- Collaborative project with ANU
- **See Poster #1** in the poster hall!



The screenshot displays the SEED-Vault web interface, divided into several panels:

- Search Around Events:** A panel for defining a search area around selected stations. It includes fields for Minimum radius (degree) and Maximum radius (degree), both set to 30.00 and 45.00 respectively. There is a "Draw Area" button.
- Filters:** A panel for filtering data. It includes a "Choose a client" dropdown menu set to "EARTHSCOPE". Below are buttons for "Last Year", "Last Month", and "Last Week". It also has fields for "Start Date" (2025/09/30) and "End Date" (2025/10/08), and a "Network" dropdown set to "IU".
- Event Arrivals:** A panel showing event arrival information. It includes a "Force Re-download" toggle, a success message "Successfully retrieved waveforms for 96 channels", and options for "Select View Type" (Single Event - Multiple Stations, Single Station - Multiple Events) and "Select Event" (Event 1: 2025-09-30T13:59:43.322000Z M6.9 LEYTE, PHILIPPINES).
- Step 1: Data Source:** A panel for filtering events around individual stations. It includes fields for Minimum radius (degree) and Maximum radius (degree), both set to 30.00 and 45.00. It also has a "Time Window" section with "Start (secs before P arrival)" and "End (secs after P arrival)" fields, both set to 20. It includes a "Choose a client" dropdown set to "EARTHSCOPE" and a "Download Preferences" section with "Channel Priority", "Location Priority", "Network" (All networks), "Station" (All stations), and "Channel" (All channels) dropdowns.
- Step 2: Search & Select Stations:** A panel for selecting stations from a map. It includes a "Previous" button, a "Next" button, and a "Select Stations from table or from Map" button. It shows a map of the Philippines with several stations marked by blue triangles and a yellow circle indicating the search area. Below the map, it shows "Total Number of Stations: 15" and buttons for "Select All" and "Unselect All".
- Waveform Plots:** A panel showing four seismic waveform plots for the event. Each plot is labeled with station ID, location, and event details: "IU.PMG.00.HH1 - 3415.0 km, OT:2025-09-30T13:59:43, M6.9, LEYTE, PHILIPPINES, 1.0-3Hz, COUNTS". The plots show seismic waveforms in blue, green, and black.

# The Legacy

- Despite being envisaged as a kick-starter program, many projects are still alive and well
- Many projects evolved from an AVRE Build produced MVP to full-fledged projects
- CSIRO's Exploration Toolkit (XT) team adopted the process of collaborative project engagement via involvement in the AVRE Build project activities

# Learnings

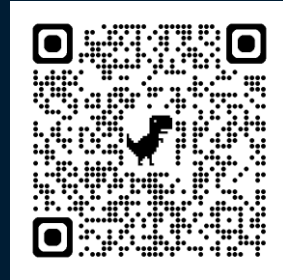
- Improved co-design process
- Direct researcher/user early engagement in the rapid and iterative development process:
  - Research, develop, present, test, break, iterate...
- Long-term sustainability challenges and opportunities
  - Management of technical debt
- Early planning and management of the MVP transition into the researchers' custodianship
- Community uptake

# Evolution of Build

- Outward to Inward facing program:
  - Shift in strategic priorities from external collaboration to internal priorities and serving the already vast AuScope research community
- What's on the horizon:
  - Catalogue technology development
  - AuScope Instrument Register (using PIDINST)
  - AuScope Projects Register (using RAID)
  - Natural Language Query search interface
  - Improved user statistics and product analytics



# Thank you!



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