Australian Government

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Sample Environment :

What we can do for you…

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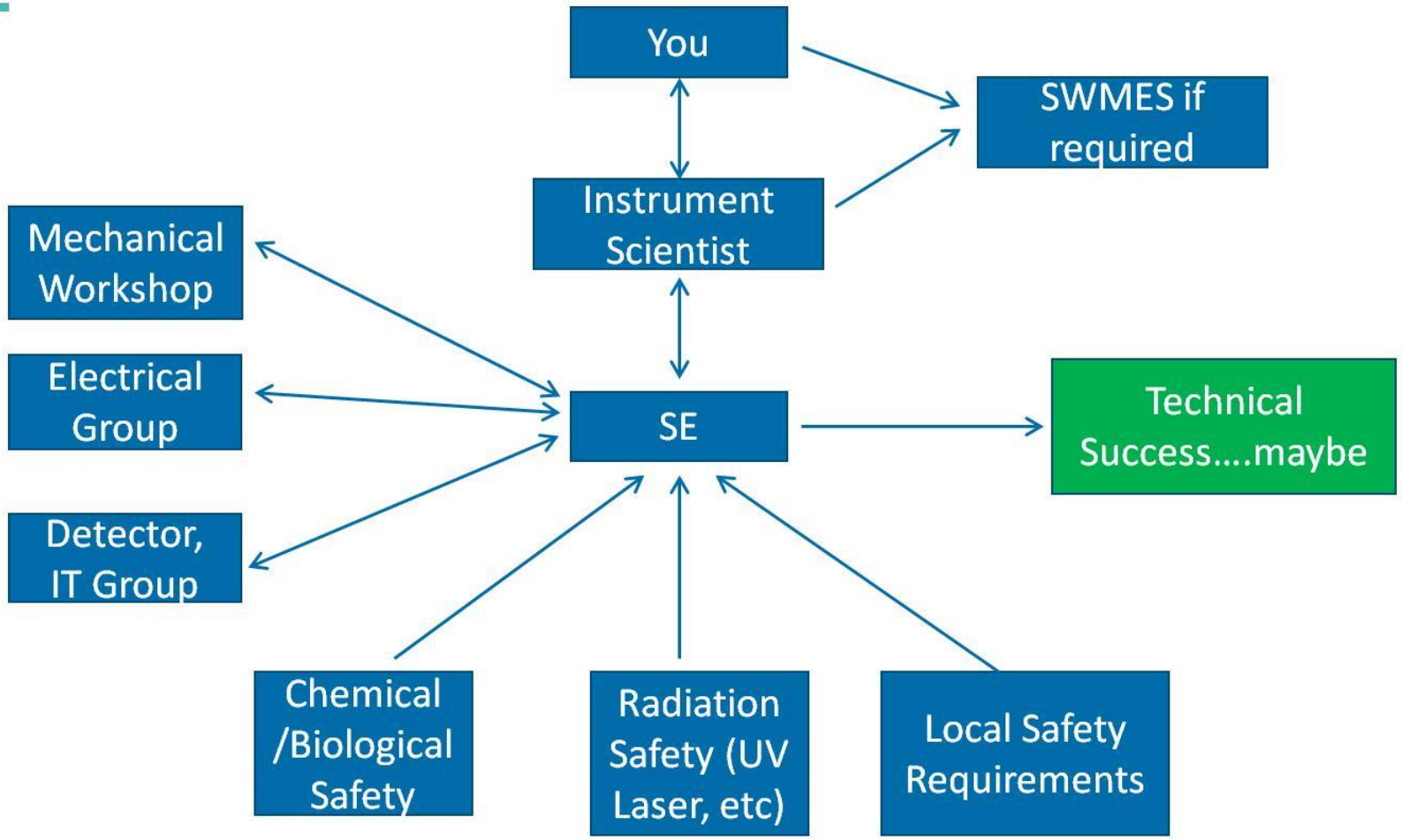
Science. Ingenuity. Sustainability.

What we do….



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The Labs at ACNS

- Our labs are for sample preparation not synthesis!
  - Balances, Centrifuge, ovens and furnaces available
  - Limited solvents and gases as stock
  - Please check via your Instrument Scientist/User office that we have what you need well before hand.

- Also available
  - UV/Vis, FTIR, pH meters
  - Spin coater
  - Dipping trough

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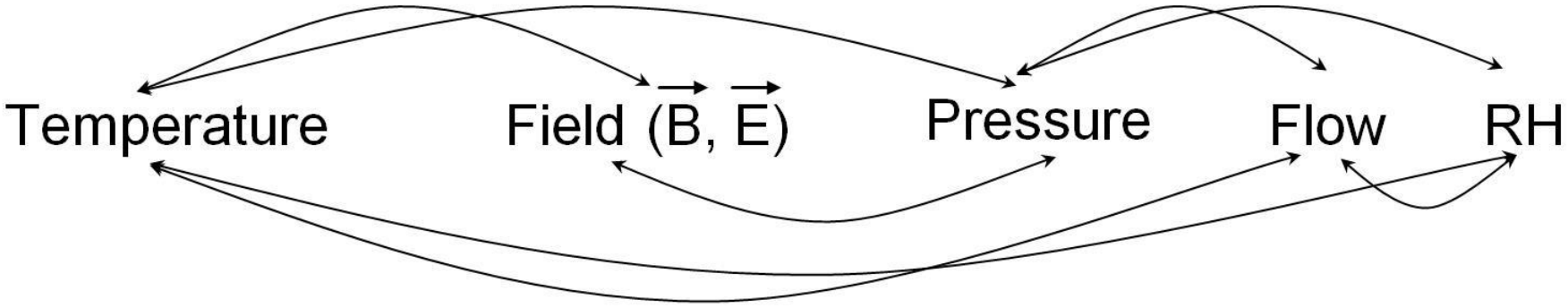
So what about Sample Environment?

What is important for your sample?



Data Acquisition Time

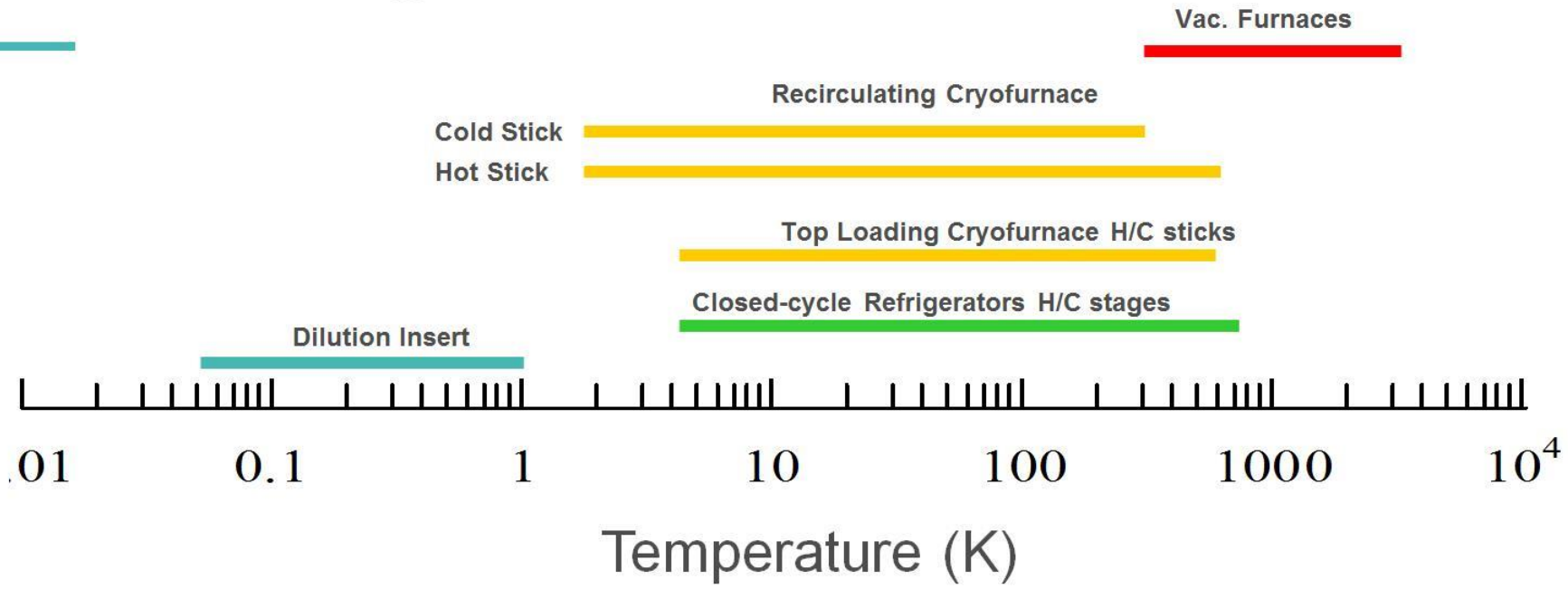
Accuracy and Precision

Results

Be methodical / Know your sample

- **Prioritise Parameters**
- Temperature
  - Static (tolerance) or Range (ramp or isothermal steps)
- Pressure
  - Magnitude, pressurised with liquid or Gas
- Magnetic or Electric Field
  - Magnitude, Static ?, Direction (parallel or perpendicular)
- Light Irradiation
  - Magnitude and wavelength (or white)
- Complimentary Spectroscopy
  - Wavelength range, UV/Vis, NIR…
- THIS LIST DOES NOT INCLUDE ALL OPTIONS.

What Range ?



Temperature sensor/equipment operating ranges are finite !

Same applies to other parameters (eg. electric field)

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What Direction ?

- Electric Field orientations
  - Both parallel and perpendicular available.
  - Parallel requires neutron transparent electrodes.
- Magnetic Field orientations
  - Dictated by magnet construction
    - Vertical and Electromagnet perpendicular only
    - Horizontal parallel and perpendicular (diffraction can be difficult depending on magnitude)
- Single Crystal Alignment
  - Try to do this before you arrive
  - Long thin crystal when align may touch chamber walls

What Size ?

- Discuss path lengths for SANS, USANS
- Will it fit on the sample stage? Is it cut to size ?(Strain Scanner , Radiography)
- Is it going in a cryostat ? Check sample chamber dimensions.
- If its powder do you have enough ?
  - Generally neutron samples volumes are much larger than Synchrotron or normal x-ray samples.

How many samples have you got ?

- Sample changers available for SANS, USANS, Diffraction and Strain Scanner. (limited temperature ranges)
  - Soon to be available for 1T magnet

Generally cryostats one sample at a time

Top loaders allow fast sample changers

Bottom loaders have to be warmed to room temperature.

If you are controlling over a range that requires a changes to the SE try to minimise changes to reduce lost time.

Planning (in a perfect world)

Prior Preparation Prevents Poor Performance

- Preparation **(S.E. consultation)**
- Submission
- Review
  - ✓ Scientific – national & international experts
  - ✓ Technical & Safety Review **(S.E. & Lab Manager)**
  - ✓ Proposal Assessment Committee
- Scheduling
  - ✓ User Office
  - ✓ Instrument Scientists **(S.E. consultation)**
- Arrival **(24 hrs min.)**
- Completion
- Customer feedback (smiley emoji)

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Planning

What REALLY HAPPENS

- Preparation — **WILL BRING OWN SE or None Requested (unclear proposal)**
- Submission
- Review
  - Scientific
  - Technical & Safety — **Proposal calls for ambient conditions**
  - PAC
- Scheduling — **SE GROUP IS RELIEVED**
- Arrival — **Experiment parameters changed**
  SE scrambles to meet demand
- Completion
- Customer feedback — @!%!**#~@#!! SE Group

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Now some cool set ups…. Big Cryo's

12T on TAIPAN


CF10 and Dil Fridge on WOMBAT


CF8 and NIR Spectro on WOMBAT


10T on QUOKKA. Single crystal

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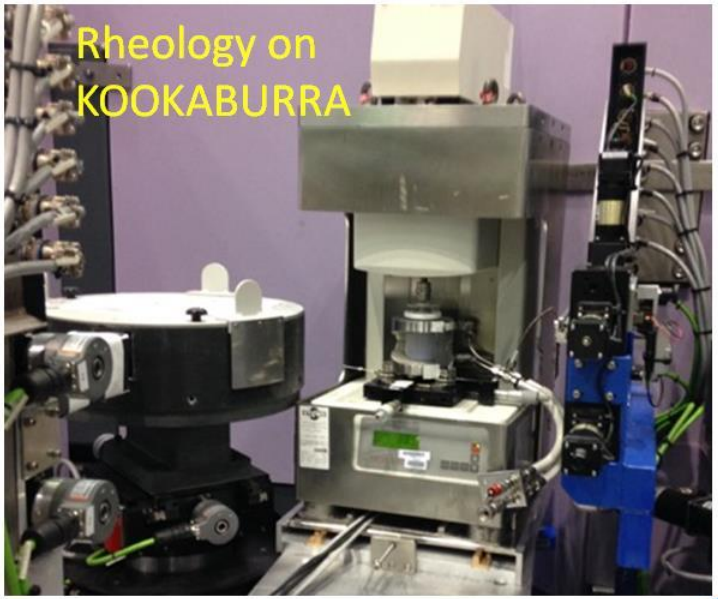
More Weird Stuff…


DSC on QUOKKA


Vapour Delivery on KOOKABURRA


UV/Vis Spectro on QUOKKA


Gas Dosing on WOMBAT


Rheology on KOOKABURRA

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And Many more…

- High pressure on Diffraction (8GPa) and SANS (350Mpa)
- High Voltage up to 20kV
- Potentiostat control to pA
- Syringe and HPLC pumps for in situ sample delivery and mixing.
- Stopped flow cell kinetics on SANS
- Polarised neutron experiments.

- And we will help with custom designed experiments but give us plenty of time.

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What is Your Dream Experiment ?

Apart from environmental controls what complimentary measurement do you want while collecting neutron data ?

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Lets talk about your SE.