Advice to applicants for ARC and NHMRC grants

Planning for your research needs

Many research projects will incur costs in terms of training, instrument time, preparation materials and staff input.

The University of Sydney has a number of University-wide Core Research Facilities that provide access to high-end research infrastructure and services. Each facility has expert staff who provide training and can advise on research design, new data science and techniques to reveal new insights, and equipment use.

Core Research Facilities are funded through a combination of user fees and contributions from user faculties and, where possible, these costs should be planned for and included in the budget of research proposals.

Proposals to funding agencies require detailed costings in their budgets; for example, numbers of samples, estimated analysis hours and justification of why the techniques are required for the project. This guide shows how to incorporate the costs of accessing the University’s Core Research Facilities into ARC and NHMRC applications.

With the ARC’s inclusion of ‘Research Environment’ as one of the selection criteria (worth 20%) in Discovery Projects, Core Research Facilities are an important part of the research environment that you need to describe in your project and something you need to budget for.

Core Research Facilities

Specific information about instruments, expertise and pricing can be found on the Core Research Facility websites, or by contacting facility staff. The following facilities are available:

- **Sydney Mass Spectrometry**: A wide portfolio of mass spectrometers and data analysis packages for proteomics, glycomics, metabolomics, lipidomics, and mass spectrometry imaging applications; advice and assistance for experimental design, sample preparation and data analysis
- **Research & Prototype Foundry**: Clean room, electron beam and laser lithography, nanofabrication, etching, deposition, metrology and prototyping
- **Sydney Cytometry**: Cytometry instrumentation including analysers and cell sorters; experimental design, data acquisition, data analysis and interpretation; development of cytometry techniques and instrumentation
- **Sydney Imaging**: Clinical and pre-clinical imaging instrumentation, and the Hybrid Theatre; facilities include Artis Pheno C-arm, high field MRI, combined microCT and optical imager, high resolution ultrasound; image processing and analysis
- **Sydney Informatics Hub**: Artemis High Performance Computer, data science and analytics, Sydney Health Data Coalition, bioinformatics software and consultancy, environmental sensing and modelling, data visualisation, statistical consulting, and research data management
- **Sydney Microscopy & Microanalysis**: Light and electron microscopy, scanning probe, atom probe instruments, x-ray and spectroscopy equipment, image analysis, 3D visualisation and data visualisation software
- **Vibrational Spectroscopy**: Raman and FT-IR spectrometers; experimental design, data collection, data analysis, report writing; assistance with finding and using external equipment, including the Australian Synchrotron

Core Research Facilities

Director, Core Research Facilities:
Professor Simon P Ringer
T +61 2 9351 2353 | E simon.ringer@sydney.edu.au
Operations and Program Manager: Tim Dixon
T +61 2 8627 6132 | E timothy.dixon@sydney.edu.au

Sydney Mass Spectrometry
Academic Director: Professor Stuart Cordwell
T +61 2 9351 6050 | E stuart.cordwell@sydney.edu.au
Facility Manager: Dr Ben Crossett
T +61 2 9351 6010 | E ben.crossett@sydney.edu.au

Research & Prototype Foundry
Academic Director: Professor Simon Fleming
T +61 2 9351 6050 | E simon.fleming@sydney.edu.au
Facility Manager: Dr Nadia Court
T +61 2 8627 8671 | E nadia.court@sydney.edu.au

Sydney Cytometry
Academic Director: Professor Nick King
T +61 2 9351 4553 | E nick.king@sydney.edu.au
Technical Director: Dr Adrian Smith
T +61 2 8627 1828 | E a.smith@centenary.org.au

Sydney Imaging
Administration Manager: Sylvia Lohrengel-Kuhner
T +61 414 921 518 | E sylvia.loheregengel@sydney.edu.au
Hybrid Theatre Facility Manager: Dr Veronika Tatarinoff
T +61 2 8627 6208 | E veronika.tatarinoff@sydney.edu.au
Preclinical Imaging Facility Manager: Dr Nana Sunn
T +61 2 8627 0232 | E nana.sunn@sydney.edu.au
Clinical Imaging Senior Technical Officer: Dr Govinda Poudel
T +61 2 8627 5808 | E govinda.poudel@sydney.edu.au

Sydney Informatics Hub
Academic Director: Professor Dietmar Muller
T +61 2 9036 6533 | E dietmar.muller@sydney.edu.au
Deputy Director: Professor Geraint Lewis
T +61 2 9351 5184 | E geraint.lewis@sydney.edu.au

Sydney Microscopy & Microanalysis
Academic Director: Professor Julie Cairney
T +61 2 9351 2351 | E julie.cairney@sydney.edu.au
Lab Manager: Eleanor Kable
T +61 2 9351 7566 | E eleanor.kable@sydney.edu.au

Vibrational Spectroscopy
Academic Director: Professor Peter Lay
T +61 2 9351 4269 | E peter.lay@sydney.edu.au
Facility Manager: Dr Elizabeth Carter
P +61 2 9036 5179 | E elizabeth.carter@sydney.edu.au
Example text for applications

Advanced instruments (microscopy example)
“This research project requires the examination of N samples per week/month/year [as appropriate] with the advanced microscopy and/or microanalysis [as appropriate] technique/s of [specify; e.g. atom probe tomography]. The estimated time required for characterisation of each sample is X hours, at a cost of $Y per hour of instrument time.” You should add further specific explanation of why the chosen technique/s is/are necessary for the research, for example: “Atom probe tomography is a unique characterisation tool that is able to reveal elemental and structural detail at the atomic scale and is essential for exploring the structure-function relationships in these alloys with nanometre-sized grains” with a reference to further detail elsewhere in the application.

Advanced instruments (mass spectrometry example)
“This research project requires the analysis of N samples per week/month/year [as appropriate] by a discovery/targeted proteomics/metabolomics [as appropriate] technique/s. The estimated time required for characterisation of each sample is X hours, at a cost of $Y per hour of instrument time.” Typical discovery proteomics projects require 24 hrs/sample, whereas a targeted metabolomics project may only require 20 min/sample, LCMS systems are charged at $10/hour. You should add further specific explanation of why the chosen technique/s is/are necessary for the research, for example: “The Sciex 6600 Triple TOF coupled with Eksigent 415 UHPLC system and the ProteinPilot SWATH software enables the data independent, label free analysis of complex proteomes” with a reference to further detail elsewhere in the application.

Software, data analysis and expert assistance (bioinformatics example)
“Access to bioinformatics advice and software (CLC Genomics) will be required to analyse the data collected in this research project. This can be obtained through a $1500 per user annual subscription to the University of Sydney’s Sydney Informatics Hub core research facility. The project will use the University of Sydney’s high performance computing (HPC) service, which comprises 4264 cores, 136 standard compute nodes, 3 nodes with 6TB of RAM, 5 GPU nodes with 2 GPUs each, 56 Gbps FDR Infinibanc interconnect and a 232 TB Lustre file system. Compute on Artemis is available at no cost to the project. You should add further specific explanation of why the equipment is necessary and how it adds value to your research, for example: “Because of the large amount of next-generation genome sequence data generated in this project it will require both detailed analysis using CLC Genomics workbench and considerable computational power as provided by the new HPC service” with a reference to further detail elsewhere in the application.
Core Research Facility example costs for University of Sydney users

Please contact individual facilities for more detailed costs

**Sydney Cytometry:**

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Cost unassisted</th>
<th>Cost operator assisted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cell sorter: basic, 2 laser</td>
<td>$34 per hour</td>
<td>$75 per hour</td>
</tr>
<tr>
<td>Cell sorter: advanced</td>
<td>$51 per hour</td>
<td>$90 per hour</td>
</tr>
<tr>
<td>Sort set up</td>
<td>$40 “flag-fall” each session</td>
<td></td>
</tr>
<tr>
<td>Cytometers: basic, &lt;4 lasers</td>
<td>$34 per hour</td>
<td>$75 per hour</td>
</tr>
<tr>
<td>Cytometers: advanced, &gt;4 lasers</td>
<td>$51 per hour</td>
<td>$90 per hour</td>
</tr>
<tr>
<td>Image Cytometer: plates</td>
<td>$34 per hour</td>
<td>$75 per hour</td>
</tr>
<tr>
<td>Image Cytometer: ImageStream</td>
<td>$51 per hour</td>
<td>$90 per hour</td>
</tr>
<tr>
<td>Mass Cytometer</td>
<td>$60 per hour</td>
<td>$100 per hour</td>
</tr>
<tr>
<td>Additional operator assistance</td>
<td>-</td>
<td>$50 per hour</td>
</tr>
<tr>
<td>Training</td>
<td>-</td>
<td>$25 per hour</td>
</tr>
</tbody>
</table>

* Requires extensive training

**Sydney Imaging:**

<table>
<thead>
<tr>
<th>Preclinical Imaging Equipment</th>
<th>Cost per hour</th>
</tr>
</thead>
<tbody>
<tr>
<td>HFUS + Photoacoustics: Vevo2100 + VevoLAZR</td>
<td>$550+ *</td>
</tr>
<tr>
<td>Optical Imaging with microCT: IVIS SpectrumCT</td>
<td>$50</td>
</tr>
<tr>
<td>Body composition analyser in awake animal: echoMRI</td>
<td>$20</td>
</tr>
<tr>
<td>X-ray: FaxitronUltraFocus100DXA</td>
<td>$40</td>
</tr>
<tr>
<td>7T MRI</td>
<td>$150+ *</td>
</tr>
</tbody>
</table>

* Costs dependent on applications

**Sydney Informatics Hub:**

- Access to Artemis High Performance Computer is free for users
- Access to the Research Data Steward is free for users
- Access to Statistical Consulting is free for users
- Access to the Data Science Team is on a cost-recovery basis – please contact the facility

**Bioinformatics software and services**

- 6 month subscription to CLC Genomics Workbench and CLC Server: $750
- 12 month subscription to CLC Genomics Workbench and CLC Server: $1,500
- Ingenuity Variant Analysis software: $165 per sample
- High-throughput sequence analysis: competitive pricing negotiated on a per-project basis

**Sydney Mass Spectrometry:**

<table>
<thead>
<tr>
<th>Category</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Registration and training</td>
<td></td>
</tr>
<tr>
<td>2D gel electrophoresis</td>
<td>$300</td>
</tr>
<tr>
<td>Mass spectrometer</td>
<td>$500</td>
</tr>
<tr>
<td>Bench fees</td>
<td></td>
</tr>
<tr>
<td>IEF cells and large gel tanks</td>
<td>$1 per hour</td>
</tr>
<tr>
<td>LC-MS systems</td>
<td>$10 per hour</td>
</tr>
<tr>
<td>Consumables</td>
<td></td>
</tr>
<tr>
<td>Zip tips</td>
<td>$195 per box</td>
</tr>
<tr>
<td>96 well plates with silicon seal</td>
<td>$10 each</td>
</tr>
<tr>
<td>Contract research</td>
<td></td>
</tr>
<tr>
<td>Sample clean up</td>
<td>$25 per sample</td>
</tr>
<tr>
<td>Peptide mass fingerprinting</td>
<td>$65 per sample</td>
</tr>
<tr>
<td>Deuteration analysis</td>
<td>$65 per sample</td>
</tr>
<tr>
<td>Intact protein mass</td>
<td>$100 per sample</td>
</tr>
<tr>
<td>1D LCMS</td>
<td>$750 per sample</td>
</tr>
<tr>
<td>Quantitative proteomics</td>
<td></td>
</tr>
</tbody>
</table>

Please contact us for a quote for bespoke contract ‘omics analytical services

**Sydney Microscopy & Microanalysis:**

<table>
<thead>
<tr>
<th>Category</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 8 consecutive hours per session per instrument</td>
<td>$40 per hour</td>
</tr>
<tr>
<td>Each consecutive hour over 8 hours per session per instrument</td>
<td>$10 per hour</td>
</tr>
<tr>
<td>Specimen preparation and image analysis equipment</td>
<td>$2 per hour</td>
</tr>
<tr>
<td>Individual user cap</td>
<td>$1,500 per calendar year</td>
</tr>
</tbody>
</table>

Not included in the cap:

- $270 one-off training fee for new users
- $195 per hour for technical staff instrument operation

**Vibrational Spectroscopy:**

<table>
<thead>
<tr>
<th>Category</th>
<th>Cost</th>
<th>Hours per annum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pay-as-you-go</td>
<td>$50 per hour</td>
<td>Unlimited</td>
</tr>
<tr>
<td>Assisted pay-as-you-go</td>
<td>$150 per hour</td>
<td>Unlimited</td>
</tr>
<tr>
<td>Standard user</td>
<td>$1,670 per annum</td>
<td>50</td>
</tr>
<tr>
<td>Type C</td>
<td>$4,200 per annum</td>
<td>150</td>
</tr>
<tr>
<td>Type B</td>
<td>$8,300 per annum</td>
<td>350</td>
</tr>
<tr>
<td>Type A</td>
<td>$16,600 per annum</td>
<td>700</td>
</tr>
</tbody>
</table>

Any assistance provided by Facility Staff will be charged at $100 per hour

**Research & Prototype Foundry:** Please contact the facility for an explanation of services and costs.