

Advice to applicants for ARC and NHMRC grants 2018

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:

- **Research & Prototype Foundry:** Clean room, electron beam and laser lithography, nanofabrication, etching, deposition, metrology and prototyping
- **Sydney Analytical:** Raman and FT-IR spectrometers, X-ray diffraction, magnetic resonance; experimental design, data collection, data analysis, report writing; assistance with finding and using external equipment, including the Australian Synchrotron
- **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 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
- **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

Core Research Facilities

sydney.edu.au/research/facilities

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ARC Project Costs example

Grant proposals to the ARC must be submitted in their online Research Management System (RMS). For ARC Discovery Project applications to be submitted in 2018, for instance, you should include a line item in the 'Project Costs' table (Part E) under 'Other' as shown below.

In this example, the project requires access to Sydney Imaging instrumentation in Year 1 - 225 hours of VEVO use @ \$50/ hour plus 200 hours use of the PET/MR at \$150/hour. This comes at a total cost of \$41,250 for Year 1 of the project.

| Year 1 | | | | | Year 2 | | | | | Year 3 | | | | | Year 4 | | | | | Year 5 | | | | |
|--|-----------------------------|--|--|--|--------|----------------------------|--|--|--|--------|---------|--|--|--|--------|--------|--|--|--|--------|--|--|--|--|
| Description | Australian Research Council | | | | | Administering Organisation | | | | | | | | | | | | | | | | | | |
| | Cash | | | | | Cash | | | | | In-kind | | | | | | | | | | | | | |
| Total | 41,250 | | | | | | | | | | 41,250 | | | | | | | | | | | | | |
| Personnel | + | | | | | | | | | | | | | | | | | | | | | | | |
| Teaching Relief | + | | | | | | | | | | | | | | | | | | | | | | | |
| Travel | + | | | | | | | | | | | | | | | | | | | | | | | |
| Field Research | + | | | | | | | | | | | | | | | | | | | | | | | |
| Equipment | + | | | | | | | | | | | | | | | | | | | | | | | |
| Maintenance | + | | | | | | | | | | | | | | | | | | | | | | | |
| Other | + | | | | | 41,250 | | | | | | | | | | | | | | | | | | |
| Sydney Imaging Equipment Use - VEVO (225hrs@\$50/hr), PET/MR (200hrs@\$150/hr) | ✎ 🗑 | | | | | 41,250 | | | | | 0 | | | | | 41,250 | | | | | | | | |

The host university maintains substantial infrastructure and the value of this is transmitted to research projects at a level at least equivalent to the instrument usage charges to the individual user, so that the same total value as the request to the ARC for Imaging should be added to the Administering Organisation column.

Step 1: Click on the plus adjacent to the 'Other' row in the table. In the resulting text box, type 'Sydney Imaging Equipment use [plus description]', then press the 'Add Item' button.

Step 2: Click on the ARC column of the new 'Sydney Imaging equipment' row and enter the required amount, \$41,250 in our example above.

Step 3: Click on the 'In-kind' column of the same row and enter the matching amount, \$41,250 in our example.

Step 4: Click on the next year, Year 2, above the budget table and then repeat, with the requested amount adjusted for the higher or lower facility usage needs of the different years of the project.

Step 5: Click on additional years and repeat the process.

Please contact facilities directly for information about equipment and services, specific advice about your project and to confirm project costs.

NHMRC Project Costs example

Grant proposals to the NHMRC must be submitted in their online Research Grants Management System (RGMS). Applicants should consult with our facilities to ensure that the services they require can be provided and that the charges included in the research budget are accurate.

For NHMRC applications to be submitted in 2018, **letters of support from participating facilities (detailing expenses and confirming facility availability) are required to be uploaded as part of each application.** Failure to provide a letter of support regarding the proposed research facilities may lead to the reviewing panel making changes to the budget if the items requested are not adequately justified for the research to be successfully undertaken. Applicants should select 'Yes' from the dropdown menu in the 'Using research facilities' section, and upload CRF support letters in PDF format.

Add your calculated access fees for each year to the corresponding direct research costs and insert the total into the appropriate year box as below. For example, assume \$36,619 of other direct research costs for year 1. The facility access fees total \$41,250 (as per the ARC example). Adding these costs gives a total direct research cost of \$77,869 for Year 1 (\$80,000 when rounded up to the nearest \$5,000 quantum). This is entered in the relevant year of the RGMS form (Proposed Budget under Part B).

Proceed in a similar manner for each year of the application, with the requested amount adjusted for higher or lower equipment needs, and other direct costs, as required by the different stages of the project.

Please contact facilities directly for information about equipment and services, specific advice about your project and to confirm project costs.

Hints & Instructions

Additional Information: <http://www.nhmrc.gov.au/grants/research-grants-management-system-rgms/rgms-training-program>

Hints And Instructions For This Page: /niku/nu#action:gm_hints_instructions&odf_view=b_pb_app_budget

General

Item Type: Direct Research Costs

Item: (50 character limit including spaces)
VEVO and PET/MR equipment use

Budget Data

| | |
|---------------|------------------------------------|
| Year 1 (SAUD) | <input type="text" value="80000"/> |
| Year 2 (SAUD) | <input type="text" value="80000"/> |
| Year 3 (SAUD) | <input type="text" value="80000"/> |
| Year 4 (SAUD) | <input type="text" value="0.00"/> |
| Year 5 (SAUD) | <input type="text" value="0.00"/> |

Justification

Justification: (500 character limit including spaces and line breaks.)

= Required = Enter Once

Example 'Justification' 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. 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 Sydney Informatics Hub at the University of Sydney. 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.

Example instrument costs for University of Sydney users

Sydney Analytical:

| Category | Cost |
|--------------------------------------|---|
| Vibrational Spectroscopy instruments | |
| XPS/UPS | \$50 per hour |
| EPR | |
| Powder X-ray diffractometers | \$25 per hour* |
| XRF | |
| X-ray Scattering | TBA* |
| Single Crystal X-ray diffraction | \$113 per full sphere collection* |
| NMR (from 2019) | TBA |
| Group cap | \$4500 per calendar year for up to 5 members (increasing to \$5000 in 2019) |
| (instrument time only) | + \$200 per group member |
| Training | \$50 per person, up to cap of \$300 per group. |
| Staff assistance | \$100 per hour |

Sydney Microscopy and Microanalysis:

| Category | Cost |
|---|----------------------------------|
| Up to 8 consecutive hours per session per instrument | \$40 per hour |
| Each consecutive hour over 8 hours per session per instrument | \$10 per hour |
| Specimen preparation and image analysis equipment | \$2 per hour |
| Individual user cap | \$1,500 per calendar year |

Not included in the cap:

\$270 one-off training fee for new users

\$195 per hour for technical staff instrument operation

Sydney Cytometry:

| Equipment | Cost unassisted | Cost operator assisted |
|---------------------------------|-------------------------------|------------------------|
| Cell sorter: basic, 2 laser | \$34 per hour * | \$75 per hour |
| Cell sorter: advanced | \$51 per hour * | \$90 per hour |
| Sort set up | \$40 "flag-fall" each session | |
| Cytometers: basic, <4 lasers | \$34 per hour | \$75 per hour |
| Cytometers: advanced, >4 lasers | \$51 per hour | \$90 per hour |
| Image Cytometer: plates | \$34 per hour | \$75 per hour |
| Image Cytometer: ImageStream | \$51 per hour | \$90 per hour |
| Mass Cytometer | \$60 per hour | \$100 per hour |
| Imaging Mass Cytometer | \$60 per hour | \$100 per hour |
| Additional operator assistance | - | \$50 per hour |
| Training | - | \$25 per hour |

* Requires extensive training

Sydney Informatics Hub:

Bioinformatics software and services

| | |
|---|------------------|
| 6 month subscription to CLC Genomics | \$750 |
| Workbench and CLC Server | |
| 12 month subscription to CLC Genomics | \$1,500 |
| Workbench and CLC Server | |
| Ingenuity Variant Analysis software | \$165 per sample |
| Ingenuity Pathways Analysis software | Free for users |
| Next-generation sequencing analysis, merit based – please contact | |

- Access to Artemis High Performance Computing cluster is free for users
- Access to the Argus Research Virtual Desktop is free for users
- Access to the Research Data Steward is free for users
- Access to the Data Science Team is merit based
- please contact the facility

Example instrument costs for University of Sydney users

Research and Prototype Foundry:

| Equipment | Cost |
|--|---------------|
| Nikon microscope | \$20 per hour |
| DekTak stylus profilometer | |
| Leica stereo zoom microscope | |
| Olympus stereo zoom microscope | |
| MLA 100: Maskless Aligner | \$50 per hour |
| Spin dryer | |
| Die Bonder | |
| 3D Optical Profiler | |
| Wet benches | |
| Brewer Spin coater | |
| Brewer Developer | |
| SVG 88 track | \$60 per hour |
| AFM: Atomic Force Microscope | |
| Oxford ICP reactive ion etcher | |
| DWL 66+ Laser mask writer | |
| ALD: Atomic Layer Deposition system | |
| FIB-SEM: Focused Ion Beam Scanning Electron Microscope | \$90 per hour |
| ASML PAS 5500/100 Stepper | |
| Elionix EBL: electron beam lithography, incl Beamer software | \$50 per hour |
| Staff assistance | |

Sydney Mass Spectrometry:

| Category | Cost |
|--|-------------------|
| Registration (inc training) | |
| Mass spectrometry | \$500 |
| 2D gel electrophoresis | \$300 |
| Bench fees | |
| Off line LC, IEF cells and large gel tanks | From \$1 per hour |
| LC-MS and MSI systems | \$10 per hour |
| Consumables | |
| Zip tips | \$195 per box |
| 96 well plates with silicon seal | \$10 each |
| PCR strip (8 tubes) and seal | \$2 |
| Contract research | |
| Sample clean up | \$25 per sample |
| Peptide mass fingerprinting | \$70 per sample |
| Deuteration analysis | \$70 per sample |
| Intact protein mass (purified protein) | \$70 per sample |
| Protein ID by 1D LCMS | \$105 per sample |
| Quantitative proteomics | \$750 per sample |

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

Sydney Imaging:

| Preclinical Imaging Equipment | Cost |
|---|--|
| HFUS + Photoacoustics: Vevo2100 + VevoLAZR | \$50+ per hour* |
| Optical Imaging with microCT: IVIS SpectrumCT | \$50 per hour* |
| Body composition analyser in awake animal: ec | \$20 per hour |
| X-ray: FaxitronUltraFocus100DXA | \$40 per hour |
| 7T MRI | \$150+ per hour* |
| 3T MRI | \$150 per hour* |
| PET/MR (pre-clinical) | \$150 per hour* |
| Hybrid Theatre* | |
| C-Arm (SIEMENS Artis Pheno) | <i>Please contact us for a quote for Hybrid Theatre projects</i> |
| Ultra Sound | |
| Heart Lung Machine | |
| Image intensifier | |

**costs depending on application*