

**Abstract**  
 Shared Resource Laboratories (SRLs) play a critical role in providing investigator access to technologies, equipment and expertise for advancing high-quality research in a cost-effective manner.  
 The purpose of the 2018 ACS SRL survey is to gain an overview of the landscape of cytometry resources and expertise across Australia and New Zealand. The survey contained 60 questions that covered a wide range of topics, including facility operation, instrumentation, staff, service, training, data management, user engagement, cost recovery and more. 36 SRLs were invited to participate in this survey resulting in 27 responses.

**Facility & Staff**

- 11/27 SRLs are 100% flow cytometry and 8 SRLs are a combination of flow cytometry, imaging and other activities.
- 40.7% of SRLs are happy about their staffing level while 55.6% of SRLs are currently under staffed
- 77.8% of SRL managers are participating in day-to-day activities
- 92.6% of SRLs provide ongoing staff training including local (84.6%), domestic (61.5%), international (50%) educational activities as well as in house training (88.5%).
- 56% of SRLs have >\$2000 budget per annum for ongoing staff training while 16% of SRLs and 12% have \$1000-\$2000 and <\$1000 respectively. 16% of SRLs don't have any budget.

# of Staff	# of SRLs
0	1
1	2
2	6
2.4	2
3.5	1
4	2
9	1

**Operation**

- Operational hours: 17/27 SRLs open at 8 or 8:30am; 21/27 closes at 5-6pm

**Cell Sorting**

- 19/27 SRLs have 6-10 hours sorting hours available daily; 6 SRLs have 21 to 37 sorting hours
- 55.6% SRLs have flexible time sessions for users while 25.9% SRLs have fixed time sorting sessions
- 20/27 SRLs offer after hours sorting under certain conditions including clinical samples only, user operated sorting only, advanced notice, only for low biohazard samples, surcharge applied and case by case
- 17/27 SRLs allow users to operate sorters themselves. 72.2% of these SRLs will start up, QC and set up the template for users and only allow users to monitor and shutdown sorters themselves. 3 SRLs allow users to operate sorters completely independent and 2 SRLs only allow users to monitor it during the run

**Analysis**

- 18/25 SRLs open their analysers to users for 24 hours on weekdays and weekends while 5 SRLs open 12-23 hours

**Instrumentation & Service Agreement**

Model	# of analysers
Accuri	8
Attune	1
Aurora	6
Calibur	10
Canto I	2
Canto II	21
CYTOf	3
CytoFLEX	5
CytoFLEX S	6
Fortessa X20	14
Gallios	3
ImageStream	1
ImageStream X	4
LSRII	14
LSR Fortessa	14
LSR SOPR	11
Muse	1
Symphony	3
Verse	4
Luminex	1

Model	# of cell sorters
Aria	5
Aria II	12
Aria III	11
Aria Fusion	9
FACS Vantage	1
Influx	16
Jazz	4
Melody	3
Microfluidics...	3
MoFlo Astrios	2
MoFlo Legacy	3
MoFlo XDP	2
Cell picker	1

Service Agreement	Cell Sorter (# of SRLs)	Analyser (# of SRLs)
Comprehensive	22	22
Parts Only	0	0
Labor Only	0	0
PM Only	3	2
None	1	2

OR

- >20 SRLs are happy with the service level
- Issues: high cost, lack of skills for high end instruments

**Training & Services**

- ALL SRLs provide trainings including theoretical, hands-on, experimental design, sample preparation and data analysis.
- 17/27 SRLs assess competency after training.

Topic	# of SRLs
Theoretical operation of flow cytometers	22 (81.5%)
Hands-on instrument time	26 (96.3%)
Understanding fluorochromes	18 (66.7%)
Panel design	15 (55.6%)
Sample preparation	13 (48.1%)
Data analysis	19 (70.4%)
Advanced analysis (informatics)	1 (3.7%)

- 15/27 SRLs provide consumables & other services to users with or without charge

Item	Charged	Uncharged
FACS tubes	0	17
Filter FACS tubes	4	6
Transfer pipettes	1	12
Live/dead dyes	4	5
Fixative	1	2
Lysis buffer	1	2
DNA dyes	1	5
Columns	1	2
Antibodies	2	1
Others	4	4

- Others including comp beads, brilliant staining buffer, imaging plates, reference particles

Service	Charged	Uncharged
Sample Preparation	5	1
Sample Acquisition	10	3
Data analysis	6	10
Experimental design	0	17
Antibody titration	3	2
Analyte measurement (e.g CBA assay)	4	3
Others	6	5

- Others including 3D printing, troubleshooting, figure preparation for publication and review manuscript

**Charging Structure**

Rate	# of SRLs
0	1
30	1
35	1
70	1
75	1
80	1
85	1
88	1
90	4
95	1
100	7
105	1
107.5	1

Rate	# of SRLs
0	15
48	1
53.25	1
75	1
100	3

Rate	# of SRLs
0	4
15	1
20	3
25	1
30	1
35	2
36	2
40	1
43	1
45	2
50	1
55	1
71	1

Rate	# of SRLs
0	4
15	1
20	1
25	1
30	2
36	1
40	1
43	3
50	1
55	2
60	1
65	1
80	1

Rate	# of SRLs
0	3
15	1
23	1
30	1
35	1
40	2
45	3
50	1
54	1
55	3
60	1
71	1
80	1

Rate	# of SRLs
0	15
50	2
55	1
90	1
91	1
103	1
200	1
1200	1

Rate	# of SRLs
0	13
10	1
15	1
50	2
91	1

Rate	# of SRLs
0	7
15	1
35	1
40	1
50	3
60	2
71	1
90	1
91	1
100	1
165	1
200	1

- 24/25 of SRLs don't have off peak rates
- 17/25 SRLs have increased fees for external academics (1.5-3 times) and commercial users (2-4 times)

**Cost Recovery**

Category	Charged	Uncharged
Rent	4	11
Services (electricity...)	8	9
Lab consumables	20	0
Depreciation	7	10
IT support	7	10
Training & conference	15	4
Service contract/self...	20	1
Salaries	18	2

Percentage	Count
< 20%	8
20-40%	24
40-60%	12
60-80%	12
80-<100%	12
100%	8
Unsure	2

- The remaining balance is covered by organisation (21/23) or/and grant funding (4/23) and philanthropic funding (1/23)

**User Engagement**

Activity	# of SRLs
Open day	7
Basic tutorial	16
Advanced tutorial	15
Data analysis tutorial	10
Wetlab	9
User group meeting	12
Newsletter	3
Tours	2

- 21/27 SRLs run events
- 18 SRLs open events to external researchers
- 16 SRLs would like ACS to advertise their events on the ACS website or via email notification
- ALL SRLs would recommend ACS to their users
- 26/27 SRLs would promote ACS conference/Roadshows to their users

**Data Management & Facility Administration**

**Data Transfer**

Method	Percentage
Manually by staff	22.2%
Manually by Users	25.9%
Automatically by software/script	51.9%

- Automatic data transfer software: Sycovery, MyData, FreeFileSync, beyondSync

**Data Storage on the Instrument**

Duration	Percentage
< one week	30.8%
< 1-4 weeks	42.3%
< 1-6 months	23.1%
> 6 months	2.8%

- 22/25 SRLs keep the data on the server over 6 months post transfer
- 24/26 SRLs don't charge users for data storage
- None of SRLs charge users for data retrieval

**Data Backup**

Method	Percentage
Users themselves	18.5%
Facility staff	29.6%
Others	51.9%

Others including:

- Facility staff blindly back up database periodically
- Maintained by IT
- Both users and facility

**Comprehensive Facility Management Package**

Package	Yes - Commercial	Yes - In house	No
Instrument bookings	13	11	3
Invoicing	10	9	8
Training records	9	12	6

- The commercial management packages include PPMS (6), iLabs (2), ACLS (4), Calpendo (1)

**CONCLUSION**

This survey will act as a benchmark and assist SRL managers for proper planning, managing and resourcing of cytometry SRLs, and build a stronger relationship among SRLs within ACS.

**Acknowledgement:**  
 ACS council would like to thank all SRLs Which have participated this survey as well as Andrew Fryga and Rob Salomon for their advices.