



THE UNIVERSITY
OF QUEENSLAND
AUSTRALIA

CREATE CHANGE

School of Biomedical Sciences

Septennial Review Submission

2019

Preface

This review has provided the School with an opportunity to reflect on its performance since 2009 and, most importantly, to focus on strategies to move forward in the years ahead, consolidating the work that has been done in this intervening time.

This document is the collective effort of staff of the School. In particular, I would like to express my appreciation for the contributions by the Chairs of School Committees, Tim Forrest (School Manager), and Wendy Brealey (Review Project Officer). I also acknowledge the contributions from all members of our School Committees and other staff, who provided input into sections of the submission and constructive comment on the final draft. Thanks to Simone Moyle for her expertise in producing the final published version.

Benchmarking with other institutions in the dimension of teaching and learning was problematic for the School, as it proved difficult to find comparator schools with a similar mix of disciplines. Nevertheless, the School is grateful to the School of Biomedical Sciences at Monash University, the School of Medical Sciences at Sydney University and the Edinburgh Medical School (Biomedical Sciences) who participated in benchmarking data exchange.

We hope that the School Review Committee and the Senior Executive of the University will find this document valuable and look forward to discussing the School's priorities further during the forthcoming review process.



Kaye Basford
Head, School of Biomedical Sciences

Contents

Preface	i	5. Engagement and Advocacy	42
List of Tables and Figures	iii	5.1 Overview	42
Glossary	v	5.2 Alumni Engagement	42
1. Executive Summary	1	5.3 Academic and Professional Engagement	43
2. Management and Resources	2	5.4 Partnerships with Government and Industry	45
2.1 Brief History of SBMS	2	5.5 Engagement with the Community	46
2.2 Outcomes of the 2009 Septennial Review	3	6. Futures	47
2.3 SBMS within the University	4	6.1 Preamble	47
2.4 School Organisation and Communication	5	6.2 Infrastructure and Resources	48
2.5 Academic Staff	6	6.3 Staffing	51
2.6 Professional Staff Profile	10	6.4 Future Directions in Teaching and Learning	52
2.7 Finance	11	6.5 Future Directions in Research	55
2.8 Space and Resources	13	6.6 Equity and Diversity	58
3. Teaching and Learning	16	6.7 Engagement	58
3.1 Overview	16	6.8 Internationalisation	60
3.2 Student Load and Demand (Coursework Programs)	17	Appendices	61
3.3 Areas of Teaching in SBMS	20	Appendix 1. Academic Staff Detail	61
3.4 Assessment and Academic Integrity	22	Appendix 2. List of Staff in SBMS	62
3.5 Teaching Staff and Support	23	Appendix 3. Professional Staff Chart	67
3.6 Student Outcomes from SBMS Biomedical Sciences Courses	24	Appendix 4. Course Enrolments by Subject Area for SBMS	68
3.7 Teaching Quality	26	Appendix 5. Entry Requirements for Selected Programs to which SBMS Contributes	75
3.8 Internationalisation	27		
3.9 Student Equity	29		
3.10 Student Engagement	30		
4. Discovery	31		
4.1 Overview	31		
4.2 Research Themes	32		
4.3 Research Performance	33		
4.4 Higher Degree Research Training and Outcomes	39		

List of Tables and Figures

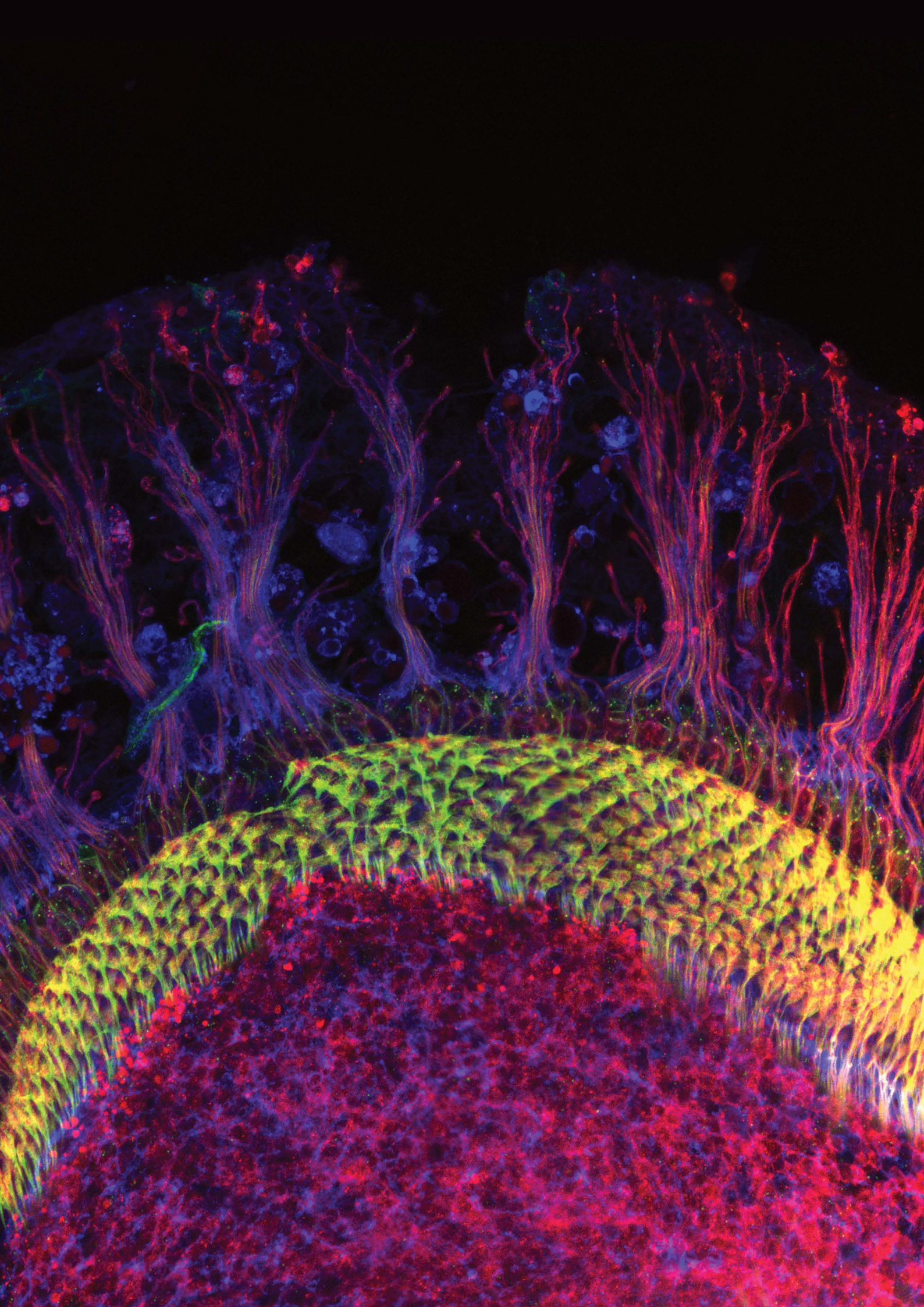
Table 2.1	Income and Expenditure Statement – Core Operating Functions	12
Table 2.2	Allocation of SBMS Controlled Space	13
Table 3.1	EFTSL by Program or Cluster of Programs in SBMS	18
Table 3.2	Graduating Students in Programs and Majors Relevant to SBMS	25
Table 3.3	International EFTSL by Cohort Group	28
Table 4.1	SBMS Top 10 Contributions to Fields of Research in ERA 2015	37
Figure 2.1	School of Biomedical Sciences Committee Structure	6
Figure 2.2	SBMS Continuing and Fixed Term Academic Staff FTE by Level	7
Figure 3.1	Total Student Load by Level in SBMS 2013-2018	17
Figure 3.2	Comparative Student Staff Ratios 2017 and 2018 for Cognate and Partner Schools	23
Figure 3.3	SECaT Undergraduate Mean Responses to Question 8: Overall, how would you rate this course? And Question 7: I learned a lot in this course.	26
Figure 4.1	Research Income for SBMS by Source 2014-2019	34
Figure 4.2	Comparative Research Income per FTE 2015 (Partner Schools)	35
Figure 4.3	Comparative Research Income per FTE 2017 (Cognate Schools)	35
Figure 4.4	Comparative Publication Output per FTE 2014 (Partner Schools)	36
Figure 4.5	Comparative Publication Output per FTE 2017 (Cognate Schools)	36
Figure 4.6	HDR Enrolment Trends 2013-2018	39
Figure 4.7	Comparative HDR EFTSL per FTE 2017 (Cognate Schools)	40

Opposite page

“Biological Hardwiring” by Joshua Li
2017 NHMRC Science to Art Award (1st Prize)

In the developing brain, neurons find their prospective partners with high precision. How this complex form of biological hardwiring is achieved remains elusive. This image is of the developing visual system of a fruit fly dissected, fixed, immunostained and whole-mounted. Photoreceptor neurons (top) project down towards the lamina neuropil (yellow-green) to establish synapses with specific partners. Experiments conducted in this system hope to unravel mechanisms of neurodevelopment.

Acknowledgement to Sean Millard and Shaun Walters



Glossary

APR	Academic Program Review	NHMRC	National Health and Medical Research Council
AQF	Australian Quality Framework	N/A	Not applicable or not available
ARC	Australian Research Council	OHS	Occupational Health and Safety; more recently referred to at UQ as Health, Safety & Wellness
Blackboard	UQ e-learning system	OP	Overall Position (Qld tertiary admissions score used for entrance to university)
CCCR	Culture, Compliance and Capability Review (2016 Faculty of Medicine initiative)	PAH	Princess Alexandra Hospital
CPD	Continuing Professional Development	PASS	Peer Assisted Study Sessions (UQ)
CSP	Commonwealth supported (student) places	PGCW	Postgraduate Coursework
CTQRA	Curriculum and Teaching Quality Risk Appraisal (UQ)	PPL	UQ Policies and Procedures Library
DRT	Director of Research Training (Medicine Faculty)	Program /Course	At UQ a program is a course of study leading to an award of a degree and courses are individual subjects.
ECP	Electronic Course Profile (UQ)	QH	Queensland Health
ED	Executive Dean	QILT	Quality Indicators for Learning and Teaching (national)
EFTSL	Effective full-time student load	QTAC	Queensland Tertiary Admissions Centre
ERA	Excellence for Research Australia	RACS	Royal Australian College of Surgeons
ESC	Enhanced Student Contribution	RBWH	Royal Brisbane & Women's Hospital
FoR	Field of Research	RF	Research Focused (academic staff)
FTE	Full-time equivalent	RTP	Research Training Program (Australian Government, replaced the former Australian Postgraduate Award)
GIBH	Guangzhou Institutes for Biomedicine and Health	SES	Student Experience Survey
Go8	Group of Eight (universities)	SBPF	School-Based Performance Framework (UQ)
GOS	Graduate Outcomes Survey	SECaT	Student Evaluation of Course and Teacher (UQ survey instrument)
GPA	Grade Point Average	SSP	Special Studies Program (sabbatical leave)
HDR	Higher Degree Research (normally referring to student, formerly RHD)	T&L	Teaching and Learning
HECS	Higher Education Contribution Scheme	T&R	Teaching & Research (academic staff)
HERDC	Former Higher Education Research Data Collection	TF	Teaching Focused (academic staff)
IES	International Education Services	TIG	Teaching Innovation Grant (UQ)
KPI	Key Performance Indicators	TSM	Teaching Space Management
LIMS	Laboratory Information Management System	TUM	Technical University of Munich
LMU	Ludwig Maximilians University	UFA	Usable Floor Area
MCN	Munich Centre for Neurosciences	UQ	The University of Queensland
MEI	Major Equipment and Infrastructure Grants (UQ)	UQ2U	UQ new student strategy
MOOC	Massive on-line Open Course		

Unit Sometimes still expressed as #; the unit of study at UQ. Most courses at UQ equal 2 units with a standard semester comprising 8 units

WIL Work Integrated Learning

UQ Schools, Faculties, Research Institutes, Services and Facilities

AIBN Australian Institute for Bioengineering and Nanotechnology

ATARM SBMS Anatomy Teaching and Research Management Committee

ATSISU Aboriginal & Torres Strait Islander Studies Unit

BDP Body Donor Program

BEL Faculty of Business, Economics and Law

Biol Sci School of Biological Sciences

CIPDD Centre for Integrated Preclinical Drug Development

EAIT Faculty of Engineering, Architecture and Information Technology

GAF Gross Anatomy Facility

HABS Faculty of Health and Behavioural Sciences

HASS Faculty of Humanities & Social Sciences

IMB Institute for Molecular Bioscience

IPF Integrated Physiology Facility

IPLC Integrated Pathology Learning Centre

ITaLI Institute for Teaching and Learning Innovation

ITEE School of Information Technology and Electrical Engineering

ITS Information Technology Services

MaBS Former Faculty of Medicine and Biomedical Sciences

P&F Property and Facilities Division

PBI Planning and Business Intelligence

QAAFI Queensland Alliance for Agriculture and Food Innovation

QBI Queensland Brain Institute

SAFS School of Agriculture and Food Sciences

SASS SBMS Student Academic and Social Society

SBMS School of Biomedical Sciences

SCMB School of Chemistry and Molecular Biosciences

SHM&NS School of Human Movement and Nutrition Sciences

SHRS School of Health and Rehabilitation Sciences

SNM&SW School of Nursing, Midwifery and Social Work

SoACC SBMS School of Anatomy Assurance Committee

SVS School of Veterinary Science

TRI The Translational Research Institute

UQCCR The UQ Centre for Clinical Research

1. Executive Summary

The School of Biomedical Sciences (SBMS) at The University of Queensland (UQ) is a large, multi-disciplinary teaching and research unit with a reputation for delivering innovative and quality teaching, and demonstrated excellence in research spanning the fundamental-translational spectrum.

Since the last septennial review in 2009 the School has gone through a period of substantial change, including a move from the Faculty of Science to the Faculty of Medicine. In the teaching domain, the University's roll out of initiatives tied to the Student Strategy is already impacting on teaching and learning, while nationally changes to the National Health and Medical Council (NHMRC) granting system and other developments, both within and external to UQ, continue to affect research. The School is seizing new opportunities opened up through these changes and doing so in a context of aspirations and objectives set out in the Faculty of Medicine's Statement of Decadal Intent 2018-2027 and the University's Strategic Plan 2018-2024.

The School currently has a core academic staff of 57, comprising 38 Teaching and Research (T&R) staff, nine Teaching Focused (TF) academic staff and 10 Research Focused (RF) staff at level B or above. It contributes to the education of 1427 equivalent full-time students (EFTSL) each year, which equates to approximately 15,000 enrolments. Courses are taught in anatomy, pathology, physiology, pharmacology, cell biology, developmental biology and neuroscience, and delivered into undergraduate pass and honours programs offered by the Faculty of Science, and as professional discipline teaching into programs coordinated by the Faculties of Medicine, and Health and Behavioural Sciences (HaBS). The quality of the School's teaching and its responsiveness to feedback is evidenced by course evaluation scores and other ratings of teaching quality by students, and by informal feedback from Program Directors and others who work with SBMS staff in the development and delivery of the teaching programs.

The School's research broadly falls into themes that capture and frame a diversity of cross disciplinary activity. A recent decline in Australian Competitive Grant income has been reversed in 2019 with the School securing eight new NHMRC and two Australian Research Council (ARC) grants. In recent years, income from industry and international sources has also risen. Publication output in leading journals for the disciplinary fields has remained strong. External partnerships, particularly

with biopharmaceutical and biotechnology companies, have resulted in successful commercialised outcomes, while in other fields research has impacted positively on government policy and community health and well-being. Recent academic appointments and promotions have increased the proportion of level D and E staff to 36% and these staff will provide leadership in achieving the operational goals developed at recent planning retreats, especially in seeking out and nurturing opportunities from a diversity of sources, and mentoring early and mid career staff to achieve to their potential.

The School, supported by successful funding bids from the Faculty of Medicine and the University, has invested significantly in the development of new teaching laboratories, informal student areas and core facilities in MacGregor and Skerman buildings, and improvements to teaching spaces in the Otto Hirschfeld building. Additionally, the School is acting on an opportunity to put forward plans for the construction of a new, state-of-the-art Gross Anatomy Facility (GAF) in the proposed Science Complex, which is earmarked for development on the St Lucia campus within the next five years.

The School's immediate future strategies include four key objectives:

1. Exercise leadership in the roll out of UQ wide initiatives to provide for flexible delivery of undergraduate teaching and to ensure students are exposed to innovation and genuine partnering opportunities.
2. Strengthen the School's profile in research by supporting diversity and individual excellence, forming collaborations and links with industry, and nurturing Higher Degree Research (HDR) students, and early to mid career researchers through special initiatives, leadership and mentoring programs.
3. Enhance the international reputation of the School by leveraging new and existing efforts with partner universities and global industries.
4. Provide the best possible physical environments in which to foster innovation in teaching, flexibility in learning and excellence in research and research training.

The chapters that follow offer a broad overview of the School in the domains of management and resources, teaching and learning, discovery (research), engagement and future plans and initiatives. Where feasible, comparator data provided by the University's Office of Research Analysis, Policy and Operations and our national and international benchmarking partners have been included.

2. Management and Resources

2.1 Brief History of SBMS

In the 1990s, UQ was organised as a collection of faculties with departments as the organisational unit.

A restructuring of the University saw the combination of smaller faculties to form larger entities and cognate departments forming schools which were established as the organisational and financial units with budgets delegated by Executive Deans. As a result in 1999, the Departments of Anatomical Sciences and Physiology and Pharmacology combined to form the School of Biomedical Sciences (SBMS) within a Faculty of Biological & Chemical Sciences.

In 2003, the School underwent its first review from which it had 'emerged as an impressive, dynamic unit' with recommendations to assist the School realise the full potential of its teaching and learning and research activities. In the following years, the School strengthened its research base with professorial appointments in a diverse range of fields and in partnership with the Faculty of Science introduced several successful initiatives including a new Bachelor of Biomedical Science degree, as well as professional development workshops for medical and allied health practitioners.

In 2009, just prior to the School's second septennial review, a reorganisation of the faculties resulted in the School becoming a member of a newly constituted Faculty of Science. Five years later a further reorganisation resulted in the School becoming a member of a new Faculty of Medicine and Biomedical Sciences (MaBS). Most recently, effective January 1 2017, the Faculty was reconfigured to better integrate its component entities and improve support of staff and students. This included a name change to the Faculty of Medicine. At this time, Pathology was moved to SBMS.

The School occupies several buildings on the St Lucia campus reflecting its discipline origins, but the configurations of these spaces are inappropriate for modern teaching and research purposes and the buildings require significant maintenance and upgrades. Anatomy has been housed within the Otto Hirschfeld Building since 1961. This building underwent a major refurbishment over 17 years ago including at the time, new research laboratories and modernisation of the GAF. In order to comply with evolving regulatory requirements and maintain authorisation to operate a Body Donor Program (BDP), significant refurbishments have taken place since late 2016, however, issues remain (see 2.8.3).

Physiology and Pharmacology have occupied the Sir William MacGregor (since the early 1960s) and Skerman (early 1990s) buildings and upgrades of various floors have been progressively actioned in recent years, but considerable work remains, particularly in Skerman. Other related disciplinary areas such as developmental biology, cell biology and neuroscience have grown out of the original disciplines and also occupy these spaces. In mid 2018, the School's reception and administrative and technical support staff moved into a new fit-for-purpose space on level 1 of MacGregor, located adjacent to new informal student learning spaces and a new teaching laboratory.

The School also manages the Centre for Integrated Preclinical Drug Development (CIPDD) in the Steele Building at St Lucia and the Integrated Pathology Learning Centre (IPLC) at Royal Brisbane and Women's Hospital (RBWH) which supports the teaching of the Pathology discipline. Further discussion of infrastructure is provided in 2.8.



2.2 Outcomes of the 2009 Septennial Review

The School's second septennial review conducted in August 2009 resulted in nine commendations and 19 recommendations.

Commendations included the School's success in attracting research fellows and in seeding research institutes such as QBI, the advancement of the scholarship of teaching and learning through the establishment of the Education Research Unit, and the major role the School played in the delivery of teaching within the Faculty of Science and professional courses led by committed and effective teaching staff.

Fundamental issues underlying the recommendations included a high staff turnover, the School's vulnerability in research funding, and teaching workloads. Leadership and futures planning was a major focus of the recommendations and this has remained an ongoing challenge in the succeeding years. The more recent inclusion of the School in the Faculty of Medicine was recognition of the need to better integrate biomedical sciences with the clinical sciences, both in teaching and to encourage stronger research collaborations with clinical partners and research institutes. This is an ongoing focus. Progress on meeting specific recommendations (except where overtaken by internal or external developments) are discussed within relevant sections within this submission.

2.3 SBMS within the University

SBMS is one of two teaching and research schools within the UQ's Faculty of Medicine, the other being Public Health.

The Faculty also comprises clinical schools that deliver medical education and five hospital-based research institutes/centres. The Faculty is led by the Executive Dean (ED) Professor Geoff McColl (who succeeded the Acting ED, Professor Robyn Ward, in June 2018). Details about the Faculty can be found on their [webpage](#).

The Faculty of Medicine has recently undertaken an intense period of strategic reflection and overhaul of management practices, necessary to position it for the future and overcome problems which had increasingly beset its operations and threatened to erode its competitiveness in education and research. The School has been shaped by the resultant changes, particularly in the areas of governance, budget methodology and administration, with a realignment of professional services under a centralised Faculty model (refer 2.6).

SBMS has strong and productive links with many schools and research institutes across the University as evidenced in discussions within the following Teaching and Learning, Discovery and Engagement chapters. These links take the form of teaching contributions to programs offered by various faculties (especially Medicine, Science and HaBS), research collaborations, shared higher degree research (HDR) student supervision, committee memberships and affiliate positions with staff in schools within these faculties and in others. The location of the School within the Faculty of Medicine is consistent with the trend in many interstate universities and is seen as an emerging opportunity to strengthen the continuum from basic to translational research as well as to encourage improved collaboration between research groups in the School and clinical academics.

The School is strongly aligned to UQ's vision of knowledge leadership for a better world with future directions supporting several of the University's medium-term strategic focus areas, as outlined in Chapter 6. SBMS has a reputation for excellence in several areas classed as pure basic science as well as in translational science; the School is committed to encouraging their equal growth since many basic science discoveries serve as a catalyst for subsequent investigation and translational outcomes. The collaborative culture encouraged at UQ means that the School's location in a Faculty of Medicine does not preclude staff developing productive relationships with colleagues located in other faculties, as evidenced by examples of collaborations discussed in 5.3.

While it is difficult to isolate performance of biomedical sciences, in the 2018 QS World University Rankings for the broad category Medicine and the Life Sciences, UQ ranked 30 (with Australian institutions Melbourne and Sydney ranking higher). In the Times Higher Education World Rankings, Life Sciences at UQ ranks at 34 (with Melbourne ahead at 32).

In 2009, UQ implemented a School-based Performance Framework (SBPF) analysis to improve awareness of the strengths and weaknesses of schools and institutes. The Framework provides a means for translating the University's strategic priorities in the dimensions of learning, discovery and engagement to a school level and enables an assessment of where each school currently sits in relation to the strategy of the institution as a whole as well as facilitating comparison with other schools across the University.

While the structure of this framework is currently under review, the results of the most recent performance (based on previous year's data) are embedded in the appropriate chapters throughout this submission. In summary, in the dimension of research, the School performs most highly in the number of fellowships from national and international competitive grant schemes (second highest among all schools in 2018 based on 2017 data) and category 1 research income per academic staff FTE (fifth highest among schools in 2017 based on 2016 data, the latest year for which data are available). In the teaching dimension, the School ranks fifth for students rating the quality of their learning experience, and rates soundly for Question 8, overall course rating. While the SBPF shows some weaknesses for the School, mostly with respect to engagement indicators, strategies to improve performance, where it is within the School's ambit, are discussed in Chapter 6.

2.4 School Organisation and Communication

SBMS is managed through a committee structure that ensures representation of staff from across the core business areas of the School.

Figure 2.1 illustrates the current governance structure. The position of Deputy Head of School is a new position in 2019, an initiative of the ED for both schools in the Faculty, and seen as a developmental position to provide support to the Head of School across their range of duties.

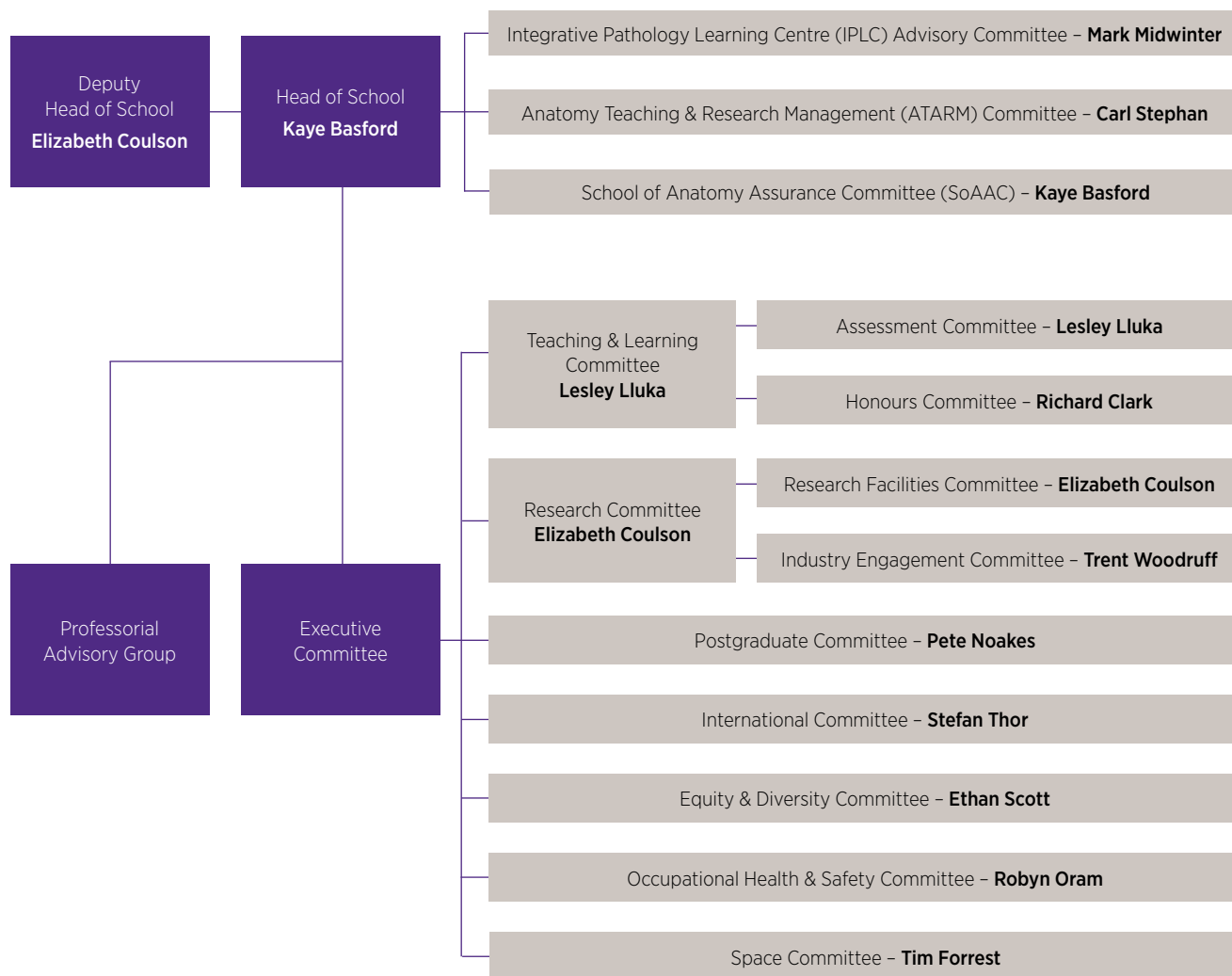
The central decision-making body of the School is the Executive Committee, comprising the chairs of all School committees and the School Manager. The Committee meets monthly. Underpinning the Executive Committee are the permanent committees that report to the Executive Committee: Teaching and Learning, Research, Postgraduate, Equity and Diversity, Occupational Health and Safety and Space Committees, plus a new International Committee. Two committees representing Assessment and Honours fall under the auspices of Teaching and Learning, and two committees, Industry Engagement and Research Facilities, report to the Research Committee. The chairs of these committees also sit on the Executive. For reasons of statutory compliance, ATARM and SoAAC report directly to the Head of School, who functions as custodian of the School of Anatomy¹ (see 2.8.3 and also UQ PPL 1.30.07 *Anatomy Facilities and Programs Governance*). The newly formed IPLC Advisory Committee reports to the Head of School on matters of policy and direction. The Professorial Advisory Committee provides both strategic advice to the Head of School and an avenue for two-way communication with senior staff.

As a large School, providing effective communication without overloading staff is a challenge. A number of formal strategies have been implemented: a weekly update from the Head of School as a means of providing important announcements, updates or links to relevant items; whole of School meetings every six to eight weeks, chaired by the Head of School, to inform staff on a wide range of matters; academic staff meetings held quarterly to facilitate two-way discussion on core business activities; and senior professional staff meetings twice a month to foster communication between the functional areas. A School intranet was replaced with a Faculty intranet with the move to the Faculty of Medicine and the inclusion of School specific items on this site is still being refined.

There is regular multi-level communication between the Head of School, School Manager and senior leadership within the Faculty of Medicine and appropriate representation of School staff on Faculty Committees and other relevant University groups. The School is also represented on Faculty Boards, Boards of Studies, program and other committees, both at strategic and operational levels, within the Faculties of Science and HaBS due to the significance of the biomedical science program and majors within the Bachelor of Science (BSc) and Bachelor of Advanced Science (Honours) (BAdvSc(Hons)) programs, and the provision of discipline or service teaching into professional programs.

Strategic planning is driven by the Faculty inclusive of its constituent members. The most recent planning exercise was conducted in the latter half of 2017 including representation from the School. The resulting Decadal Plan included 35 recommendations across the two focus areas of Education and Research (*Faculty of Medicine Statement of Decadal Intent 2018-2027*). To mobilise the plan, recommendations were prioritised and sequenced into manageable projects, two led by staff from SBMS. The resulting actions are being rolled out in three successive waves including some additional enabling projects, with the first 10 delivered by mid 2018 and a further five actioned by the close of year.

Figure 2.1 School of Biomedical Sciences Committee Structure (with chairs in bold).



¹'School of Anatomy' is defined by the Transplantation and Anatomy Act, 1979 (Qld) as a place 'where the study and practice of anatomy may be carried on in connection with a university or school of medicine' as authorised by the Chief Health Officer/Executive. It is, therefore, the legal entity for the practice of anatomy under the Act and in UQ's case is operated by SBMS. The Head of SBMS is registered with the Chief Executive as the UQ School of Anatomy Custodian. The primary physical location of the UQ School of Anatomy is the Otto Hirschfeld Building.

2.5 Academic Staff

2.5.1 Academic Staff Profile

While total academic staff FTE appears relatively stable during the past six years (Figure 2.2, detailed table provided in Appendix 1), within this there has been movement of staff within the functions. While in the years 2015-2017 there was a contraction in T&R staff matched by an expansion of RF staff, by 2018-19 this has been redressed in favour of continuing T&R staff.

Several research fellows have chosen to leave the School in recent years, going to one of UQ's research institutes or more lucrative positions in external research-intensive organisations. For early to mid career staff, it is considered appropriate that the career development received within the School and UQ advantages their career prospects and their departure provides opportunities for the School to widen its collaborative networks; however, this has had an impact on some research performance indicators.

The recruitment and retention of fellows is one of the Faculty's wave 2 projects arising from the Strategic Plan, and is a focus across the University. For some time, the School was able to offer a 'safety-net' from operating funds to provide selected researchers with additional time to secure new funding to sustain their positions. However, with changing budgets this has become unsustainable. The development of proactive strategies in this regard, such as the recent UQ Amplify program (an institution-wide approach to attracting,

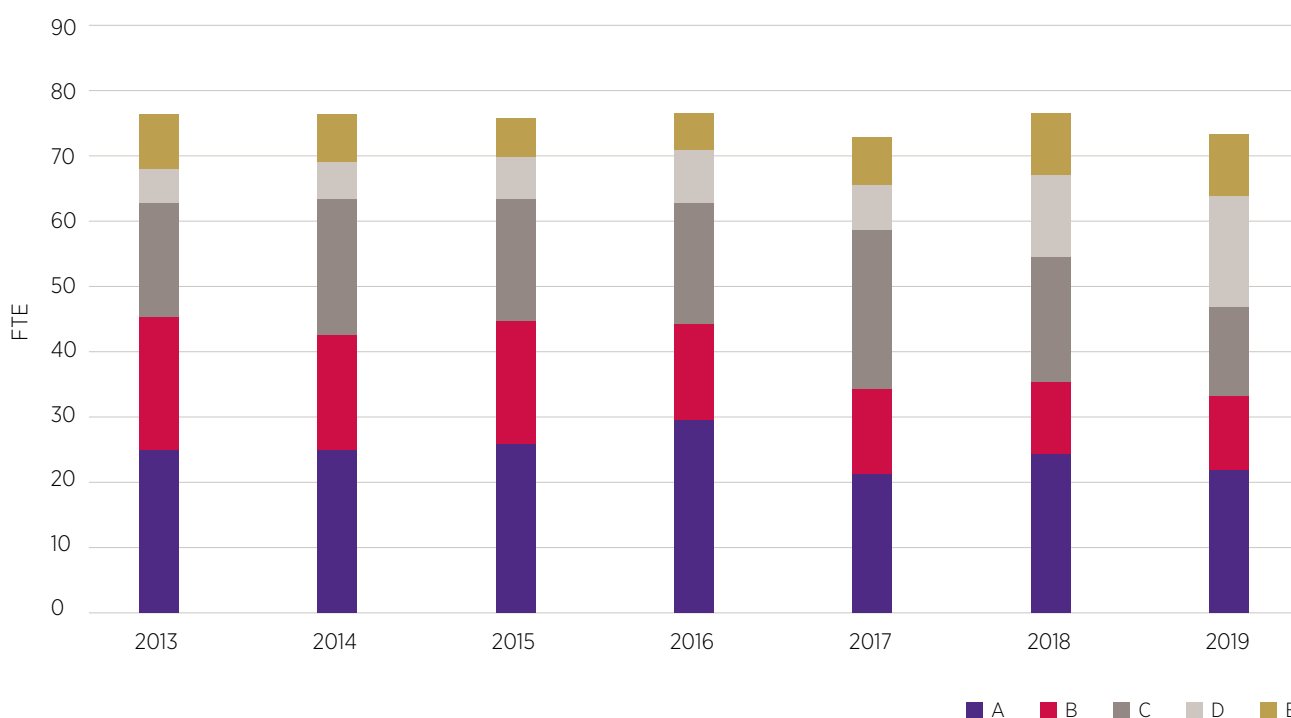
retaining and developing externally-funded fellows), is therefore welcomed by the School. Staff will work closely with the Faculty and University to develop initiatives to attract and retain strong or upcoming researchers.

Consistent with recommendation 5 of the 2009 Review, three senior staff appointments (levels D-E) have been made in recent years. New appointments together with successful promotions, have increased the FTE of levels D to E staff from 13.4 in 2013 to 26.4 in 2019, 36% of all staff, well above the 2018 University average of 28%.

In replacing staff, the School has focused on making strategic appointments of quality applicants in areas of teaching needed to fill vacated positions. In part to redress equity across the Faculty, and as a budgetary saving measure, the previous ED implemented fixed new staff appointment packages across the Faculty. These were at lower levels than some earlier appointments in SBMS had received, but are consistent with, and in some cases better than, packages applied in other UQ faculties.

Excluding RF staff, many of whom are at level A or B on fixed term contracts, the School's complement of continuing T&R and TF staff has increased to 47 (head count) in 2019, redressing a decline from 2015 to 2017. Since 2016, 14 appointments have been made, mostly in T&R across levels B(5), C(6), D(1) and E(2). The level E positions have been strategic appointments, one in Developmental Biology and

Figure 2.2 SBMS Continuing and Fixed Term Academic Staff FTE by Level (at 31 March official data collection date 2012-2018 and at 1 January 2019).



Source: UQ Reportal Staff FTE, by Function & Classification and HR advised data.

the other replacing a level C in Clinical Anatomy to allow the incumbent (a surgeon) to undertake teaching and research at a higher level. Discussed further in 2.5.2, addressing gender and cultural equity in the selection processes has been foregrounded with 58% of recent appointments being women.

The School was an early adopter of appointing or moving appropriate staff to TF positions when this category was introduced across the University. With such a large teaching load (over 15,000 students in all classes taught by SBMS in 2017), the School has made strategic use of this category of staff. The School's complement of nine continuing TF academic staff recognises the importance of providing a quality service to client schools. It also ensures dedicated and experienced staff lead curriculum development and delivery, reducing teaching loads on T&R staff and providing a better student experience. In contrast, the number of casual staff has decreased by approximately one third since 2013, to an estimated 16 FTE in 2018. In 2019, a number of TF and T&R staff are undertaking the Higher Education Academy Fellowship program (HEA@UQ), to progress their careers and improve their professional practice.

T&R and TF staff now account for 65% of staff (measured in FTE) reflecting the balance between supporting the teaching programs and research activity. There are currently seven staff holding externally funded fellowships. RF staff are encouraged to deliver lectures and tutorials to students or supervise projects to enrich the student learning experience and enhance research and teaching links. The number involved is expected to expand in time as the UQ Amplify scholarship program takes effect.

Reflective of the proportion of senior to mid career and junior staff, the age profile of the School is sound with 59% of staff aged 25 to 44 in 2018. This suggests potential for a growth in research performance indicators as their careers progress. As retirements or resignations occur, a decision to fill vacant positions will be made in discussion with the ED according to School needs and strategic directions at that time.

Overall, female academic staff form almost equal proportions to male staff (48% based on total head count in 2019), a proportion that has improved from 37% in 2013 due to affirmative action policies. This is better than the average for the University as a whole (at 41% in 2018). In comparison female staff hold 29% of the senior (level D and E) positions, similar to the norm across the University for this cohort (27%), and an improvement on 2013 when only 14% were female.

Staff from the School have achieved high levels of success during promotion rounds. Fifteen staff were promoted effective 2017 to 2019, including eight women. The School is committed to increasing the percentage of female senior appointments through competitive recruitment with appropriate incentives, and supporting legitimate bids for promotion by existing female academics across all disciplines.

The School is using the UQ Workloads tool to understand workload distribution among staff and as a basis for working towards greater equity and balance with the underlying principle of 40% teaching, 40% research and 20% service and engagement for T&R staff. A Workloads Working Party was formed in 2018 to evaluate the available data against these proportions and to provide recommendations to the Head of School on any necessary adjustments. A report is awaited.

Concerns raised in earlier reviews over the number of staff available to manage the heavy teaching loads has been addressed through appointments made in recent years, as noted in previous paragraphs, and teaching and learning innovations to manage large class teaching, some of which are discussed in 6.4. The School will also work with the Faculty in achieving its goal to involve a broader range of stakeholders to contribute to teaching such as clinicians, alumni, and other partners to optimise educational capability across the Faculty and to introduce students to a range of knowledge sources and expertise. Student:staff ratios are discussed in 3.5.

A full list of SBMS staff, including honorary, adjunct and affiliate staff is provided in Appendix 2. Staff biographies and research activity is available from the links to individual staff on the School website under Our People.

2.5.2 Support and Mentoring

The School's leadership team model the values and principles espoused by the Faculty and University and have set in place a number of processes to address previous concerns expressed by staff, including those raised as a result of the 2016 Culture, Compliance and Capability Review (CCCR). The latter was commissioned by the then Faculty of MaBS to facilitate a process of self-assessment and address some ongoing challenges resulting from the period of successive changes that had impacted on the School's sense of purpose and interconnectivity with UQ values and strategy. The long-term goal, supported by the School's leadership team, is to enable continuous improvement of the School's performance in this area.

A series of Focus Groups were held in 2018 to evaluate progress made since the audit in 2016. These confirmed that there was transparency of routine activities and processes; the leadership team were approachable and open to sharing of information; there was sound collegiality among staff with appropriate respect and camaraderie; downward communication was appropriate and there was an appropriate level of trust, especially at an individual level, for staff to ask for help or admit mistakes. Several recently introduced initiatives, including investment in facilities and resources were applauded. The academic and professional divide had also been much more closely bridged.

Remaining challenges included more transparency and better inclusion in Faculty decision making in keeping with the Faculty's vision of a body representative of a collection of equally-valued disciplines. There were several challenges in the area of sustainable research; discretionary funding; flexible work practices and workforce planning; academic credibility and sense of being valued.

Recommendations that the School is addressing, some of which are discussed in [Chapter 6](#), include the further development of a clear School strategy and research themes; better transition and workforce planning; additional mentoring and support mechanisms for new staff; investment in teaching and learning (T&L) projects that proactively improve the management and delivery of teaching in large, critical courses offered by the School; initiatives to improve social and personal connections within the School and with the Faculty; and ways to raise the academic profile drawing on examples from the research institutes.

To develop and promote a diverse and inclusive culture within the School, and engage all staff with these principles, the School's Equity and Diversity Committee is charged with identifying and addressing cultural and professional challenges facing women, members of the LGBTQIA community, under-represented minorities and people with disabilities within the School. As part of its brief, the Committee assesses the professional and social culture of the School and proposes changes to School policies and procedures to ensure an inclusive and supportive environment. A key function is to assess and suggest amendments to the School's selection and mentorship procedures to support an equitable appointment process, and equitable probation and promotion processes.

An initial focus for the Committee has been gender issues as these were the most critical areas of concern. Progress has been made in the recruitment and selection processes, resulting as noted in 2.5.1, in the increased number of female appointments at levels B to D. Female staff now chair 50% of the eight permanent committees (and the Executive Committee chaired by the Head of School) including the T&L and Research Committees, and female staff are being encouraged to apply for University programs supporting the career development of women such as the Promoting Women's Fellowships, Career Progression for Women Program and UQ Women in Leadership Program.

As a result of affirmative action, the Research Seminar program now better reflects gender equity and the website features stories that better reflect gender and cultural diversity. The involvement of UQ (which will be applying for Bronze status shortly) in the national SAGE Pilot of the Athena Swan project will drive further improvement in the School, as it will across all units within the University.

Likewise, all staff are encouraged to apply for academic appointments when they arise and are equally supported to apply for promotion and other career or self-development activities. Following the recommendations of the CCCR, staff were particularly encouraged to undertake leadership training programs, tapping into the framework developed by the University including New to UQ Senior Leaders Program and the Leadership and Self-development courses run through UQ's [Staff Development Program](#). A budget allocation of 1% of general operating academic salaries has made these initiatives extremely viable.

Mentorship in the School is a combination of formal and informal processes. Workshops for new staff are discussed in 3.5. Each new academic staff member is assigned a mentor as part of 'on boarding' before the staff member arrives in the School. The Deputy Head of School (and previously in her role as Chair of the Research Committee) meets informally with varying groups of academic staff, to discuss their ideas for improving processes and practices at a more intimate level than the formal committees. The School also encourages staff to take advantage of various mentoring opportunities provided through the University at a central level.

Early career researchers have taken a more deliberate approach to stimulate networking and support among themselves. Research groups form another pillar of mentorship for more junior staff and staff are encouraged to feel comfortable in approaching any other member of staff, at any level, to seek advice or support on a relevant matter. Intra-school social events, such as a monthly morning tea, hosted in turn by staff occupying floors of buildings, and social activities such as Friday drinks organised by the School's Student Academic and Social Society (SASS, see 4.4.3) provide further opportunities for informal networking. Staff have identified the need for further improvements in these areas and suggested actions to progress.

Using the QS International Indicator to identify staff as international, 53% of the School's staff in 2018 are considered international, but it is perceived there is more that can be done to encourage ongoing cultural diversity, including from UQ Global Strategy priority areas.

The Chair of the SBMS Equity and Diversity Committee sits on the Faculty Equity and Diversity Committee and the Faculty is highly supportive of the work being undertaken within this area of the School, which is also driving Faculty-wide policies and processes in this regard. School and Faculty endeavours are supported by the comprehensive range of policies and online training programs relating to staff equity and diversity provided by the University including strong support provided for staff with carer responsibilities, among others. Details of the University's policies are available on the University's [Human Resources Diversity and Inclusion website](#).

2.6 Professional Staff Profile

The School's professional services is made up of 20 FTE staff reporting within Central and Faculty divisions and 23 FTE staff supporting the teaching technical and research areas of the School. Like much of the sector, UQ is transitioning its professional services towards a centralised, function led model.

Across UQ, the transition began in 2017 with the centralisation of Finance and HR and more recently, HDR administration. At the Faculty level, Medicine moved quickly in late 2016 to introduce function led teams in Marketing and Communications, Academic and Student Administration and Research Administration, then in 2017, Occupational Health and Safety and Infrastructure Management. In 2018, Academic and Student Administration became Teaching and Assessment. Under this model, staff within each function have a solid line report to the function manager and a dotted line report to the School Manager. Within SBMS, all function led staff are embedded in the School full time except HR and Marketing and Communications staff, who are deployed to the School on a part time basis.

The transition from a devolved to a centralised model has taken time to settle. By the close of 2018, the School's professional services were mostly in place and working to meet the needs of the operation.

The strength of the Faculty model is its presence and integration at the organisational unit level. SBMS has benefited from functional area managers and experts working *in situ* rather than remotely. Clear lines of communication between functional areas and School management are an area of vulnerability, which needs ongoing vigilance at both ends. (Refer to [Appendix 3](#) for a chart outlining the reporting structures.) Accordingly, function team leaders meet routinely with the Head of School and School Manager on operational issues and planning.

Professional staff who report directly to the School Manager support the specialist technical and scientific service areas in both teaching and research. These service areas interface closely with academic leaders and mentors in the disciplinary areas. In 2018, the Research Committee initiated a review of the Core Facilities to look closely at their capabilities, instrumentation, take up within the School and unmet client demand. The intent is to better align the facilities with the current and emerging needs of the School and Faculty, and to guide the efforts of the newly formed Research Facilities Committee, which will exercise oversight and support. Within this evolving scenario, the School Manager's primary role will be to ensure the function and specialist led areas interact with each other in areas of mutual interest and responsibility. A Faculty led review of core facilities across all Faculty units is also currently underway.

Among the professional staff recorded as employed within SBMS, there is a slightly higher proportion of females (58% by FTE in 2018) though this is somewhat biased towards the lower HEW levels. With the centralisation of professional staff into the Faculty, the appointment and selection processes for continuing (non-research) professional staff are largely Faculty driven and the University equity and diversity principles apply.

Similar to academic staff, career development is a feature of the annual staff appraisal for professional staff, and staff are encouraged to take up opportunities for advancement and career development offered by the University or other sources, and attend Faculty sponsored forums and workshops. A substantial Faculty budget exists for this purpose. In the last 12 months, two senior professional staff enrolled in UQ leadership courses; one senior technician was flown to Sydney for training in echocardiography; the GAF technical team held a full day team-building workshop and were sponsored to attend the Australasian Institute of Anatomical Sciences Conference on the Gold Coast; and the Teaching Laboratory Services team were sponsored by the School to attend the TechNet conference at UQ.

Moving forward, retaining 'embedded' staff will be necessary for providing basic services to the School. Feedback from professional staff in the CCCR highlighted the need to retain the student-school connection and expressed some teething issues with interfacing with the Faculty of Medicine whose experience was with a different style of cohort and different practices to students in Science, who make up the largest portion of SBMS enrolments. Professional research staff felt better access to more training and career progression opportunities was needed. All groups of professional staff expressed a desire to be included in strategic planning and developing innovations for the future.

2.7 Finance

The School's budget is largely driven by income from Commonwealth funding and tuition fees and makes a major contribution to the Faculty, generating approximately 19% of the Faculty's operating revenue after tax.

Operating income is made up of Commonwealth funding (teaching and Research Block), tuition fees, trading and contract income, and internal contributions. Restricted income encompasses research, scholarships, and donations. Common across faculties within the University and in keeping with the University's financial management strategy, School budgets are managed as an integral component of the Faculty's budget as a whole, with cross subsidisation used to sustain operations where necessary and surpluses (or deficits) not necessarily retained by each School.

Currently unique to the Faculty of Medicine in the University, member schools are provided with an annual allocation based on submitted budget projections encompassing fixed operating costs such as salaries, general operating costs, and other pre-agreed items. The Faculty funds appointment costs and provides start-up funds for new staff. The Faculty is also the enrolling unit for HDR students so that travel allowances and computers are provided from Faculty funds. Other costs covered by the Faculty include replacement of computers out of warranty and high demand laboratory assets at the end of their operating life. In 2018, the Faculty contributed \$270K towards new assets in SBMS.

During the year, the School may make *ad hoc* submissions and requests through the mid-year budget review process to access Faculty strategic funds for specific items or activities, and in the past two years has been successful in obtaining over \$1 million for mostly capital items. While the approach limits discretionary spending, it has forced the School to plan, consult internally and provide sound reason for undertaking specific spending initiatives. A resultant change has been the cessation of 'formula funding' based on student supervision, grants and publications. This is consistent with the trend in other schools at UQ and at other Australian universities. In its place, the School has introduced targeted subsidies to assist in covering the operating expenses of HDR and honours students (see 4.4.3), and small competitive grants to seed new and collaborative research (see 4.3.4). Income received on the basis of teaching is not directly attributable to the EFTSL taught.

A slight reduction in revenue since 2014 (refer Table 2.1) has been offset by adjustments to internal allocations during the intervening years. So while the total external revenue dropped between 2014 and 2018, internal allocations were adjusted favourably, resulting in an overall decline in revenue of \$1.4 million (or 7%). A small increase in EFTSL in 2018 should see some revenue growth in 2019. However, a concerted effort in international recruitment will be needed to improve tuition fee income. This will be led by the School's new International Committee (refer 6.8).

The budget was also offset by changes in professional service costs. Centralisation of professional services saw a progressive transfer of general non casual salary expenditure (and the corresponding revenue) from the School to Central and Faculty in 2017. By 2018, \$1.8 million in professional staff salaries had been moved while the School retained the benefit of staff remaining embedded in its operation (refer 2.6).

The rise in academic expenditure from 2017 is the result of new staff appointments discussed in 2.5.1 and the flow-on effect of promotions. Several waves of recruitment were undertaken in 2017 to fill vacant and new positions approved by the Faculty, and they were filled progressively during 2017 and 2018. Additionally, four staff were transferred to the School in 2017, three of which belonged to the pathology group. As previously noted, one strategic level E position was added in 2018, the cost of which will not be incurred until 2019. A forecast rise in academic salaries in 2019 includes the level E, senior fellows returning to substantive positions and academic promotions. Academic casual salaries have returned to normal levels following two years (2015-2016) of lab renovations resulting in the cancellation of practicals for some courses.

The School allocates 10-15% of its operating budget to progressive minor works and leveraging of funds from Faculty and Central towards refurbishments and acquisition of equipment, necessary given the age of facilities. Thus, the School has been able to seed more than \$23 million in capital works since the last review.

Table 2.1 Income and Expenditure Statement – Core Operating Functions

Operating Income & Expenses	2014 Actuals \$	2015 Actuals \$	2016 Actuals \$	2017 Actuals \$	2018 ¹ Forecast Year End \$	2019 ¹ Forecast Year End \$
External Revenue						
Government Operating Grants	32,173,975	31,594,773	30,371,033	30,670,653	30,682,561	34,424,652
Research Block Grants	3,315,037	3,329,013	3,644,253	4,322,524	3,529,499	3,258,662
Tuition Fees	12,007,610	9,144,645	10,124,791	10,982,533	9,770,493	11,051,203
Commercial Services/ Fees/ Charges	392,189	385,359	595,395	460,479	263,358	380,000
Other Income	125,150	142,215	96,874	97,832	69,602	21,000
Total External Revenue	48,013,961	44,596,006	44,832,345	46,631,853	44,385,114	49,156,517
Total Internal Allocations	(29,711,715)	(26,886,271)	(25,971,421)	(28,894,015)	(27,491,425)	(32,467,073)
TOTAL REVENUE	18,302,047	17,709,735	18,860,924	17,737,838	16,893,689	16,689,444
Expenditure						
Salaries – Academic Non Casual	6,550,737	7,095,421	7,136,330	7,712,822	8,419,678	9,460,740
Salaries – Academic Casual	1,759,616	1,315,877	1,187,650	1,425,939	1,736,792	1,719,599
Total Academic Salaries	8,310,353	8,411,298	8,323,980	9,138,761	10,156,470	11,180,339
Salaries – General Non Casual	3,668,113	3,811,575	4,312,226	2,548,723	2,293,109	2,418,282
Salaries – General Casual	264,571	417,432	471,608	360,910	259,124	176,148
Total General Salaries	3,932,685	4,229,006	4,783,834	2,909,634	2,552,233	2,594,430
Other Expenditure						
Consultant Professional & Other	217,408	377,466	804,468	492,833	582,955	297,705
Equipment & Minor Works	3,517,812	2,898,132	1,787,112	2,202,523	1,743,328	677,685
Travel	315,066	457,444	305,416	228,797	185,244	181,746
Scholarships	282,465	415,991	339,346	252,369	260,545	195,968
Other Expenses	1,131,527	2,206,093	2,358,510	2,291,626	1,718,244	1,899,814
Total Other Expenditure	5,464,277	5,481,691	4,950,089	4,986,982	4,044,527	2,875,204
TOTAL EXPENDITURE	18,139,787	18,245,743	18,129,852	17,348,011	16,969,976	16,800,473

Note 1: The Faculty of Medicine currently operates an expenditure model for the budget with the School receiving an agreed sum of money per annum based on its projected expenditure as agreed with the ED.

Source: Faculty supplied figures from the Workbook and predicted adjustments

2.8 Space and Resources

2.8.1 Facilities

The School has approximately 7174 m² of useable floor area (UFA) in 2018, as noted in 2.1, located mainly in the Sir William MacGregor (MacGregor), Otto Hirschfeld and Skerman buildings on the St Lucia campus. In 2017, other spaces were merged with SBMS including the CIPDD on level 2 of the Steele building and the IPLC on level 6 of the UQ Health Sciences building at RBWH campus (2.8.2). Approximately 35% of the space is occupied by teaching or combined teaching and research laboratories, 37% by research laboratories and 28% in staff offices and HDR space (refer Table 2.2).

As was noted in the 2009 review, much of the space in the School is poorly configured for modern use and inhibits the development of multi-use laboratories and other common areas. The buildings date from the 1960s and '70s and floor areas are mostly long and narrow. They also require substantial ongoing maintenance, a fact recognised by the University's Property & Facilities Division (P&F) which is regularly called on to carry out repairs, such as rectification works on the external cladding on Otto Hirschfeld in 2016–17 resulting in a \$2.2 million expense to the University.

Noted in 2.7, since the last review the School has been successful in obtaining capital funding through the University's Infrastructure Sub Committee (ISC), the Enhanced Student Contribution (ESC) scheme and more recently from funding sourced from the Faculty of Medicine for progressive refurbishments. Over \$3 million has been invested in upgrades and refurbishments in Otto Hirschfeld building, and over \$20 million on renovations in Skerman and MacGregor buildings. There have also been successes in securing funds through the University's Major Equipment and Infrastructure Grants (MEI) scheme including two projects awarded for 2019 comprising \$740,000.

The most recent round of staged refurbishments concluded in 2018 at a cost of \$15 million and culminated in the development of a 180 seat teaching laboratory, informal learning areas and administration spaces on level 1 of MacGregor. It is especially gratifying that the informal learning areas on level 1 have been well utilised by the School's biomedical science students and are creating a new sense of 'SBMS' identity within the student body. Level 1 also functions as a shopfront for the Faculty of Medicine at St Lucia.

In addition, the project included new research facilities in Skerman level 2, office spaces in Skerman level 3 and a PC2 laboratory, instrument room and office spaces in MacGregor level 4. In Otto Hirschfeld, the School, Faculty and University together funded upgrades to the GAF to achieve regulatory compliance and to improve the general amenity. Improvements were carried out as a short-term measure and plans to rehouse the GAF in more appropriate surroundings are currently on the drawing-board (refer 6.2.4).

The School's Space Committee is responsible for coordinating space requirements across the School and recommending priorities and projects to the Head of School based on consultation and feedback, with reference to a set of criteria that includes capacity building in strong and emerging areas, outputs of high quality and impact, sharing and co-location of staff in high demand areas, reduced duplication of facilities and spaces, re-purposing of underused spaces, and leveraging of funds. The Committee includes staff representation from buildings and disciplines. A priority for the Committee going forward is to identify and encourage academics to apply for grants and schemes that include infrastructure and major equipment acquisitions.

As discussed in 2.6, a Faculty led team of professional staff are embedded in the School to support building management, infrastructure, space allocation, resources and stores.

Table 2.2: Allocation of SBMS Controlled Space

Type	Number	Size (m ²)
Teaching Labs	10	1853.3
Combined Teaching & Research labs (non PC2)	3	622.2
Combined Teaching & Research labs (PC2)	2	14.0
Non PC2 Research labs	23	586.7
PC2 Research labs	58	2106.7
Staff Offices and HDR Student Areas	130	1991.6

Source: UQ Archibus, customised report as of 27 April 2018.

2.8.2 Equipment and Resources

The School has an extensive range of scientific equipment with several well provisioned Core Research Facilities that are easily accessible by staff and students of SBMS as well as by others across the University and external clients on a fee for service basis. Full details and a list of available equipment at each facility are provided on the School's [Facilities website](#) and associated links.

The facilities are as follows:

- Imaging and Analytical Facility (located on level 2 of Skerman building), includes advanced instrumentation for RNA, DNA, and protein analysis, spectrophotometry, flow cytometry, cellular physiology, robotic pipetting systems and readers for high content analysis; and an array of advanced microscopes housed in purpose-built imaging suites for live and fixed cell and tissue imaging including basic confocal, super-resolution and multiphoton microscopy, 3D image reconstruction and analysis software.
- Histology Facility, also on level 2 of Skerman, provides access to specialised microscopy systems for tissue preparation, slide production and histochemical staining. The Facility includes a dedicated cryostat room and space in the main lab for tissue processing, embedding and staining.
- Integrated Physiology Facility (IPF), a state-of-the-art animal in vivo physiology centre located on level 4 of MacGregor, housing TSE Phenomasters, Memmert chambers, surgical suite, short term mouse holding room, telemetry implant system, a Bruker Minispec NMR analyser, and a range of other analytical equipment.

The School employs two full-time staff to run the Analytical and Imaging Facilities and one full-time operator to oversee the Histology Facility. Histology is supplemented with casual staff as required. The IPF is managed by one full-time operator. In 2019, the IPF position will be jointly funded by SBMS and the University of Queensland Biological Resources (UQBR) to support both School and UQBR animal facilities.

The Core Research Facilities staff provide a range of services to the School including induction and training of user groups, sample preparation and analysis, maintenance and operation of instruments, safety, procurement of assets and facility housekeeping. Honours and HDR students rely on the facilities each year for training in a wide range of techniques and assays. Additionally, the staff are called on regularly to support undergraduate teaching in courses involving microscopy and histology.

Cost recovery is applied variably across the facilities.

Histology offers a full range of service charges to internal and external clients while only certain instruments in the Imaging and Analytical labs incur hourly charges. Charges applied in the IPF are currently under review.

In addition, the School manages two other teaching and research facilities:

- The IPLC, located at RBWH, which came across with the pathology teaching group and serves primarily to support the Medicine program. The facility houses a collection of over 3500 pathology specimens including objects from the Marks-Hirschfeld Museum of Medical History as well as more recent specimens that highlight the progression in understanding of human disease, presented using the latest technologies to create interactive learning resources. A satellite centre at PAH provides teaching resources for UQ students enrolled in the MD program and clinicians located on the south side of the city. The IPLC is staffed by a full time curator and one full-time technician, both of whom support the pathology academic staff involved in Phase 1 of the Medicine program.
- The Gross Anatomy Facility located in the Otto Hirschfeld Building (see separate entry, 2.8.3).

In the last three years, the School and recently the Faculty, have invested in upgrading microscopes and related equipment to ensure adequate resources are available to support teaching and research. Approximately 30% of the School's scientific assets are ten years or older and many of these are approaching end of life. As part of its central management strategy, the Faculty funds a proportion of asset replacement costs and the School works with the Faculty to plan, identify and replace assets in critical and high demand areas.

In 2018, assets replaced include biological safety cabinets, isotope counters, incubators and more biomedical fridges and freezers. As part of its responsibility, the School carries out preventative maintenance on a range of standard items found in most teaching and research laboratories. In 2018, the Faculty also funded a number of infrastructure improvement initiatives including the opening up of more general-access spaces (mainly in Skerman level 4) and upgrading of the School's freezer storage resources.

2.8.3 Gross Anatomy Facility

The School of Biomedical Sciences operates an authorised School of Anatomy under the *Transplantation and Anatomy Act 1979 (Qld)* and includes a Gross Anatomy Facility (GAF) and Body Donor Program (BDP). The GAF is the School of Anatomy's cadaveric teaching facility and in 2018 catered to 6300 students studying anatomy in courses servicing multiple programs in three faculties: Medicine, HaBS and Science. The core teaching functions of the facility are underpinned by a large prosected specimen collection derived from donors and developed over many years comprising approximately 1800 wet specimens and 8500 osteological specimens.

GAF infrastructure includes a large dissection wet lab on level 2 of Otto Hirschfeld, a mid-size dissection wet lab on level 1, an embalming suite, a prosectory laboratory, cadaver receiving area, two walk-in fridges and two freezers for cadaver storage, a fireproof document storage room, and staff amenities and office spaces. Teaching tools range from potted, plastinated and wet specimens to life size plastic skeletons, human bones, radiographic images and anatomical models. The GAF is further supported by the IPLC (see 2.8.2) and the Biological Sciences Library, where models are also housed for student use and private study. The BDP is one of the largest in Australia with approximately 12,500 donors currently registered and provides up to 110 cadavers per year to the GAF depending on GAF requirements.

The facility is also used for training in advanced surgical anatomy delivered by external *bona fide* health professionals. The prime example is the Advanced Surgical Anatomy Course (ASAC), which is currently run by the School and accredited by the Royal Australasian College of Surgeons (RACS). Between 15 and 20 trainee doctors enrol in the course each semester. External surgical workshops are also held in the GAF on a fee for service basis.

While the GAF is an essential teaching resource for the University, its ability to continue to operate as a state-of-the-art facility is currently compromised by its historical infrastructure and student enrolments which have nearly trebled in the last 12 years, peaking in 2018. There is also demand for facilities to support research. A solution for the future is discussed in 6.2.4.

2.8.4 Health, Safety and Wellness

The School is committed to achieving best practice in Occupational Health and Safety (OHS) in all of its activities. The UQ Health, Safety and Wellness (HSW) Division website provides comprehensive policies, procedures and support in this regard. To manage this area effectively in the School, there is an OHS Committee chaired by the Faculty Safety Manager (St Lucia precinct). The Safety Manager provides leadership, training and advice on all aspects of OHS and Biosafety within the School. She is supported by a full time Workplace Health and Safety Coordinator (WHSC) and local Workplace Health and Safety Representatives (WHSR). Both the Safety Manager and WHSC report to the Faculty OHS Manager, who is also a member of the Committee.

The Committee and its members facilitate the implementation of the University and School Safety Management System, including the development and implementation of UQ policy and procedures, accident and incident investigations, a schedule of workplace inspections and surveys, School OHS induction processes for students, volunteers and visitors, and implementation of risk management systems. The Safety Manager and WHSC also represent the School at Faculty and University levels on relevant OHS matters. An academic currently acts as the Drugs and Poisons Officer.

The School has a sound record of OHS performance and a good OHS culture, striving for best practice in implementation of OHS management systems. Excellent relationships are maintained with the HSW Division and other relevant external regulatory agencies such as the Office of Gene Technology Regulator (OGTR) and Department of Agriculture and Water Resources (DAWR).

3. Teaching and Learning

3.1 Overview

The goal of the teaching and learning program in SBMS is to provide students with sound foundational and higher level knowledge and skills in the biomedical science disciplines of anatomy, developmental biology, physiology, pharmacology and pathology, through the delivery of innovative and engaging learning activities and assessment tasks, which are appropriate to the students' career trajectories.

Those trajectories include a broad range of clinical professions, research and other pathways including industry and government sector employment.

The School is the ninth largest school in the University with a total coursework EFTSL load of 1424 in 2018 excluding non-award students. This EFTSL load includes 1307 EFTSL at undergraduate level and 117 at postgraduate level including 106 EFTSL in the postgraduate Doctor of Medicine (MD) program. Teaching is grouped into three categories: (i) biomedical science teaching in the disciplines of anatomy, developmental biology, physiology, pharmacology and neuroscience in Faculty of Science programs; (ii) professional discipline teaching in anatomy, physiology and pharmacology in programs run by other faculties, particularly the HaBS Faculty; and (iii) teaching in anatomy, pathology, physiology and pharmacology in the postgraduate MD program. EFTSL is discussed further in 3.2 and teaching in each of these categories in 3.3. The relationships forged through teaching strengthen the engagement of the School with many diverse schools and institutes across the University and can facilitate collaborative research activities.

Despite large classes, especially in first year, as outlined in 3.6 and 3.7, the School is rated highly by current students and (as far as can be garnered from surveys currently available) by graduates for the quality of its teaching and resources. This is reflected in the strong performance in the SBPF for these indicators.

The School Teaching and Learning Committee focuses on developing and implementing strategies relating to the quality of teaching, learning and assessment. The chair is a member of the Faculty of Medicine and Faculty of Science Teaching and Learning Committees and Boards of Studies as well as several program or partner school teaching and learning committees (refer 3.3).

The current focus for the Committee is the conversion, initially of ten courses, to a blended learning mode of delivery as part of the UQ2U University initiative. Redesigning or newly developing several courses to meet the needs of partner schools in professional discipline teaching is another significant task. These activities are discussed further in 6.4. In November 2018, a one and a half day retreat was held, involving staff and student representatives, to discuss planned activities and future strategies.

Several other committees are also active in the teaching and learning space. This includes the Anatomy Teaching and Research Management Committee (ATARM) who report directly to the Head of School as custodian of the School of Anatomy (see 2.8.3). The Honours Committee and Assessment Committee also oversee operational matters under their purview and report to the Executive Committee.

The School supports an environment that encourages excellence in all aspects of teaching and learning. One of the School's research themes is Innovation in Biomedical Education with a focus on developing, implementing and evaluating innovative teaching methods to enhance student learning (see also 4.2). The group of academics involved in this research area, predominantly TF academic staff, drive innovation in teaching and learning across the SBMS teaching program and their success is reflected in the awards received for teaching excellence at Faculty and University levels. The group also provides support for new academics in the practice of teaching at UQ.

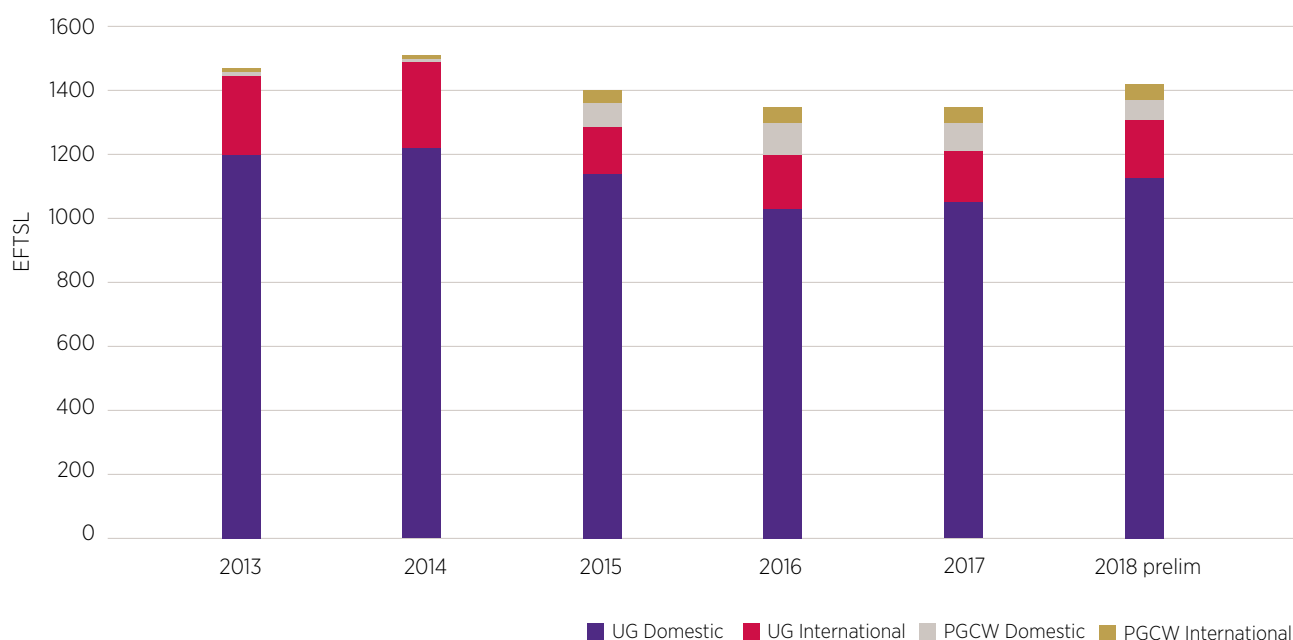
3.2 Student Load and Demand (Coursework Programs)

Total coursework load for the School has remained stable during the time frame presented in this submission, with only minor fluctuations caused by a decline in EFTSL when the MBBS program changed to a postgraduate level in 2015, and the addition of teaching into nursing and midwifery programs from 2018. It is anticipated this will remain steady during the next few years (refer Figure 3.1).

Table 3.1 provides a breakdown of EFTSL by program. As can be seen, programs taught through the Faculty of Science generate approximately 47% of these EFTSL (total of 675 from all programs in 2018). Teaching in the disciplines of anatomy, physiology and pharmacology in the programs run by the Faculty of HaBS provide a further 38% (543 EFTSL) while EFTSL attributed to the School from the Faculty of Medicine programs contributes 12%.

In 2018 there were over 15,000 student enrolments in courses to which the School contributes. A full list of head count and EFTSL for each course is provided in Appendix 4. Such a high teaching load impacts on the School in a number of ways. These include the challenge of ensuring that there is an equitable distribution of workloads across TF, T&R and RF staff, but also the provision of consistently high quality learning experiences for the students in large classes, mentoring of new teaching staff, training of tutors (for practical classes, workshops, tutorials and peer assisted study sessions (PASS) classes) and the provision of sufficient and appropriate teaching spaces, including laboratories and the GAF (refer 2.8.3).

Figure 3.1 Total Student Load by Level in SBMS 2013-2018



Source: UQ Reportal: Load by Faculty, Campus, School and Program, 5 Year Trend, accessed 07/12/18.

Table 3.1. EFTSL by Program or Cluster of Programs in SBMS

	2016	2017	2018 prelim
Programs taught within the Faculty of Science			
B Biomedical Sciences (4 yr pre AQF) (code 2286) ¹	40.22	17.65	3.93
B Biomedical Sciences (Hons) (4 yr AQF8) (code 2374) ¹	84.70	73.47	59.35
B Biomedical Sciences (3 yr) (code 2415)		58.11	177.82
B Biomedical Sciences (PG Hons) (code 2423)		0.50	15.0
B Science and BSc dual degree programs	420.50	388.03	309.37
B Advanced Science (Hons)	4.16	15.18	35.06
B Science (PG Hons)	66.50	79.00	52.25
Other Programs in Science	24.20	20.52	22.27
Programs taught within the Faculty of Medicine			
B Medicine, B Surgery & Grad entry MB,BS1	0.95		
B Health Sciences	67.98	76.67	64.84
Doctor Medicine (incl. Ochsner)	135.83	130.80	106.122
Programs taught within the Faculty of HaBS			
B Clinical Exercise Physiology (Hons)		11.00	18.60
B Exercise & Nutrition Sciences	71.59	88.50	85.19
B Exercise and Sports Sciences (Hons)	43.79	37.61	33.73
B Health Sport and Physical Education(Hons)	28.36	23.40	17.87
B Dental Science (Hons)	23.30	24.24	26.83
B Nursing			52.88
B Midwifery			9.25
B Nursing & Midwifery			26.50
B Occupational Therapy (Hons)	41.01	39.25	39.92
B Pharmacy (Hons)	120.54	101.61	100.19
B Physiotherapy (Hons)	81.38	77.38	81.38
B Speech Pathology (Hons)	40.32	40.81	40.06
Master Speech Pathology Studies	5.38	5.63	6.88
Other Bachelor Programs in HaBS	2.38	1.85	3.28
Other Programs in BEL	12.56	13.02	11.48
Other Programs in HaSS	3.64	3.67	4.18
Other Programs in EAIT	17.80	15.29	12.41
Diplomas and UG cross institutional	9.54	7.16	7.23
Non Award	4.49	7.03	2.63

Notes: 1. These programs are in teach-out. 2. Semester 2 EFTSL appears to be under-reporting for this program. The EFTSL for the Doctor of Medicine is expected to be similar to the figure for 2017.
Source: Load by Faculty, Campus, School and Program, 5 Year Trend, accessed 08/2/18



Entry prerequisites for undergraduate programs are set by the respective Faculty. The Overall Position (OP, see Glossary) for the Bachelor of Biomedical Science (BBIomedSc) is currently 7 (2018 median of 3). While there is significant competition for students in biomedical science and related programs in south-east Queensland, UQ has increased its market share of OP 1 to OP 5 domestic first preferences for the BBIomedSc to 53% in 2018, reversing a decline between 2015 and 2016 when the program was a 4-year on-course honours program. In the last five years, 90% or more of offers have translated into enrolments. Entry OPs for the Bachelor of Advanced Science (Honours) (BAdvSc(Hons)) and Bachelor of Science (BSc) are provided in Appendix 5 together with admission requirements for the other main programs into which the School teaches. Programs and majors into which the School teaches are discussed further in 3.3.

The School is involved in a range of outreach activities to attract students to the biomedical sciences each year. These include University-wide events such the Young Scholars

Program, the Young Achievers Program and UQ Experience Science; outreach programs run by the Faculty of Science, such as the Conoco/Phillips Science Experience, which is a nationwide STEM outreach program for year 9 and 10 students, and the Student-Scientist Research Partnership Program; national programs such as the Youth Science Forum and Scientists in Schools program; and activities with the International Education Services (IES) Foundation Year for international students completing their pre-university study at the IES College. Staff also participate in workshops for STEM students in local primary and high schools and school visits to the ILPC facility are welcomed.

Members of the School undertake in-school and on-campus tours and presentations to secondary students and participate in TSXPO, UQ Open Day and other University and Faculty marketing strategies that assist in highlighting UQ as the university of choice for high-achieving school leavers wishing to study biomedical sciences.

The School is involved in a range of outreach activities to attract students to the biomedical sciences each year.

3.3 Areas of Teaching in SBMS

3.3.1 Undergraduate Science Teaching

There are three options for students wishing to pursue undergraduate studies in the biomedical sciences, and the appropriate choice is partly related to whether the student wishes to pursue a career in this area or is preparing to enter a professional program such as the MD. The options include the BBiomedSc, BAdvSc(Hons) and BSc. The School teaches the disciplines of anatomy, physiology, pharmacology, developmental biology and neuroscience into these programs. Other areas of biomedical science including genetics, microbiology, immunology and biochemistry are taught by the School of Chemistry and Molecular Biosciences (SCMB).

The BBiomedSc was introduced in 2008 as an initiative of SBMS in partnership with SCMB and other schools within the Faculty of Science, originally as a research-focused four year degree including an honours year (program code 2286). In 2015, with the introduction of the AQF model, the program moved to an AQF 8 (program code 2374). However, with many students choosing to use the program as entry to medicine and subsequently transferring to a biomedical science major in the shorter three-year BSc, a strategic decision was made to revert to a three year AQF level 7 program commencing 2017 (program code 2415). This program is now marketed as suitable for those preparing to enter a graduate medicine or allied health program as well as a career in the biomedical sciences.

High achieving students with an interest in a research career are now steered towards undertaking the biomedical science major in the BAdvSc(Hons) program, an elite program designed to challenge these students with a focus on developing their passion for and skills in research. Students have been able to select a major in biomedical science in this program since 2017. This program provides continuous interaction with researchers from a student's first year of study. Courses specifically for biomedical science students in this program include advanced biomedical science techniques courses in second year (BIOM2222) and third year (BIOM3333) and a 2 or 4 unit research project mentored by academics in the student's third year. These courses prepare the students for cutting edge research in their fourth year honours research project to put them at the forefront of the next generation of biomedical scientists.

For those students who are less clear about their career trajectory or wish to undertake a breadth of study, such as two majors or a dual degree program, their program of choice is the BSc where they may choose to undertake a major or an extended major in biomedical science. As evidenced by the EFTSL in Table 3.1, this has been a popular option but the impact of the introduction of the three year BBiomedSc program is still to be seen. This separation of programs has made pathways much clearer for students.

Postgraduate honours (one year) is still an available option for either the BBiomedSc graduates or those who graduate with a major or an extended major in biomedical science in the BSc, if they decide to follow this path after their bachelor's graduation. This option is taken by a broad cohort of students, including those who want to progress to a PhD and a research career, students who recognise the increased employability associated with the completion of honours and students who are waiting to gain entry to a postgraduate program such as the MD.

The School also teaches wholly or contributes to other courses offered within other majors and programs such as the Bachelor of Biotechnology(Hons) (refer [Appendix 4](#)).

The School continuously refreshes its teaching and assessment practices, with initiatives including enquiry-based practicals with vertical progression from Year 1 through to Year 3; reflective tasks such as meta-learning assessment as one of several ways to help students to self-regulate their learning; workshop-based learning; and development of online self-assessment resources for students.

The School has been successful in obtaining significant funding as part of the implementation of the UQ Student Strategy. A recent focus has been on re-imagining BIOM3200, which is the capstone experience for students in both the BBiomedSc and the biomedical science majors in the BSc to enable students to develop skills most appropriate for their career trajectory (see 3.10). Teaching and learning initiatives, formerly driven by the Education Research Unit, are led by staff active in the Innovation in Biomedical Education research theme of the School.

3.3.2 Undergraduate Professional Discipline Teaching

The School continues its tradition of teaching the disciplines of anatomy, physiology and pharmacology to students across a wide range of programs within the University (for discussion of contribution to the MD program see 3.3.3). This is often referred to as service teaching.

SBMS works closely with partner school program teams to ensure that the content and modes of delivery meet the needs of the cohort and meshes with the program as a whole. This is approached in different ways as required by the partner school. For example, (i) SBMS has a representative on the School of Pharmacy Teaching and Learning Committee; (ii) the School of Nursing, Midwifery and Social Work (SNM&SW) has a designated academic responsible for liaison with SBMS about the Nursing and Midwifery courses and to arrange meetings with the Program Directors before and at the end of each semester to discuss program content, delivery, assessment and student performance; and (iii) the main mechanism for similar discussions in courses of interest to the School of Health and Rehabilitation Sciences (SHRS) is direct contact between SBMS Course Coordinators and SHRS Program Directors.

Being responsive to the needs of partners and acting when issues arise is seen as a critical part of the School's role as a provider of discipline content to professional degree programs. Two examples follow.

An extensive revision of the Bachelor of Nursing (BN) and Bachelor of Midwifery (BMid) (and dual degree) programs in 2016 to 2017 resulted in the introduction of much more comprehensive studies in anatomy, physiology and pharmacology (as well as therapeutics from the School of Pharmacy) into the programs at the request of SNM&SW. This resulted in the introduction in 2018 of four new courses across the first three semesters of the programs to fulfil their needs with lectures, workshops and practicals, including practicals undertaken in the GAF. These have been very well received by the students, who have achieved excellent grades in the courses. Ensuring vertical and horizontal integration with the rest of the relevant programs is a key component of the consultation needed in these developments. Courses were created in close collaboration with staff from SNM&SW and the School of Pharmacy for delivery in 2018.

In response to issues of poor student engagement and performance that arose in 2017 courses for HaBS programs of special interest to SHM&NS, a Working Party was formed comprising representatives from both Schools and Faculty Associate Deans (Academic) oversight, with staff working together to refresh the courses (BIOM1050, ANAT1005 and PHYL1007) and to provide additional resources and support for the students. The changes resulted in much more positive student engagement and better grade outcomes for the cohort. The SHM&NS staff are very satisfied with these outcomes and the School is continuing to work with relevant program coordinators to ensure that the material in the courses meet the needs of the students' programs in future semesters. For the Bachelor of Health Sciences (BHLthSc), the School is collaborating with a Working Party in the School of Public Health on the development of more appropriate courses for students in the BHLthSc, for introduction in 2020 (refer 6.4.5).

3.3.3 MD Program Teaching

SBMS provides teaching in anatomy, histology, pathology, physiology, pharmacology and radiology to the MD program with pathology having been transferred, with the associated movement of staff, to the School from the former School of Medicine in 2017.

The MD program is coordinated at the Faculty of Medicine level and the School contributes to clinical courses offered in Phase 1 of the program. The program is structured as a case-based learning model so SBMS staff work closely with the relevant curriculum committee (i.e. Phase 1 MD Committee) and the School of Clinical Medicine to ensure teaching in the different disciplines from SBMS and other disciplines is coordinated for each of the cases, and horizontally and vertically integrated with the rest of the program. The School's recent appointment of a Professor of Clinical Anatomy has provided senior leadership for development of initiatives in the SBMS contributions to the MD and senior representation on the relevant program committees.

3.4 Assessment and Academic Integrity

The University uses criterion-referenced assessment and all details of assessments are provided in the Electronic Course Profile (ECP) delivered to students through the on-line portal Blackboard.

The School has an Assessment Committee chaired by the SBMS Chief Examiner, originally arising as an outcome of the 2009 septennial review. This Committee takes a lead role in managing assessment practices and quality across the School. This includes a formal meeting of the Committee with individual course coordinators prior to the commencement of each semester to discuss the suitability of the assessment tasks in the course relative to the course objectives and learning activities and to review assessment criteria, hurdles and standards prior to publishing the ECP, with a flow-on effect of overall oversight of the delivery of the course.

The Committee discusses innovations in assessment being planned by course coordinators prior to their development, and at a subsequent meeting at the end of the semester reviews grade outcomes and oversees generally any other issues that arise with respect to assessment in the course. The Committee also oversees processes associated with approving the standard of the questions in mid-semester and end of semester examination papers and ensuring they are clear, accurate and error-free prior to submission.

Through this Committee and its members, innovative assessment practices are developed and/or disseminated across courses taught by the School. The Committee has played a substantial role in the development of new courses such as those for SNM&SW mentioned in 3.3.2 and has raised awareness of how reorganising assessment can drive a different way of learning and improve outcomes such as student engagement and success.

Assessment policies and processes applied in the School comply with the University Policy and Procedures Library (PPL) Policy 3.10.02 Assessment, which covers marking and award of grade, timing and length of examinations, and student access to feedback. The University's Enrolment and Academic Progression policies provided in PPL 3.40.11 Enrolment and PPL 3.50.14 Academic Progression also govern aspects of assessment processes.

The University's prescribed graduate attributes set out in PPL 3.10.05 are formally embedded in all undergraduate programs and are mapped against the learning objectives of each course in the ECPs. Attainment of graduate attributes is linked to course objectives and assessment outcomes.

Academic integrity is a core value of UQ as set out in PPL 3.60.04 Student Integrity and Misconduct. The SBMS courses that have written assessment use online submission via Turnitin to assist the academic integrity process, as well as to optimise the submission of student work, and the School's resources. The School has adopted a pro-active stance whereby academic staff in all School courses draw students' attention to the issue of academic integrity, and are also directed to review potential cases of plagiarism in submitted work and forward any concerns to the Academic Integrity Officer (AIO).

A finding of Poor Academic Practice (PAP) accounts for about half of cases referred to the AIO, and about 40 'level 1' academic misconduct cases are referred to the Head of School as the Decision Maker. The majority of cases relate to plagiarism and collusion, but falsification of documents and cheating (in exams) also occurs. The approximately 80 cases that resulted in either PAP or a Guilty finding in 2018 involved about 0.5% of the 15,000 students who were enrolled in School courses.

This Committee takes a lead role in managing assessment practices and quality across the School.

3.5 Teaching Staff and Support

Student:staff ratios in the School have decreased in recent years to an estimated 22.7 in 2018 and are below those of a School with a similar teaching profile, SCMB (Figure 3.2), and similar to partner institution Monash.

For practical classes a typical ratio of 20:1 applies, but the tutor support is varied depending on the type of class (e.g. a year 1 enquiry-based practical requires a 12:1 student:staff ratio in order to provide sufficient support for the students). A maximum ratio of 20:1 for practical classes held in the GAF is mandated by legislation.

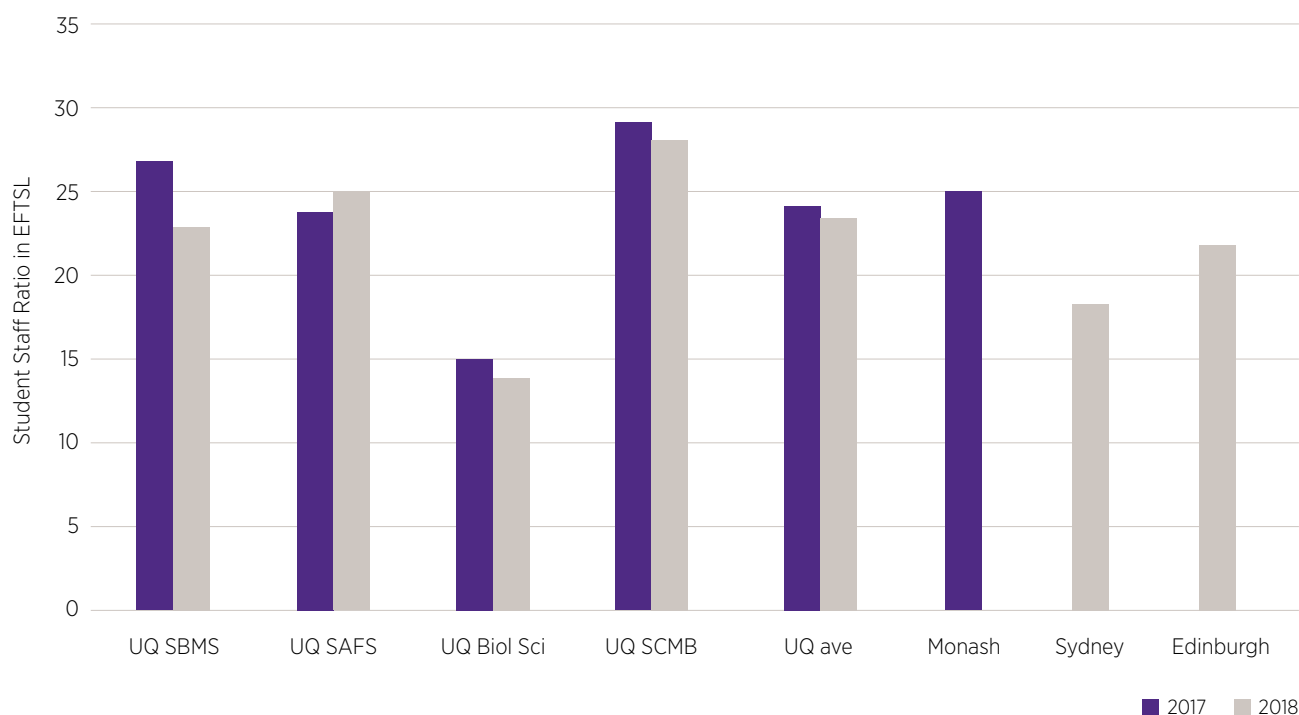
The School's complement of TF staff are most heavily involved in professional discipline teaching but also contribute increasingly in the teaching to science students. They lead innovations in teaching and assessment practices across courses in the School and introduce mechanisms to evaluate initiative outcomes to inform whether they are successful or require further changes. While TF staff carry significantly higher teaching loads, the necessity to give them time to undertake research is taken into account when determining their workloads.

In 2018 and ongoing at least until mid-2020, staff introducing teaching and assessment innovations in the School have been supported by a Learning Designer, a joint appointment between the Faculty of Medicine and ITaLI. The appointee has been working with academic staff to implement and evaluate a range of initiatives and new activities such as the changes to BIOM3200 mentioned in 3.10.

The Learning Designer's ongoing support will be invaluable as the School plays a lead role in the conversion of large courses to blended learning under the UQ2U program. It is perceived that these revisions, discussed in 6.4.4, will assist in managing the delivery of large classes as well as improving the student experience, and will also inform the redesign of other courses in the School to a more blended approach to facilitate student learning.

The School holds a series of eight two-hour workshops for new staff building on the ITaLI run sessions for new staff. The workshop sessions are interactive and all new staff at level C or below are expected to participate, while those new staff at level D are encouraged also to attend. These staff then receive mentoring for at least a further 12 months, especially as they carry out the role of course coordinator for the first time.

Figure 3.2. Comparative Student Staff Ratios 2017 and 2018 for Cognate and Partner Schools



Note: Ratios for UQ are calculated using the FTE of T&R and TF staff and include casual staff based on figures from the previous year. The data for 2018 have been manually calculated and are not the official data generated by PBI as this is not yet finalised. Partners have provided approximately equivalent figures but advise that actual ratios vary considerably between individual courses and year levels, as well as according to content being taught so that a generalisation such as contained in this graph has limited validity. This is also true of the data for UQ schools.

Source: UQ Reportal, Student Staff Ratio, 5 Year Trend; Staff FTE, 5 Year Trend; Load by Faculty, Campus, School and Program, 5 Year Trend; and partner supplied data.

The School has also run a teaching internship scheme for RF staff from the institutes and other relevant sectors within the University. For each intake, about eight internships are available with staff committing to a two year period. Interns undertake a tailored version of the staff workshop series and are involved in courses appropriate to their area of expertise and receive ongoing mentorship from the relevant course coordinators. This scheme has benefited a number of postdoctoral staff from the institutes who have gained skills and experience in teaching that they would not otherwise have received and that may progress their career trajectories. Opportunities may continue for junior fellowship holders who wish to take advantage of the UQ Amplify Program. The success and opportunities provided by the SBMS scheme have been acknowledged by the senior executive at UQ and strengthen the School's contribution to the One UQ culture.

A major task for tutor coordinators in the School is to ensure that all tutors undertake generic training on teaching and learning practices including the facilitation of student learning. In addition, the responsible academic staff member for a particular practical also conducts specific training on

the practical, underpinning theory and assessment aspects of the class. Honours, PhD and medical students, and some postdoctoral staff contribute to tutoring in practical classes, with the level and experience of the tutors being selected based on the requirements of the particular class. The lead tutor will always be at least at the level of a PhD student. Tutor contributions to teaching and learning are recognised through the T&L awards managed by the Faculty of Medicine and assessed through the SETutor evaluation process.

The School uses Peer Assisted Study Sessions (PASS) for five large first year courses run by the School. PASS was introduced in 2018 to two of these courses, ANAT1005 and PHYL1007, as part of the revision of these courses (see 3.3.2). PASS leaders are required to participate in a one-day training school each semester, focusing on how to facilitate student learning and how to deal with various scenarios that may arise in the class, as well as receiving support from the professional staff to obtain the resources they require for the classes. Students selected as PASS leaders are high achieving students who have recently completed the course and are selected on the basis of both their academic performance and their attitudes to peer teaching.

3.6 Student Outcomes from SBMS Biomedical Sciences Courses

3.6.1 Retention Rates

The retention rate for the BSc for the biomedical science major is not easy to discern as students need not declare their plans until late in their programs, however, retention in the program as a whole averages 74%. In the former BBiomedSc/(Hons) programs, the retention rate of first year students averaged 83% with a retention rate across the whole program of 67%. The introduction of the 3-year BBiomedSc is expected to result in a lower attrition rate than from the former 4-year program when students changed programs to a shorter program for quicker entry to medicine. In 2017, the retention rate for first year students in the new BBiomedSc was 88%. This is close to a retention rate of approximately 90% reported by national benchmarking partners in 2017 though not as high as over 97% reported by Edinburgh for their biomedical sciences and medical sciences programs. The SBPF (referring to students who have completed more than 25% of their total course load in courses offered by the School) places the School in the upper half of all schools at UQ for this performance indicator.

3.6.2 Pass Rates

The mean pass rate (i.e. the percentage of students who obtain a passing grade and therefore receive credit for a course) for students in the BBiomedSc and former BBiomedSc(Hons) is typical for such a program (84.4% in 2013 rising to 87.7% in 2017) and comparable to that for the BSc (average of 85.3% over the same time span) and is not dissimilar to the average for all undergraduate programs in the University (89.6%). In comparison to the School's benchmarking partners, Sydney School of Medical Sciences report similar pass rates across their undergraduate programs, however, Edinburgh report a higher rate of over 93%.

Commencing students in the BBiomedSc generally achieve slightly lower pass rates than continuing students (3 to 4% below and up to 10% lower during the AQF8 program years). The pass rate for commencing students in the new 3-year BBiomedSc in 2017 is a pleasing 88.1%. International students in recent years have performed similar or better than the averages for all students.

The School's teamwork approach to managing occasions when pass rates fall in a particular course or within a program, has been discussed in 3.3.

3.6.3 Graduation Data

Graduations data for the programs relevant to the School are provided in Table 3.2.

Until 2016, the annual Graduate Destination Survey (GDS) polled graduates of bachelor's pass and honours degrees and results available to schools at UQ were grouped using the most relevant MyUniversity Field of Education. From 2016, the GDS has been changed to the Graduate Outcomes Survey (GOS) with core components of the questionnaire redesigned so that outcomes are not directly comparable to the GDS. The publically available data comparing performance in the biomedical sciences at UQ with other institutions are reported under the category Sciences & Mathematics, too broad to draw any true comparisons of ratings by students between institutions.

While survey responses for students at UQ specifically in the BBiomedSc(Hons) is low (n=16-18), the graduates who responded rated their foundation, adaptive and collaborative skills highly with ability to integrate knowledge, think independently about problems, develop relevant knowledge and work collaboratively with colleagues to compete tasks rated among the most highest. Development of numeracy skills and broader general knowledge were rated less well by the group (between 53% to 59% agreement).

Graduates (n=21) rated the program very highly in Overall Satisfaction (over 90% agreement), Generic Skills (over 95%) and Graduate Qualities (over 85%) while Good Teaching rated satisfactory (over 60%). Ratings by graduates on preparedness for job (n=18) was 61.1%. Several graduates advised there were no suitable jobs in their area of expertise and of these small survey numbers, 50% were in full time employment and 86% were in the labour force including a proportion who were also in further full-time study.

In the former version of the Course Experience Questionnaire, graduates (similar low response numbers of 19 to 25) reported similar ratings of 84-92% for Overall Satisfaction, 84-100% for Generic Skills and 68-88% for Good Teaching.

Referring to confidential data from two other interstate Go8 institutions, students in biomedical sciences at UQ rate their Overall Satisfaction and Good Teaching midpoint between ratings by students from these institutions, and Generic Skills at a higher level. The rating for Graduate Qualities is at a high level for all institutions. It must be reiterated these are based on very small data-sets for UQ and one of the other institutions. In the broad field of study area, UQ graduates had the highest full-time employment rates of Go8 graduates, well above the national average, and received the highest median salary.

Table 3.2 Graduating Students in Programs and Majors Relevant to SBMS

Degree	2013	2014	2015	2016	2017	2018
BSc	197	219	355 ¹	349	330	256
BSc & dual degree programs ²	30	25	16	23	29	23
BBiomedSc (3 yr) (2415)					20 ³	61
BBiomedSc (4 yr) (2286)	32	32	24	20	14	6
BBiomedSc (Hons) (2374)				15	16	26
BBiomedSc (Hons) (2423)						11
BSc (Hons) – SBMS disciplines ⁴	21	25	32	42	51	33

Notes: 1. This increase reflects the change in provisional entry to medicine that influenced the timing of completion of the BSc rather than an increase in students choosing the Biomedical Science major. 2. Sorted by declared plan 'Biomedical Science' and variations thereof – due to variations in how this is expressed, data may have minor inaccuracies. 3. Students who chose to move across to the new program from the former AQF8 program. 4. SBMS fields of honours are Anatomy, Biomedical Science, Developmental Biology, Drug Design & Development, Neuroscience, Pharmacology and Physiology.

Source: UQ Reportal: Awards by Program Level & Program, 5 Year Trend; Majors and Graduations – official data, customised report.

3.7 Teaching Quality

3.7.1 Student Evaluation of Course and Teaching (SECaT)

The SECaT survey instrument comprises two scales measuring students' perception of the course and teaching. Both scales culminate in Question 8 which asks for ratings of Overall Satisfaction. Question 7 measures the level to which the School is delivering a quality learning experience demonstrated by responses to the question 'I learnt a lot in this course'.

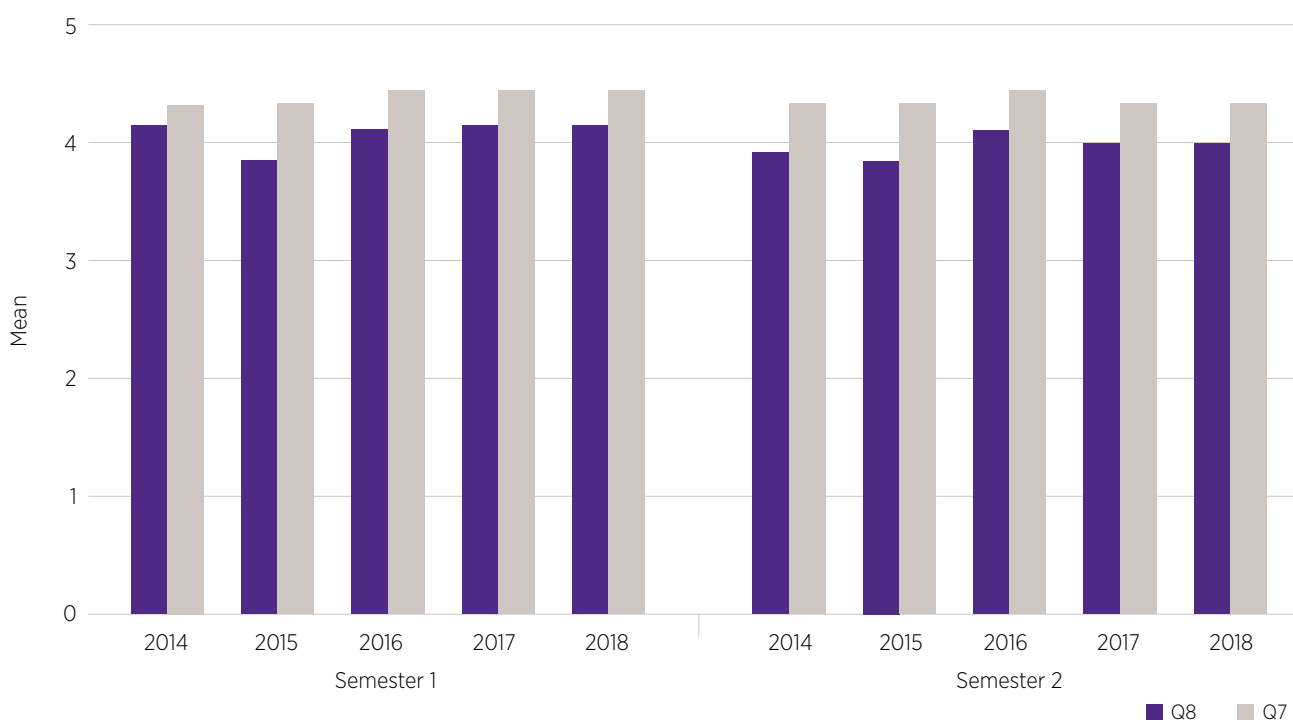
Figure 3.3 presents the average of ratings across all SBMS courses for both Questions 7 and 8. As can be seen, the School is rated strongly by students for both questions. Every semester there are only a few courses that rate less well and these are addressed by the T&L Committee in discussion with course coordinators. BIOM3200 is an example where poor ratings in 2016 and 2017 resulted in the establishment of a Working Party which substantially revised the teaching and assessment focus resulting in improved SECaT ratings. The course will undergo further changes for 2019, as it moves to blended learning delivery as one of the courses in the UQ2U Project (refer 6.4.4). Partner institution Monash, received similar or marginally higher ratings for their BBiomedSc using a similar 5-point rating scale (with a mean of 4.2 for 'Overall, I was satisfied with this unit').

3.7.2 Student Experience Survey (SES)

The SES, a national survey of higher education students, provides an additional comparator of quality of the student experience. Students commencing the new three year BBiomedSc program in 2017 rated the quality of their entire educational experience satisfactory (74%) and rated the quality of teaching, and learning resources higher (83% and 90%, respectively). Students in this program rated learner engagement and sense of belonging less well (57% and 50%, respectively).

Like the GOS, the only publically available data which can be used to compare graduate outcomes with other Australian institutions are at the broad field of study area Science and Mathematics which contains a mix of too many disciplines to be of any real value. Among Go8 institutions, UQ students in this study area rated among the highest in several indicators including Overall Quality of Educational Experience, Overall Teaching Quality, and Learner Resources and midpoint among institutions in other indicators. It is anticipated that these results would be reflected if data pertinent to biomedical sciences could be obtained.

Figure 3.3. SECaT Undergraduate Mean Responses to Question 8: Overall, how would you rate this course? And Question 7: I learned a lot in this course.



Note: Percentage of students who strongly agreed or agreed; average of the mean score for all courses on a 5-point scale.
Source: CTQA Dashboard and UQ Reportal SECaT School Course Report

3.8 Internationalisation

3.8.1 Internationalisation of programs

The University's Student Strategy focuses on opportunities for students to gain global competencies through internationalisation experiences. SBMS has already initiated and run for some years exchange agreements with prestigious international institutions, specifically for students in the biomedical sciences.

One example is an arrangement with Oxford University in the UK that provides three scholarships per year for UQ biomedical science honours students to attend Oxford and for Oxford masters students to undertake a project at UQ. A similar elite student exchange program has recently commenced with Ludwig Maximilians University (LMU) through the Munich Centre for Neurosciences (MCN) in Germany. It is proposed to develop further robust exchange programs with these and other international institutions, building on the experience gained from existing successful arrangements (see 6.8). These and related activities will be overseen by a new International Committee.

The University's Study Abroad program provides additional opportunities for undergraduate students studying the BBiomedSc program or majors in biomedical science in the Science Faculty to undertake an overseas exchange semester with a wide choice of institutions available. In 2016 and 2017, approximately 32 students in the discipline went on exchange to institutions across Europe, the UK and North America, among others. The UQ website on Careers and Employability provides more information on student exchange opportunities at UQ.

As noted in 5.3, the School's exchange agreements have also facilitated staff from partner institutions providing teaching in undergraduate courses in SBMS, such as second year cardiovascular physiology and third year neuroscience, and exchanges of SBMS teaching in anatomy and neuroscience at host institutions overseas. This not only deepens the international focus in coursework teaching but also strengthens the School's global reach.

3.8.2 International Student Profile (Coursework Students)

International students represent 17% of the total SBMS student body in 2018, a proportion that has remained relatively stable during the past four years. This is a much smaller percentage than 30% for the Faculties of Medicine and Science in 2018, however, it is comparable to national and international partners. In the BBiomedSc program specifically, SBMS has a greater proportion of international students (16%) than Monash (11%), while Sydney reports a percentage of less than 20% across all their undergraduate programs in the medical sciences. Edinburgh reports the same percentage as SBMS (16%) across their domestic undergraduate programs but this excludes students from elsewhere in the European Union. It is anticipated that the development of additional specific exchange agreements, discussed in 6.8, will assist in increasing the proportion of international students studying in the School. Table 3.3 sets out international EFTSL in SBMS by cohort group.

Students studying courses offered by the School come from more than 80 countries with some of the higher numbers of commencing students in recent years coming from China, Hong Kong, Malaysia, Singapore, Canada and the US (the latter mostly as a result of the agreement in the MD program with Oschner). In the BBiomedSc specifically, incoming students came from 23 countries in each of 2017 and 2018, with the highest numbers from China, Singapore and Malaysia. Since much of the School's EFTSL is associated with professional discipline teaching into other programs, the strategic directions of the schools and faculties who administer these programs also have a major impact on the international diversity in SBMS.

The percentage of commencing domestic students from a non-English speaking background has fluctuated from 3.8% in 2013 to 4.9% in 2017 and these students also often need additional support during their studies. After a slight dip in 2014/15, it is pleasing that their success ratio is again the same as that for all students in 2017 (the latest date that data are available; non-English speaking background data not shown).

The School works closely with marketing and communications staff to develop the most appropriate strategies for attracting international students into the biomedical science programs. Most international undergraduate students aim to return home to use their degree, unlike domestic students, who often view it as a pathway to enter medicine or a postgraduate allied health program. The flexibility of choice, including an array of dual degree programs, is a selling point to international students as well as domestic students.

Table 3.3 International EFTSL by Cohort Group

Program	2014	2015	2016	2017	2018 prelim
Undergraduate					
BBiomedSc 3 yrs (2415) ¹				10.0	29.5
BBiomedSc 4 yrs (2286) ¹	22.5	15.6	12.8	5.8	2.3
BBiomedSc(Hons) (2374) ¹		8.4	18.2	17.3	16.9
BSc & BSc duals excl MBBS	33.1	28.4	26.8	31.1	24.2
BSc Hons	5.5	5.6	8.5	8.0	10.0
MBBS & BSc/MBBS	115.0	12.0	0.7		
Other Bachelor Programs incl duals	82.6	88.1	98.8	92.9	101.9
PGCW programs					
MD		43.3	53.7	58.5	45.9
Other PGCW	12.2	4.0	3.0	2.0	6.1
Other					
Study Abroad	13.0	17.1	3.6	6.7	1.9
Non Award & Cross-Institution	0.1				0.5
Total International EFTSL excl HDR	284.0	222.5	226.1	232.3	239.2
Proportion of Total EFTSL	18.7%	15.6%	16.7%	17.1%	16.8%

Note 1: refer to 3.3.1 for an explanation of the changing structures of the BBiomedSc program
Source: UQ Reportal, Load by Faculty, Campus, School and Program, 5 Year Trend

Marketing career opportunities for graduates from the relevant programs across the gamut of science, such as in the pharmaceutical industry, policy development and research, and promoting the resources available across the School's high-tech facilities, are also ways to encourage international,

as well as domestic students, to study biomedical sciences at UQ rather than at a competitor institution. There are opportunities in the future to stress the advantages of the School's location within the Faculty of Medicine and improved interactions with the medical school and research institutes.

3.9 Student Equity

The School student body (i.e. those studying in courses offered by the School) has remained steady with 60% of the domestic cohort, and 62% of commencing students, being female in the past five years, higher than the University average (of 55%).

For the new BBiomedSc, the proportion is slightly lower at 56% for both cohorts (but still above that of the University in most years) and is typical for the discipline areas in Australia. In contrast, Biomedical Sciences at the Edinburgh Medical School report a much higher percentage of female students (70.5%) across their undergraduate programs.

Although the University has supportive systems in place to assist students with disabilities, there are few students reporting with a disability enrolled in School courses (less than 3% of the total School student cohort).

Like most programs at UQ, the number of enrolled students reporting as Aboriginal and Torres Strait Islanders is low with an access rate (proportion of commencing students) varying from a low of 0.7% in 2013 to a high of 1.3% in 2015 and 1.1% in 2017. This is not dissimilar to the proportion for the University as a whole which has risen from 0.9% in 2013 to 1.3% in recent years, but is much lower than desirable. Such low access figures are typical for the broader discipline group (Natural & Physical Sciences) in most Go8 universities in Australia. The success ratio of these students in the School is only slightly below that of the domestic cohort as a whole (ratio of 0.91 to 0.94 in the last 3 years).

The number of undergraduate students from low socioeconomic status backgrounds (SA1 as defined by the Federal Government and based on student's permanent home address) has remained steady at around 9-10% of the domestic cohort (with their access rate rising marginally in the last few years in which data are available). This is similar to the average for the University as a whole (9.6% in recent years) and the average reported by our international partner Edinburgh (9.5%). Access rates for the broader discipline group at other Go8 institutions vary above and below these figures. Success rates of these students again are close to those of the whole cohort (success ratio of 0.98) and the same as for this group University-wide.

Students studying in the School from regional and remote areas have remained steady, comprising typically just under 18% of commencing students, slightly higher than the percentage for this cohort at the University. Their success ratio is equal to or better than that of the cohort as a whole.

The School has identified the need to explore mechanisms for improving the recruitment and support of students from under-represented groups, supportive of the Faculty's strategic objective in this regard. This will be taken forward by the Equity and Diversity Committee (see also 6.6).

The number of undergraduate students from low socioeconomic status backgrounds has remained steady at around 9-10% of the domestic cohort.

3.10 Student Engagement

The School highly values opportunities to engage with a diverse student body resulting from large enrolments in SBMS courses and therefore engaged with the 'Student as Partners' approach early in its introduction at UQ.

A priority for the School is implementing the University and Faculty strategies to provide students with greater opportunity for experiencing meaningful extension activities and to enhance their employability, such as internships and global experiences, albeit at a scale that is feasible for such a large School. It is acknowledged that the large numbers of students studying in SBMS science courses is an impediment to rolling out comprehensive work-integrated learning (WIL) programs across the entire student body.

One solution is to encourage students to self-select opportunities based on their career trajectory. From 2018, changes to the capstone course (BIOM3200) allow students to focus their learning and assessment tasks to suit their chosen career option of research, clinical or industry and is one initiative to support the University and Faculty strategies to personalise the education process. Early experience has shown the majority of students (69%) have chosen a clinical focus with 14% completing the industry stream, and the remaining 17% completing the research stream. The School will continue to explore opportunities for WIL in industry for those students who are interested. The School's involvement of honours students as tutors provides a further opportunity for participants to enhance their employability.

To further support and encourage undergraduate students who are considering going on to postgraduate study, the School participates in the UQ Summer and Winter research programs with 10 to 15 students undertaking the Summer program in biomedical sciences and around five the Winter program each year. Offered through several SCIE courses, SBMS also hosts students from a range of programs to undertake a 6 to 8 week research project in a School laboratory during the summer semester or throughout semester 1 or 2. The SBMS Summer Dissection Scholarship program provides another opportunity for students to extend their technical skills and consider careers in this area.

Students are encouraged to complete the University's online employability course to learn how to best present their experiences, qualities and skills to future employers and enhance their opportunities of obtaining future employment. The School's International Postgraduate Symposium discussed in 4.4.3 is a further opportunity to encourage students and staff to widen their professional networks both nationally and internationally.

Other initiatives with a student focus include the new informal learning space in MacGregor, noted in 2.8.1 and the introduction of blended learning courses being rolled out and discussed in depth in 6.4. The latter are in addition to many initiatives already introduced across teaching and learning in recent years. The teaching pedagogy research being undertaken in the School, especially by TF staff, has as an end goal the enhancement of student learning and experience.

The School has a Student Academic and Social Society (SASS) that has operated for many years, discussed in 4.4.3, with membership open to honours, masters and PhD students in the School. In late 2017, the UQ Association of Biomedical Students (UQABS) was formed to better cater to the interests and needs of undergraduate students in biomedical sciences. Partnering with other clubs and societies including the UQ Premedical Society, the Chemistry Club and the Physics Club, UQABS attracted over 280 members in 2018 and finished the year by winning the best new club award at the 2018 UQ Clubs and Societies Awards event. The group held social events, academic events (Honours evening) and an industry networking night. The relationship between UQABS and the School has been deepening over the past year with the School drawing on group members to assist at various events and in return contributing towards some of their broader activities and inviting representatives to formal School functions.

To celebrate student achievements for the undergraduate cohort in the teaching disciplines, the School holds an annual awards evening, which is attended by the prize recipients and their families, staff and alumni. In 2019, the School will also participate in the Faculty's annual prize giving ceremony to showcase student achievement to a broader audience.

4. Discovery

4.1 Overview

SBMS academics undertake research in wide-reaching areas aiming to understand the fundamental biological mechanisms underpinning human health and disease, and to translate basic discoveries into clinical benefit.

The broad research aims (outlined in 4.2) are aligned with the Faculty of Medicine's active principles of (i) betterment of individual and community health, and (ii) embracing the full continuum from discovery to application. Although the vast majority of staff would classify their research area as fundamental or discovery research, at least 35% of T&R and RF staff have clinically related collaborations, several are participating in clinical trials, and many are undertaking preclinical in vivo investigations of candidate therapeutics.

Research in SBMS is multi-disciplinary and interdisciplinary and involves collaborations not only with clinical partners, but researchers in Public Health, Human Movement, Engineering and Nanotechnology, and with a range of industry and end users, albeit predominantly pharmaceutical companies. Collaborations external to the School that are currently active are highlighted in 5.4.

SBMS researchers have been very successful at producing significant fundamental and translational research outcomes (including publishing a majority of their research articles in high impact, tier 1 journals) and in obtaining a range of grant and fellowship funding to support their ongoing endeavours, averaging that of other Biomedical Schools in Australia. SBMS is in the top five in the UQ SBPF for category 1 research income per academic staff FTE (2017, based on 2016 figures, the latest for which data are finalised) and is placed second highest in the SBPF for holding nationally or internationally-competitive fellowships (15 in 2017), reflecting the high quality of staff.

Furthermore, staff have been recognised for their research excellence with a range of accolades, most recently the 2017 Lions Dunning-Orlich National Health and Medical Research Council (NHMRC) New Investigator Award (Dr Jana Vukovic), 2018 UQ Foundation Research Excellence Awards (Dr Sherry Wu, and Dr Kirsty Short – now in SCMB), 2018 UNSW Eureka Prize for Excellence in Interdisciplinary Scientific Research (Associate Professor Ethan Scott and UQ Optical Physics in Neuroscience team) and the 2018 Australian and New Zealand Stem Cell and Developmental Biology Society Emerging Leader Award (Associate Professor Mike Piper).

The Research Committee promotes and supports excellence in research and research training and provides recommendations to the Head of School on strategies to encourage high quality research and to grow the quality and impact of outputs. The Committee, together with the Professorial Advisory Committee and Executive Committee, held a Strategy Planning day in late 2018 which, in addition to work earlier in the year defining the School's disciplines and strengths (see 4.2), has helped to cement the basis of the future research strategy outlined herein. In particular, it is considered that now is an opportune time to set new aims, initiatives and targets.

The School's research themes and discipline areas acknowledge the breadth of teaching and research expertise within the School. Broadly, SBMS will continue to encourage individual academics to ask important questions, particularly at the intersection of disciplines, and to support them to undertake cutting edge and multidisciplinary research to address their questions, so as to build and strengthen biomedical sciences research broadly at UQ.

By supporting individual and collective excellence, the ability of SBMS researchers to lead and participate in quality collaborative teams will be enhanced. This is an advantage as funding is increasingly directed to multidisciplinary teams addressing large scale issues. Some key foci for the School for the future are outlined in 6.5.

4.2 Research Themes

The School's teaching and research spans seven disciplines (anatomy, pathology, pharmacology, physiology, cell biology, developmental biology and neuroscience, refer 3.3) with RF academics (generally fellowship holders) also contributing to teaching. Academic staff manage their own research programs using laboratories and other facilities within the School. Information relating to an individual's research can be found on the School's [Research webpage](#).

In addition, nine themes have recently been identified to capture and display the cross-disciplinary foci within biomedical sciences research that is currently undertaken at SBMS. They include:

- Cell Architecture.
- Chronic Diseases: Cancer, Cardiovascular Disease, Diabetes, Neurodegeneration.
- Drug Design and Development.
- Functional and Comparative Anatomy.
- Innovation in Biomedical Education.
- Musculoskeletal and Motor Control.
- Neurobiology and Brain Function.
- Receptors and Signalling.
- Reproduction.

These themes reflect several of the research strengths of the University as a whole and are well-placed to encourage the expansion of partnerships across the University. They are designed to be inclusive, yet flexible so as to evolve as staff turnover and/or their research areas change. Recent appointments have provided an opportunity to diversify and consolidate some of these themes.

The study of **Cell Architecture** (the structural makeup of cells and how molecules are trafficked and regulated within this complex environment) captures the research of two recent appointments to the School. Their work builds on research areas of existing staff, is a burgeoning field, and is closely related to the theme of **Receptors and Signalling**. The research of both themes is aligned with the Institute for Molecular Bioscience (IMB) with whom SBMS has close historical ties.

The theme of **Chronic Diseases** includes the research of many SBMS staff, who are discovering mechanisms of the causes and progression of long-lasting diseases or designing therapies to treat them. In particular, the School has critical mass in the study of neurodegenerative diseases (neuro-muscular disease including motor neuron disease

(MND), dementia, and traumatic brain and spinal injury), as well as congenic neurodevelopmental disorders, and brain cancers. Causes and treatments of cancer more generally is an emerging strength of the School, given new staff recruitment. Cardiovascular disease was a particular strength of the School, and drove the establishment of the UQ Centre for Cardiac & Vascular Biology which involves researchers from across UQ. However, recent departures from UQ have depleted the previous critical mass. New appointees might fill the gap or there might be a change in School focus.

Drug Design and Development is an area of strength in which the School has undertaken strategic recruitment and investment with a secondary aim of revitalising the pharmacology teaching and curriculum. There is critical mass of researchers designing and testing peptide-based drugs, and developing drug delivery methods. In addition, researcher-developed candidate therapies are being tested in preclinical animal trials. School facilities include mass spectroscopy, robotics and high-throughput analytical equipment for screening compounds and their actions, and in vivo animal expertise under the IPF umbrella.

The theme of **Functional and Comparative Anatomy** was cemented in 2017 with the recruitment of a Professor of Clinical Anatomy. Although the group is diverse, it is an area in which new technology is shifting teaching and research practice, and becoming more multi-disciplinary. There is now a critical mass of researchers in SBMS with the interest and expertise in DNA and skeletal forensic analysis for applications relating to crime, war or mass trauma. This is an area in which strategic support could further develop the sub-group as a novel theme, which is closely linked to the School's GAF.

Another subset of anatomical researchers forms the basis of the **Musculoskeletal and Motor Control** theme. In addition, this theme includes a number of physiology and neuroscience researchers interested in the neuromuscular junction, motor control and/or conditions that affect muscle function including MND and malignant hypothermia. This area has been identified as a key grouping for further development. Existing SBMS researchers already have strong collaborations with staff in Engineering and HM&NS.

Neurobiology and Brain Function is one of the largest themes in the School (winning six out of ten Australian Competitive Category 1 grants in 2019). This is partially due to the close association of SBMS with neighbouring QBI, in which a number of staff have either joint or affiliate appointments. However, the School's strengths in developmental, cell and molecular neuroscience, neurotrauma and neuroimmunology distinguish it from the research foci of QBI. Neuroscience is a University strength, which places SBMS, as the undergraduate neuroscience teaching school, as a highly desirable location for recruitment of high quality T&R staff.

The theme of **Reproduction** integrates the research of stem and germ cells, endocrine biology and foetal and maternal health. SBMS staff have close ties with the Faculty's clinically-based Child Health Research Centre in this regard.

Finally, the theme of **Innovation in Biomedical Education** grew out of the Education Research Unit which functioned from 2005, producing a record of highly regarded research papers and relevant grants. Many of the TF and T&R staff in this area of focus have received teaching accolades from UQ and externally. They are studying the science of teaching and learning, and implementing best practice.

4.3 Research Performance

4.3.1 Research Income

Research grant funding received by the School from 2013 to 2018 is portrayed in Figure 4.1. The data reflect the completion of several NHMRC grants in 2016/17 resulting in lower income from this source, as well as a decline in NHMRC project grants and Australian Research Council (ARC) Future Fellowships. However, this trend is being reversed with a growth in ARC Discovery Projects (including three awarded in 2018 and two in 2019) and eight new NHMRC grants secured for 2019 that are expected to bring in over \$5M. Successes may be attributed, in part, to initiatives by the Research Committee and Industry Engagement Committee.

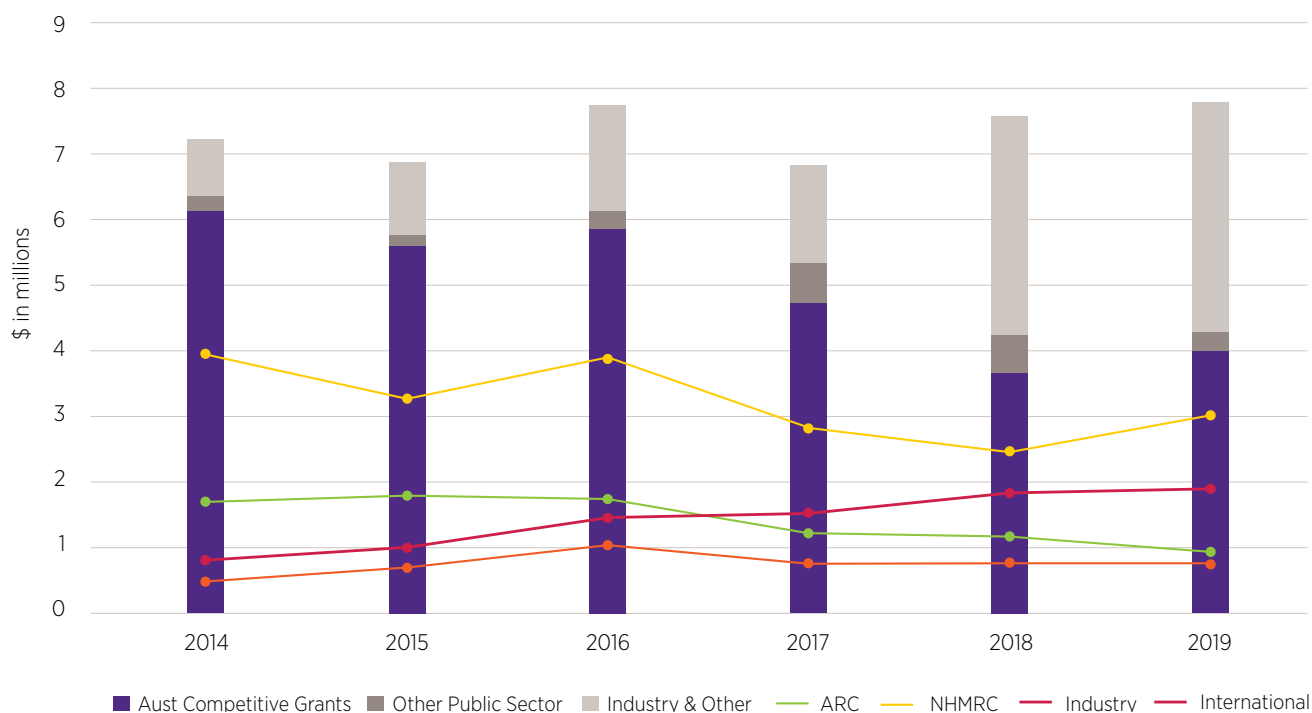
In keeping with the University and Faculty emphasis on securing non-federal government funding, the School has received almost \$1 million in funding under the Queensland Government's Advance Queensland Innovations Partnerships scheme and up to eight school staff receive funding from the MND Research Institute of Australia each year.

Evidenced in Figure 4.1, sources of income from international sources and especially industry have grown in recent years, consistent with UQ strategic priorities. This is partly the result of a change in School strategy to encourage academics to diversify their income sources, e.g. making researchers more aware of non-category 1 grant opportunities, from which part or full funding for research in unfunded applications could also be sourced.

The School's performance compared to other schools as reflected in the SBPF has been noted in 4.1 and the School has reached the University's stage 3 threshold in several KPIs, including the number of staff holding fellowships from nationally or internationally competitive grant schemes. As the NHMRC grant and fellowship scheme transitions toward an Investigator and Ideas grant program with a limit on the number of applications one can hold and apply for, the continuity of individual research funding from this source is likely to be a challenge. However, as the review of NHMRC Ideas grants will have a greatly reduced emphasis on track record, less experienced T&R academics may have increased competitiveness relative to RF peers.

In keeping with the University and Faculty emphasis on securing non-federal government funding, the School has received almost \$1 million in funding.

Figure 4.1. Research Income for SBMS by Source 2014-2019.



Note. 2018 uses Faculty estimates of amount by category. 2019 uses SBMS estimates of amount by category presuming similar amounts will be received in those categories for which little data is yet available. Prior to 2017, international higher degree research fees were also included within International income. From 2017 this has been discontinued and in Medicine, the Faculty has become the enrolling unit.

Source: UQ Reportal, Research Income, 5 year Trend, KPI Research Income Detail, 5 Year Trend, Faculty of Medicine Finance Unit estimates.

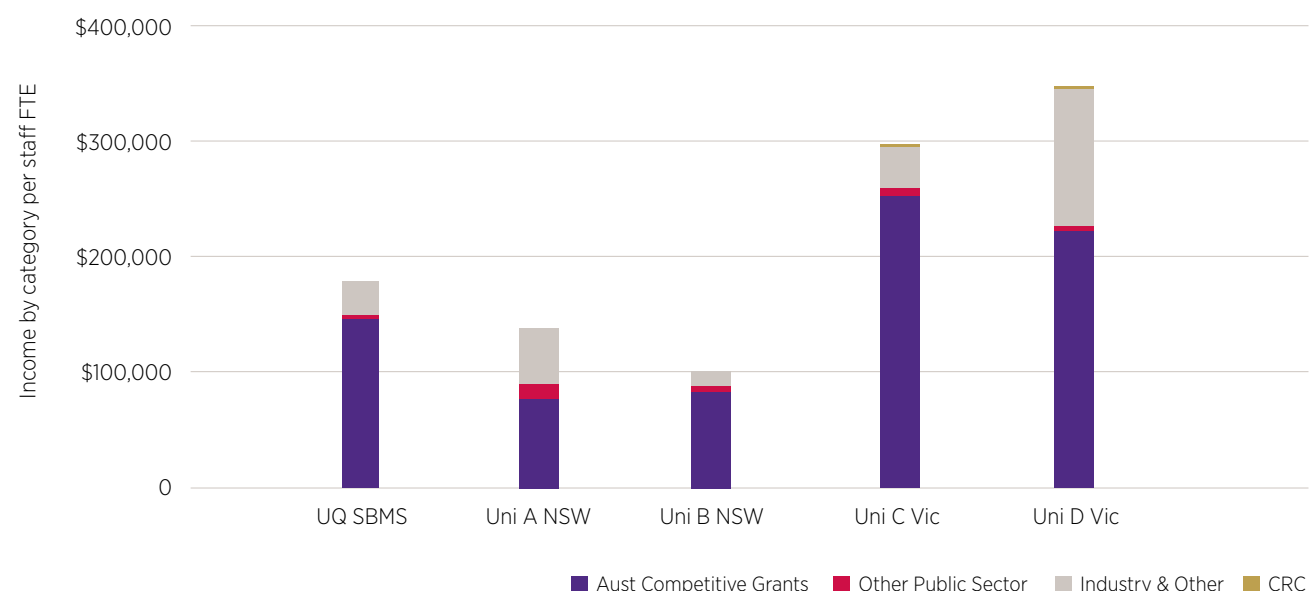
To retain high performing research staff, the University has introduced UQ Amplify, a program in which fellowship staff are offered two to five year fixed-term contracts with a 20 to 40% teaching contribution following the end of a fellowship. While this provides individual security in terms of salary, it does not address funding difficulties for a fellow's group.

The program also has a number of challenges for SBMS (and SCMB) as biomedical undergraduate teaching schools, given the surrounding six biomedical institutes and centres with predominantly fellowship funded staff, who would essentially require significant teaching opportunities under the scheme.

A further challenge is provision of laboratory space, as current School infrastructure is close to maximal, particularly given the design of the School's older buildings which are difficult to convert to shared laboratories where groups can expand and contract with changes in staffing due to funding.

Figures 4.2 and 4.3 compare income earned per academic staff member (including T&R and RF staff at level B and above) with the average for selected Go8 partners and cognate schools within the University.

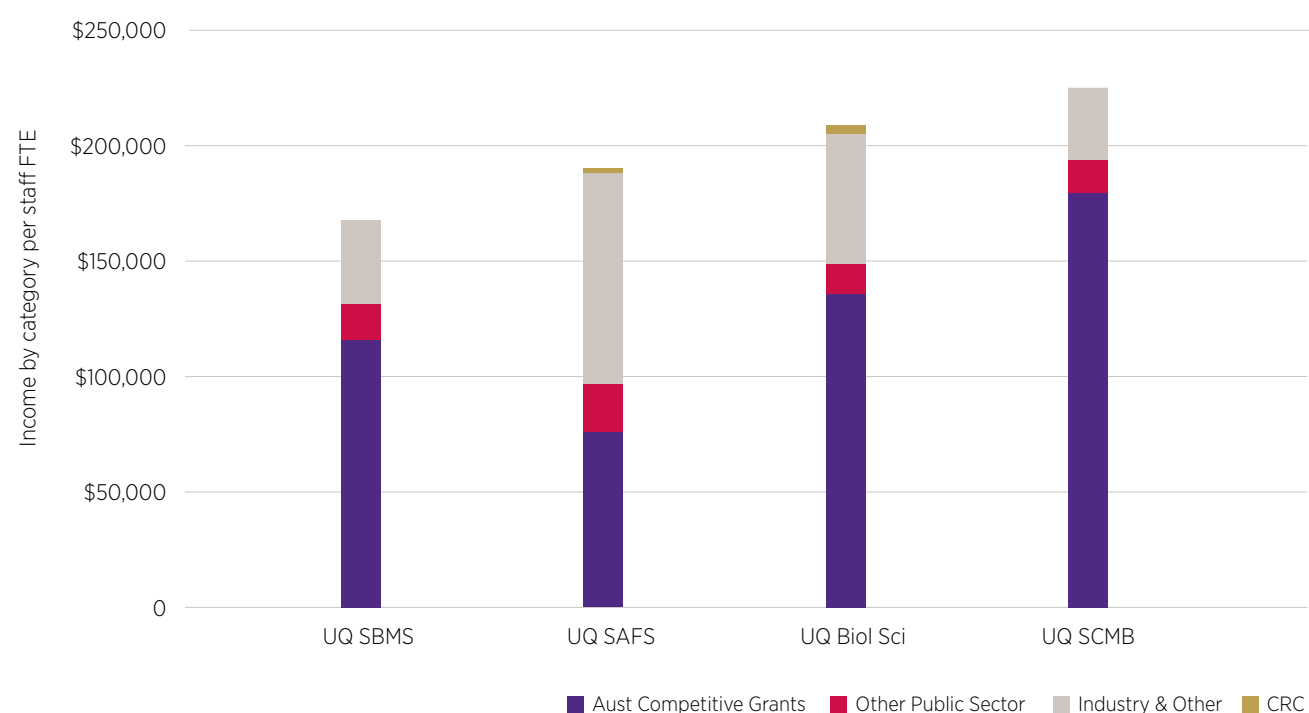
Figure 4.2. Comparative Research Income per FTE 2015 (Partner Schools)



Note: Research income for 2015 presented per academic staff FTE (T&R and RF level B and above) compared to selected Go8 partners (includes those departments most relevant within the selected partners).

Source: Go8 partner data supplied by UQ Research Analysis and Operations.

Figure 4.3. Comparative Research Income per FTE 2017



Note: Research income for 2017 presented per academic staff FTE (T&R and RF level B and above) and compared to other cognate schools in the University.

Source: UQ Reportal, Research Income per Staff Member, 5 Year Trend .

While the comparison data show that SBMS has room for improvement in this indicator and was behind cognate UQ schools in 2017 (Figure 4.3), in 2015 (latest year data are available for Go8 partners) SBMS staff attracted more research income per FTE compared to peers at cognate schools of biomedical sciences in NSW, although below the higher levels achieved by SBMS's Victorian counterparts (Figure 4.2). With the recent successes, it is likely this ratio will significantly rise from 2019.

Future strategies to regain an upward trend in research income, especially to maintain an upward trajectory in industry and other funding, include additional professional support and communication of opportunities (refer 4.3.4). Strategies are discussed further in 6.5. Reference to staff biographies on the [UQ Researchers website](#) provides information on their active grants.

4.3.2 Publications

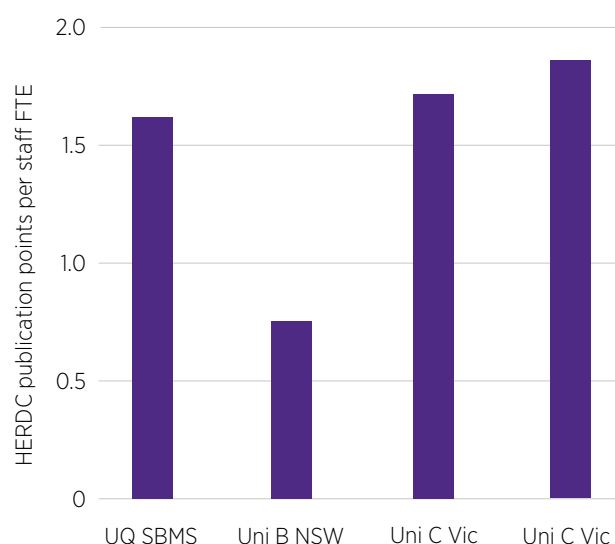
Staff in the School have a strong record of high quality, international research, especially in the disciplinary fields of neuroscience, cell and molecular biology, physiology, pharmacology, and developmental biology, which closely align with discipline areas and themes.

Since 2014, there has been a rise each year in the number of journal articles published, from 484 to 582 in 2017. Conference papers have declined during this time frame (possibly due to the change in School policy of staff needing to source their own travel funds). As typical for member disciplines, the publication of books is few. Although maintaining a strong publication output is important, quality is encouraged over quantity.

Figure 4.4 benchmarks publication output per FTE for 2014 using former HERDC publication points for selected Go8 institutions for which data were available. Though these data are somewhat out of date, they demonstrate that SBMS output per staff member was on par with the School's Victorian counterparts. Interestingly, the School's publication number was similar to that of interstate cognate schools, despite lower funding levels, indicating efficiencies. This is reflected in the comparison to schools within UQ using raw and more recent (2017) data (Figure 4.5), where the School's total output per FTE was higher than selected cognate schools.

Authorship on publications reflects the diverse range of collaboration that occurs across the School and with many external partners. As would be expected, publications featuring co-authors from the health and corporate sectors are represented and testify to the partnership approach that is a growing feature of research across the School. Further discussion of partnerships with national and international organisations are discussed in Chapter 5. Reference to staff biographies on the [UQ Researchers website](#) provides information on their recent publication output.

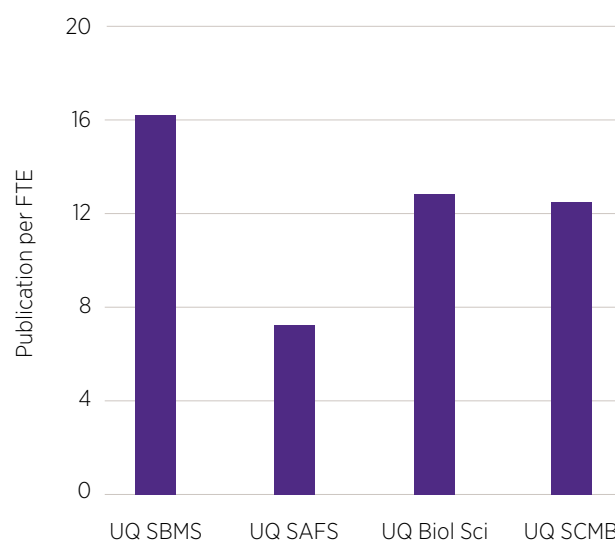
Figure 4.4 Comparative Publication Output per FTE 2014 (Partner Schools)



Note: Research publications presented per academic staff FTE (T&R and RF level B and above) for 2014 being the latest year that data are available from selected GO8 partners using the former HERDC Publications Points.

Source: Go8 partner data supplied by UQ Research Analysis and Operations

Figure 4.5 Comparative Publication Output per FTE 2017 (Cognate Schools)



Note: Research publications (books, book chapters, journal articles and conference proceedings only) presented per academic staff FTE (T&R and RF level B and above).

Source: UQ Reportal, Publications by Author Unit or Aurion Unit – Trend and Current

4.3.3 Research Quality and Impact

In 2010, the Australian Government introduced the Excellence in Research for Australia (ERA) initiative through the ARC. ERA assesses research quality within Australia's higher education institutions using a combination of indicators and expert review by committees comprising experienced, internationally-recognised experts. ERA is intended to support better research quality including detailing areas that are internationally competitive and pointing to emerging areas where there are opportunities for further investment.

In the last ERA exercise for which final data are available (2015 as the 2018 collection is still underway), the School's publication output contributed predominantly (more than 10%) to six subfields of research (FoR) at the four digit level, of which Neurosciences and Zoology received the highest rating of 5, Well Above World Standard, and the others received a rating of 4, Above World Standard (refer Table 4.1).

The spread of the historical contributions reflects the diverse focus of the School's disciplines. Nationally, the University rated slightly higher than the average Go8 rating for most of these FoR codes (or equal in Fisheries Sciences) and only just below in Medicinal and Biomolecular Chemistry which accounted for only 5% of the School's output. For those FoR codes in which the School has the highest output, ratings received were comparable to cognate institutions.

Research in the School contributes to several of UQ research strengths including in Biological Science, Cancer Studies, Clinical Sciences and Experimental Medicine, Medicinal Chemistry and Pharmaceutical Sciences, Molecular and Cellular Biosciences, and Neurosciences. Several of the School's identified research themes reflect these strengths and will progress partnerships with others across the University working in these areas.

Current and previous staff have published more than 2600 refereed articles in the past five years including in leading journals such as BJU International, Nature Communications, Journal of Neuroscience, Nature Neuroscience, Neuron, Nature Methods, Circulation, Blood, Cerebral Cortex, J Biological Chemistry, Frontiers in Pharmacology and others relevant to the disciplines.

While the quality of journals and their impact factors provide an indication of publication quality, citations provide an alternative measure that more directly reflects publications' value in the research community and the impact in their field. Note, however, that citations are topic specific and those publications in smaller fields will not attract as many. An analysis of the School's research publications by current staff, undertaken by the Library's Research Outputs and Impact Group and drawing on data from the Web of Science for the period 2013 to 2017 (analysed in InCites), found that over 15% of the 987 articles and reviews included in the dataset were in the top 10% of the world in terms of relevant citation impact with

Table 4.1 SBMS Top 10 Contributions to Fields of Research in ERA 2015

Field of Research (4 digit)	Apportioned weighted Outputs ¹	% SBMS Contribution to FOR ²	% SBMS Output ³	UQ (=ERA) Rating
0606 – Physiology	124.9	31%	7%	4
0704 – Fisheries Sciences	63.4	16%	4%	4
0601 – Biochemistry and Cell Biology	328.5	15%	20%	4
0608 – Zoology	189.3	12%	11%	5
1109 – Neurosciences	144.2	10%	9%	5
0304 – Medicinal and Biomolecular Chemistry	81.2	10%	5%	4
1115 – Pharmacology and Pharmaceutical Sciences	117.0	8%	7%	5
1107 – Immunology	50.6	8%	3%	5
1112 – Oncology and Carcinogenesis	41.0	3%	2%	5
1103 – Clinical Sciences	154.8	3%	9%	5

Notes: 1. Publication output apportioned to this FoR code for SBMS. 2. Percentage of apportioned weighted output that SBMS contributed to the total weighted output from across the University towards the listed FoR. 3. Percentage of apportioned weighted output by members of SBMS in each of the listed FoR. 3. Source ERA 2015 Top 10 Outputs by Org Unit.

a h-index of 42 for the respective data set; 62.8% were in the top quartile (Q1) journals. Of these, 39% involved international collaborations from a diverse range of countries reflecting UQ's global reach, with the highest number with institutions in the USA, UK and China. These, and several other countries on the SBMS collaborators list, are among the priority countries identified in the recent University Global Strategy.

SBMS current staff have demonstrated capacity (greater than 50 publications) and research excellence (a Category Normalised Citation Impact greater than 1) in six Web of Science subject categories: Neurosciences, Biochemistry & Molecular Biology, Pharmacology and Pharmacy, Cell Biology, Developmental Biology, Physiology, and Endocrinology and Metabolism which overlap with the School's identified research themes and strengths.

4.3.4 Research Support and Culture

The Medicine Faculty has a research office dedicated to supporting both research staff and HDR students. The Associate Dean (Research) and administrative staff provide advice to staff on external research funding schemes as well as facilitating integration of research across members of the Faculty, and with external partners. Internal grant rounds funded by the Faculty and designed to provide seed funding or support other strategic activities, are available on a competitive basis throughout the year. The School's appointment of a Research Development Manager (see 6.3) is intended to promote and enable larger multidisciplinary grant bids, and in parallel, to ensure the diversity of funding opportunities for individual academics is communicated and can be facilitated.

The School also operates small internal schemes to support new ideas, collaborations, and expedite ongoing research. In 2018, for example, two schemes were available to encourage collaboration, increase the capacity and quality of future research grants, and increase the profile of SBMS researchers and SBMS as a place to undertake research. These were an intra-SBMS Collaborative Grants Scheme (five grants of up to \$10,000 each) and a SBMS Research Committee Small Grants Scheme (each one of up to \$5000 to the limit of available funds). These will continue in 2019.

The University holds an extensive range of workshops and other research events on a regular basis to provide information and support to researchers, many with a particular focus on developing early career researchers, including industry forums and briefings that highlight emerging opportunities for collaborations through UniQuest (UQ's commercialisation company) with major multinational companies. UniQuest's 'Commercialisation Bootcamp' is a popular annual event. Other workshops provide advice on writing successful grant proposals and publishing strategies. Central activities are supplemented by Faculty and School specific events, such as the SBMS Industry Forum (noted in 5.4), the International Postgraduate Symposium (see 4.4.3), annual grant pitching sessions for SBMS staff, and Faculty grant readership schemes.

Staff are encouraged to identify with one of the newly developed research themes in the School and network with peers to develop collaborative grant applications as well as provide, and receive, support and mentorship, especially more junior colleagues and HDR students. Chapter 2.5.2 has discussed mentorship and support provided to staff in more detail.

4.3.5 Research Facilities

The School is currently reviewing space management with a view to reducing duplication of facilities and equipment when these can be shared appropriately among several groups or communal access can be provided. A rolling schedule of refurbishments has resulted in significant upgrades of several research areas, with more to follow. Recent refurbishments are discussed in 2.8, while future plans for research space and facilities are outlined in 6.2.3.

4.3.6 Commercialisation and Consultancies

Much of the research coming out of the School in the past few years is anticipated to translate into direct benefits to the community, such as improved treatment options for neurodegenerative diseases like Parkinson's, Alzheimer's, Huntingdon's and MND. Staff may act as consultants for industry, governmental agencies and non-government organisations (NGOs) and conduct contract research work on behalf of industry partners. ARC-Linkage grants (a scheme that pairs university research with industry or government agencies for targeted translational outcomes) form a small but steady component of research activity.

Several research outcomes are in the process of being commercialised through partnerships with global pharmaceutical companies such as Alsonex Pty Ltd, Ultrageny Pharmaceuticals, Pfizer, AstraZenica and others. Several patents have been filed in recent years, within Australia and overseas, mostly within the theme of Drug Design and Development, targeting specific disease conditions or other improvements that will lead to improved health and wellbeing. Several of these are subject to commercial-in-confidence agreements. Others, where relevant, are at clinical trial stage.

The Faculty's intent to encourage greater partnerships across the health sector and with other institutions in south-east Queensland to link academics and researchers is strongly supported by the School, and will build upon those linkages already in place.

While there is evidence of commercial sector engagement, there is considerable scope for expanding these interactions and strengthening links between innovative research in the School and industry. Chapter 5 provides a more detailed discussion of the School's broader engagement activity, while 6.7 discusses ways to extend opportunities for industry engagement.

4.4 Higher Degree Research Training and Outcomes

4.4.1 Student Profile

Since 2017, the School is no longer an enrolling unit for HDR students. This makes assessing the School's performance in this area difficult and figures presented for 2017 and 2018 in this document are based on manual in-house records and EFTSL data provided by the Faculty of Medicine (the enrolling unit).

The number of HDR students steadily rose to a peak in 2015 and thereafter new enrolments have declined as indicated in Figure 4.6, although with 22 new enrolments in 2018, and new staff being appointed during the year, 2019 should see an improved position. The decline in total EFTSL and head count evidenced between 2016 to 2017, reflects student enrolments transferring to the Faculty of Medicine One Enrolling Unit and QIMRB and MRI-UQ students previously enrolled through SBMS, no longer included in the School EFTSL. No downturn in domestic enrolments are being reported by partner institutions.

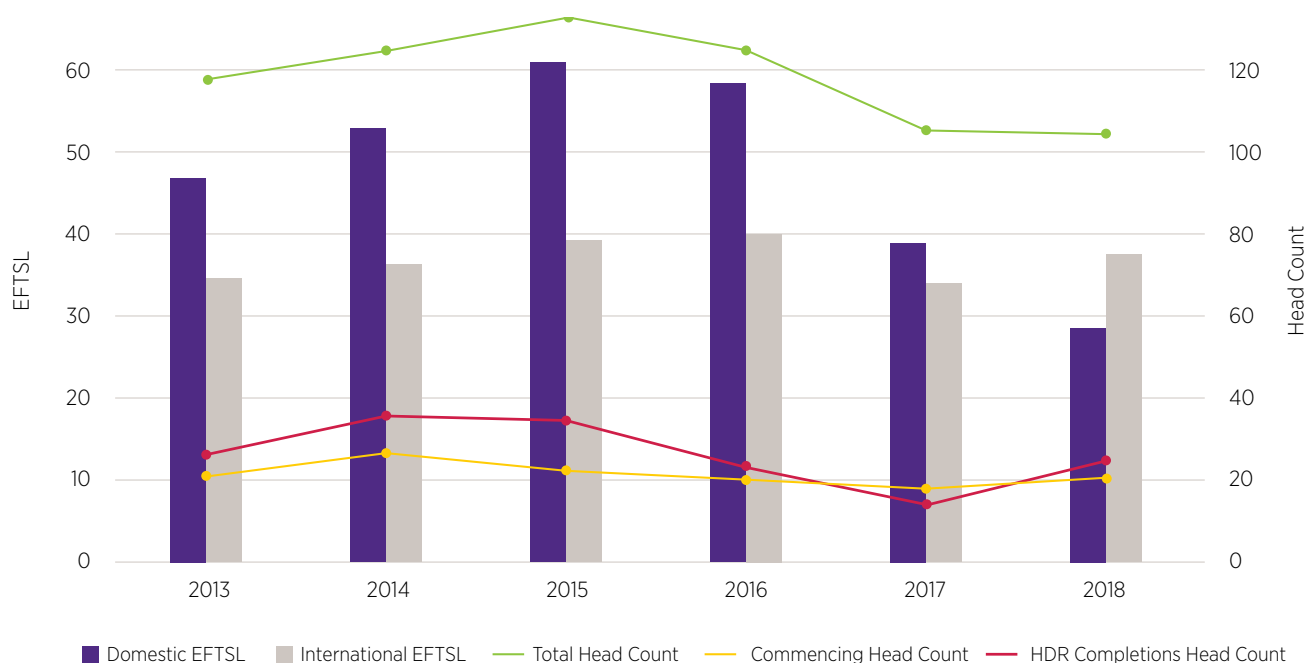
The gender balance is approximately equal (females in 2018 comprised 51.4% using head count) and almost all candidates are enrolled full-time in a PhD (all but one student in 2018).

The School has considerably fewer HDR students than some cognate schools although the proportion of international students is similar. As a result of the very high undergraduate EFTSL, the ratio of HDR EFTSL to total EFTSL is low relative to some other schools (i.e. 6.8% in 2016, the last year that the School was an enrolling unit).

While an enrolling unit, the percentage of students in extended load had reduced significantly from 11.3% in 2013 to 2.4% in 2016 and the School was in the top ten schools in the University in the SBPF for this indicator. The 2017 introduction of fees for domestic students who exceed their scholarship funding (for a maximum of four years for a full-time PhD), has provided added incentive for students to complete on time.

A trend for enrolments from international students to slowly increase has reversed in recent years. International enrolments had averaged 41% (as measured by EFTSL) but enrolments have slowed with approximately only 6 new international enrolments commencing in each of the last three years.

Figure 4.6 HDR Enrolment Trends 2013-2018



Note: HDR head count refers to any HDR student supervised or co-supervised by SBMS staff regardless of the %. Since 2017, student enrolment has transferred to the Faculty of Medicine One Enrolling Unit. QIMRB and MRI-UQ students previously enrolled through SBMS are no longer included in the EFTSL.
Source: UQ Reportal, HDR Load, 5 Year Trend; Whole Year Enrolments, Summary 5 Year Trend (customised reports and manual evaluations); HDR Awards, 5 Year Trend; in-School spreadsheet and Faculty of Medicine provided figures.

During the past five years, students have come from 24 countries from around the globe. The School has taken advantage of initiatives, such as the Chinese Scholarship Council-UQ Scholarship; however, there is scope to market opportunities more proactively. The Masters in Human Biology exchange program with LMU that commenced in 2018 has resulted in the first completing student continuing to undertake a PhD at UQ. Similar programs may be an ongoing source of future students, albeit in small numbers.

The average supervisory load in SBMS had steadily increased from 1.9 in 2013 to 2.6 in 2016 but this has fallen subsequently, mostly due to the removal of EFTSL from students now enrolled in QIMRB and MRI-UQ, but also reflecting a small decline in domestic enrolments. Loads are generally shared across all staff.

Figure 4.7 compares HDR load per FTE in 2017 with cognate schools at UQ. The load being carried by SBMS is below that of selected schools. However, the 2017 SBMS figure of 1.76 is similar to or higher than that reported by national and international cognate schools for 2015 (the latest year their

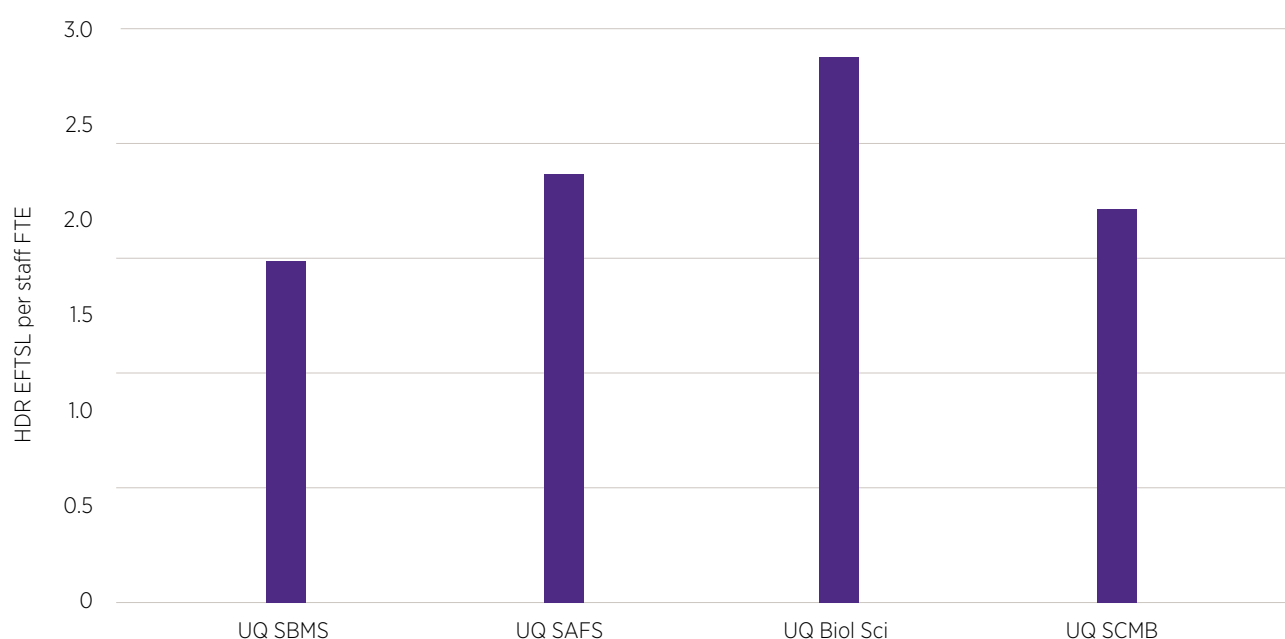
data is available). Discretionary funding available to staff in the School has changed in recent years. While it has always been UQ policy that staff demonstrate that they have funding available to support a PhD candidate, for some staff this has had an impact on their ability to take on students.

The School's future focus for growing HDR enrolments include new partnership arrangements in train and discussed in 6.8. Much of this effort will be coordinated from 2019 by the new SBMS International Committee.

4.4.2 Completions

The School graduated 24 HDR students in 2018. Completions per staff FTE have been higher than the School's interstate comparators (given the latest available data in 2015 with 0.54 completions per FTE in SBMS compared to figures of 0.41 or lower for interstate partners). The small percentage of students in extended load has previously been noted and will continue to be monitored so that this percentage does not increase.

Figure 4.7. Comparative HDR EFTSL per FTE 2017 (Cognate Schools)



Note: Comparison of HDR load per academic staff FTE T&R and RF level B and above compared to selected cognate schools for 2017, the latest year official data is available. Source: UQ Reportal, HDR Load per Staff Member, 5 Year Trend and Faculty of Medicine supplied data

4.4.3 HDR Administration and Support

As noted in 4.4.1, the Faculty of Medicine is the enrolling unit for HDR students and therefore is responsible for managing and implementing the University's Graduate School processes. This includes the Milestone Policy, a four-stage process to enable students to articulate their research to colleagues and peers and assist students to successfully complete their studies within the prescribed time frame. The Faculty also provides computing resources to support HDR students so that there is equity across the Faculty.

While the School essentially has a Postgraduate Coordinator (PGC), as is consistent across the University, these are unofficial positions known as Directors of Research Training (DRT) in the Faculty of Medicine. This has led to problems centrally, both in delays in communication and a lack of a voice for a School with a large HDR cohort. Research administration staff are now appointed directly to the Graduate School under the ESS process mentioned in 2.6 and deployed to the Faculty to provide support and advice to advisors and HDR candidates. The School maintains a record of its HDR students to facilitate management by the DRT.

The School has its own Postgraduate Committee, chaired by the DRT, to guide the School in the development and maintenance of strategies to promote and support excellence in research training. This includes monitoring the quality of supervision; providing guidance and pastoral care; providing advice to ensure students adhere to a realistic budget and that adequate funding is available for their project; and providing mentoring when problems arise. The Committee includes three postgraduate student representatives. In recent years, the focus has been on providing students with academic and social support. The Chair sits on the Faculty Higher Degree Research Committee which has a more strategic Faculty-wide focus.

The majority of students are housed in the School as a cohort group adjacent to their associated laboratories and supervisors; the trend has been for several cognate groups to house their students together. This facilitates supervision and support and develops student collegiality.

The Faculty provides each student with a dedicated UQ-supported desktop computer if required or funding towards the purchase of a laptop. Students and staff have access to an extensive range of training options provided through the Graduate School Career Development Framework (students) and Advisor training (staff).

Consistent with UQ policy, it is expected that a supervisor can demonstrate that they have sufficient funds to support a student's project before they can be accepted as a HDR candidate. The School currently provides a small subsidy of \$3000/HDR student and \$1500/honours student

annually to help meet the costs of their research. These allocations are determined annually in light of the School's budgetary position.

HDR students in the Faculty of Medicine are eligible to receive travel scholarship funding of up to \$2800 during their candidature once they have passed their Confirmation Milestone. These funds may be used to present at conferences or to advance their research projects (e.g. through visiting another research group or attending specialised workshops). Students are encouraged to apply for other travel scholarships such as those offered through the Graduate School or from external sources.

HDR students participate in the life of the School through representation on the Postgraduate, T&L, Space and OHS committees and participation in research group meetings, reading groups, and research seminars. There is a formally-constituted SBMS Student Academic and Social Society (SASS) that provides an avenue for students to network and support each other, as mentioned in 3.10. The Society organises social and career development events for students including workshops and seminars to help the transition from a HDR student to a postdoctoral researcher. Social events are designed to encourage engagement with other students and staff and include trivia nights, barefoot bowls, and wine and cheese events.

The Faculty has also established a HDR Student Committee (that includes SBMS student representation) to enable HDR students to contribute to decision making at a Faculty level, improve professional development and enhance the student cohort experience.

A flagship event is the SBMS annual International Postgraduate Symposium in Biomedical Sciences which aims to expose HDR students and their supervisors to biomedical research across the globe and encourage networking. Presentations are given by staff and students from SCMB and cognate UQ schools and institutes, as well as by visiting national and international guest speakers, many from partners associated with the School's exchange activities.

At the 2018 Symposium, these included international staff from the University of Oxford, University of Otago, Ludwig Maximilian University of Munich (LMU), Guangzhou Institute of Biomedicine and Health (GIBH), and Uppsala University and staff from Monash University and UNSW. Students from partner institutions are also invited to participate. The Symposium, which has run for nine years, has served as a valuable catalyst for facilitating collaborations and developing staff and student exchange programs (with more in train, refer 6.8).

5. Engagement and Advocacy

5.1 Overview

The development of productive partnerships with all stakeholders, across the dimensions of both education and research, is central to the University, Faculty and School strategic plans.

The Faculty of Medicine's Strategic Plan includes strategies to more purposefully attract, develop, retain and replenish its research body, including improving the Faculty's capability for collaboration. In education, providing more meaningful extension experiences for students, as well as developing further education support to alumni, academic title holders and practicing clinicians, are two of several strategies that inform engagement policy. The School is contributing to the working parties developing mechanisms to progress these aims.

SBMS has also introduced initiatives that further these aims at a local level, discussed in the relevant chapters in this submission. These strategies reflect those within the University's Strategic Plan and recent Global Strategy, especially medium-term foci such as to build engaged and strategic partnerships with a broad range of local and global networks, to enhance research by improving collaborations to achieve greater impact, and to transform the student experience through a flexible, integrated and partnered learning environment. The School plans to build on its established partnerships, particularly with industry and several identified international institutions, to progress these aims further (see below and discussion in 6.7 and 6.8).

5.2 Alumni Engagement

The School, like many others with a diverse cohort in the sciences, faces difficulties in maintaining engagement with graduates from the bachelors' programs.

This is true even for the BBiomedSc since so many students have used this program as a pathway to another health program with which one presumes, they more closely identify, and students identify with at least two schools while undertaking this program.

Research groups maintain contact with many of their HDR graduates, many of whom who have moved on to positions in academia, industry and government. The School will be working with the Faculty of Science Advancement Office as well as with the new UQABS, as noted in 6.7.2, to build better relationships with its biomedical sciences alumni.

5.3 Academic and Professional Engagement

Within the University, SBMS engages with many schools, faculties and institutes through its teaching and research activities.

In the dimension of teaching and learning, and as previously noted, those with whom it has closest ties include the Faculties of Medicine and Science through teaching into the BHthSc, MD, BSc and BAdvSc(Hons) programs; and with SHRS, HM&NS Nursing, NM&SW, Dentistry, and Pharmacy, through contribution to professional degrees in the Faculty of HaBS.

School staff regularly serve on University committees (including the Academic Board Standing Committee; appointments, confirmation and promotions committees across the University; fellowship committees; Faculty Animal, and Human, Ethics Management Committees; and the UQ Institutional Biosafety Committee) and participate in University-wide initiatives (e.g. recent initiatives such as Athena-SWAN SAGE pilot, Women in Science, the UQ Global Leadership series, and various UQ Enhancing Systems and Services and ITaLI projects). The School is well represented on all committees of the Faculty of Medicine. Several members of staff have extensive leadership experience within the University, e.g. Professor Kaye Basford, a former Head of School and President of the Academic Board and Professor Wally Thomas, also a former Head of School and Acting Director of the Diamantina Institute.

Research collaborations are equally widespread. There are especially close links between the School and the research institutes, notably IMB, QBI and the Australian Institute for Bioengineering and Nanotechnology (AIBN), as well as with centres within the Faculty of Medicine including the UQ Centre for Clinical Research (UQCCR), The Diamantina Institute, the Child Health Research Centre and the Mater Research Institute-UQ. These collaborations result in shared HDR student supervision and joint research grants and resulting publications. There are some affiliated and joint positions, although these were not supported by the previous Acting ED (who felt that such collaborations were covered under the One UQ policy).

Research collaborations are equally widespread. There are especially close links between the School and the research institutes, notably IMB, QBI and the Australian Institute for Bioengineering and Nanotechnology (AIBN), as well as with centres within the Faculty of Medicine including the UQ Centre for Clinical Research (UQCCR), The Diamantina Institute, the Child Health Research Centre and the Mater Research Institute-UQ. These collaborations result in shared HDR student supervision and joint research grants and resulting publications. There are some affiliated and joint positions, although these were not supported by the previous Acting ED (who felt that such collaborations were covered under the One UQ policy).

Nationally, members of the School are collaborating on NHMRC and ARC-funded projects with Monash University, the University of Sydney and until recently the University of Melbourne, as well as with institutes such as The Murdoch Children's Research Institute and the Florey Institute of Neuroscience and Mental Health. Individual staff also collaborate with colleagues across Australia, with significant co-publishing institutions including the Baker Heart and Diabetes Institute, Charles Darwin University, Griffith University, James Cook University, La Trobe University, QIMR Berghofer Medical Research Institute, QUT, RMIT, University of Melbourne, UNSW, University of Sydney, University of Adelaide, and University of Western Australia.

Internationally, staff networks encompass collaborators from around the globe exemplified by productive relationships (nine or more joint publications in recent years as advised by the Library's Research Outputs and Impact SBMS Publications Analysis) with staff from the MD Anderson Cancer Center at the University of Texas, State University of New York (SUNY) Buffalo, US Department of Defense, Mayo Clinic, Simon Fraser University, University of Nantes, University of Cambridge, University of Birmingham, University College London, Yeungnam University, Hanyang University, Xi'n Jiaotong University and the National University of Singapore.

Staff have established similar research collaborations with colleagues from schools across the University.



The School also has strong partnerships with Otago, Oxford, and the MCN, LMU, and TUM (Technical University of Munich) in Germany, as a result of several student and staff exchange arrangements. These have embedded a global focus into the undergraduate programs and encouraged research collaborations. The agreement with Otago, for example, has resulted for several years in presentations from Otago staff and their HDR students at the SBMS International Postgraduate Symposium and reciprocal presentations by staff and HDR students from UQ at Otago's equivalent Symposium (see 4.4.3). This has facilitated research collaborations including joint seeding grants to drive these partnerships further.

Likewise, the arrangement through MCN has provided for international staff from TUM and LMU to teach into senior neuroscience courses, present at the Symposium and engage in other scientific exchanges. Twelve Munich delegates attended the QBI-MCN 2018 Symposium to facilitate the mutual scientific exchange between QBI/SBMS and MCN. Other key collaborating institutions include Harvard University, University of California, Oxford University, the Technical University of Denmark, the University of Uppsala and the Chinese Academy of Science.

School members contribute to their professions as journal reviewers (including leading journals for the disciplines); members of editorial boards, NHMRC and other national and international body's grant review panels, conference program and organising committees, and thesis examiners; invited keynote and plenary speakers; serving as ARC ERA Discipline Experts; and many other related activities.

As expected, staff hold leadership roles in their relevant professional organisations at local, national and international levels and several are represented at the highest level in Australian and overseas learned and professional bodies, while others have received awards that recognise their contributions to their profession and/or the community.

For the past decade, the School has partnered with external groups to offer professional development courses for medical (and formerly allied health) practitioners, on a fee basis, conducted within the School's GAF (as noted in 2.8.3). Currently active and highly subscribed is an Advanced Surgical Anatomy Course, jointly offered by UQ and Queensland Health (QH) and accredited by the RACS.

5.4 Partnerships with Government and Industry

The School's major engagement with government is through QH, with extensive collaborations with staff from QH local and regional hospitals, as well as several interstate. In this regard, several staff hold affiliate or visiting positions.

Staff are well represented on several hospital research committees and routinely share their expertise via workshops and presentations to groups of health professionals, such as the nursing profession, REI trainees and GPs.

Engagement with industry has generally developed through one or more research activities, often in collaboration with the University's research institutes. Research outputs have influenced relevant government policies and led to commercialisation of products to the benefit of the wider community. As discussed in 4.2, the recent identification of nine research themes that cut across disciplines aims to facilitate greater cross-disciplinary collaborations and partnerships with government, industry and non-government organisations (NGOs).

Examples of some successful industry partnerships, many of those in the biopharmaceutical and biotechnology areas, that have had impact either through commercialisation or influence on government policy, include:

- Alsonex Pty Ltd, a biopharmaceutical company founded in 2014 from research undertaken by Associate Professor Trent Woodruff's group and focusing on the development of new treatments for neurodegenerative disease with the most advanced project developing a new treatment for MND. In 2017, Woodruff and CEO Dr Alan Robertson received a UQ 2017 Partners in Research Excellence Award.
- Filing and licensing of several patents for a new approach to treat epilepsy and MND with Ultragenyx Pharmaceuticals (Associate Professor Karin Borges' research group), including leading successful clinical trials at two major Australian hospitals with funding from industry, the Epilepsy Foundation (USA) and the Thrasher Fund (USA) to trial new metabolic treatments in adults and children with epilepsy. Ultragenyx is currently testing this discovery in a trial with MND patients in the USA. A large international phase III trial is being planned in adults with epilepsy at the Mid-Atlantic Epilepsy Center and several Melbourne hospitals.
- Collaborations with CSL Behring progressing to a Phase I Clinical Trial of a drug to attenuate harmful inflammation for patients with acute spinal cord injury, being conducted with the collaboration of clinicians at PAH (Associate Professor Marc Ruitenberg's research group).

- Development of drink supplements to reduce the adverse effects of chronic stress with Leopa Biohealth Pty Ltd (Associate Professor Nick Lavidis' research group). Having completed the first stage of development (Formula 42), through Uniquet a licence has been signed with Leopa for the commercialisation of the formula with human trials commenced in 2018.
- Research into the study of giant manta rays and the impact of fishing activity and climate change, and other shark and ray-related research funded by the Marine Megafauna Foundation, the Manta Trust, Reef Check Australia, Austral Fisheries among many others, mostly NGOs; the former research involving collaborations with the Centre for Applications in Natural Resource Mathematics in the School of Mathematics & Physics and CSIRO (Professor Mike Bennett's research group). One outcome of related research in Chile (2015) funded by the Chilean Government resulted in country-wide changes in fisheries legislation in order to protect the sustainability of commercially important skate species.

The School has actively taken advantage of UQ's partnerships with global pharmaceutical companies Pfizer and AstraZeneca undertaking collaborative research in several areas. Other examples of industry and government organisations who have partnered with SBMS staff in recent years, funded research projects or with whom staff have consulting agreements include AIBL, Air Aroma International Pty Ltd (Japan), Allergenix, Amaron Bio, Avalyn Pharma (USA), CSIRO, CTI BioPharma, Implicit Bioscience Ltd, Neuro Aroma Laboratories Pty Ltd, Neuroscint Pty Ltd, QUE Oncology, StarPharma Ltd and Takeda Australia. Emeritus Professor Maree Smith, inaugural Director of the Centre for Integrated Preclinical Drug Development (CIPDD), has an outstanding record of industry partnerships and commercialisation activity through TetraQ (developed while she was in the School of Pharmacy).

In 2018, the School formed an Industry Engagement Committee, formerly a subcommittee, to promote an awareness of opportunities for industry engagement across the School. A successful Industry Forum was held in November 2017 featuring presentations from Starpharma and CIPDD on industry needs and tips for obtaining industry partnerships and funding; Uniquet on commercialisation processes and opportunities through UQ; and SBMS staff on success stories from within the School. A similar forum is planned for 2019 while in 2018 staff attended commercialisation workshops held by UQCCR and UniQuest. The Committee's plans for the future are outlined in 6.7.

Staff play an active role in several government agencies and many NGO's and charitable foundations relevant to their area of expertise. The success of these partnerships is indicated in the growing income from this category of grants, supporting University strategic Key Performance Indicators for medium term strategic focus areas.

Relationships in the academic sphere and with industry and government reflect engagement with a range of partners and acknowledge individual staff members'

high academic standing. There has not been, however, a School-wide cohesive approach to relationship-building in recent years; rather it has been opportunistic and mostly led by individual researchers. Moving forward, these relationships will also provide a platform for the School to consider more strategically those with whom strengthening partnerships would be the most mutually advantageous and the best way to progress these, for the benefit of students as well as for research productivity.

5.5 Engagement with the Community

The Body Donor Program is an important activity within the School and has been mentioned with the discussion of the GAF in 2.8.3.

In running this program, the School has developed close relationships with the funeral industry and members of the public. An important feature of the program is a Thanksgiving Ceremony conducted biennially to thank donors and their families for the contribution they have made to research and teaching at the University and for their generosity in providing such a unique resource. This event is attended on average by 800 people including donor families and friends, as well as staff and students.

Various staff present research outcomes and developments through public lectures, presentations to community groups, media interviews and televised segments for both adult and children's programs, articles in community and media publications, involvement in local and regional events, as well as podcasts, tweets, YouTubes and other social media posts on topics of community interest. Several staff are active science communicators.

School staff are involved in a range of community-centred projects, often in conjunction with government or charitable bodies, reflecting their areas of expertise. Staff are also involved in various programs to support women in higher education and as noted in 3.2, programs to encourage high school students to consider studying STEM. These activities are a further source of relationship building as well as providing a service to the community, and are in keeping with the University's strategic foci.

6. Futures

6.1 Preamble

The timing of this Review is optimal. There have been many changes in the national and international landscape for the disciplines in which SBMS teaches.

As populations live longer, healthy aging is becoming a greater focus with dementia, cancer and cardiovascular problems becoming more common, as well as a rise in other diseases such as diabetes. Translational health research that crosses barriers between fundamental and clinical research and applies findings from the biomedical sciences to prevent, predict or cure disease will go towards fulfilling UQ's vision to 'deliver globally significant solutions' (UQ Strategic Plan Long Term Objective 2).

While research is absolutely crucial, how this research will be funded is more uncertain. There is an expectation that more nationally competitive funding will be available within the health sector, but some believe that those funds will be concentrated in fewer though larger teams. The School will need to be creative in accessing international, national and local funding from a wide variety of sources and leveraging opportunities from existing partnerships.

Multidisciplinary teams which cover the broad spectrum from fundamental to applied research are likely to be more successful in attracting greater funding. It will be essential that the School capitalises on its strengths and works with colleagues from other research entities, industry and government, both nationally and internationally, to achieve success. This will require leadership from senior staff and relevant initiatives to support and mentor all staff within the School.

Graduates, likewise, will need to be prepared to adapt to change, think critically, be innovative and work collaboratively to solve complex problems if they are to succeed in the diversity of future careers that lie ahead and make the positive impact on society to which UQ aspires. UQ has therefore established a comprehensive student strategy that aims to transform the student experience and 'deliver a flexible, partnered learning environment' (UQ Strategic Plan, Medium Term Goal 1). SBMS is in a strong position to take advantage of funding arising from this strategy. The School focuses on self-improvement, responds quickly to feedback, and makes innovative changes to the courses that are taught. This is reflected in student responses, both in passing grades and course and teaching evaluations. SBMS will continue on this proactive path.

To meet society's needs, more graduates will also be required in the health and allied health fields. Biomedical sciences are a fundamental requirement as they underpin study in these areas. The School is well positioned to continue to contribute to the tertiary level training of these students as well as those seeking continuing professional development later in their careers.

The University is responding to change as best it can, but it continues to face many challenges in funding its comprehensive, research-intensive domain. This has resulted in considerable upheaval as it attempts to function more efficiently and effectively, and support its academics to provide 'knowledge leadership for a better world' (UQ Vision). The Faculty of Medicine is leading some of these changes and is supporting the School's efforts, for example, to provide more general, modern laboratories which support multiple researchers. This is facilitated by both the University and the Faculty taking responsibility for the maintenance and support of items which schools cannot afford.

Other opportunities are arising as UQ plans to modernise its infrastructure. In particular, the School is seizing the opportunity to be part of the new Science Complex. This will allow the School to have a well-designed, purpose-built gross anatomy facility in which all QH requirements will be satisfied. This facility, plus other planned refurbishments, will provide a platform which will support excellence in many of the School's endeavours.

The following sections provide an overview of the School's proposed directions for the future in each of the relevant dimensions of management, learning and student engagement, research, equity, engagement and internationalisation. These have been informed by discussions in each of the School's Committees, and especially the strategic retreats held in Research and Teaching and Learning, as well as School involvement in the Faculty of Medicine's extensive strategic planning exercise conducted during the past two years.

6.2 Infrastructure and Resources

6.2.1 Overview

Initially flowing out of the 2009 review and as a result of innovative planning and extensive negotiations, between 2010 and 2018 multiple projects were consolidated into a major program of staged works. These have significantly progressed the refurbishment of teaching and research spaces in MacGregor and Skerman (level 2). Over 3000 m² of usable floor area in MacGregor and 260 m² in Skerman, have been turned into modern, open plan spaces at a cost of around \$20 million. Approximately 84% of MacGregor is now refurbished and fit for purpose; 55% of Skerman has been refurbished in the last ten years with several older areas still in satisfactory condition. Approximately 85% of Otto Hirschfeld has also been refurbished.

A number of building condition audits have been carried out since 2010, the most recent in 2016. Major defects rendering floors non-compliant exist on mostly un-refurbished areas in Skerman levels 3 and 4, MacGregor levels 3 and 4, and Otto Hirschfeld levels 3 and 4, and include laboratories, utility rooms, corridors, toilets, stairwells and foyers.

In collaboration with P&F and the Faculty, the School is committed to ongoing development and renewal of its space to meet its teaching and research responsibilities. In so doing, the School's strategic and operational priorities will align with the University's commitment to building teaching spaces that can accommodate innovative approaches to learning and integration of technology, and research spaces that facilitate collaboration and sustainability. This is also consistent with the Faculty's *Statement of Decadal Intent 2018-2027* and the *Student Strategy 2016-2020*.

A key component of the School's future objectives is to retain a manager level position whose mandate will be to work with the Faculty, client and stakeholder groups to plan and devise an infrastructure plan for each 12 month capex funding cycle as well as for the three and five year horizons. This is consistent with the University's plan 'to build an agile, responsive and efficient University operation' and thereby to 'proactively build the capacity and capability of our workforce to achieve our strategic goals' (UQ Strategic Plan, Medium-term Strategy 5). The Facilities Manager role has been redrafted as a strategic position and reports as a Faculty role embedded in the School.

A second component will be an emphasis on 'partnering with students' in the rollout of new spaces consistent with the *Student Strategy*. Student representation exists already on the Space Committee. Inviting students onto planning and design teams, and surveying student opinion post-development, will characterise the approach moving forwards.

6.2.2 Teaching Spaces

The tertiary sector's vulnerability to 'increasing competition and digital disruption' has forced the University to rethink the unique future role and character of the learning space on the University campus (UQ Strategic Plan). Consistent with what is happening nationally and internationally, teaching space at UQ will become increasingly characterised by a blending of physical space with technology to support innovation in delivery and flexibility in learning. Thus, curriculum reform (including new online modules) and major investments in technology and development of formal and informal learning spaces are taking place across UQ and will continue to do so for the foreseeable future (UQ Strategic Plan, Medium Term Goal 1).

Blended learning is active, self-paced and personalised, involving both face-to-face and computer assisted learning. The blended learning space supports diverse learning styles, human interactions and includes audio-visual (AV) and computer based technologies. In a science blended learning room, the space may also be equipped with scientific instruments and virtual reality equipment.

SBMS is playing a role in the UQ2U transformation process with multiple courses identified for redesign in the next few years (refer 6.4.4). Accompanying these changes are a number of proposed facility developments and innovations:

- Development of Otto Hirschfeld 304 as a large flat-floor collaborative learning space for blended courses in science. This would allow adoption of the 'flipped classroom' approach to learning and give an opportunity for students to collaborate on problem solving, sharing resources and develop team working skills. Currently, the space seats 120 students in a traditional format with rows facing forwards to a lectern on a stage with AV screens at the front and suspended from the ceiling. To accommodate changes in teaching and learning, it is proposed that the School in collaboration with Teaching Space Management (TSM) leads a feasibility study to redesign the space as a 'science' blended learning area with a seating configuration similar to other such spaces (e.g. Gordon Greenwood 215) and infrastructure, storage and computing to facilitate student learning. With a floor area of 275 m², the space potentially could seat 120-140 students. An operable wall may also be incorporated as a way of dividing the room into smaller spaces for cohorts of 60-70.

- Inclusion of an unencumbered area for virtual reality learning. Virtual reality platforms such as HoloLens or equivalent are receiving serious and widespread attention at UQ, especially in the health sciences. A redesign of Otto Hirschfeld 304 offers an opportunity to create a virtual reality learning environment equipped with glasses or some form of head mounted display through which students may engage with holographic displays of a scientific nature. Use of virtual reality as part of the pedagogical mix in a blended learning environment is consistent with the School's goal to 'awaken students' thirst for learning and intellectual exploration' (Faculty of Medicine, Statement of Decadal Intent 2018-2027).
- Installation of a multi-zone AV platform in the GAF. To achieve another five years of operational service as an anatomy teaching space, it will be necessary to upgrade the audio visual elements in the existing facilities. The GAF will be used to deliver blended learning from 2021 with at least one anatomy course so far earmarked for redesign. More will follow. A proposed upgrade will include projectors, LCD panels, cameras and AMX control systems installed across multiple zones in room 210 and room 120, to accommodate different cohort sizes. The AV treatment will bring the teaching facility up to the UQ standard and will greatly enhance the student learning experience. Once the GAF moves to the new Science Complex (6.2.4), the space in Otto Hirschfeld will become available for blended learning and teaching in any discipline as it will no longer be quarantined under the *Transplantation and Anatomy Act*.
- Expansion of the core research facilities to accommodate undergraduate teaching in microscopy. Support of teaching in microscopy is part of the mandate of staff who work in the imaging facility. Most of the support is delivered in the MacGregor teaching labs while some instruction on advanced instrumentation takes place in the Skerman core facilities. The core facilities, however, are compact and densely equipped and unable to take the growing numbers of students. Therefore, the proposal is to develop non-PC2 spaces in MacGregor level 2 (the same floor as the core facilities in Skerman) to house equipment for access and use by students. MacGregor rooms 225-228 offer a series of adjoining small spaces for such purposes.

6.2.3 Research Spaces

With 20% of largely research floor space still to refurbish, the School is poised to embrace an infrastructure plan that will strengthen its research diversity, invite multi-group, multi-disciplinary collaboration, and render available Faculty assets and resources as needed. Such spaces and assets will enable available funding to stretch further and support more research staff. UQ's Strategic Plan describes research infrastructure as a core enabler of research, and prioritises funding for new infrastructure that is 'collaborative and provides the most open access possible' (UQ Strategic Plan, Medium Term Goal 2).

The Faculty places infrastructure in a broader scheme of building critical mass, recruiting and retaining high quality research fellows, attracting the brightest minds of up and coming HDR students, and having impact as a contributor to the advancement of science, clinical practice and health system delivery. The School concurs with these sentiments and sees the continuing renewal of its infrastructure as an important element in building a strong and viable future for itself in biomedical sciences research. As such, the School's infrastructure plan includes a number of much-needed refurbishments, upgrades and acquisitions:

- Complete the refurbishment of multi-room research laboratories and redesign as open plan to promote sharing of space and assets. This applies to the un-refurbished areas in Otto Hirschfeld level 4, Skerman levels 3 and 4, and MacGregor levels 3 and 4. Some of these areas are dilapidated and not fit for purpose, though they continue to be used for research and research training. While recognising that diversity in research sometimes means diversity in research spaces, the School's strategic emphasis moving forward will be to create large, open plan spaces with adjoining rooms for instruments and freezer storage. Within the open plan design, smaller specialist areas might be developed for a particular use but these will not necessarily be fixed. The aim is to build spaces that are generic, flexible and enduring.
- Continue the roll-out of critical infrastructure in School buildings. Critical infrastructure including chilled water air conditioning, humidity controls, gas, emergency power and wired freezer alarms, is absent in many laboratories though mainly in the un-refurbished areas. On some floors, the existing infrastructure is old and in need of replacement, such as the RO water supply in Skerman. As laboratories are refurbished, the School will work with P&F to address the infrastructure deficiencies.
- Acquire a Laboratory Information Management System (LIMS) to improve the efficient handling of data produced within the Core Research Facilities. LIMS offers a software based solution with dynamic features that support basic laboratory operations including workflow, data and usage tracking capabilities. Administrative workload is significantly reduced through the automation of equipment booking and invoicing workflows. A LIMS system would simplify the accurate tracking and reporting of usage levels, augmenting planning and decision making activities. Investment in a LIMS system (e.g. PPMS) will permit the core facility staff to focus on service delivery rather than lose too much time to administration. It will also provide usage and revenue data that will assist the School in its strategic deliberations.

- Nourish strategic relationships at UQ to position the School optimally for funding, loans and acquisitions, centrally funded upgrades, and access to new space and infrastructure. The School already enjoys a strong relationship with central units including Space Management and UQ Biological Resources and has benefited from the availing of space for decanting and research continuity. Approaches to ITS and Campus Operations have also resulted in centrally funded upgrades of infrastructure in School buildings. Most important is the relationship with Faculty. Through the Infrastructure and Research Operations portfolio, the School has access to spaces and assets located elsewhere in the Faculty, as they are available. The portfolio also distributes funds for asset replacement and provides advice on questions of space management in complex research environments. Thus, the relationship with Faculty will play an integral role in the School's research infrastructure strategy going forward (UQ Strategic Plan, Medium Term Goal 3).

6.2.4 Gross Anatomy Facility

Anatomy at UQ has been a major growth area within the School. During the last 10 years, student numbers entering the GAF near trebled to a peak in 2018, making the GAF and BDP a major operational asset that will continue into the future. Our vision is to make SBMS a leading entity in anatomical teaching, training, scientific studies and research on the global stage.

The timing is ideal to progress this vision given: (i) the depth of staff expertise both in academic and professional domains; (ii) professional workshop demand; (iii) newly realised research impact; and (iv) the potential for a new facility within the proposed Science Complex to be completed within the next four to five years. Furthermore, the construction of an expanded and purpose built GAF within the upper aspects of the newly proposed building is vital in ensuring the GAF can meet increased student numbers into the future and capitalise on opportunities.

The success of the BDP and therefore UQ's ability to deliver large-scale cadaveric resources provides significant opportunities for collaborative interdisciplinary research and teaching in new areas such as forensic science, advanced surgical techniques and to provide income generation through external surgical courses and industry engagement. The GAF should aim to nurture the anatomical knowledge of aspiring science and health professionals, not only in their undergraduate years but continue to provide research and advanced professional training opportunities to the School's alumni where applicable throughout their careers. It should also act as a draw card to inspire and attract high profile external researchers and industry to seek out the School as a centre of excellence for its specialised facilities and professional expertise.

With judicious timetabling and resource allocation, an estimate of 4000 m² of usable floor area (UFA) for the GAF will allow the School to: (i) meet the expected student growth to 2050; (ii) vastly improve the efficiency of our technical support services; and (iii) capitalise on the significant research opportunities and external surgical training demand that cannot currently be accommodated.

The expanded facility should encompass secure wet lab teaching facilities, purpose-built mortuary processing and technical preparation areas, multi-functional research laboratory spaces, cadaveric radiography and specialist imaging, biomechanical testing, surgical skills training and research, and dedicated osteology space. All areas must be physically linked to meet the recent heightened legislative obligations of the anatomy regulator.

To enhance the student learning experience under the new UQ2U blended learning model, the teaching spaces should be fitted with state-of-the-art audio-visual equipment and secure teleconferencing capabilities, allowing for the delivery of teaching sessions to remote and rural students and for live surgery feeds in support of surgical and other anatomical training. This is a fundamental requirement for effective face-to-face laboratory classes with students to supplement online blended learning components or to enable contributions in the online learning space. This is consistent with all teaching spaces for other disciplinary areas.

Collaboration with key stakeholders such as QH, RACS, police agencies and the Australian Department of Defence will be vital in attracting the most prestigious research opportunities and surgical training courses and the School's ability to bid for world-class symposia. Provision should be made for large multi-function 'clean' teaching areas immediately adjacent to or below the GAF to enable the delivery of living anatomy sessions for medical and allied health students, yet able to be partitioned for smaller cohorts.

The BDP's operations are highly sensitive and a critical component of the University's community engagement. Thus the design should be easily accessible to accommodate visits from members of the public to discuss their existing or intended donation with BDP staff and allow for direct and regular face-to-face contact between GAF and BDP staff. The BDP office and fireproof document storage area are an integral part of everyday operations and should be physically linked to the GAF.



6.3 Staffing

Recruitment in 2017 filled T&R positions that had fallen vacant during the previous two years. This, together with internal transfers and strategic appointments by the Faculty of Medicine, has enabled the School to achieve an optimal staffing level to cover the full breadth of its teaching and research (2.5).

Faculty led initiatives have helped also in the professional services area. More recently, as part of the Faculty's plan to finance positions in research support and competitive grant writing, the School has acted on this unique opportunity and appointed a Research Development Manager for two years to work with researchers on their grants.

Looking forward, the School's most pressing need will be to recruit and appoint a new Head of School. Professor Kaye Basford was appointed Acting Head of School in late 2016, then Head of School in 2017 following two unsuccessful attempts to recruit a new Head.

An experienced Head of School, Professor Basford was appointed for a three year term. Her mandate was to lead the School through a period of significant organisational change and prepare the School for its septennial review. Professor Basford's appointment will see out the 12-15 month post-review phase. An international search for a new Head will commence in the second half of 2019.

The School's academic staffing is complete at the time of the review. Guiding principles for future appointments will include assessment of workloads, equity and diversity imbalances, strategic goals and opportunities for growth and innovation. The recruitment drives in 2017 demonstrated a need for improved on-boarding and mentoring of new arrivals, especially early career academics. Mentoring has been organised mostly around informal and voluntary arrangements. In addition to the teaching internship program, there is interest within the School in developing a more structured approach to mentoring, and efforts will be made to identify appropriate training for mentors and a program of learnings for new appointees.

6.4 Future Directions in Teaching and Learning

6.4.1 The Future Environment

Disruption in the higher education sector is clearly evident, as many Australian universities position themselves to address key challenges such as the changing nature of work, evolving digital technologies, the growth of global education and increasing international competition, and movement towards a more continuous learning paradigm. Thus the future of teaching and learning within the School will be broadly influenced by external forces.

UQ has set out a vision in teaching and learning (UQ Student Strategy, 2016 to 2020) to provide a transformative student experience. In essence, UQ aims to offer a signature student experience. Four pillars of the UQ student experience have been defined: game changing graduates, student-centred flexible learning, dynamic people and partnerships, and a vibrant digitally-integrated environment to support learning.

The challenge for SBMS is to engage with this larger University transformation and evolve the School's teaching and learning expertise and environment. Therefore, the School's teaching and learning objectives in the next few years are dominated by implementing large scale change in the delivery of many of its courses to a more flexible mode and complimentary initiatives to adapt teaching spaces and introduce appropriate technologies to facilitate the new teaching and learning pedagogies. Ongoing continuous work to improve the delivery of professional discipline teaching in collaboration with partner schools and initiatives to improve the student experience will also ensure that students have a vertically integrated learning environment throughout their programs.

6.4.2 Students as Partners

This is a University-wide initiative that partners students with teaching staff and researchers to develop a culture that supports continued innovation, adapts to change, and is shared, valued and enriched by students and staff.

Engaging students as partners is a growing feature of new teaching and learning initiatives in SBMS. One example from 2018 was the partnering of second year students with staff to review practical resources for BIOL2200, resulting in the generation of an interactive, online preparatory module, designed and built within the SmartSparrow adaptive learning platform. The module introduces students to theoretical and practical applications of imaging techniques in research and medicine, to better highlight the relevance of practical learning activities, and will be available to the 2019 cohort. Additional projects are being progressed in 2019, supported through the UQ Student Staff Partnerships scheme, such as a project in selected BIOM level 2 courses focusing on student engagement with feedback, and another developing video content for courses delivered to SHRS students.

Another example of students partnering with staff and already mentioned in 3.10, is the pivotal role students have played in the redevelopment of the BBiomedSc capstone course BIOM3200 which has already been highly successful. Students will continue to be involved in a similar way as selected courses are redesigned into a blended learning model, refer 6.4.4.

6.4.3 Employability and Work Integrated Learning

UQ has a strategic goal of expanding the opportunities for students to enhance their employability (Student Strategy, Goal 1, page 10). The approach is to develop discipline specific teams at the Faculty level to provide career development and work integrated learning (WIL) (initiative 1), whilst expanding the short term global mobility program (initiative 5).

The Faculty of Science has developed a website designed to encourage students to think about their career and build their employability during their studies and has developed its own **Employability Framework: Literacies for Life** (a self-assessment tool to encourage students to think about their academic and personal development and skills, personal attributes or knowledge that may enhance their future employability). As well as access to the Framework, the site provides links to other University resources, promotes the **UQ Employability Award**, the **MOOC Unlocking your Employability**, the **SCIE3050 Industry Placement course** (see below) and the **Summer and Winter Research Scholarship schemes** (3.10). In Semester 1, 2019, the Faculty of Science will host an employability week for students, including those in biomedical science programs.

In the Faculty of Science, a new industry placement course (SCIE3050) was introduced for the summer semester 2018-2019 for a maximum of 40 students enrolled in the BSc from any major/discipline including biomedical science. The course aims to enable students to gain real-world application of their learning through the completion of 120 hours of placement in a science-related workplace.

In SBMS, specific initiatives to progress the UQ Employability goal have already commenced, such as the redesign of the biomedical science capstone course, BIOM3200, for students in BSc, discussed in 3.10. The capstone course for the BAdvSc(Hons) program, BIOM3333, is also being redeveloped for the first cohort of students in the biomedical science major in 2019, to focus on WIL in the context of a research career.

Examples of how recent UQ T&L funding to enhance the employability of the School's graduates is being utilised are: (i) The implementation of handheld imaging devices in anatomy classes for students in the MD and allied health programs to enhance their employability as graduates working in locations where these devices are regularly used in practice; and (ii) Master classes for Year 3 and honours students to enhance the breadth of their experience in high level laboratory techniques to enhance their opportunities to demonstrate work readiness once they graduate.

In addition to the development of specific WIL activities, students in Science programs need to be encouraged to effectively use the eportfolio software that is now accessible to all UQ students. It is important that they are mentored regarding the appropriate collection of artefacts throughout their studies and how to display them appropriately as evidence of WIL and other activities relevant to their future employment. Students in Science programs in particular require this specific instruction, in contrast with students in clinical professional programs who utilise it in their undergraduate courses. The inclusion of alumni as partners is also an, as yet, untapped resource of WIL opportunities and mentorship, see 6.7.2.

Global extension experiences specific to SBMS have been noted in 3.8.1. The existing exchange agreements with Oxford University in the UK and LMU in Munich provide students with opportunities to study and work in multi-cultural settings. Negotiations are in train to develop similar models in other institutions with details discussed in 6.8. Though involving small numbers, these will allow more students to take advantage of opportunities in a broader range of countries. Together with existing student exchange agreements and short term experiences promoted by the Faculty of Science and available through UQ's Global Mobility program managed by UQ Abroad, the School aims to slowly grow the number of opportunities available to students to benefit from a global experience.

6.4.4 UQ2U and Blended Learning

The UQ2U initiative involves the conversion of some 70 UQ courses in the next three years to a blended learning experience, offering both online and on-campus learning experiences. It is key component of the UQ student strategy that seeks to provide more student-centred flexible learning (Student Strategy, Goal 2, page 11), and a more personalised student experience. The introduction of blended learning is also being rolled out by the School's peers in biomedical sciences across Australia. International partner institution Edinburgh is more advanced in this regard, with approximately 50% of their postgraduate courses and 20% of their undergraduate courses already transitioned to a blended learning model.

In designing UQ2U courses, the University has proposed a number of common principles and attributes, integrating high-quality online and high-value on-campus active learning experiences, a learner-centred focus that is constructed to help all students succeed, courses designed for flexibility including modularisation, and the use of authentic assessment tasks and e-assessment.

To support major change, ITaLI is providing technical and practical support for the development of selected courses (e.g. learning design, project management, analytics, tool development and media production expertise) and a financial contribution towards redevelopment of each course (\$20,000 per course). Supplementary financial support will also be provided by the School.

SBMS is one of the most significant participants in the UQ2U initiative, with ten largely traditional courses in the School being blended during the next three years. The SBMS courses proposed for change are mainly large enrolment first and second year level courses, plus the School's third year biomedical science capstone course in the BSc and BBiomedSc. Together with other new UQ2U courses in cognisant disciplines in the Faculty of Science including SCMB (three courses), Biological Sciences (three courses), and Mathematics and Physics (six courses) this will be significant change in teaching and learning within the science and biomedical science programs. Further, some 15 courses in the Faculty of HaBS will be changed and these changes will influence the learning landscape for many other student cohorts who are included in the professional discipline teaching in SBMS.

Such broad-scale adoption of blended learning within SBMS poses considerable challenges and opportunities. To begin the process of change in SBMS, blended learning was the major focus of the recent Teaching and Learning retreat in November 2018.

In UQ2U course redesign, the School seeks to achieve the following key objectives:

- Achieve an appropriate balance between online and on campus experiences. Laboratory practical classes, tutorials and workshops will remain the cornerstones of on-campus experience in biomedical science. Such activities are highly valued by both students and academics. Online resources will replace some lectures to provide more flexible learning, whilst other lectures will be transformed into more active learning experiences.
- Create economies of scale in the development of online biomedical resources, to maximise gains across the School's broad range of programs. A key goal is to develop online content that has extended shelf-life and is adaptable to many student cohorts, so that courses beyond the 10 flagged for the UQ blended learning initiative will also benefit from these developments.



- Use course redevelopment to enhance vertical and horizontal integration of the curriculum. Curriculum mapping will be undertaken during UQ2U course redesign, but liaison between cognate schools in degree programs will be critical to ensure vertical and horizontal integration in learning and course design occurs. Newly appointed program liaison academics will play a key role in the wider integration of blended learning.
- Utilise experiences gained in the earliest blended UQ2U biomedical science courses to support future blending of other courses. Whilst some large enrolment courses are targeted for blending in the UQ2U initiative, many academics have expressed a desire to begin movement towards more blended approaches in other courses with smaller enrolments. Peer mentoring and facilitating more widespread change to blended learning in the School is proposed.
- Progressively develop processes for the effective evaluation of blended courses, with a strong involvement of student partners.

6.4.5 Professional Discipline Teaching

Several activities will be undertaken in 2019-20 as a result of program reviews and the introduction of blended learning courses that affect SBMS professional discipline teaching. In all cases, SBMS staff will work closely with partner schools to ensure that changes deliver the desired student outcomes.

These will include:

- Representation by SBMS staff on the Working Party formed as a result of the Academic Program Review of the Bachelor of Health Sciences. New first year courses covering integrated anatomy and physiology will be developed to more specifically meet the needs of these students.
- SBMS will be developing a new biomedical science course to be delivered in intensive mode for the summer semester 2020 for the Master of Nursing Studies to better prepare students for their studies in the subsequent semesters of this program.
- Changes will be made in anatomy courses resulting from reviews of relevant programs in SHM&NS, particularly those that qualify students as specialist teachers with the Queensland College of Teachers.
- The teaching of pathology by pathology staff is currently occurring only into the MD program. With the transfer of staff and responsibility for pathology teaching having moved to SBMS, it is proposed that from 2019 the pathology academic staff will be better integrated into teaching within the School. This will include some integration of anatomy, histology and pathology teaching in the MD program, led by the Professor of Clinical Anatomy. As a next step, it is intended to broaden pathology contributions to several courses in both science and professional discipline teaching programs in the School.

6.5 Future Directions in Research

6.5.1 Overview

In line with the long-term objectives in the UQ Strategic Plan, the aim for research in SBMS is to deliver globally significant solutions to challenges in biomedical sciences by generating new knowledge. Increasing the impact of the School's research will be achieved through enhancing innovation, collaboration, and partnerships, particularly cross-disciplinary approaches that bring together different perspectives.

Imminent future funding challenges include the major changes to the NHMRC granting system, which has traditionally provided the bulk of the School's research funding, and positioning the School to capitalise on funding opportunities via the Medical Research Future Fund.

Success will be indicated through changes in outputs such as increased citations of publications, uptake and translation of discoveries by international peers, industry and clinical stakeholders, which in turn will be reflected in ongoing research funding successes, and the formation of additional academic and 'translational' partnerships. It will also be reflected in the number of national and international students, postdoctoral fellows and visiting academics who wish to work with SBMS academics.

The overlying strategy for improving research excellence in SBMS is to promote individual success and encourage collaboration and partnerships as opportunities arise (see 4.1). The School will continue to embrace the diversity of research being undertaken while facilitating internal as well as external collaborations. The recent influx of new academics to SBMS, and UQ and Faculty support to upgrade the buildings and infrastructure through renovation and purchase/replacement of core equipment (refer 6.2.3) provide a forward-looking base on which to build.

Critical success factors that have been identified by SBMS academics are leadership, collegiality and mentoring, strategic funding, time (balanced workloads), and appropriate and efficient support (infrastructure, administration, technical, specialist). Furthermore, in order to achieve our research aims, it is recognised that the School must:

- Maintain diversity ('cohesive diversity') while encouraging collaborative ventures where strengths can be leveraged.
- Be strategic in research efforts.
- Further develop an environment that encourages and supports new ideas and innovation.
- Continue to nurture current researchers, especially early career staff.
- Develop data driven evidence of success.
- Promote the School and individual staff members' successes to inspire others (internally and externally).

Any future initiatives must ensure there is accountability, by communicating the actions and outcomes. Initiatives will be driven by addressing these critical success factors.

6.5.2 Leadership

Discipline-specific leadership is a key factor in fostering individual as well as organisational self-belief and for promoting research initiatives. The current Head of School has provided a much needed period of stability during a time of change. It is anticipated that a new Head of School, a biomedical scientist with a proven track record of exceptional quality, will be recruited to lead the School into its next phase of development.

Championing the achievements of T&R academics will be important. The weekly Head of School update is one source of highlighting successes. Better use of the visual signage placed through SBMS buildings, and with the support of Faculty Communications staff, better use of the website and social media, could also champion recent SBMS academic achievements.

6.5.3 Collegiality and Mentoring

In order to enable staff to persist as successful academics, the School must provide a nurturing environment. This incorporates mentoring of HDR students, and early and mid career staff. Assisting these staff develop a more strategic trajectory for their research and encouraging applications for seed funding and similar schemes to 'grow' their research could be improved.

While constructive criticism of staff ideas and approaches is partially provided through grant pitching, this does not capture the strategic direction of individuals' research. The Research Committee is discussing the implementation of rolling three yearly research reviews for SBMS academics, a process formerly employed in the School. These would be separate to yearly appraisals and involve strategic advice to the academic by members of the review committee. The composition of the review panel could leverage off visits by international partnership and institute colleagues or invited seminar speakers, so as to provide an expert and general committee for each academic. Directions will also be informed by the review on academic performance metrics being undertaken centrally as part of the People, Performance and Planning initiative.

As noted in 6.3, the School leadership team are also reviewing existing mentorship processes and will be investigating ways that these, especially induction and onboarding activities for new staff, can be improved.

One of the strongest values in SBMS is collegiality. This comes to the fore in the running of grant pitching days for new research ideas six months prior to major Australian government granting opportunities. This scheme, together with organised collegial reviewing of grant applications prior to submission, will remain a core initiative of the School.

The value that staff make to training undergraduates as researchers as well as valuing HDR students as members of the research team, is underlined by the financial contribution provided by the School to help support students' research endeavours (4.4.3), as well as the annual SBMS HDR Awards. This support and recognition will continue.

It is also important for all SBMS academic staff to acknowledge that teaching excellence is integral to their roles. SBMS has a strong TF group generating research outputs in the Science of Teaching and Learning. These academics are identified in the School's themes, but more can also be done to enhance their research endeavours, and to value and celebrate their achievements. Recognising their outputs as genuine research, and including these staff in internal granting schemes are important first steps. As teaching and learning moves increasingly to blended learning, it is imperative that there are more strongly developed mechanisms for collaboration of T&R and RF staff with TF staff in the development and evaluation of effective and innovative teaching methodologies.

6.5.4 Research Excellence and Strategic Funding

There is great research potential in SBMS, but the breadth of the research endeavours is a strength and a weakness. On one hand, it facilitates interactions between diverse fields, systems and methodology, and on the other hand it is challenging to catch under a single banner (necessitating many disciplines and themes), and to consistently engage all staff in School-wide research initiatives.

Because much of SBMS research is fundamental science, the School will persist in attaining research grants from Government agencies, particularly the NHMRC. However, an ongoing strategy, which aligns with the Faculty of Medicine and UQ's aims, is to broaden funding sources, including industry partnerships (see also 6.7.1). As noted in 4.3.1, the Research Committee has encouraged applicants to repackage unsuccessful grants for other schemes, acknowledging that each rewriting also further develops and finesses an application, enhancing its chances of success. This will continue as will the provision of a small seed funding grants (discussed in 4.3.4) and the Head of School collaborative grants to encourage staff to explore risky but more innovative research questions and encourage collaboration.

The School seminar series provides excellent opportunities not only for staff to maintain currency in each other's' work, but exposing staff and students to world class research through seminars by national and international research leaders (within a \$10,000 budget). The series also 'advertises' the capabilities of SBMS, through facility tours and a series of casual meetings with interested and available staff during a speaker's visit to UQ. The new research themes will form a basis for more focused seminars to encourage better attendance, as well as other 'inspiration' initiatives.

Building on the latter, in 2018 SBMS hosted a number of half or full day symposia with national or international experts on topics of interest to SBMS academics, coupled with talks from within SBMS and the Faculty and Brisbane community. They included a Cardiovascular mini-symposium, Brisbane Calcium symposium, the Australasian Chronobiology Meeting, SpinalCure's 3rd Frontiers in Spinal Injury Research symposium, and an inaugural Sleep@UQ symposium. In addition, SBMS has sponsored the Queensland Developmental Biology Society monthly seminar series for a number of years. These are topic-focused but broadly inclusive of UQ and clinical colleagues, and facilitate networking and larger idea generation such as required for a Centre of Excellence, Research Partnership or MRFF application.

The new Research Development Manager (RDM) role will be pivotal in supporting the School to achieve its research initiatives. The role is tasked with identifying new funding opportunities that are targeted to individuals, and to facilitate preparation of grant applications through provision of strategic and scientific advice on applications, as well as administrative support for larger team bids involving outside collaborators and partners. The position will provide support for and encourage early and mid career staff to develop competitive applications and track records, such as identifying suitable sources so they may achieve small granting successes prior to submitting more ambitious applications. The role will also be involved in the production of fact sheets and press releases for industry marketing of SBMS's research and facilities as mentioned in 6.7.1.

Intellectual stimulation and scientific discussion between colleagues is a key ingredient for impactful ideas and designing world class research experimentation, and could be more robust within SBMS in order to encourage researchers to challenge their current ideas and think 'bigger'. The recent renovation of level 1 MacGregor has facilitated social networking, and use of 'The Pit' to have more spontaneous scientific discussions between academics that might also engage undergraduates over pizza or beer, is a fledgling idea. Another idea for increased exposure to inspirational science is 'state of the field' remotely delivered seminars from international experts or TED-like talks from international authors of recently published breakthroughs, as nominated by staff.

6.5.5 Planning for future initiatives

Although one arm of the School's research strategy is to support individual success, from which collaborations will grow, SBMS will nonetheless be strategic in its research efforts to take advantage of areas with particular strengths, critical mass and/or distinctiveness with potential for forming larger multidisciplinary collaborations that are tackling 'big' issues. Research areas within SBMS themes with identified potential are the areas of Drug Design and Development, Developmental Biology including Neurodevelopment and Neurodegeneration, Musculoskeletal and Neuromuscular Control, Sleep, and Forensic Biology. Industry, clinical, and broader UQ collaborations exist in each case. The challenge is to identify and work towards a coherent aim, and to maintain momentum when the potential rewards are not immediately tangible. Leadership training and mentoring of mid career SBMS academics is crucial for many of these initiatives to succeed.

Planning is also essential for maintaining and enhancing the research environment. Recent changes to infrastructure management and funding of replacement of core equipment has been welcomed (see 2.8.2). Future replacement of high demand equipment is being managed at Faculty level. The newly formed Research Facilities Committee, in conjunction with the Core Facility staff, will coordinate the upkeep and upgrades of specialist core and high-end research equipment. Driven by the Research Committee, the School aims to also provide support for new techniques, such as single cell analyses, an electrophysiology core, and potentially human iPSC organoid capabilities, so that SBMS research can remain at the cutting edge technically.

6.5.6 Task and Time Management

One of the greatest challenges for academic staff is partitioning time for creativity and idea development, in order to cultivate cutting edge research questions and methodology. The burden of compliance be it ethics, OHS and finance has increased, and support has trended toward self-service. While the School must work with UQ and Faculty frameworks and time management is the responsibility of the individual, the School leadership team will encourage and support staff regarding their workloads, an activity that requires reliable data to implement. The current Workloads Working Party is expected to make recommendations to guide the School's Executive in this regard.

Several initiatives have already been put in place in teaching and learning to assist staff manage teaching and coordination workloads. New delivery methods such as blended learning, discussed in 6.4, may also assist staff in managing the workloads associated with delivering large classes and make teaching more rewarding as student engagement improves.

There are also processes that can be implemented to strategically facilitate staff sequestering research-intensive time such as through the uptake of SSP to develop new techniques, establish a new research direction, or publish outstanding papers. UQ Amplify or Teaching Internship initiatives could be utilised to back-fill teaching gaps. This will be discussed further within the School.

The School will also review compliance requirements and administrative processes with a view to identifying those that are efficient, sustainable and add value and those that can be managed more efficiently. This may include developing Standard Operating Procedures (SOPs) for routine requirements, e.g. ethics, new risk assessments, and initiatives as simple as developing a matrix of professional staff support and contact details to facilitate who to contact when necessary.

6.5.7 Higher Degree Research Students

As the enrolling unit, the Faculty of Medicine works with the School in developing future directions for HDR students with the School's focus on improving the support they receive within the School as well as increasing enrolments. An expansion of existing partnerships to facilitate the latter are discussed in 6.8.

The value of the International Postgraduate Symposium in Biomedical Sciences has been expressed several times, as an important engagement event not only for the School and the Faculty of Medicine but across the entire UQ biomedical precinct. It is one of the largest HDR symposium events at UQ. Given the size and complexity of running such an event annually, the School and Faculty have agreed that this event will be held every two years. This change will allow the Faculty of Medicine to develop and promote a similar style of international symposium in clinical and public health in the alternate year.

Given the above, and the desire to enhance the HDR experience within the School, an annual HDR student retreat will be introduced. This will encourage closer interactions between HDR students, improve mentoring, and encourage students to develop a better sense of belonging to SBMS. It will also act as a venue to inform and assist HDR students with respect to their responsibilities in the management and progress of their candidature.

6.6 Equity and Diversity

The Equity and Diversity (E&D) Committee has several initiatives taking shape or in progress and these are intended to improve policies, practices, and culture across the School.

In an effort to improve the representation and profile of Aboriginal and Torres Strait Islander members, the School would like to provide an Indigenous Honours Scholarship to support the living expenses of one student undertaking honours in the School each year. Unfortunately, this was not funded in the 2019 budget. The School will continue efforts to develop the proposal and garner Faculty support.

As part of the School's effort to promote gender equity in the School, an E&D Committee member has initiated a bimonthly meeting of the School's female academics as an informal setting for discussing challenges, proposing improvements to School practices, and networking. Ideas from these meetings

will be fed into discussions in the E&D and Executive Committees so that positive changes can be instituted to support the School's female academics.

A major focus of the E&D Committee in 2019 will be to bring insights from the SAGE process to bear on SBMS policies and practices. This began in early 2018, with the adoption of several new policies and practices to the School's Selection and Recruitment process such as modifications to the wording and structure of position descriptions for School hiring, and the adoption of unconscious bias training for those involved with selection and recruitment. Further suggestions springing from the UQ SAGE process, spanning selection and recruitment, appraisal, promotion, mentorship, flexible work, and culture, will be considered by the E&D Committee for feasibility and benefit, and suggested changes to policies and procedures will be made to the Executive Committee. It is anticipated that this will result in the adoption of numerous new policies and procedures supporting gender equity.

6.7 Engagement

6.7.1 Expanding Partnerships

As discussed in 6.5, there is strong support in the School for the view that individual researchers are the best means for driving initial connection to industry (rather than a School-wide approach). However, it is agreed that the School needs to raise staff profiles to attract interested partners and promote available expertise. The development of research themes and their promotion on the website as an avenue for linking to individuals and topics is one way to facilitate this. It is therefore critical that the website effectively showcases the research and engagement activities of the School to increase visibility and enhance the School and its members' reputation.

The SBMS Industry Engagement Committee proposes to develop a series of Fact Sheets on research capabilities in the School as a means to foster diversification of research partnership opportunities with industry, including promotion of the facilities available (IPL, Histology, etc.), highlighting the specific expertise not available elsewhere. They would include Standard Operating Procedures for specific techniques as required by industry. These will be placed on the website and linked to individual researchers to allow outside industry partners to appreciate the extent of activity and availability of expertise and facilities across the School. The School also proposes to work closely with the Research Development Manager in the flyer's development and promotion at events like AusBiotech and the BIO Convention.

Strategies to encourage more philanthropy (discussed below) also apply to overall better promotion of the School, areas of expertise and staff achievements. Further opportunities for promotion include seminars, invited guest speakers and visitors, and staff acting as ambassadors when travelling to conferences or visiting other institutions.

More closely cross-promoting cognate group's activities in this area, such as the workshops and seminars run by UQCCR on industry engagement, will also be undertaken. Given the success of the 2017 Symposium, SBMS will run another Industry Engagement Symposium in 2019.

The Committee will also consider ways to more systematically leverage existing linkages to encourage further collaborations with these or new partners. Currently, information on existing partnerships has not been readily available in a coordinated way and will require better tracking in the future; data collected for the purpose of this Review could form the basis for ongoing management by an appropriate professional staff member.

As evidenced in Chapter 5, the School already attracts international researchers to undertake collaborative research. The partnerships discussed in 6.8 will further promote this networking and potentially lead to additional collaborative ventures.

6.7.2 Strengthening Alumni Relationships

Building stronger relationships with alumni is another goal for the School. It is proposed that alumni are more actively included as partners, embedded in School activities and encouraged to engage more with the student body on an opt-in basis. Suggestions include a survey of graduates to track their career trajectories and improve the School's understanding of graduate destinations, as well as seeking alumni input as to the skills they believe should be embedded as part of their training and ways they would like to partner with the School in the future, and inviting their involvement in relevant activities such as the embedding of employability skills and introduction of blended learning in the redesign of courses.

Outreach to alumni will continue primarily through the Faculty of Science, with the School contributing via membership of relevant Faculty of Science committees. The formation of the new UQABS is another opportunity to facilitate closer engagement with the student body in future years and ways to best progress this will be explored.

6.7.3 Increasing Philanthropic Donations and Bequests

As government funding diminishes and the competition for research funding increases, the need to grow philanthropic support for student opportunity and education and research excellence is vital. SBMS appreciates the need to work more closely with the Faculty of Medicine's Advancement team to increase philanthropic revenue to the School, especially given at least one domestic benchmarking partner reports attracting significantly higher levels than that achieved in SBMS. The School will further discuss with this partner strategies they employed to see if any would be applicable to the local situation.

Communication as to why philanthropy is important and sharing stories about existing donors is a key factor in raising awareness. It is acknowledged more can be done to highlight these messages in brochures, e-newsletters, in the *UQmedicine* magazine, on websites, and through other communications devices. Facilitating ways to donate such as the School being included on donation forms in *UQmedicine* magazine and other UQ platforms is also important.

The School intends to better leverage opportunities to invite potential donors and sponsors to SBMS events that showcase the School's research and teaching achievements, e.g. the International Postgraduate Symposium and the annual Awards Night. SBMS donors are already included in the Faculty annual donor appreciation event. The School's biennial Body Donor Thanksgiving Ceremony is a further opportunity to message generosity and giving. Likewise, relevant members of staff need to actively be involved as participants in University and external donor recognition activities (such as the Perry Cross Spinal Research Foundation tour and lunch).

The School already receives philanthropic support from current staff members and will continue to recognise and acknowledge these individuals. The importance of philanthropy can be promoted further through new employee orientation and on-boarding materials to encourage others with whom staff partner to consider this avenue in the future.

Communication as to why philanthropy is important and sharing stories about existing donors is a key factor in raising awareness.

6.8 Internationalisation

The School operates under the principle that the training of future biomedical scientists should be, like science itself, a global enterprise.

In recent years, as previously noted, the School has developed several exchange agreements, including with Oxford University, the Munich Centre for Neuroscience (MCN) encompassing LMU and TUM, and Otago University in New Zealand. These agreements have been nurtured through the School's International Postgraduate Symposium and partnerships that have been established are thus broader than the routine student exchanges managed by UQ Abroad. The staff exchanges that have developed as a result allow for staff development and global networking in teaching and research in the biomedical sciences.

The School has additional proposals under development to expand these student and staff exchange partnership models to other international institutions in Europe and Asia, including countries listed within the current UQ Global Strategy. These arrangements will not only provide a source of quality international students at the graduate (honours) and postgraduate level into the School, but also provide for staff exchange and international visitor input into teaching and research activities. This positively influences the international focus of the School and facilitates further partnerships.

The School's International Postgraduate Symposium in Biomedical Sciences, discussed in 4.4.3, is testimony to the partnerships forged through these exchange processes with staff from LMU, Oxford, Otago, Guangzhou and Uppsala presenting during the two days in 2018 (typical of representation in preceding years).

In recognition of the importance of these developments and the need to provide improved coordination of activity in this area, the School recently convened an International Committee to oversee the direction of international staff and student exchanges and international marketing in general, and engage with respective staff in the Faculty and UQ Global Engagement. Some of the key developments active or in train are listed below.

- In late 2018, a SBMS staff member attended LMU to meet with international officers to finalise 2019 Erasmus + funding and to support and strengthen engagement activities and researcher mobility between UQ, MCN, LMU and TUM. Together with QBI, SBMS has also initiated a formal arrangement with the UQ Graduate School and the Graduate School of Neurosciences at MCN for a joint PhD student exchange program providing for two partnership scholarships for PhD students in the neurosciences from LMU or TUM (as both are part of MCN) to undertake a component of their studies at SBMS. Reciprocal scholarship arrangements for two students from SBMS/QBI to attend LMU under a similar arrangement are under development.
- The exchange program for PhD students with Uppsala University in Sweden could also be bolstered. Uppsala masters students are currently hosted in SBMS to

undertake their six-month M.Sc research project with a member of SBMS's medicinal chemistry team on a self-funded basis. This has led to a strong cohort of students in medicinal chemistry, but it is not on a reciprocal basis. It is anticipated that the new International Committee can help drive an elite exchange program, for example, for the benefit of honours students in the School.

- An agreement is currently in draft between the Guangzhou Institutes for Biomedicine and Health (GIBH), the Chinese Academy of Sciences (CAS) and UQ to establish a joint UQ-GIBH biomedical PhD training centre in Guangzhou, China. It is proposed that support will be provided by GIBH, CAS and local government and industrial sources. Application processes, entry requirements and the award of the degree will be those of UQ while the supervisor team will comprise UQ and GIBH staff. It is envisaged that the first group of 10 students will commence in Research Quarter 3, 2019 with a cap of 30 over three years. As well as supporting an increase in the number of quality international PhD students, and facilitating greater staff collaboration and exchange between the institutions, the agreement will facilitate access to funding from the Natural Science Foundation of China. If the program is successful, it is also intended to establish a joint research laboratory at each institution.
- In keeping with the UQ Global Priority target countries, China is a potential source of additional PhD candidates. Attracting PhD students funded through the China Scholarship Council requires additional marketing of the School and University in China. This was undertaken very successfully for several years but has declined in recent times. It is proposed, in line with the UQ Global Strategy Strategic Partners, that the School work with the University to revive efforts in this area.

School staff already have a global focus in their research networks, with some collaborations evidenced in 5.3, and many more on an individual basis spanning numerous countries around the world. Harnessing these collaborations in a more strategic way will need further discussion within the School. It is appreciated that self-funding overseas travel is a barrier for staff. One initiative to encourage more or closer collaborations is to encourage staff applications for relevant funding e.g. under the Special Studies Program (SSP), to visit existing or emerging collaborators.

Targeted discussions with, and engagement of, academic staff members who already have active or budding collaborations with UQ partner institutions can form the basis of closer relationships, such as widening those invited to participate in the International Postgraduate Symposium in Biomedical Sciences. Fostering these naturally occurring collaborations between academics is also more likely to lead to immediate impact in terms of driving research grant success, joint publications and involvement in international consortia. A recent successful example is a grant from the International Spinal Research Trust that now funds a jointly supervised PhD student working on a collaborative project between SBMS and Oxford University.

Appendices

Appendix 1. Academic Staff Detail

Continuing & Fixed Term	Level	2013	2014	2015	2016	2017	2018	2019
T&R								
	E	8.40	7.20	6.00	4.70	6.50	8.70	8.80
	D	3.00	3.00	3.50	5.00	3.80	8.80	14.80
	C	11.40	11.40	9.00	9.00	11.00	11.00	7.90
	B	12.50	8.00	5.60	4.60	3.60	5.50	6.00
	A	1.00	1.00					
	Total	36.30	30.60	24.10	23.30	24.90	34.00	37.50
RF								
	E				1.00	0.50	0.50	0.50
	D		0.50	1.70	2.10	2.30	2.70	1.30
	C	3.00	5.00	6.90	6.40	7.00	4.00	2.90
	B	3.90	4.50	5.85	4.41	6.45	2.45	3.30
	A	20.60	20.80	23.73	27.13	19.10	20.25	19.60
	Total	27.50	30.80	38.18	41.04	35.35	29.90	27.60
TF								
	D	2.00	2.00	1.00	1.00	1.00	1.00	1.00
	C	3.40	4.40	3.00	3.00	6.00	4.00	2.00
	B	4.00	5.00	7.00	5.40	3.00	3.00	4.00
	A	3.00	3.00	2.00	2.50	2.00	4.00	2.00
	Total	12.40	14.40	13.00	11.90	12.00	12.00	9.00
Continuing & Fixed Term Total		76.20	75.80	75.28	76.24	72.25	75.90	73.10
Casual	Total	22.64	22.94	16.04	14.14	15.95	N/A	N/A

Notes: Figures are official 31 March of each year except for 2019 which reflects the staffing cohort as at 18 January.
Source: UQ Reportal Staff FTE, by Function & Classification.

Appendix 2. List of Staff in SBMS

Current 24 January 2019

Academic Staff

T&R Professors

Basford, Kaye
Head of School
Bennett, Michael
Chen, Chen
Coulson, Elizabeth+
Deputy Head of School
Chair of Research Committee
Key, Brian
Minchin, Rodney
Midwinter, Mark
Chair IPLC Advisory Committee
Thomas, Walter
Thor, Stefan

Research Professors

Moritz, Karen+^

T&R Associate Professors

Anderson, Stephen
Bellingham, Mark
Borges, Karin
Bowles, Josephine
Gobe, Glenda
Launikonis, Bradley
Lavidis, Nickolas
Millard, Sean
Ng, Dominic
Noakes, Peter+
Chair Postgraduate Committee
Piper, Michael
Ruitenbergh, Marc
Scott, Ethan
Chair E&D Committee
Stephan, Carl
Chair ATARM Committee
Teasdale, Rohan

Research Associate Professors

Ovenden, Jennifer*+
Principal Research Fellow
Woodruff, Trent^*
NHMRC Career Dev't Fellow
Chair Industry Eng. Committee

Teaching Focused Associate Professor

Lluka, Lesley
Chair T&L & Assessment Committees

T&R Senior Lecturers

Hughes-Stamm, Sheree
Kaminskas, Lisa
Rajapakse, Niwanthi
Rash, Lachlan
Simmons, David
Tucker, Kylie
Vukovic, Jana+
Wu, Sherry

Research Level C

Butcher, Neville*
Snr Research Fellow
Clark, Richard*
Snr Research Fellow
Chair Honours Committee
Rosengren, Johan*
Snr Research Fellow

Teaching Focused Senior Lecturers

Aland, Claire
Colthorpe, Kay

T&R Lecturers

Cuffe, James
Dick, Taylor
Pagan, Julia
Pillai, Suja
Rawashdeh, Oliver
Reichelt, Melissa

Research Level B

Conibear, Anne*
UQ Development Fellow
Dudgeon, Christine*+
Research Fellow
Gallo, Linda*+
NHMRC Early Career Fellow
Spiller, Cassy*+
UQ Postdoctoral Res Fellow

Teaching Focused Lecturers

Ainscough, Sarah
Chunduri, Prasad
Langfield, Tracey
Ernst, Hartmuth

Research Level A

Fogarty, Matthew*
NHMRC Early Career Fellow
Marasini, Nirmal*
UQ Development Fellow
Sharmin, Sazia*
UQ Development Fellow

Teaching Focused Associate Lecturers

Kibedi, Judit
Roy Manchudi, Mary-Louise

Staff absent on fellowships holding substantive positions in SBMS

T&R Professors

Lynch, Joseph (QBI)
Meunier, Frederic (QBI)
Richards, Linda (QBI)

Postdoctoral Research Fellows Level A

Chen, Hsiao-Jou*
Constantin, Lena*
Essid, Sumia*
Han, Felicity*
Harvey, Tracey*
Kumar, Vinod*
Kuo, Andy*
Lambole, Cedric*
Lee, John*
Outhwaite, Jennifer*
Smallwood, Taylor*
Qian, Lei*
Vanwalleghe, Gilles*
Wilkinson, Andrew*
Zalucki, Oressia*+

Research Officers Level A

Feng, Chun-Wei*
Huang, Lili*+
Yang, Zhe*

Professional Staff

Governance

Forrest, Tim
School Manager
Chair Space Committee
Hamlet, Marianne
Executive Assistant

Gross Anatomy Facility and BDP

Fisk, Wesley
GAF & BDP Manager
Veprek, Andrew
Senior Anatomy Mortuary Technician
Anatomy Mortuary Technicians:
Glen, Christopher
Hocking, Nataly
Nicholson, Chantal
Seidl, Laura
Battin, Kimberley
Body Donor Program Coordinator
Wardropper, Jill*
DP Admin Assistant

Core Facilities

Whitehead, Darryl
Manager, Histology Facility

Lush, Rebecca
Museum Curator IPLC

Walters, Shaun
Research Facilities Manager

Research Facility Coordinators:

Flint, Melanie +

Purdue, Brooke*+

Zell, Neville
Museum Attendant IPLC

Teaching Laboratories

Kershaw, Scott
Manager, Teaching Lab Services

McLennan, Elizabeth
Senior Technical Officer

Technical/Scientific Officers:

Gamage, Niranjali

Jennings, Raeleen

Kerr, Matthew

Reid, Chantelle

Faculty Staff embedded in the School (full or part-time)

Building, Facilities & Safety

Oram, Robyn
Safety Manager
Chair OH&S Committee

Myers, Lawrence
WHS Coordinator

Rose, Harmony
Facilities Manager

Rey, Bruno
Operations & Facilities Officer

Facilities Officers:

Beauchamp, Adam

Deeming, Nigel

Research Support & HDR

Ulrike Siebeck
Research Dev't Manager

Vacant
Research Dev't Officer

Mather, James
HDR Liaison Officer

Teaching & Assessment Services

Summerhayes, Trudi
T&A Coordinator

T&A Officers & Assistants:

Cox, Kelly

Kaur, Bacsweet+

Norris, Bridget

Pitt, Line

Waldron, Janet

Watkins, Krystal

Wical, Carol+*

Marketing & Communications

Moyle, Simone
MarComs Manager

Human Resources

Betts, Lou
HR Advisor

Finance

Curnow, Cathryn
Snr Management Accountant

Alcorn, Brenda
Management Accountant

Larkin, Corinne
Senior Finance Officer

Finance Officers:

Wong, Catherine

Craik, Emma

Rice, Michele

Research Assistants

Research Assistants/Technicians HEW 6

Chen, Rui
Ineson, Jessica +
Pearce, Luke+
Richards, Dominic
Rumbale, Bree+

Research Assistants/Technicians HEW 5

Burow, Rachel+
Carroodus, Nissa
Imam, Mohammad+
Li, Rui
Liu, Ning
McDonald, Tanya
McGill, Raquel B
Milne, Michael
Parker, Sandra E
Shayegh, Maryam+
Song, Angela A
Wang, Lili
Jacobsen, Esther+
Clinical Research Coordinator

Honorary and Adjunct Academic Appointments

Emeritus Professors

Kerr, John
McManus, Michael
O'Donnell, Stella
Pettigrew, John
Smith, Maree

Honorary Professors

Adams, David
Garland, Christopher
Hannan, Ross
Khanna, Rajiv
Mountford, Carolyn
Nielsen, Einar
Perkins, Andrew
Thor, Johan
Thorn, Peter

Health Title Professors

Clouston, Andrew
Samaratunga, Hemamali

Affiliate Professors

Lewis, Richard
Muscat, George
Parton, Robert
Yap, Alpha

Adjunct Associate Professors

Lee, Tong
Moore, Brendan
Nissen, Michael
Spurdle, Amanda

Honorary Assoc Professors

Barclay, Christopher
Boyle, Michelle
Dawson, Paul
Duffy, David
Lee, Jason
Phipps, Simon
Porello, Enzo
Sernia, Corrado
Wiegman, Adrian

Health Title Assoc Professor

Cummings, Margaret
Naylor, Charles
Norton, Robert
Pretorius, Carel
Rosty, Christophe
Rowbotham, Beverley
Walker, Neal

Affiliate Assoc Professor

Wicking, Carol

Adjunct Senior Fellow

Moore, Anthony

Honorary Senior Fellows

Boyle, Glen
Cocchi, Luca
Faddy, Helen
Frazer, David
Hudson, James
Navarro, Severine
Soekmadji, Carolina

Honorary Senior Lecturers

Bradley, Adrian
Kippers, Vaughan
Siebeck, Ulrike

Health Title Senior Lecturers

Bettington, Mark
Brown, Ian
Buzacott, Katie
Cooper, Caroline
Dettrick, Andrew
Heney, Claire
Lau, Chiyan
Matsika, Admire
Miller, Gregory
Milne, Nathan
Muttaiyah, Sharmini
Nandakumar, Lakshmy
Ong, Beng
Pandey, Sushil
Perry-Keene, Joanna
Robertson, Thomas
Rowell, John
Seymour, Louise
Sim, Sarah
Srinivasan, Bhuvana
Stewart, Anne
Taheri, Touraj
Tang, Fiona
Ungerer, Jacobus
Vyas, Vipul
Warner, Janet
Wilgen, Urs
Williams, Bronwyn

Affiliate Senior Research Fellow

Hogan, Benjamin

Adjunct Lecturer

Proctor, Lavinia
Honorary Fellows Level B
Bald, Tobias
Beverdam, Annemiek
Guillerey, Camille
Renteria Rodriguez, Miguel

Honorary Lecturers

Barry, Guy
Zimbardi, Kirsten

Health Title Lecturers

Abdulrasool, Ghusoon
Reid, Andrew
Vidler, Jessica

Adjunct Fellow Level A

Heales, Luke

Honorary Fellow Level A

Fitzgerald, Danielle
Ullah, Ashik
Yang, Seung

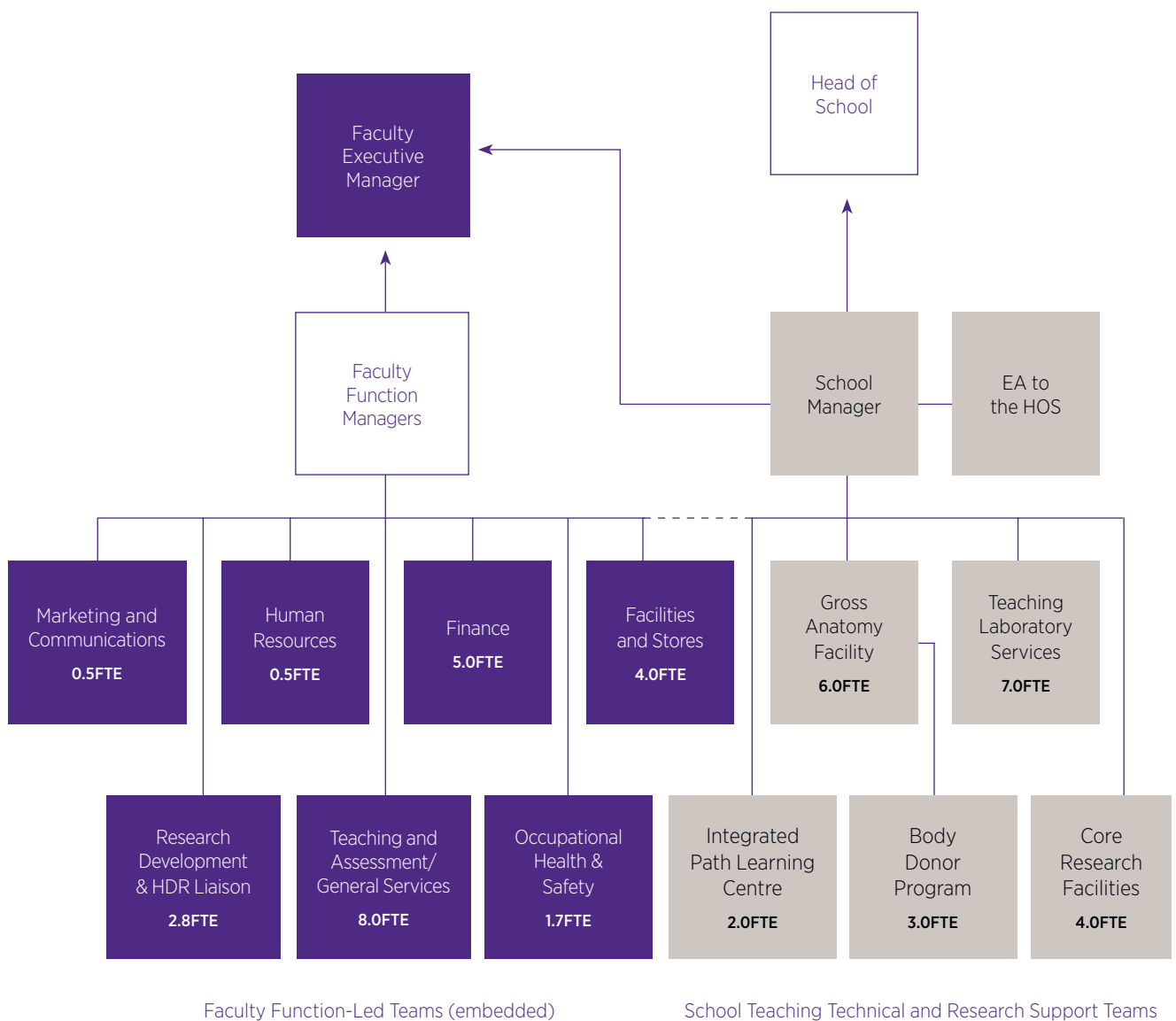
Health Title Assoc. Lecturers

Azlan, Aliya
Bennett, James
Chuang, Jin-Yu
Dedina, Liana
Furnas, Lauren
Gous, Rehna
Hsieh, Michael
Hutson, Peter
Johnstone, Kate
Lester, Joanne
Martin, David
Melville, Lewis
Mulyadi, Arief
Power, Amy
Sokolova, Anna
Squires, Lisa
Tan, Edwin
Thomas, Michael
Thompson, Kyra
Tin, Kyi S
Whitfield, Joseph
Willis, Timothy
Yan, Hui

Key:

- ^ Holds an underlying continuous appointment
- + Fractional appointment
- * Fixed term position

Appendix 3. Professional Staff Chart



Appendix 4. Course Enrolments by Subject Area for SBMS

Course Code	Course Title		2015	2016	2017
ANAT1000	Systemic Anatomy	Number of Students	27	-	-
		EFTSL % Owned	80.00	-	-
		EFTSL	2.70	-	-
ANAT1005	Anatomical Basis of Human Move	Number of Students	530	613	634
		EFTSL % Owned	100.00	100.00	100.00
		EFTSL	66.13	76.50	79.25
ANAT1012	Regional Anatomy	Number of Students	142	132	130
		EFTSL % Owned	100.00	100.00	100.00
		EFTSL	17.75	16.50	16.25
ANAT1018	Systematic & Applied Anatomy	Number of Students	132	114	117
		EFTSL % Owned	100.00	100.00	100.00
		EFTSL	16.50	14.25	14.63
ANAT1019	Regional, Neuro & Applied Anat	Number of Students	137	103	111
		EFTSL % Owned	100.00	100.00	100.00
		EFTSL	17.13	12.88	13.88
ANAT1020	Systematic Anatomy	Number of Students	165	140	150
		EFTSL % Owned	100.00	100.00	100.00
		EFTSL	20.50	17.38	18.75
ANAT1022	Anatomy of the Head, Neck & Th	Number of Students	104	95	97
		EFTSL % Owned	100.00	100.00	100.00
		EFTSL	13.00	11.88	12.13
ANAT1100	Anatomy for Paramedics	Number of Students	131	-	-
		EFTSL % Owned	80.00	-	-
		EFTSL	13.10	-	-
ANAT2000	Functional Anatomy	Number of Students	31	36	52
		EFTSL % Owned	100.00	100.00	100.00
		EFTSL	3.88	4.50	6.50
ANAT2005	Neuroanatomy (Speech Path)	Number of Students	98	94	89
		EFTSL % Owned	100.00	100.00	100.00
		EFTSL	6.13	5.88	5.56
ANAT2012	Functional Anatomy (Physio)	Number of Students	139	134	127
		EFTSL % Owned	100.00	100.00	100.00
		EFTSL	17.38	16.75	15.88
ANAT2029	Intro Human Musculoskel Anat	Number of Students	97	136	161
		EFTSL % Owned	100.00	100.00	100.00
		EFTSL	11.88	16.88	19.88
ANAT3022	Functional Neuroanatomy	Number of Students	302	188	179
		EFTSL % Owned	100.00	100.00	100.00
		EFTSL	37.38	23.50	22.13

Course Code	Course Title		2015	2016	2017
ANAT7000	Anatomical Fundamentals	Number of Students	24	26	33
		EFTSL % Owned	100.00	100.00	100.00
		EFTSL	3.00	3.25	4.13
BIOL1040 ¹	Cells to Organisms	Number of Students	1,712	1,151	962
		EFTSL % Owned	85.00	85.00	85.00
		EFTSL	186.26	122.72	102.74
BIOL2200	Cell Structure & Function	Number of Students	696	653	588
		EFTSL % Owned	40.00	40.00	60.00
		EFTSL	34.60	32.60	43.88
BIOL3006	Molecular Cell Biology	Number of Students	88	91	72
		EFTSL % Owned	25.00	25.00	25.00
		EFTSL	2.72	2.72	2.16
BIOM1050 ¹	Biology for Health Sciences	Number of Students	-	610	641
		EFTSL % Owned	-	80.00	80.00
		EFTSL	-	61.00	64.10
BIOM1051 ¹	Intro Cellular Physiology	Number of Students	-	-	206
		EFTSL % Owned	-	-	87.00
		EFTSL	-	-	22.40
BIOM1052	Integrated Anatomy and Physiol	Number of Students	250	259	202
		EFTSL % Owned	100.00	100.00	100.00
		EFTSL	31.25	32.38	25.25
BIOM2009	Human Physiol & Pharmacol AI	Number of Students	263	181	182
		EFTSL % Owned	100.00	100.00	100.00
		EFTSL	32.88	22.63	22.75
BIOM2010	Human Physiol & Pharmacol All	Number of Students	251	176	193
		EFTSL % Owned	100.00	100.00	100.00
		EFTSL	15.69	11.00	12.06
BIOM2011	Cell & Tissue Biology	Number of Students	453	433	513
		EFTSL % Owned	97.00	97.00	97.00
		EFTSL	54.81	52.26	61.84
BIOM2012	Systems Physiology	Number of Students	446	413	410
		EFTSL % Owned	97.50	97.50	97.50
		EFTSL	53.99	50.09	49.60
BIOM2013	BBiomedSc Cell Biology	Number of Students	95	96	-
		EFTSL % Owned	100.00	97.00	-
		EFTSL	11.88	11.64	-
BIOM2015	Biomed basis of Hlth & Disease	Number of Students	71	-	-
		EFTSL % Owned	80.00	-	-
		EFTSL	7.10	-	-
BIOM2015	Physiol&Pharmacol HumanDisease	Number of Students	-	86	138
		EFTSL % Owned	-	100.00	100.00
		EFTSL	-	10.63	17.25

Course Code	Course Title		2015	2016	2017
BIOM2020	Human Anatomy	Number of Students	459	446	411
		EFTSL % Owned	100.00	100.00	100.00
		EFTSL	57.25	55.00	51.25
BIOM2052	Physiology & Pharmacology	Number of Students	-	65	72
		EFTSL % Owned	-	100.00	100.00
		EFTSL	-	8.13	9.00
BIOM2208	Differentiation & Development	Number of Students	99	126	114
		EFTSL % Owned	60.00	60.00	60.00
		EFTSL	7.28	9.23	8.33
BIOM2402	Principles of Pharmacology	Number of Students	299	289	242
		EFTSL % Owned	100.00	100.00	100.00
		EFTSL	37.25	36.00	30.13
BIOM3002	Human Biomedical Anatomy	Number of Students	242	261	225
		EFTSL % Owned	100.00	100.00	100.00
		EFTSL	30.25	32.63	28.13
BIOM3003	Funct Musculoskeletal Anatomy	Number of Students	60	62	44
		EFTSL % Owned	100.00	100.00	100.00
		EFTSL	7.50	7.38	5.50
BIOM3010	Human Physiol & Pharmacol B1	Number of Students	225	248	183
		EFTSL % Owned	100.00	100.00	100.00
		EFTSL	28.13	31.00	22.75
BIOM3011	Human Physiol & Pharmacol B2	Number of Students	214	264	182
		EFTSL % Owned	100.00	100.00	100.00
		EFTSL	13.38	16.50	11.38
BIOM3014	Molecular & Cell Physiology	Number of Students	89	45	81
		EFTSL % Owned	100.00	100.00	100.00
		EFTSL	11.13	5.63	10.13
BIOM3015	Physiology & Pathophysiology	Number of Students	203	130	139
		EFTSL % Owned	100.00	100.00	100.00
		EFTSL	25.25	16.25	17.25
BIOM3020	Integrated Endocrinology	Number of Students	243	163	186
		EFTSL % Owned	100.00	100.00	100.00
		EFTSL	30.38	19.88	22.88
BIOM3200	Biomedical Science	Number of Students	405	420	421
		EFTSL % Owned	69.00	69.00	69.00
		EFTSL	34.93	36.14	36.31
BIOM3333	Principles of Biomed Research	Number of Students	43	40	45
		EFTSL % Owned	100.00	100.00	100.00
		EFTSL	5.38	5.00	5.63
BIOM3401	Systems Pharmacology	Number of Students	134	165	123
		EFTSL % Owned	100.00	100.00	100.00
		EFTSL	16.75	20.63	15.25

Course Code	Course Title		2015	2016	2017
BIOM3402	Experimental Pharmacology	Number of Students	29	41	53
		EFTSL % Owned	100.00	100.00	100.00
		EFTSL	3.63	5.13	6.50
BIOM6191	Research Project	Number of Students	51	54	67
		EFTSL % Owned	100.00	100.00	100.00
		EFTSL	51.00	54.00	66.00
BIOM6192	Research Project	Number of Students	28	25	25
		EFTSL % Owned	100.00	100.00	100.00
		EFTSL	14.00	12.50	12.50
BIOM6193	Research Project	Number of Students	1	-	3
		EFTSL % Owned	100.00	-	100.00
		EFTSL	0.25	-	1.00
BIOM6501	Research Project	Number of Students	21	29	26
		EFTSL % Owned	100.00	100.00	100.00
		EFTSL	19.50	29.00	25.00
BIOM6502	Research Project	Number of Students	9	13	13
		EFTSL % Owned	100.00	100.00	100.00
		EFTSL	4.50	6.50	6.50
BIOM6503	Research Project	Number of Students	2	2	1
		EFTSL % Owned	100.00	100.00	100.00
		EFTSL	0.50	0.50	0.25
BIOT2002	Introduction to Biotechnology	Number of Students	41	44	43
		EFTSL % Owned	20.00	20.00	20.00
		EFTSL	1.00	1.08	1.08
BIOT3002	Drug Design & Development	Number of Students	25	50	53
		EFTSL % Owned	70.00	70.00	96.00
		EFTSL	2.10	4.20	6.36
BIOT7030 ²	Drug Discovery & Development	Number of Students	4	9	5
		EFTSL % Owned	100.00	100.00	96.00
		EFTSL	0.50	1.00	0.60
DENT2052	Dental Biosciences	Number of Students	83	-	-
		EFTSL % Owned	48.67	-	-
		EFTSL	15.15	-	-
DEVB3001	Developmental Neurobiology	Number of Students	92	96	117
		EFTSL % Owned	90.00	90.00	90.00
		EFTSL	9.90	10.35	12.71
DEVB3002	Molec Mechanisms of Devel	Number of Students	30	-	-
		EFTSL % Owned	89.00	-	-
		EFTSL	3.23	-	-
DEVB3002	StemCells&RegenerativeMedicine	Number of Students	-	38	70
		EFTSL % Owned	-	89.00	89.00
		EFTSL	-	4.12	7.45

Course Code	Course Title		2015	2016	2017
MEDI1011	Medical Science 1	Number of Students	8	-	-
		EFTSL % Owned	59.56	-	-
		EFTSL	1.19	-	-
MEDI1012	Medical Science 2	Number of Students	11.00	-	-
		EFTSL % Owned	59.56	-	-
		EFTSL	1.64	-	-
MEDI1021	Clinical Skills 1	Number of Students	1.00	-	-
		EFTSL % Owned	59.53	-	-
		EFTSL	0.07	-	-
MEDI1022	Clinical Skills 2	Number of Students	1.00	-	-
		EFTSL % Owned	59.53	-	-
		EFTSL	0.07	-	-
MEDI2011	Clinical Science 1	Number of Students	527	20	-
		EFTSL % Owned	6.24	6.24	-
		EFTSL	8.22	0.31	-
MEDI2012	Clinical Science 2	Number of Students	415	23	-
		EFTSL % Owned	6.24	6.24	-
		EFTSL	6.47	0.36	-
MEDI2021	Clinical Practice 1	Number of Students	524	16	-
		EFTSL % Owned	6.20	6.24	-
		EFTSL	4.06	0.12	-
MEDI2022	Clinical Practice 2	Number of Students	519	23	-
		EFTSL % Owned	6.20	6.24	-
		EFTSL	4.02	0.18	-
MEDI7111	Clinical Science 1	Number of Students	533	533	509
		EFTSL % Owned	57.07	57.07	57.07
		EFTSL	57.03	57.03	54.47
MEDI7112	Clinical Science 2	Number of Students	513	517	492
		EFTSL % Owned	57.07	57.07	57.07
		EFTSL	54.89	55.32	52.65
MEDI7211	Clinical Science 3	Number of Students	-	504	508
		EFTSL % Owned	-	12.47	12.47
		EFTSL	-	11.78	11.88
MEDI7212	Clinical Science 4	Number of Students	-	500	505
		EFTSL % Owned	-	12.47	12.47
		EFTSL	-	11.69	11.81
NEUR3001	Molecular & Cell Neuroscience	Number of Students	92	96	102
		EFTSL % Owned	84.00	64.00	64.00
		EFTSL	9.66	7.44	7.92
NEUR3002	The Integrated Brain	Number of Students	179	124	145
		EFTSL % Owned	85.00	85.00	85.00
		EFTSL	18.38	12.33	15.19

Course Code	Course Title		2015	2016	2017
PCOL2000	Introduction to Pharmacology	Number of Students	67	-	-
		EFTSL % Owned	100.00	-	-
		EFTSL	8.38	-	-
PTY7101	Adv Stud in Behav, Med Sc A	Number of Students	20	-	-
		EFTSL % Owned	40.00	-	-
		EFTSL	1.00	-	-
PTY7102	Adv Stud in Behav, Med Sc B	Number of Students	17	-	-
		EFTSL % Owned	35.00	-	-
		EFTSL	0.74	-	-
PTY7305	Adv Studs in Sports Science	Number of Students	4	-	-
		EFTSL % Owned	38.00	-	-
		EFTSL	0.19	-	-
PHYL1007	Physiology for HMS	Number of Students	307	331	373
		EFTSL % Owned	90.00	90.00	90.00
		EFTSL	34.54	37.24	41.96
PHYL2062	Physiology I	Number of Students	128	128	126
		EFTSL % Owned	100.00	100.00	100.00
		EFTSL	16.00	16.00	15.75
PHYL2063	Physiology I	Number of Students	121	102	104
		EFTSL % Owned	100.00	100.00	100.00
		EFTSL	15.13	12.75	13.00
PHYL2064	Physiology II	Number of Students	129	129	120
		EFTSL % Owned	100.00	100.00	100.00
		EFTSL	16.13	16.13	15.00
PHYL2065	Physiology II	Number of Students	109	97	93
		EFTSL % Owned	100.00	100.00	100.00
		EFTSL	13.63	12.13	11.63
PHYL2066	Human Function Hlth & Dis A	Number of Students	97	107	88
		EFTSL % Owned	100.00	100.00	100.00
		EFTSL	6.06	6.69	5.50
PHYL2067	Human Function in Hlth & Dis B	Number of Students	105	117	86
		EFTSL % Owned	100.00	100.00	100.00
		EFTSL	6.56	7.31	5.38
PHYS1171	Physical Basis of Biol. System	Number of Students	600	482	424
		EFTSL % Owned	13.00	13.00	13.00
		EFTSL	9.90	7.95	6.87
SCIE1000	Theory & Practice in Science	Number of Students	656	-	-
		EFTSL % Owned	5.00	-	-
		EFTSL	4.10	-	-
SCIE1100	Adv Theory and Practice	Number of Students	137	-	-
		EFTSL % Owned	5.00	-	-
		EFTSL	0.86	-	-

Course Code	Course Title		2015	2016	2017
SCIE2011	Perspectives in Science	Number of Students	40	40	26
		EFTSL % Owned	50.00	50.00	50.00
		EFTSL	2.50	2.50	1.63
SCIE3220	Biomedical Science Research	Number of Students	77	72	49
		EFTSL % Owned	100.00	100.00	100.00
		EFTSL	9.63	9.13	6.13
SCIE3221	Biomed Sc Summer Project	Number of Students	23	50	31
		EFTSL % Owned	100.00	100.00	100.00
		EFTSL	2.88	6.25	3.88

Note: This official record contains some inconsistencies that are being resolved by SBMS in discussion with partner schools.

Notes: 1. BIOM1050 and BIOM1051 split from BIOL1040 in 2016 and 2017 respectively. 2. SBMS also contributed teaching towards BIOT7033. An official EFTSL split for this course has been put in place from 2018.

Source: UQ Reportal, Course Enrolments by School and Subject Area, 5 Year Trend accessed 21 November 2018

Appendix 5. Entry Requirements for Selected Programs to which SBMS Contributes

	Minimum Entry Requirements	2018 OP & Rank	Length	Other	Weblink for more info
Undergraduate Coursework					
Faculty of Science					
Bachelor of Advanced Science (Hons)	Qld yr 12 or equiv. English, Maths B + 2 of Agric. Sci, Biol., Chem., Earth Sci, Maths C or Physics	3/95 (median OP 1)	4 years (64 units)	AQF 8	my.uq.edu.au/programs-courses/program.html?acad_prog=2341
Bachelor of Biomedical Science	Qld yr 12 or equiv. English, Maths B + 1 of Chem. or Physics	7/86 (median OP 3)	3 years (48 units)	AQF 7 (The AQF8 4 year vn is in teach-out)	my.uq.edu.au/programs-courses/program.html?acad_prog=2415
Bachelor of Biomedical Science (Hons)	BBiomedSc with GPA of 4 & GPA 4.5 at 1st attempt of #8 late year courses incl. #2 research project.	N/A	1 year (16 units)	AQF 8	my.uq.edu.au/programs-courses/program.html?acad_prog=2423
Bachelor of Science ¹	Qld yr 12 or equiv. English, Maths B + 1 of Chem. or Physics.	9/81 (median OP5)	3 years (48 units)	AQF 7. Also offered at Gatton campus	my.uq.edu.au/programs-courses/program.html?acad_prog=2030
Bachelor of Science (Hons)	BSc with GPA of 4 & GPA 4.5 in #8 relevant late year courses from Part B course list.	N/A	1 year (16 units)	AQF 8	my.uq.edu.au/programs-courses/program.html?acad_prog=2031
Faculty of Medicine					
Bachelor of Health Sciences	Qld yr 12 or equiv. English. Recom + 1 of Biology, Chem., Physics or Science21.	8/84 Dual M 2/97	3 years (48 units)	AQF 7. Also offered as BHIthSc(Nutr) / M Dietetics	my.uq.edu.au/programs-courses/program.html?acad_prog=2252
Faculty of Health and Behavioural Sciences					
Bachelor of Clinical Exercise Physiology (Hons)	Qld yr 12 or equiv. English + 1 of Biology, Chem. or Physics.	4/93	4 Years (64 units)	AQF 8	my.uq.edu.au/programs-courses/program.html?acad_prog=2413
Bachelor of Dental Science (Hons)	Qld yr 12 or equiv. English & Chemistry (Biol. recom) + UMAT for dom. studs.	1/99	5 years (80 units)	AQF 8	my.uq.edu.au/programs-courses/program.html?acad_prog=2367
Bachelor of Exercise and Nutrition Sciences	Qld yr 12 or equiv. English, Maths A, B or C + 1 of Biology, Chem. or Physics.	9/81 Dual M 2/97	3 years (48 units)	AQF 7. Also offered as BEx&Nutr Sc / M Dietetics	my.uq.edu.au/programs-courses/program.html?acad_prog=2325
Bachelor of Exercise and Sport Science (Hons)	Qld yr 12 or equiv. English + 1 of Biology, Chem. or Physics.	6/89	4 years (64 units)	AQF 8.	my.uq.edu.au/programs-courses/program.html?acad_prog=2371
Bachelor of Health, Sport & Phys Ed (Hons)	Qld yr 12 or equiv. English, Maths A, B or C + 1 of Biology, Chem. or Physics.	9/81	4 years (64 units)	AQF 8. Also AITSL specified non-academic criteria	my.uq.edu.au/programs-courses/program.html?acad_prog=2372
Bachelor of Midwifery	Qld yr 12 or equiv. English + 1 of Biology, Chem. or Physics.	4/93	3 Years (48 units)	AQF 7	my.uq.edu.au/programs-courses/program.html?acad_prog=2261
Bachelor of Nursing	Qld yr 12 or equiv. English + 1 of Biology, Chem. or Physics.	7/86	3 Years (48 units)	AQF 7	my.uq.edu.au/programs-courses/program.html?acad_prog=2241
Bachelor of Nursing/Midwifery	Qld yr 12 or equiv. English + 1 of Biology, Chem. or Physics.	4/94	4 Years (64 units)	AQF 7	my.uq.edu.au/programs-courses/program.html?acad_prog=2290
Bachelor of Occupational Therapy (Hons)	Qld yr 12 or equiv. English + 1 of Biology, Chem. or Physics.	3/95	4 years (64 units)	AQF 8	my.uq.edu.au/programs-courses/program.html?acad_prog=2368

	Minimum Entry Requirements	2018 OP & Rank	Length	Other	Weblink for more info
Bachelor of Pharmacy (Hons)	Qld yr 12 or equiv. English, Maths B & Chemistry	7/86	4 years (64 units)	AQF 8	my.uq.edu.au/programs-courses/program.html?acad_prog=2373
Bachelor of Physiotherapy (Hons)	Qld yr 12 or equiv. English + 1 of Biology, Chem. or Physics (Physics recom).	2/98	4 years (64 units)	AQF 8	my.uq.edu.au/programs-courses/program.html?acad_prog=2369
Bachelor of Psychological Science (Hons)	Qld yr 12 or equiv. English	7/86	4 years (64 units)	AQF 8	my.uq.edu.au/programs-courses/program.html?acad_prog=2379
Bachelor of Speech Pathology (Hons)	Qld yr 12 or equiv. English + 1 of Biology, Chem or Physics.	4/93	4 years (64 units)	AQF 8	my.uq.edu.au/programs-courses/program.html?acad_prog=2370
Faculty of Engineering, Architecture and Information Technology					
Bachelor of Engineering (Hons) ¹	Qld yr 12 or equiv. English, Maths B & 1 of Chem. or Physics	7/86	4 years (64 units)	AQF 8	my.uq.edu.au/programs-courses/program.html?acad_prog=2342
Postgraduate Coursework					
Doctor of Medicine	Direct: Relevant bachelor's degree with GPA 5 & GAMSAT (MCAT internat.) Provis: OP1/99 + yr 12 English & UMAT (or ISAT for internat.) provided completing yr 12 in year applic.	N/A	4 years (64 units)	AQF 9 (extended) Provisional enter after completion of bachelor's program in minimum time frame.	my.uq.edu.au/programs-courses/program.html?acad_prog=5578
Master of Nursing Studies	Approved degree with prereq study in biol. Sci., chem. or physics at UG level	NA	2 Years (32 units)	AQF 9. SBMS no contribution 2018-19	my.uq.edu.au/programs-courses/program.html?acad_prog=5491
Master of Speech Pathology Studies	Approved degree in health, humanities, education, social, physical or biol sci with prereq study in statistics + 1 of linguistics, psychology or physiology	N/A GPA based	2.5 years (40 units)	AQF 9	my.uq.edu.au/programs-courses/program.html?acad_prog=5228
Doctor of Medicine	Direct: Relevant bachelor's degree with GPA 5 & GAMSAT (MCAT internat.) Provis: OP1/99 + yr 12 English & UMAT (or ISAT for internat.) provided completing yr 12 in year applic.	N/A	4 years (64 units)	AQF 9 (extended) Provisional enter after completion of bachelor's program in minimum time frame.	my.uq.edu.au/programs-courses/program.html?acad_prog=5578
Master of Nursing Studies	Approved degree with prereq study in biol. Sci., chem. or physics at UG level	NA	2 Years (32 units)	AQF 9. SBMS no contribution 2018-19	my.uq.edu.au/programs-courses/program.html?acad_prog=5491
Master of Speech Pathology Studies	Approved degree in health, humanities, education, social, physical or biol sci with prereq study in statistics + 1 of linguistics, psychology or physiology	N/A GPA based	2.5 years (40 units)	AQF 9	my.uq.edu.au/programs-courses/program.html?acad_prog=5228

Note: 1. Plus associated dual degrees.

