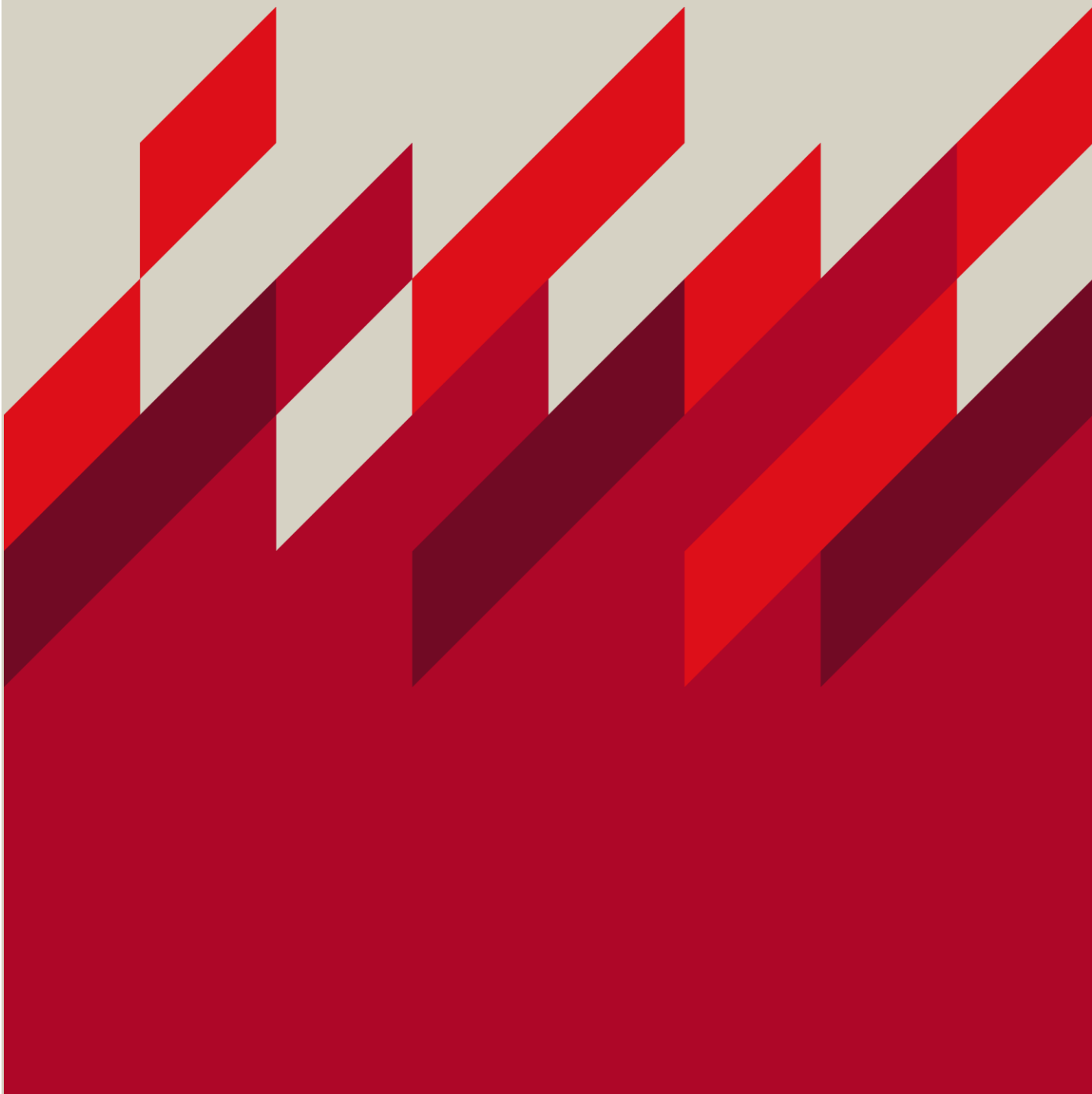




MACQUARIE
University

2015 Year-in-Review: Research



Macquarie continues its ascendant trajectory as one of Australia’s leading research universities, bringing together the best minds to conduct cutting-edge research that crosses traditional disciplinary boundaries and addresses the big issues facing the world. Macquarie is committed to World-leading Research with World-changing Impact.

2015 EXCELLENCE IN RESEARCH AUSTRALIA

Macquarie's 2015 Excellence in Research Australia (ERA) results further cement the University’s position as a world-leading research intensive university. From ERA 2012 to ERA 2015, the University has increased the proportion of its 4-digit Fields of Research (FoRs) rated at 3 (performance at world standard) and above from 85.7% to 96% in 2015. Of the research submitted for assessment, 96% of our research is rated as being “at world standard” and above. This exceeds the target of 95% that the University set for 2024. At the 2-digit level, 100% of our research is rated as being “at world standard” and above – see Table 1.

This is a stunning achievement that exemplifies the hard work of our research community. Through the guidance and stellar achievements of our research leaders and leading researchers across campus, we are shifting the research culture at Macquarie to one with a greater emphasis on quality and excellence.

Table 1: 2015 ERA Ratings Amalgamated

	‘Outstanding performance well above world standard’ (5s)	‘Performance above world standard and above’ (4s + 5s)	‘Performance at world standard and above’ (3s + 4s + 5s)	‘Performance below world standard’ (2s)
# at 2-digit level	3	12	21	0
% of 2-digit level	14%	57%	100%	0%
# at 4-digit level	14	33	53	2
% of 4-digit level	25.5%	60%	96%	4%

RESEARCH BLOCK GRANTS

Macquarie University will receive \$39.4m in Research Block Grants (RBGs) in 2016. This is 9.87% up from Macquarie’s 2015 research block grants of \$35.9m – see Table 2 (below) for full details. Among universities that earn more than \$10 million in research block grants, Macquarie displays the largest percentage year-on-year growth. The average year-on-year growth across the sector for research block grants is 4.2%, Macquarie more than doubles this. Macquarie’s growth rate is well above the growth rate of the funds in each of the RBG schemes. This results in the capture of additional RBG allocation share for Macquarie. The right-hand column in Table 2 (above) indicates Macquarie’s increased share of the available RBG funding.

Table 2: National Research Block Grant Allocation Comparison 2015-16

	National 2016	% ↑ from 2015	Macquarie 2016	Allocation Share 2015	Allocation Share 2016	Allocation % Change
APA	\$284m	1.65%	\$7.3m	2.43%	2.56%	0.13%
IPRS	\$22.6m	1.7%	\$554k	2.29%	2.45%	0.16%
SRE	\$209m	8.9%	\$3.6m	1.55%	1.72%	0.17%
JRE	\$363m	1.7%	\$6.4m	1.63%	1.78%	0.15%
RIBG	\$244m	1.7%	\$4.8m	1.78%	1.99%	0.21%
RTS	\$690m	1.7%	\$16.6m	2.28%	2.41%	0.13%
TOTAL	\$1.8b	2.48%	\$39.4m	2.02%	2.17%	0.15%

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RESEARCH INCOME

In the 2014 Higher Education Research Data Collection (HERDC), Macquarie more than doubled the national average increase. The national average increase was \$4.5m and Macquarie's increase was \$9.2m. While Macquarie increased its research income by 19%, five of the Group of Eight universities experienced a decrease in research income over the same period. Within the band of universities attracting more than \$50m in external research income, Macquarie had the second highest increase after James Cook University.

Table 3: Top 25 Universities ranked by Research Income

		2013	2014	2014 %↑
1	The University of Melbourne	\$373.9m	\$412.3m	10.29%
2	The University of Queensland	\$381.7m	\$377.3m	-1.17%
3	The University of Sydney	\$363.1m	\$356.5m	-1.81%
4	Monash University	\$314.5m	\$355.9m	13.18%
5	The University of New South Wales	\$346.7m	\$344.8m	-0.55%
6	The Australian National University	\$251.4m	\$272.4m	8.32%
7	The University of Western Australia	\$214.4m	\$204.5m	-4.61%
8	The University of Adelaide	\$183.2m	\$182m	-0.63%
9	University of Tasmania	\$90m	\$97m	7.72%
10	The University of Newcastle	\$83.8m	\$92.9m	10.82%
11	Queensland University of Technology	\$92.5m	\$91.4m	-1.19%
12	Curtin University of Technology	\$72.4m	\$80.4m	11.10%
13	University of South Australia	\$66.6m	\$71.8m	7.70%
14	Griffith University	\$62.4m	\$67.7m	8.56%
15	James Cook University	\$51.3m	\$64.3m	25.25%
16	University of Wollongong	\$56.9m	\$63.7m	11.88%
17	RMIT University	\$52m	\$61.8m	18.74%
18	Macquarie University	\$48.6m	\$57.9m	19.09%
19	La Trobe University	\$53.2m	\$55.3m	4.01%
20	Flinders University	\$62.2m	\$53.8m	-13.45%
21	Deakin University	\$43.4m	\$47.8m	10.10%
22	University of Technology, Sydney	\$42.3m	\$46.8m	10.77%
23	Charles Darwin University	\$35m	\$46m	31.43%
24	The University of New England	\$29.8m	\$32.2m	7.93%
25	University of Western Sydney	\$22.2m	\$26.2m	17.63%

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HIGHER DEGREE RESEARCH

One of the key goals of Macquarie's *Strategic Research Framework (2015-2024)* is to produce "world-ready Higher Degree Research (HDR) candidates." By consolidating its research training program into a two-phase Masters of Research (MRes)/PhD structure, Macquarie aims to provide a highly supported introduction to candidates' research careers. We are now seeing the flow-on of MRes graduates into the PhD, and they are reported to be better equipped for, and more confident about, undertaking a major research project than ever before. Macquarie continues to attract numbers into our Masters of Research program, and applications for HDR scholarships continue to increase. This year, for example, the number of applicants for international HDR scholarships more than doubled to nearly 500.

Macquarie has partnered with most of world's major research degree funding agencies (China Scholarship Council, European Commission Horizon 2020, DAAD, National Science Foundation USA, Vietnam International Education Development (VIED), Sciences Without Borders Brazil, Conacyt Mexico, PRONABEC Peru, ANII Uruguay, Boloshak Kazakstan, Higher Education Commission Pakistan, etc.) to fund HDR candidates. With the adoption of the MRes, HDR completion numbers are also increasing. In terms of the program structure, we continue to offer an expanded learning skills program, while in 2016 we will also be developing a professional skills program to broaden the employability options for HDR candidates beyond the academy. The supervision enhancement program will be re-designed in 2016 to create a more varied and flexible program of continuous professional development, and we are also well advanced in implementing a peer-to-peer mentoring program for MRes and PhD candidates. Macquarie continues to be Australia's biggest player in international joint and Cotutelle PhD programs, which are now also extending to the MRes. This is an important program to deliver the key strategic goal of being a "world-recognised research collaborator of choice".

Macquarie's HDR completions increased by 96 in 2014. This was the highest increase in the sector (Sydney University decreased by 54 HDR completions). Macquarie has maintained an annual increase in HDR completions above 10% since 2011. Macquarie is the only university to maintain such consistent and accelerated growth in HDR completions – see table 4 (below) for more details.

Table 4: Top 25 Universities by HDR Completions 2013-14

2013 Ranking		#	2014 Ranking		#
1	The University of Sydney	901	1	The University of Sydney	847
2	The University of Queensland	752	2	The University of Queensland	829
3	The University of Melbourne	744	3	Monash University	781
4	The University of New South Wales	741	4	The University of New South Wales	775
5	Monash University	714	5	The University of Melbourne	720
6	Queensland University of Technology	374	6	The Australian National University	399
7	The Australian National University	361	7	Macquarie University	393
8	The University of Western Australia	346	8	The University of Adelaide	386
9	The University of Adelaide	333	9	Queensland University of Technology	381
10	RMIT University	299	10	The University Of Western Australia	306
11	Macquarie University	297	11	Curtin University of Technology	297
12	Curtin University of Technology	281	12	University of Wollongong	289
13	University of Wollongong	273	13	Deakin University	280
14	La Trobe University	238	14	RMIT University	276
15	The University of Newcastle	225	15	La Trobe University	240
16	University of South Australia	212	16	Griffith	230
17	UTS	204	17	University of Newcastle	206

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18	Griffith University	198	18	UTS	206
19	Deakin University	188	19	University of South Australia	180
20	University of Tasmania	178	20	University of Tasmania	166
21	Western Sydney University	156	21	Flinders University	144
22	Swinburne University	141	22	Swinburne University	131
23	Edith Cowan University	111	23	Edith Cowan University	123
24	Flinders University	106	24	Western Sydney University	122
25	James Cook University	98	25	Victoria University	115

Table 5: HDR Completions by Faculty (2011-2015)

	2011	2012	2013	2014		2015	
	PhD/ MPhil	PhD/ MPhil	PhD/ MPhil	PhD/ MPhil	MRes	PhD/ MPhil	MRes
Faculty of Arts	62	70	67	71	43	68	101
Faculty of Business & Economics	20	20	23	30	9	34	28
Faculty of Human Sciences	47	75	90	90	14	94	41
Faculty of Medicine & Health Sciences	NA	NA	NA	NA	NA	15	2
Faculty of Science & Engineering	103	94	103	102	18	98	95
MGSM	12	11	14	15	1	16	2
Total	244	270	297	393		594	

RESEARCH PARTNERSHIPS

Macquarie University continued to demonstrate its credentials as a research collaborator of choice in 2015 through the establishment and development of new solution-focused partnerships. One example of Macquarie's significant research collaborations is a landmark research co-investment of \$20.5 million between Macquarie and Horticulture Innovation Australia focusing on the management of the Queensland fruit fly (Qfly) through the Sterile Insect Technique (SIT). A research team led by Associate Professor Phil Taylor will focus on developing an effective SIT program to curb the prevalence of fruit flies in Australia. The team will be working with members of the SITPlus research consortium, which includes South Australia's Primary Industries and Regions and the South Australian Research and Development Institute; the CSIRO Health and Biosecurity Flagship, Plant & Food Research Australia; and the NSW Department of Primary Industries. The SIT technique provides an environmentally acceptable alternative to banned synthetic insecticides, thus protecting Australian crops valued at \$9 billion. In addition, the ARC Industrial Transformation Training Centre for Fruitfly Biosecurity Innovation led by Associate Professor Phil Taylor, awarded a total of more than \$3.7M for the years 2015-2019, will ensure that Australia is well supplied with new researchers able to tackle this problem.

Another example of a solution-focused partnership is provided by Professor Johanna Westbrook of the Centre for Health Systems and Safety Research at the Australian Institute of Health Innovation. Professor Westbrook is the lead researcher on an NHMRC Partnership Project grant titled "Delivering safe and effective care for children in hospital with eHealth systems". The partners on the project include eHealth NSW, the Sydney Children's Hospital Network, and NSW Kids and Families. She is also involved in two other Partnership Project grants, one focusing on a "Patient-centred eHealth approach to improving outcomes for gout sufferers" and the other, led by Associate Professor Andrew Georgou has the aim of "Delivering safe and effective test result communication, management and follow-up". These projects involve a wide range of partnerships including AstraZeneca and Alzheimers NSW as well as the South Eastern Area Laboratory Services and the Australian Commission on Safety and Quality in Health Care.

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RESEARCH PUBLICATIONS AND QUALITY

Macquarie continues its research acceleration in its research publications. Based on internal data collection, the publications by Macquarie researchers published in 2014 (reported in 2015) increased by 7% over 2013. The Faculty of Science and Engineering generated 44% of research published in 2014 and generated the largest Faculty increase in research publications (19%). With increased emphasis placed on quality publications, Macquarie's research published in peer reviewed journals increased by 13% in 2014. Additionally, conference-based research publications decreased for the second year running making up only 12% or 1 in 8 research publications published in 2014.

By the last quarter of 2014 more than 135 Macquarie researchers from more than 15 Departments across all 5 Faculties were publishing highly cited research in the top 1% of the world for their research field (Source: Essential Science Indicators) – see Table 6 for rankings for proportion of publications in the top 10% in Life and Earth Sciences and Physical Sciences and Engineering.

Table 6: Proportion of Publications in the Top 10%

	Australian Ranking	World Ranking
Life and Earth Sciences	8 th	170 th
Physical Sciences and Engineering	5 th	168 th

The reputation of research excellence from Macquarie's researchers extends globally with Macquarie researchers co-authoring with researchers based in almost 80 countries, resulting in 48% of research articles involving international collaboration in 2014 (see Table 7 for national and world ranking for life and earth sciences; mathematics and computer sciences; and physical sciences and engineering). At the national level, 44% were co-authored with researchers from another Australian university or organisation. One in five research articles published in 2014 by Macquarie researchers involved collaboration with both Australian and overseas institutions (Source: Scopus). When compared with other Australian universities, Macquarie ranks 6th in Australia for the percentage of research co-authored with other countries (Source: InCites).

Table 7: Level of 2014 International Collaboration

	Australian Ranking	World Ranking
Life and Earth Sciences	5 th	148 th
Mathematics and Computer Sciences	5 th	33 rd
Physical Sciences and Engineering	6 th	107 th

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