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Discipline, department or individual?

Assessing research quality in Australia - the ERA approach

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Unit of Assessment around the world

Unit of assessment	Jurisdiction
Individual	New Zealand - PBRF
Research Fields	United Kingdom - RAE
Field of Research	Australia - ERA





New Zealand - PBRF

- The PBRF since 2003
- Individual researcher performance is assessed
- PBRF assesses research outputs across 12 assessment panels covering 42 subject areas



PBRF - Which panel??

- The employing institution is expected to nominate a primary panel that best corresponds to the individual's field of research
- Institutions identify staff by 'nominated academic unit' for the purpose of reporting aggregated results
- Staff may ask for their evidence portfolio to be cross-referred to multiple panels



The UK - RAE

- The RAE since 1986 (most recent 2001 and 2008)
- RAE 2008 assessed research outputs across 67 units of assessment, grouped under 15 main panels



The UK - RAE

- Each institution decides which individuals to select as ‘research active’ to put forward for assessment
- Institutions list up to four research outputs for each individual to be assessed
- Results are profiled by unit of assessment
- ‘Flagged’ research groups identified - assessed as equivalent to the highest possible level of quality.



The ERA approach

- The unit of evaluation is the 4-digit field of research code
- All research outputs must be submitted
- Journal articles are mapped by journal FoR assignment
- Non-journal outputs may be assigned to up to 3 FoRs
- Institutions may tag research outputs with two institutional codes and two research theme codes



ANZSRC

- 01 Mathematical Sciences
- 02 Physical Sciences
- 03 Chemical Sciences
- 04 Earth Sciences
- 05 Environmental Sciences
- 06 Biological Sciences
- 07 Agricultural and Veterinary Sciences
- 08 Information and Computing Sciences
- 09 Engineering
- 10 Technology
- 11 Medical and Health Sciences
- 12 Built Environment and Design
- 13 Education
- 14 Economics
- 15 Commerce, Management, Tourism and Services
- 16 Studies in Human Society
- 17 Psychology and Cognitive Sciences
- 18 Law and Legal Studies
- 19 Studies in Creative Arts and Writing
- 20 Language, Communication and Culture
- 21 History and Archaeology
- 22 Philosophy and Religious Studies





ANZSRC

DIVISION 01 MATHEMATICAL SCIENCES

This division covers mathematics, statistics, and mathematical aspects of the physical sciences.

This division contains six groups:

- 0101 Pure Mathematics
- 0102 Applied Mathematics
- 0103 Numerical and Computational Mathematics
- 0104 Statistics
- 0105 Mathematical Physics
- 0199 Other Mathematical Sciences





The ERA approach

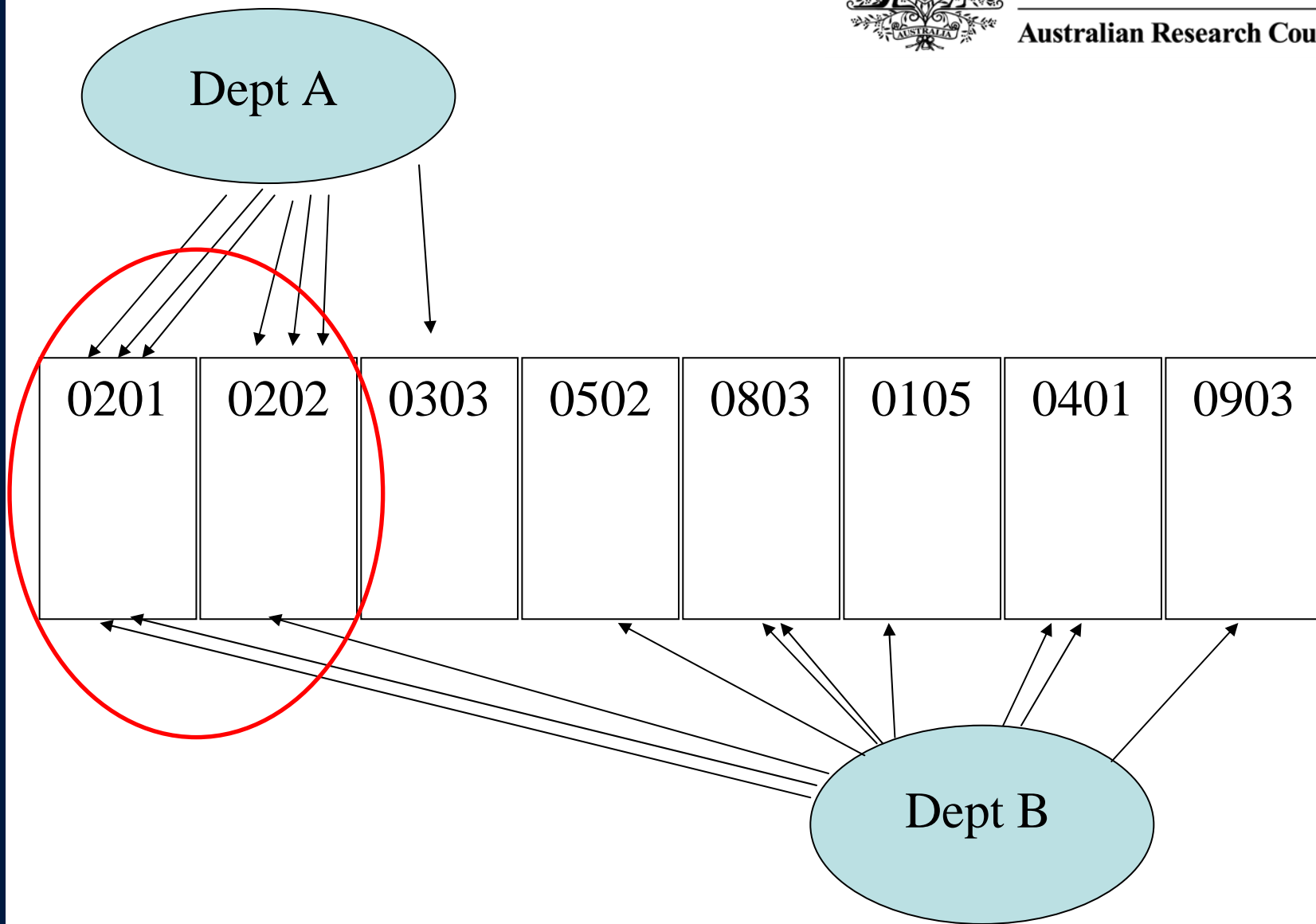
- Two pilot clusters in 2009 (PCE and HCA)
- All clusters are expected to be assessed in 2010





Low volume thresholds

- It is recognised that for some disciplines there may not be sufficient research volume to undertake a valid analysis at the four-digit level
- In these instances, the ARC will undertake quantitative analysis at the two-digit level only
- All outputs will contribute to the national analysis and benchmarks





The ERA methodology

- ERA is a disciplinary research assessment exercise
- By its very nature it will disaggregate research outputs from departments and centres and undertakes assessment by FoR
- Queries about how institutions can re-compile departments and centres following ERA



Today's example

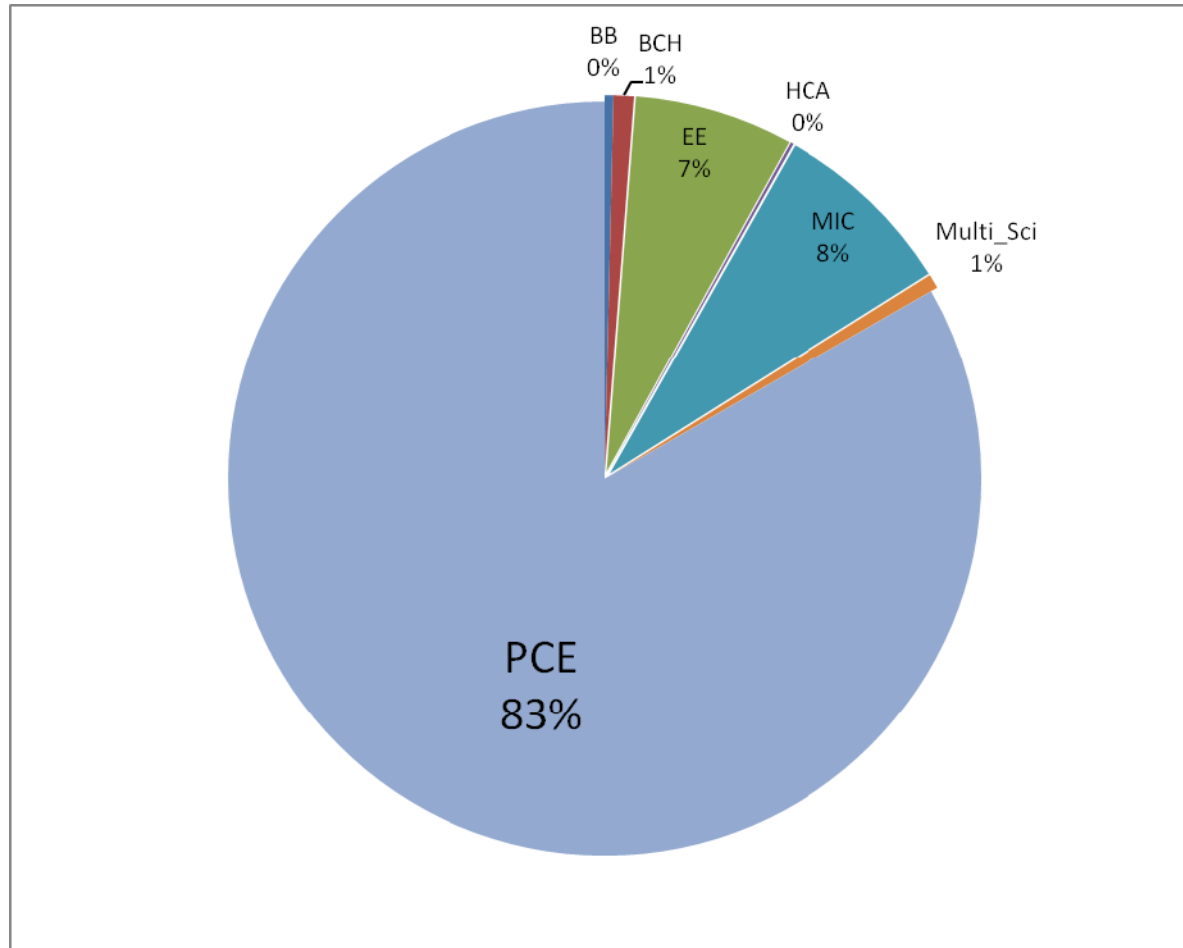
- A physics department's entire output will be mapped using the ERA journal FoR assignments
- How the low volume thresholds work
- How discipline citation performance is measured
- How data can be recompiled back into department



Cluster Mapping



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n = 809 from 533 journal articles

Field of Research Assignment



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Field of Research	Primary	Secondary	Tertiary	Total	%
02 - Physical Sciences	113	65		178	26.4%
0201 - Astronomical and Space Sciences	71	16		87	12.9%
0202 - Atomic, Molecular, Nuclear, Particle and Plasma Physics	67	29	5	101	15.0%
0203 - Classical Physics	28	28	1	57	8.5%
0204 - Condensed Matter Physics	25	4		29	4.3%
0205 - Optical Physics	13	1		14	2.1%
0206 - Quantum Physics	83	80	7	170	25.2%
0299 - Other Physical Sciences	14	11		25	3.7%
0302 - Inorganic Chemistry	1	1		2	0.3%
0303 - Macromolecular and Materials Chemistry	2	1		3	0.4%
0306 - Physical Chemistry (Incl. Structural)	4	2		6	0.9%
0307 - Theoretical and Computational Chemistry	1	1		2	0.3%
Grand Total	422	239	13	674	100.0%

n = 674 PCE only assigned articles



Field of Research Assignment



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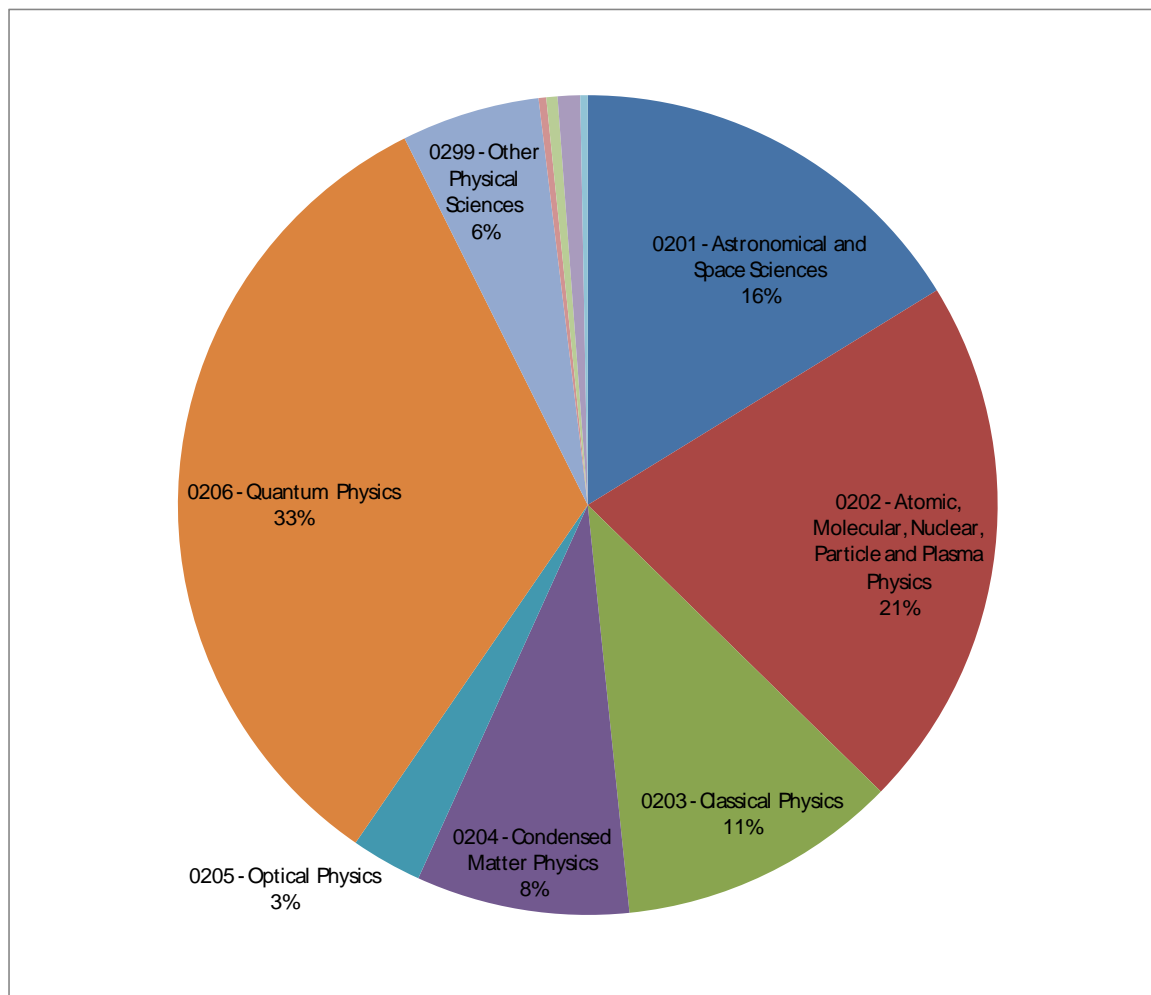
Field of Research	Total	%
0201 - Astronomical and Space Sciences	110	16.2%
0202 - Atomic, Molecular, Nuclear, Particle and Plasma Physics	143	21.1%
0203 - Classical Physics	75	11.1%
0204 - Condensed Matter Physics	57	8.4%
0205 - Optical Physics	19	2.8%
0206 - Quantum Physics	224	33.0%
0299 - Other Physical Sciences	37	5.5%
0302 - Inorganic Chemistry	2	0.3%
0303 - Macromolecular and Materials Chemistry	3	0.4%
0306 - Physical Chemistry (Incl. Structural)	6	0.9%
0307 - Theoretical and Computational Chemistry	2	0.3%
Grand Total	678	100.0%

n = 678 articles (incl 4 multidisc)

Field of Research Assignment



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n = 674



Calculating Benchmarks

Institution A
FoR code: 0301 Analytical Chemistry

	Yr of Pub	Cites	World cpp	Aust cpp	RCI (world)	RCI (Aust. Inst.)
Pub 1	2002	3	5.2	2.3	0.58	1.30
Pub 2	2002	2	5.2	2.3	0.38	0.87
Pub 3	2003	5	3.5	2.1	1.43	2.38
Pub 4	2006	2	2.5	0.9	0.80	2.22
Pub 5	2005	0	3.1	1.2	0.00	0.00
....Pub 6 – Pub 56....						
Pub 57	2007	3	2.1	0.3	1.43	10.00
Average RCI					1.83	3.59





What data will the ARC return to Universities?

- Static citation count for each indexed article
- Australian (HEP) benchmarks for each year of the reference period (by FoR)
- World benchmarks for each year of the reference period (by FoR)
- Centile citation thresholds for each year of the reference period (by FoR)



What if an institution wishes to recompile results by departments/centres?

- Summing the relative citation ratios for all articles published by a particular department, centre or group
- Re-mapping of centile bands (to derive highly cited papers)
- Identifying niche areas using other classifications

Recompiling our department



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FoR Code	FoR Name	Cluster	RCI_world	RCI_Aust	Centile	Class
0101	Pure Mathematics	MIC	1.69	1.91	25	Class III
0101	Pure Mathematics	MIC	0.89	1.01	50	Class II
0101	Pure Mathematics	MIC	0.76	0.86	50	Class I
0101	Pure Mathematics	MIC	1.14	1.29	50	Class II
0201	Astronomical and Space Sciences	PCE	0.00	0.00	50	Class 0
0202	Atomic, Molecular, Nuclear, Particle and Plasma Physics	PCE	1.97	2.23	25	Class III
0206	Quantum Physics	PCE	2.18	2.46	25	Class IV
0201	Astronomical and Space Sciences	PCE	0.00	0.00	50	Class 0
0502	Environmental Science and Management	EE	0.67	0.76	50	Class I
02	Physical Sciences	PCE	0.89	1.01	50	Class I
0201	Astronomical and Space Sciences	PCE	0.00	0.00	50	Class I
0503	Soil Sciences	EE	0.64	0.72	50	Class I
1113	Ophthalmology and Optometry	BCH	1.74	1.97	25	Class III
0206	Quantum Physics	PCE	1.14	1.29	50	Class II
0204	Condensed Matter Physics	PCE	0.85	0.96	50	Class II
0601	Biochemistry and Cell Biology	BB	1.20	1.36	50	Class III
0206	Quantum Physics	PCE	0.98	1.11	50	Class II
0201	Astronomical and Space Sciences	PCE	0.95	1.07	50	Class II
0201	Astronomical and Space Sciences	PCE	1.34	1.51	25	Class III
0206	Quantum Physics	PCE	0.21	0.24	50	Class I
0705	Forestry Sciences	EE	0.00	0.00	50	Class 0
02	Physical Sciences	PCE	0.21	0.24	50	Class I
0206	Quantum Physics	PCE	0.00	0.00	50	Class 0
02	Physical Sciences	PCE	1.30	1.47	25	Class III
0204	Condensed Matter Physics	PCE	4.86	5.49	1	Class V
0201	Astronomical and Space Sciences	PCE	3.12	3.53	5	Class IV
0105	Mathematical Physics	MIC	1.92	2.17	25	Class III
0403	Geology	MIC	2.74	3.10	10	Class IV
0203	Classical Physics	PCE	1.09	1.23	25	Class II
02	Physical Sciences	PCE	0.37	0.42	50	Class I
0203	Classical Physics	PCE	4.24	4.79	1	Class V
0206	Quantum Physics	PCE	1.58	1.79	25	Class III
0203	Classical Physics	PCE	0.64	0.72	50	Class I
0206	Quantum Physics	PCE	0.58	0.66	50	Class I





Recompiled relative citation impact profile

Citation Analysis: Relative citation impact (RCI) against world and Australian (HEP) average
 Institution: University X
 Institution code : Physics

Total Publications	Sum of Cites	Department RCI against:		% Papers Indexed
		World Benchmark	Aust. Inst. Benchmark	
533	6,396	1.23	1.39	96.3%





Recompiled centile profile

Citation Analysis : Distribution of papers based on world centile threshold and field average
Institution: University X
Institution code : Physics

World centile	Institution		Aust. Inst. Average % of papers (cumulative)	% Paper Indexed
	No. of papers (cumulative)	% of papers (cumulative)		
1	6	1.1%	n/a	
5	17	4.2%	n/a	
10	29	9.6%	n/a	
25	104	29.2%	n/a	
50	159	59.0%	n/a	
Total	533	100.0%	n/a	96%
Uncited	2			





Recompiled RCI class distribution

Citations Analysis: Citation Impact Distribution							
Institution: University X							
Institution code : Physics							
	RCI Classes						
	Class 0 (0.0)	Class I 0.01-0.79	Class II 0.80-1.19	Class III 1.20-1.99	Class IV 2.00 -3.99	Class V 4.0-7.99	Class VI ≥8.0
No. of papers	63	157	110	125	47	31	0
%	12%	29%	21%	23%	9%	6%	0%





Summary

- ERA will undertake analysis at both 2- and 4-digit FoR
- The data provided back to universities provides a large scope for internal analysis following ERA using institutional groupings