Higher Education Summit

Driving Excellence in Research: The Australian Research Landscape

Professor Margaret Sheil
CEO, Australian Research Council
Outline

• ERA overview
• Publishing behaviour
• University-wide data
• Discipline differences
• National innovation and research system
• Next steps
Objectives of ERA

- Establish an *evaluation framework*;
- Provide a *national stock take* of discipline-level research;
- Identify *excellence* across the full spectrum of research performance;
- Identify *emerging research areas* and *opportunities for further development*;
- Allow for *comparison* of Australia’s research *nationally* and *internationally* for all discipline areas.
Overseas Quality Assessment Exercises

1986—The United Kingdom
1993—Hong Kong
1997—Germany
1998—Ireland
2002—The Netherlands
2003—New Zealand
2005—France
# ERA Process Overview

<table>
<thead>
<tr>
<th>Volume &amp; Activity</th>
<th>Ranked Outlets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Citation Analysis</td>
<td>Esteem</td>
</tr>
<tr>
<td>Research Income</td>
<td>Applied Measures</td>
</tr>
</tbody>
</table>

**Peer Review**

**International Benchmarks**

**Research Evaluation Committees**

[Image of ERA 2010 National Report]
### ERA Unit of Evaluation – the FoRs

<table>
<thead>
<tr>
<th>2-digit</th>
<th>4-digit</th>
<th>6-digit</th>
</tr>
</thead>
<tbody>
<tr>
<td>19</td>
<td>Studies in Creative Arts and Writing</td>
<td>+ 1901</td>
</tr>
<tr>
<td></td>
<td></td>
<td>+ 1902</td>
</tr>
<tr>
<td></td>
<td></td>
<td>+ 1903</td>
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<td>- 1904</td>
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<td>&gt; 190401</td>
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<td>&gt; 190402</td>
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<td></td>
<td>&gt; 190403</td>
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<td>&gt; 190404</td>
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<td>&gt; 190405</td>
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<td>&gt; 190406</td>
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<td>&gt; 190410</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&gt; 190499</td>
</tr>
<tr>
<td>+ 1905</td>
<td>VISUAL ARTS AND CRAFTS</td>
<td></td>
</tr>
<tr>
<td>+ 1999</td>
<td>OTHER STUDIES IN CREATIVE ARTS AND WRITING</td>
<td></td>
</tr>
</tbody>
</table>

The ERA Unit is **not** the department nor the individual researcher.
ERA 2010 at a Glance

- All 41 eligible institutions submitted data
- Over 330,000 research outputs and 55,000 researchers represented
- 2,435 units of evaluation assessed at the two- and four-digit level
- 149 Research Evaluation Committee (REC) members and 500+ Peer Reviewers contributed evaluations
- All aggregated data presented in the *ERA 2010 National Report*. 
## The ERA 2010 Rating Scale

<table>
<thead>
<tr>
<th>Rating</th>
<th>Descriptor</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>The Unit of Evaluation profile is characterised by evidence of outstanding performance <strong>well above world standard</strong> presented by the suite of indicators used for evaluation.</td>
</tr>
<tr>
<td>4</td>
<td>The Unit of Evaluation profile is characterised by evidence of performance <strong>above world standard</strong> presented by the suite of indicators used for evaluation.</td>
</tr>
<tr>
<td>3</td>
<td>The Unit of Evaluation profile is characterised by evidence of average performance <strong>at world standard</strong> presented by the suite of indicators used for evaluation.</td>
</tr>
<tr>
<td>2</td>
<td>The Unit of Evaluation profile is characterised by evidence of performance <strong>below world standard</strong> presented by the suite of indicators used for evaluation.</td>
</tr>
<tr>
<td>1</td>
<td>The Unit of Evaluation profile is characterised by evidence of performance <strong>well below world standard</strong> presented by the suite of indicators used for evaluation.</td>
</tr>
</tbody>
</table>
ERA 2010 at a Glance

❌ Averages and Rankings
❌ Sciences v. Social Sciences & Humanities

✅ ERA does *not* evaluate individuals
✅ ERA does *not* evaluate individual outputs
✅ Ranked Journals did *not* drive ERA ratings
✅ ERA involved experts evaluating metrics and results of peer review (in 56/157)
✅ Each discipline had its own set of indicators
Research Outputs by two-digit Field of Research
Research Outputs by Discipline Cluster
# A/A* not the main driver

<table>
<thead>
<tr>
<th>Discipline</th>
<th>FoR</th>
<th>A*</th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Immunology</td>
<td>1107</td>
<td>7%</td>
<td>14%</td>
<td>24%</td>
<td>55%</td>
</tr>
<tr>
<td>Plant Biology</td>
<td>0607</td>
<td>3%</td>
<td>8%</td>
<td>14%</td>
<td>74%</td>
</tr>
<tr>
<td>Ecology</td>
<td>0602</td>
<td>9%</td>
<td>18%</td>
<td>36%</td>
<td>37%</td>
</tr>
<tr>
<td>Zoology</td>
<td>0608</td>
<td>1%</td>
<td>7%</td>
<td>18%</td>
<td>73%</td>
</tr>
<tr>
<td>Historical Studies</td>
<td>2103</td>
<td>6%</td>
<td>22%</td>
<td>32%</td>
<td>38%</td>
</tr>
<tr>
<td>Electrical and Electronic Engineering</td>
<td>0906</td>
<td>6%</td>
<td>16%</td>
<td>28%</td>
<td>49%</td>
</tr>
<tr>
<td>Macromolecular and Materials Chemistry</td>
<td>0303</td>
<td>14%</td>
<td>19%</td>
<td>31%</td>
<td>36%</td>
</tr>
</tbody>
</table>
Research Outputs by Institution
FTE by institution
(as at 31 March 2009)
Research income by institution
Units of Evaluation by institution
## The ERA Clusters

<table>
<thead>
<tr>
<th>Cluster</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cluster 1</td>
<td>Physical, Chemical &amp; Earth Sciences</td>
</tr>
<tr>
<td>Cluster 2</td>
<td>Humanities and Creative Arts</td>
</tr>
<tr>
<td>Cluster 3</td>
<td>Engineering and Environmental Sciences</td>
</tr>
<tr>
<td>Cluster 4</td>
<td>Social, Behavioural and Economic Sciences</td>
</tr>
<tr>
<td>Cluster 5</td>
<td>Mathematics, Information and Computing Sciences</td>
</tr>
<tr>
<td>Cluster 6</td>
<td>Biological and Biotechnological Sciences</td>
</tr>
<tr>
<td>Cluster 7</td>
<td>Biomedical and Clinical Health Sciences</td>
</tr>
<tr>
<td>Cluster 8</td>
<td>Public and Allied Health Sciences</td>
</tr>
</tbody>
</table>
ERA 2010 Rating by Cluster - at, above, or well above world standard (i.e. 3s, 4s, & 5s)

- Public and Allied Health Sciences
- Mathematical, Information and Computing Sciences
- Biomedical and Clinical Research
- Engineering and Environmental Sciences
- Biotechnology and Biological Sciences
- Physical Chemical and Earth Sciences
- Social, Behavioural and Economic Sciences
- Humanities and Creative Arts

### Ratings
- 3 & 4
- 5
Strengths in Australian Universities

- Astronomical and Space Sciences
- Optical Physics
- Quantum Physics
- Macromolecular & Materials Chemistry
- Physical & Structural Chemistry
- Geology
- Ecology
- Evolutionary Biology
- Plant Biology
- Zoology
- Clinical Sciences

- Electrical and Electronic Engineering
- Historical Studies
- Cardiovascular Medicine and Haematology
- Human Movement and Sports Science
- Immunology
- Oncology and Carcinogenesis
- Pharmacology and Pharmaceutical Sciences
- Medical Physiology
Gaps

• Agriculture, Land and Farm Management
• Automotive Engineering
• Maritime Engineering
• Engineering Design
• Complementary and Alternative Medicine

Pockets

• Classical Physics
• Aerospace Engineering
• Transportation and Freight

Strong Applied Research

• Electrical and Electronic Engineering
• Crop and Pasture Protection
• Resources Engineering
• Materials Engineering
• Extractive Metallurgy
• Nursing
Government Investment in Research
2010-11

- Universities: 21%
- Industry Tax Concession: 18%
- NHMRC et al: 12%
- CRCs & Other Science: 9%
- CSIRO: 9%
- Other R&D Agencies: 11%
- Other business: 6%
- ARC: 8%
For CSIRO’s “Top 10” Fields: Scientific Articles Output

CSIRO is in the Top 10 global institutions (by total citations), for 3 of its research fields

In each of these, CSIRO’s output of articles is 13 – 20% of total Australian articles

- **Plant and Animal Science**
  - CSIRO = 13.5% of AU articles
  - CSIRO = 0.66% of WO articles

- **Environment/Ecology**
  - CSIRO = 16.4% of AU articles
  - CSIRO = 0.83% of WO articles

- **Agricultural Sciences**
  - CSIRO = 20.5% of AU articles
  - CSIRO = 0.82% of WO articles

% Australian Article 20%
Comparison of CSIRO to Australia’s Leading Universities – Citations per Paper

For CSIRO’s main research fields, its citation rate runs (in most cases) at a similar rate to whichever is the leading Australian university for that field.
ERA 2010 Reviews for ERA 2012

**Targeted Reviews**
- Ranked Outlets
- Research Evaluation Committees (REC) process
- Applied Indicators
- ERA Submission Guidelines

**Broad Feedback**
- Low volume thresholds (plus outputs that contribute)
- FORs allocated to clusters
- Indicator matrix for each discipline
- Definitions/timeframes: reference periods and researcher eligibility
Summary

- ERA is *one* source of information at *one* point in time
- Important to maintain behaviours that are driven by international norms for your disciplines
- ERA can guide future policy at the national level
- We are reviewing all your feedback!!